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9286

AGENCY FOR INTERNATIONAL DEVELOPMENT  <b>PROJECT PAPER FACESHEET</b>		1. TRANSACTION CODE <input type="checkbox"/> A ADD <input type="checkbox"/> C CHANGE <input type="checkbox"/> D DELETE		PP  2. DOCUMENT CODE <b>3</b>
3. COUNTRY/ENTITY Worldwide		4. DOCUMENT REVISION NUMBER <input type="checkbox"/>		
5. PROJECT NUMBER (7 digits) <input type="checkbox"/> 936-5555 <input type="checkbox"/>	6. BUREAU/OFFICE A. SYMBOL S&T/FENR B. CODE <input type="checkbox"/> 032 <input type="checkbox"/>		7. PROJECT TITLE (Maximum 40 characters) <input type="checkbox"/> Environmental and Natural Resources Policy and Training <input type="checkbox"/>	
8. ESTIMATED FY OF PROJECT COMPLETION FY <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/>		9. ESTIMATED DATE OF OBLIGATION A. INITIAL FY <input type="checkbox"/> 9 <input type="checkbox"/> 1 B. QUARTER <input type="checkbox"/> 4 C. FINAL FY <input type="checkbox"/> 0 <input type="checkbox"/> 0 (Enter 1, 2, 3, or 4)		

10. ESTIMATED COSTS (\$000 OR EQUIVALENT \$) -						
A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FX	C. L/C	D. TOTAL	E. FX	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL	1,600		1,600	35,500		35,500
(GRANT)	( 1,600 )	( )	( 1,600 )	( 35,500 )	( )	( 35,500 )
(LOAN)	( )	( )	( )	( )	( )	( )
OTHER U.S.				40,000		40,000
1. Buy-Ins						
2.						
MOST COUNTRY						
OTHER COUNTRY						
TOTALS	1,600		1,600	75,500		75,500

11. PROPOSED BUDGET APPROPRIATED FUNDS (\$000)									
A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. TERM		F. 1st FY 91		G. 2nd FY 92	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	K. GRANT	L. LOAN
(1) ARDN	750	090				1,600		1,750	
(2) EHR	750	790						550	
(3) PSFE	750	850						1,300	
(4)									
TOTALS						1,600		3,600	

A. APPROPRIATION	B. 3rd FY 93		C. 4th FY 94		LIFE OF PROJECT		12. IN-DEPTH EVALUATION SCHEDULE  <input type="checkbox"/> MM <input type="checkbox"/> YY <input type="checkbox"/> 0 <input type="checkbox"/> 9 <input type="checkbox"/> 9 <input type="checkbox"/> 3
	D. GRANT	E. LOAN	F. GRANT	G. LOAN	H. GRANT	I. LOAN	
(1) ARDN	2,150		1,900		18,500		
(2) EHR	550		550		5,000		
(3) PSFE	1,300		1,300		12,000		
(4)							
TOTALS	4,000		3,750		35,500		

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1 = NO  
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14. ORIGINATING OFFICE CLEARANCE				15. DATE DOCUMENT RECEIVED IN AID/W. OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION			
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TITLE Twig Johnson, Acting Director S&T/FENR							
DATE SIGNED MM DD YY 01 31 91							

**ENVIRONMENTAL AND NATURAL RESOURCES  
POLICY AND TRAINING PROJECT  
(EPAT)**

**Project Number 936-5555**

**PROJECT PAPER**

**January 29, 1991**

## TABLE OF CONTENTS

	<b>Page</b>
Table of Contents	i
List of Acronyms	v
I. Summary	1
II. Project Rationale and Description	3
A. Project Rationale	3
B. Project Goal and Purposes	9
C. Description of Project Elements	10
1. Core State-of-the-Art Research	10
2. Applied Country- and Region-Specific Research	19
3. Information and Dissemination	21
4. Support for Policy Dialogue	22
5. Institutional Strengthening	23
6. Human Resources Development	24
D. Integration and Focus of Project Elements	29
E. Relationship to Other Projects	30
III. Cost Estimates and Financial Plan	33
A. Total Project Budget, FY 1991 - FY 2000	33
B. Project Personnel Requirements	33
C. Cost Estimates	42
D. Projected Financial Requirements and Phasing	42
E. Mission and Regional Buy-Ins	42

## **TABLE OF CONTENTS (continued)**

<b>IV.</b>	<b>Implementation and Management</b>	<b>55</b>
<b>A.</b>	<b>Implementation Options and Recommendations</b>	<b>55</b>
1.	Core State-of-the-Art Research	60
2.	Applied In-Country Research	63
3.	Information and Dissemination	64
4.	Mission Policy Dialogue Support, Institutional Strengthening and Related Activities	65
5.	Training	65
<b>B.</b>	<b>A.I.D. Project Management</b>	<b>69</b>
<b>C.</b>	<b>Technical Advisory Group</b>	<b>71</b>
<b>D.</b>	<b>Implementation Plan</b>	<b>72</b>
<b>V.</b>	<b>Project Monitoring Plan</b>	<b>78</b>
<b>VI.</b>	<b>Summary of Project Analyses</b>	<b>81</b>
<b>A.</b>	<b>Technical Analysis</b>	<b>81</b>
<b>B.</b>	<b>Financial Analysis</b>	<b>82</b>
<b>C.</b>	<b>Economic Analysis</b>	<b>83</b>
<b>D.</b>	<b>Social Soundness Analysis</b>	<b>84</b>
<b>E.</b>	<b>Administrative Analysis</b>	<b>85</b>
<b>VII.</b>	<b>Evaluation Arrangements</b>	<b>86</b>

## **TABLE OF CONTENTS (continued)**

### **Text Exhibits, Graphs and Tables:**

<b>Exhibit II-1: A.I.D Initiative on the Environment: Priority Problem Areas</b>	<b>7</b>
<b>Exhibit II-2: Linkages Between A.I.D. ENR Priority Areas and Potential EPAT Research Modules</b>	<b>8</b>
<b>Exhibit II-3: Some Related Projects</b>	<b>32</b>
<b>Table III-1: 10-Year Budget by Element/Activity</b>	<b>34</b>
<b>Graph III-1: Core and Buy-In Funding</b>	<b>35</b>
<b>Graph III-2: Core Funding</b>	<b>36</b>
<b>Graph III-3: Buy-In Funding</b>	<b>37</b>
<b>Table III-2: 10-Year Level of Effort by Element/Activity</b>	<b>39</b>
<b>Table III-3: Averaged 10-Year Person Month Cost by Element</b>	<b>41</b>
<b>Graph III-4: Professional Costs by Activity</b>	<b>43</b>
<b>Table III-4: Summary Funding Estimates</b>	<b>44</b>
<b>Table III-5.1 Phase I &amp; II Funding Estimates</b>	<b>45</b>
<b>Table III-5.2 Phase I &amp; II Funding Estimates: Core</b>	<b>46</b>
<b>Table III-5.3 Phase I &amp; II Funding Estimates: Buy-Ins</b>	<b>47</b>
<b>Table III-6: Buy-In Interest</b>	<b>50</b>
<b>Exhibit IV-1: Implementation Options: Option I</b>	<b>58</b>
<b>Exhibit IV-2: Implementation Options: Option II</b>	<b>59</b>
<b>Table IV-1: Illustrative Institutions</b>	<b>61</b>
<b>Exhibit IV-3: Project Component Outputs and Schedule</b>	<b>68</b>

## **TABLE OF CONTENTS (continued)**

### **Annexes:**

- A. Log Frame Matrix**
- B. Project Analyses**
  - 1. Technical Analysis**
  - 2. Financial Analysis**
  - 3. Economic Analysis**
  - 4. Social Soundness Analysis**
  - 5. Administrative Analysis**
- C. Peer Review Plan**

## LIST OF ACRONYMS

AFR	Bureau for Africa
AID	Agency for International Development
ANE	Bureau for Asia and Near East*
APAP	Agricultural Policy Analysis Project
CBD	Conservation of Biological Diversity Project
CRSP	Collaborative Research Support Program
DEFIL	Development Strategies for Fragile Lands Project
EPA	U.S. Environmental Protection Agency
EPAT	Environmental and Natural Resources Policy and Training Project
ENR	Environment and Natural Resources
EPM	Environmental Planning and Management Project
FAA	Foreign Assistance Act
FENR (or S&T/FENR)	S&T Office of Forestry, Environment and Natural Resources
F/FRED	Forestry/Fuelwood Research and Development Project
FRM	Forestry Resources Management Project
FY	Fiscal Year
ICRAF	International Centre for Research in Agroforestry
IPA	Intergovernmental Personnel Act
IPC	Implementing Policy Change
LAC	Bureau for Latin America and the Caribbean
LTC	Land Tenure Center (University of Wisconsin)
NGO	Non-governmental Organization
NIC	Newly Industrialized Country
NFA	Non-project Assistance
NPV	Net Present Value
NRMS	Natural Resources Management Support Project
OIT	Office of International Training
PID	Project Identification Document
PAAD	Program Assistance Approval Document
PPC	Bureau for Program and Policy Coordination
PRE	Bureau for Private Enterprise*
PVO	Private Voluntary Organization
RAPID III	Resources for the Awareness of Population Impacts on Development
REDSO	Regional Economic Development and Support Office

\* References to ANE in the text refer to the countries/Missions in the former ANE and/or to the staff of the former ANE. References to PRE refer to the staff of PRE before incorporation of countries/Missions or staff from the former ANE.

## **LIST OF ACRONYMS (Continued)**

<b>RENARM</b>	<b>Regional Environmental and Natural Resources Management Project</b>
<b>RFP</b>	<b>Request for Proposals</b>
<b>RIA</b>	<b>Regulatory Impact Analysis</b>
<b>ROCAP</b>	<b>Regional Office of Central America Programs</b>
<b>RRIG</b>	<b>Rural and Regional Income Generation</b>
<b>S&amp;T</b>	<b>Bureau for Science and Technology</b>
<b>S&amp;T/AG</b>	<b>S&amp;T Office of Agriculture</b>
<b>S&amp;T/EN</b>	<b>S&amp;T Directorate for Energy and Natural Resources</b>
<b>S&amp;T/RD</b>	<b>S&amp;T Office of Rural Development</b>
<b>SARSA</b>	<b>Human Settlement and Natural Resource Systems Analysis Project</b>
<b>TAG</b>	<b>Technical Advisory Group</b>
<b>TFAP</b>	<b>Tropical Forestry Action Plan</b>
<b>UNEP</b>	<b>United Nations Environmental Program</b>
<b>USDA</b>	<b>U.S. Department of Agriculture</b>
<b>USFS</b>	<b>U.S. Forest Service</b>

## I. SUMMARY

The goal of the Environmental and Natural Resources Policy and Training Project (EPAT) is cooperating country adoption of economic policies which promote sustainable use of natural resources and preservation and enhancement of environmental quality. The purpose is to advance recognition by LDC policy makers of the linkages between economic policy, sustainable ENR use and development, and to assure that they have available to them the requisite analyses to develop appropriate policy options and the technical resources to perform such analyses.

The project has six components:

**1. State-of-the-Art Research.** Under one or more cooperative agreements, groups of universities and other institutions with a strong lead manager will undertake multidisciplinary substantive and methodological research in selected priority areas where economic policy impinges on environmental quality. In the first 18-24 months of the project, the U.S. research institutions will devote considerable attention to synthesizing worldwide research and field experience, production of guidelines and other materials from the syntheses, and development and dissemination of improved analysis methods to assist AID and host country decision-makers. After that, most core research will focus on a limited number of research modules to be selected based in part on a draft research agenda included in this Project Paper, recommendations of an outside Technical Advisory Group, and collaborative work planning involving AID and the U.S. cooperating institutions. Priority research will be conducted primarily in cooperating countries with serious ENR problems identified as regional or global priorities in the AID Initiative on the Environment.

**2. Applied In-Country Research.** At the request of Missions or regional bureaus, core research institutions or a separate requirements (Q) contractor may undertake applied in-country research on areas of economic policy/ENR interaction of major concern to host countries. Applied research will be undertaken in collaboration with host country government or non-government institutions.

**3. Information and Dissemination.** To build awareness of economic/ENR interactions, EPAT will place major emphasis on dissemination of research findings and improved analytical methods through publications, workshops, networking and other means. All research projects will include an explicit budget and plan for dissemination. Dissemination media and materials will be tailored to target audiences including host government decision makers, analysts, NGOs, academic and other research institutions, and AID itself. In some cases the project will carry out these activities directly. In other instances, it will draw on a proposed new AID-wide ENR information and dissemination center.

**4. Support for Policy Dialogue.** At the request of Missions or regional bureaus, the project will provide support for Mission policy dialogue efforts. Such support may include assistance in identifying and analyzing key economic/ENR issues, transfer of analytical methods to host governments and others, provision of in-country training, and short- or long-term technical assistance. Mission needs will be arrayed against capabilities of the entire range of Agency ENR projects, and where appropriate a Mission will be referred to other projects for assistance. The project also will provide access to EPA and other government agencies via RSSAs or other means and to the core research institutions through the cooperative agreement(s). Most technical services, however, will be provided through a competitively awarded requirements (Q) contract.

**5. Institutional Strengthening.** At the request of Missions, the project will provide support in strengthening institutions which play a major policy role in influencing, analyzing, formulating or implementing economic policies which have important ENR impacts. Such institutions may be governmental or nongovernmental. Support may include management and organization studies, strategic planning assistance, cooperative research, training needs assessments, training and provision of short- or long-term technical assistance. In most cases institutional strengthening support will be provided by the Q contractor; but Missions also can access cooperating research institutions or others such as EPA.

**6. Human Resources Development.** The project will develop and sponsor short core courses (of 3-6 week duration) dealing with Economic Policy and the Environment and with Environmental Policy and Regulation. The first will be developed by the cooperating U.S. research institutions and will draw heavily on methods development and research by the core researchers. The second may be developed by EPA. The project also will support development of shorter environmental education workshops for host country policy makers and NGOs which include subject matter of both the two above courses. Other training courses will be developed as needs are identified.

Based on Mission comments on the project and on experience with ENR buy-ins to other projects, the design team foresees a very high level of buy-in demand for services under this project.

## II. PROJECT RATIONALE AND DESCRIPTION

### A. Project Rationale

#### ENR Impacts of Market and Policy Failures

Environmental and natural resource (ENR) degradation -- deforestation, soil erosion, deterioration in water quality, coastal pollution, and so forth -- impose severe constraints on the economic prospects of developing countries as well as on the health and well-being of their citizens. Historically ENR degradation has been considered a necessary if undesirable side effect of economic development. However, more recently donors, non-governmental organizations (NGOs), and host country governments have been looking more closely at the complex web of interactions which lead to environmental degradation or, conversely, to preservation or even enhancement of ENR quality. Such investigations show that two important causal forces of degradation or inability to enhance environmental quality are (1) inappropriate government policies and (2) markets in which prices and costs do not reflect the true environmental cost of providing or using particular goods or services. These cases generally are referred to respectively as "policy failures" and "market failures".

In some cases, the "policy failure" or "market failure" relates directly to natural resource extraction, processing, use, or to "free" use of the environment as a waste sink. Examples include:

- o Government stumpage fees which do not reflect the true costs of tropical forest depletion;
- o Lack of regulatory, fee, or other mechanisms to limit commercial fishing catches to a fishery's sustainable yield;
- o Free or heavily subsidized irrigation water which results in overuse, inadequate maintenance of irrigation systems, and premature siltation and salinization;
- o Subsidized energy prices which lead to overuse of energy (and consequent higher levels of environmental degradation) and lessen incentives to invest in energy efficiency improvement or renewable energy; and
- o Lack of effective regulatory regimes to force industrial plants and other point sources to reduce air emissions and wastewater discharges to economically efficient levels (i.e., those levels where the costs of

further reduction would exceed the benefits to society -- from improved health, lower drinking water treatment costs, etc. -- of such reduction).

In other cases, policies or market characteristics which were not recognized as relating to natural resource management may be important causes of ENR degradation. For example, land tenure systems, tax incentives, and other government policies may subsidize extensive cattle ranching by wealthy landowners, leading to forest clearing to expand acreage under pasture. By encouraging such extensive land use, the same policies also may push subsistence farmers onto marginal lands -- steep hillsides, forest lands with fragile soil cover, semiarid rangelands, or waterlogged coastal lands, for example -- where in the very act of survival they will cause rapid and in many cases irreversible environmental degradation. Other examples include policies to:

- o Subsidize use of fertilizer or pesticides (which leads to overuse and consequently increased environmental impacts);
- o Keep domestic agricultural prices low (which decreases financial returns from farming and forces marginal farmers either to expand the area under cultivation to maintain their total returns or to migrate to cities or frontier areas); and
- o Tax holidays, import restrictions, lax environmental controls, and other subsidies, which increase the industrial sector's output (and adverse environmental impacts, beyond economically efficient levels).

ENR quality also can be influenced by absence of government policy. Lack of (or poor implementation of) government policies and programs to reduce rates of population growth contributes to increased pressure on natural resources and the environment. Unchecked budget deficits may force governments to cut funding for forest and park/reserve management or for maintenance of irrigation or water treatment systems. Large external debts and payments imbalances may create pressures to overlog or overfish in order to increase near-term export revenues.

### **AID Mandate**

AID has an explicit mandate, that Congress has strengthened over time, to promote ecologically sustainable development in the countries in which it is working. In 1977, the Foreign Assistance Act (FAA) was amended, authorizing the President to strengthen developing countries' capacity to manage their natural resource base on a sustainable basis and to consider the environmental consequences of their actions. Successive FAA amendments have reinforced and expanded this authorization. For example, AID has been directed to place a high priority on conserving tropical forests and preserving biological diversity. Most recently, the FY1990 Foreign Assistance Appropriations Act directed AID to address the problems of global climate change through strengthened environmental

assessment, promotion of energy end-use efficiency improvement and renewable energy, tropical forestry assistance, and other means.

Concurrently, AID gradually has reduced its emphasis on field projects in favor of a greater focus on economic policy reform, market liberalization, and most recently, promotion of democratization.

The recognition of market and policy failures' role in contributing to ENR degradation reflects a fusing of twin AID priorities: enhancement of ENR management and promotion of economic policy reform and democratization.

The importance of addressing market and policy failures is reflected in two of the priority areas identified in AID's Initiative on the Environment (July 1990). One is environmental policy and economics. The other, "strengthening environmental institutions", includes strengthening government policy-making institutions and supporting public education and NGOs in order to strengthen decision-making processes. (Exhibit II-1 enumerates the global and regional priorities set forth in the Initiative.)

Market and policy failures affect all the regional as well as global priorities identified in the Initiative. Exhibit II-2 arrays principal types of market and policy failures, extracted from the Technical Annex, and priority areas in the Initiative. As can be seen, all priority areas are influenced by more than one type of market and policy failure.

Three problems associated with market and policy failures are not being adequately addressed by AID programs or projects:

1. Most government policymakers have limited appreciation or understanding of the ENR impacts of economic policy and program options. In analyzing options in light of multiple objectives such as income generation, they are likely to ignore or underestimate the costs of ENR degradation. They often lack the awareness, analytical tools, and information to fully incorporate ENR perspectives into their decisionmaking, identify and reverse current policies which contribute to ENR degradation, or design policies which have both economic and ENR benefits.
2. Environmentally damaging policies or failure to incorporate environmental costs in market prices often disproportionately benefit small but influential segments of the population. AID may lack sufficient insight into local political processes to be able to influence policy decisions or to promote an opening up of decision processes by, for example, supporting local awareness-building and NGO educational activities.
3. Governments often are quick to enunciate policy, but then are incapable of implementation. Examples include parks and forest reserves with no conservators, environmental standards with no enforcement staff, taxes and fees that are on the

books but not collected, land tenure legislation but no cadastral survey, and land titling activities which are years behind. Some policy changes, such as eliminating

## EXHIBIT II-1

**AID INITIATIVE ON THE ENVIRONMENT:  
PRIORITY PROBLEM AREAS**

	Africa	ANE <sup>1</sup>	LAC <sup>2</sup>	S&T <sup>3</sup>
Environmental Policy and Economics	x	x	x	x
Strengthening Envir. Institutions	x	x	x	x
Sustainable Agric.	x		x	x
Tropical Forests	x	x	x	x
Biodiversity	x	x	x	x
Rangelands	x			
Water Resources and Watershed Management	x	x		x
Soil Resources	x	x		x
Energy Efficiency and Use	x	x		x
Urban and Industrial Pollution		x		
Coastal Zone Management			x	x

1 Asia Near East

2 Latin American Caribbean

3 This column indicates substantive areas of S&T involvement. The Initiative on the Environment did not specifically identify S&T priorities.

EXHIBIT II-2

Linkages Between A.L.D. ENR Priority Areas and Potential EPAT Research Modules

EPAT PRIORITY AREAS	POTENTIAL EPAT RESEARCH MODULES								
	1	2	3	4	5	6	7	8	9
Tropical Deforestation		■	■	■	■	■	■	■	■
Coastal Degradation	■	■	■	■	■	■	■	■	■
Urban & Industrial Envir.	■		■	■	■	■		■	■
Sustainable Agriculture		■	■	■	■	■	■	■	■
Biodiversity		■	■	■	■		■	■	■
Energy Efficiency and Use	■		■	■	■	■		■	■
Watershed & Water Mgmt.		■	■	■	■		■	■	■
Global Warming	■	■	■	■	■	■	■	■	■

- LEGEND:**
- 1 = Environment as a Waste Sink
  - 2 = Open Access Natural Resources
  - 3 = Natural Resources Pricing
  - 4 = Population and ENR
  - 5 = Macroeconomic Policy
  - 6 = Product/Factor Prices
  - 7 = Resource Access and Tenure
  - 8 = Uncertainty and Risk
  - 9 = Externalities

price controls, may be self-implementing. In most cases, however, policies cannot be considered apart from implementation options which are feasible given budgetary, staff quality, corruption, and other constraints.

Some AID projects are addressing aspects of these problems from a particular perspective such as agricultural development or land tenure. While using the expertise resident in these projects wherever possible, AID needs to help strengthen overall policy decision-making in host countries by encouraging processes to:

- o assure awareness and competent analysis of the ENR implications of policy options;
- o identify and ultimately reverse current policies which contribute to ENR degradation; and
- o incorporate into the decision process itself voices promoting development options which both enhance economic and social welfare and lead to sustainable use of the country's natural resources and the environment.

Meeting these needs in a specific country is a responsibility of the Mission. However, the state of awareness and knowledge -- including within AID itself -- still is in an early stage of evolution. Furthering awareness and knowledge can potentially benefit many Missions concurrently. S&T/FENR is in a unique position to support the research, analysis, and institution-building required to underpin the Missions' growing programs in this field. FENR also can provide valuable direct technical support to those Missions that desire it.

To realize this potential, FENR proposes a 10 year project. Ten years appears to be the appropriate time frame given the fact that the relationship between economic policy and environmental and natural resource degradation in developing countries has not been well-studied, the complexity (and multidisciplinary nature) of the subject matter and the consequent need for continuity.

## **B. Project Goals and Purposes**

The goal of the project is cooperating country adoption of economic policies which promote sustainable use of natural resources and preservation and enhancement of environmental quality. The purpose is to advance recognition by LDC policy makers of the linkages between economic policy, sustainable ENR use and development, and to assure that they have available to them the requisite analyses to develop appropriate policy options and the technical resources to perform such analyses.

The assumptions which link the purposes to the goal, which are supported by analyses included herein, are that:

- o Widespread "market failures " (failure of markets to account for costs or benefits of changes in ENR quality) and "policy failures " (including misguided policy actions and failure to act when remedial actions are called for) lead to significant ENR degradation, or to failure to enhance ENR quality, that limits prospects for long-term economic development;
- o Remedial policy actions, starting with changing current policies which have substantial adverse impacts, can help reverse or mitigate ENR degradation, thereby providing an ecologically sustainable basis for development; and
- o Most countries do not formulate and execute effective policies due to lack of awareness and inadequate information about the contribution of particular policies to changes in ENR quality, or the economic and social impacts of such changes; lack of analytical methods and staff capacity to formulate appropriate policy responses; political processes which do not incorporate ecological concerns; and/or legal, political, human or other deficiencies in implementation.

### **C. Description of Project Elements**

The project will be composed of six elements, all focused on building environmental awareness of, assisting, and ultimately influencing developing country policy analysts and decision-makers. It will provide broadly useful products -- including improved analytical tools, analyses of selected economic-environmental issues, and training -- to a wide audience. In close collaboration with regional bureaus and Missions, the project will target much of its multidisciplinary in-country research, technical assistance, training and institutional strengthening in countries which AID considers high-priority with regard to global climate change, tropical forest conservation, and other concerns included in the AID Initiative on the Environment. It also will have some capacity to respond, at the request of individual Missions or regional bureaus, to important needs outside these priority areas.

The individual project elements are described below.

#### **1. Core State-of-the-Art Research**

During the past 30 years, there has been extensive analysis of the ENR impacts of economic policy options in the U.S. and other developed countries. Within the past decade, universities and other institutions worldwide have initiated research into such relationships in developing countries. Nevertheless, the general field of analysis of the ENR implications

of markets and policies in developing countries remains in its infancy. EPAT **multidisciplinary, state-of-the-art, substantive and methodological research**, to be supported largely with core funds, will improve the base of knowledge which developing country decision-makers can use to assess the effects of present government policies and to devise policy initiatives which move their countries toward ecologically sustainable development paths.

This project component will support:

- o Synthesis of research and field experience worldwide and extraction of useful analytical methods and research lessons learned. Such synthesis will include broad peer review and discussion of draft synthesis findings. Synthesis results will be packaged into guideline documents, workshop curricula and other useful products and widely disseminated to host country policy-makers, researchers, NGOs, and others.
- o Development and field testing of new analytical methods to improve host country policy makers' ability to identify and analyze ENR impacts of policy options. Once proven in field tests, such methods will feed into the training and policy dialogue components of the project. They also will be disseminated widely through publications, workshops, and other means.
- o Case studies and other empirical field research to address, on a multidisciplinary basis, a few priority issues regarding ENR impacts of particular types of government policies.

**Research Synthesis and Guidelines.** During the first 18 to 24 months of the project, major emphasis will be placed on synthesis of worldwide experience to date and on use of such synthesis to document decision tools, analytical methods, inter-country research results, and other information that can be used by host country policy analysts and decisionmakers. This synthesis will result in publication of a series of analytical/decision tools and policy synthesis and guideline documents which will feed into the training, policy dialogue and institutional strengthening components of the project.

A major perceived need of both host country and AID field personnel is information drawn from currently available research and evaluations and packaged in forms which can be readily used by those involved in policy analysis and dialogue. An important first step will be to identify and draw lessons from AID projects, governments that have analyzed or implemented various policy options, and researchers worldwide.

Project researchers will identify and assess field research and analyses, whether funded by AID or others, in which insights have been gained into the behavioral responses to and ENR effects of changes in particular government policies. Examples of AID projects which have generated relevant insights in ENR impacts of markets or of government policies

include APAP, NRMS, RENARM, EPM, and the MANRES project in Thailand. Synthesis activities also will draw on relevant experience in the U.S. and other developed countries in analyzing particular types of policy options relating to, for example, user fees and government capture of economic rent or options to use economic incentives to limit air or water pollution.

Early outputs of the synthesis phase will be:

- o A manual to assist AID field staff to integrate sustainable development concerns into their strategy development, programming, and policy analysis. The manual will discuss the roles of policy in USAID programming, primary areas of economic-ENR interaction, project and program options by which USAIDs can influence economic and ENR policies, and important considerations in USAID strategy development and program or project design.
- o A closely related handbook which describes each step in the process of identifying major ENR impacts, the policy or market failures which influence such impacts, and policy options to address market or policy failures. The manual also will describe information sources, data collection and analysis methods for each step including biophysical characterization, identification of economic-ENR linkages, diagnosis of such linkages, valuation of quantitative measures of impact, and identification and analysis of policy options to address market or policy failures. The handbook will also discuss the policy proposal/adoption process as well as policy implementation including sociocultural, political, institutional and other factors which may reduce implementation effectiveness. This handbook is expected to be of practical use to both USAID and host country personnel.
- o A series of succinct papers synthesizing and drawing lessons from EPAT 's assessment of worldwide research and field policy analysis and implementation experience in specific areas of interaction of economic policy and ENR management. Examples of subjects on which synthesis papers may be produced include:
  - Government pricing of and capture of economic rent in natural resources (energy, minerals, forests, water, etc.);
  - Optimization of benefits from multi-purpose natural resources such as upland forests or mangrove swamps;
  - Experience with alternative models to modify land and resource access tenure;

**Experience with regulatory, market-based, and other approaches to controlling urban and industrial wastes.**

Of the opportunities to synthesize existing experience to produce useful near-term products, perhaps the highest priority is to assemble, assess, and, where possible, make near-term improvements in analytical tools to help host country policymakers **identify priorities for policy change**. AID projects such as EPM have prepared environmental profiles and other primarily descriptive biophysical inventories of many countries. In a few cases, projects have prepared inventories of policies which may contribute to ENR degradation; the APAP/RENARM Natural Resource Inventory series in Central America is an example. There are some tools, such as the Policy Analysis Matrix (PAM) used by APAP and the recently adapted RAPID set of models addressing natural resource issues in Madagascar, for arraying the implications of various policies. There are also tools, such as those developed under NRMS, for micro-level economic analysis of ENR policy options. Finally, there are a host of alternative computer modeling approaches to aid policy analysis, ranging from the relatively simple RAPID demography-based models to sophisticated linear programming or combination GIS/simulation models.

There is both a need and an opportunity to use existing tools as a basis for developing a process and analytical methods to enable a host country policymaker to (a) use existing inventories and other physical and economic information to identify priority ENR quality problems, (b) identify market or policy failures which contribute significantly to ENR degradation, and (c) analyze not only ENR but fiscal, social and other impacts of existing policies or market characteristics and of options for intervention to slow or reverse ENR degradation or to enhance ENR quality.

In a very real sense, this is the core of EPAT, since it will provide an analytical process and supporting analytical methods which will enable analysts and decision-makers to identify and analyze impacts of market and policy failures. To do this, project researchers will have to first understand the priority analysis and information needs of policymakers and then to identify and evaluate existing data bases and decision tools in light of these needs. They then will incorporate and widely disseminate those analytical methods and data bases which could be more broadly applied and undertake near-term improvements of existing methods where feasible and desirable. In the first instance, major analytical improvements could be achieved simply by developing and widely disseminating effective ENR modules to existing models such as PAM and RAPID.

Initially, the analytical methods will be less than perfect, and there will be substantial gaps in what is known (for example, the extent to which upper-watershed deforestation leads to downstream loss of agricultural productivity or how downstream farmers will respond). Nonetheless, not only individual analytical methods but the framework itself will be useful both for analysts and for definition of research needs.

Synthesis of lessons learned from research and the project's other components will continue throughout the life of the project. However, after the initial intensive phase is completed, synthesis activities will be incorporated into the project's ongoing research and dissemination activities.

**Long-Term Core State-of-the-Art Research.** In addition to the initial synthesis, core state-of-the-art research will include two components. The first, alluded to above, is development of improved methods and tools to identify and analyze economic/ENR linkages and policies which contribute to changes in ENR quality, to analyze the ENR impacts of particular types of policy options, and to address pricing/user charges or other economic issues relating to natural resources themselves. A subset of such methodological research will be development or enhancement of computer models suitable for use by host country policy analysts. The second component will consist primarily of multidisciplinary field research into a few priority areas of economic/environmental interaction.

All core research should contribute to the development of analytical methods or insights which can be transferred to and used by host country analysts, decision-makers, or interested NGOs. Synthesis activities will lead rapidly to development of useful products, while new methods development and field research will take longer. In all cases, initial planning and priority-setting will address how the research results could contribute to improved host country decision-making, how the research has to influence to lead to such improvement, and how the research could be packaged and disseminated to achieve such influence. Such planning will form the basis for a later dissemination strategy which will potentially include guideline documents, journal articles, networking through international professional associations, workshops or other training, and direct transfer of computer models and other tools.

**Research Planning and Management Process.** The project will incorporate a process to assure that state-of-the-art research (a) is limited to a few priorities which reflect the project purposes of influencing and assisting host country policymakers, (b) takes into account differing viewpoints and analytical approaches to a particular priority area, (c) is carefully planned and managed, and (d) shields long-term research from the demands of short-term technical assistance, but also identifies and makes available interim research products where they can support field training and technical services.

As a first step in the planning process, the Project Paper includes a draft research agenda. This draft will be revised based on further comments received from AID staff and selected outside experts. Comments also will be solicited from all institutions submitting Expressions of Interest to participate in EPAT. The agenda then will be modified based on these comments.

The institution -- or, more likely, a team of institutions including universities, other research institutions, and possibly private for-profit firms -- selected to implement the state-of-the-art research will collaborate with AID in drafting a research work plan which will

take the draft research agenda as its starting point. Once approved by AID, this plan will form the basis for the state-of-the-art research program. AID and the implementing institutions will then review research progress and AID/W and field priorities and make appropriate modifications to the plan annually or more often.

The research plan will be developed and periodically modified based in part on recommendations provided by (1) an intra-AID **Project Committee** and (2) a multi-disciplinary **Technical Advisory Group (TAG)** composed of individual experts from universities, research institutes, nongovernmental organizations, selected host countries, or international organizations. The TAG will help provide AID and its cooperating institutions with the perspective needed to assure that project research makes a useful contribution to policymaking in developing countries.

**Draft Research Agenda.** In developing a draft research agenda, the design team drew on a number of sources including the report of a committee invited to recommend World Bank research priorities in environmental economics, a survey of research in environmental economics carried out for AID PPC, and a recent workshop on research needs organized by the International Society of Ecological Economics.

The report for the World Bank<sup>1</sup> identified three general areas of research needed to design effective policies to promote ecologically sustainable development: (1) to demonstrate the importance of environmental quality for the process of economic development, through valuation both of environmental resources as natural capital stock and of their multifunctional services (e.g., for forests, the value of timber and non-timber products, of preservation of biological diversity, of watershed protection and climatic stability, and so on); (2) to improve understanding of economic-environment linkages; and (3) to test propositions about the complementarity of environment and development at the levels of both macropolicy and project appraisal. The committee then identified the following priority subjects for policy research:

- o Incentives for the Efficient Use of Natural Resources (both renewable and exhaustible resources) including enabling incentives (strengthening property rights, broadening participation in decision-making, institutional strengthening, etc.), variable incentives or disincentives (prices, taxes, subsidies, regulatory standards, marketable permits, etc.), and indirect incentives (e.g., promoting energy conservation as a means of promoting lower power plant emissions).
- o Modified National Income Accounting to incorporate natural capital depreciation (e.g., reductions in forest cover or reduced soil or water

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<sup>1</sup> P. Dasgupta, T. Fisher, K-G. Maler, and D. Pearce, "World Bank Research Priorities in Environmental Economics: Suggestions by an Invited Committee", June 1988.

quality) and the costs of pollution damage or the costs of abating such damage.

- o Public Policy and the Environment. The committee cited "a need for a rigorous foundation to the analysis of public impacts on the environment".

A recent survey by the London Environmental Economics Centre (LEEC) for AID PPC<sup>2</sup> concluded that "despite the proliferation of bodies investigating environmental economics with particular reference to the developing countries, there is little coherence in the field." Of 10 fields surveyed, five -- dealing with property rights, the incentive and disincentive effects of poor government policies, linkages between agricultural pricing and environmental degradation, efficient resource transfers to induce developing countries' cooperation in global agreements, and the relationships respectively of population and poverty to the environment -- were cited as priority areas where not enough is known about economy-ENR relationships or likely responses to policy change. Areas not addressed by the survey include urban pollution, international trade in natural resource-based commodities, and the ENR impacts of large infrastructure investments.

Finally, a workshop of the International Society for Ecological Economics in May 1990<sup>3</sup> prepared both a "research agenda for ecological economics" and policy recommendations. The workshop recommended research to improve understanding of economic-ENR relationships, natural resource degradation and enhancement values and valuation techniques, and market- and non-market policy instruments. Policy recommendations emphasize prices or fees for the use of energy and other natural capital, with revenues linked to rehabilitation or enhancement of the resource (if renewable) or to the development of alternatives (e.g., renewable energy) if the resource is exhaustible.

Drawing on these and other sources, the design team analyzed research alternatives in terms of the matrix of AID priority ENR issues and types of economic policies (summarized earlier in Exhibit II-2) to determine research priorities. Based on this assessment, which is discussed in the Technical Annex, the team recommends selecting as priorities a matrix combining the following ENR issues and policy research modules:

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<sup>2</sup>IIED/UCL London Environmental Economics Centre, Environmental Economics in the Developing World, London, May 1990.

<sup>3</sup>R. Constanza and J. Bartholomew, Ecological Economics: Creating a New Transdisciplinary Science, rough draft of the synthesis chapter, September 1990.

**ENR Issues:**

Tropical Deforestation  
 Watershed and Water Management  
 Urban and Industrial Environment  
 Energy Efficiency and Use  
 Global Climate Change

**Policy Research Modules:**

- o Environment as a Waste Sink: The degradation of air, water, and land through the free or low-priced discharge of wastes generated by production and consumption activities. Alternatives to internalize costs of such discharges include regulation and market-based options, such as tradeable permits.
- o Open Access Natural Resources: The range of natural resources which are inputs to production or consumption and which, in the absence of government action, may be freely used (and overused) include inter alia fossil energy, products of forests and fisheries, and water. Institutional arrangements (e.g. concession or contracting arrangements), pricing, and other options require both additional research and synthesis of existing experience.
- o Natural Resources and Product/Factor Pricing: Relationships between product/factor prices, including natural resource prices, and ENR quality. Examples of relevant products are agricultural and industrial products, including imports and exports. Inputs in the production process include pesticides and other agricultural inputs, energy and water. Factors of production are credit (capital), land, and urban and rural labor. Examples of the ENR impacts of poor pricing policies include overuse of subsidized inputs (process water, pesticides, energy, etc.), overproduction of subsidized import substitutes (e.g., plastics and chemicals), and subsistence farmers forced out for export crop production.
- o Population/Demographics and ENR: Migration patterns and other population/demographic factors are also influenced by government policy, and can have important ENR impacts.. An example is the loss of forest area, biodiversity and forest-based cultures caused by a population influx into the Amazon stimulated by government actions including road-building, provisions of credit, lax enforcement of land laws in the Amazon and economic and agricultural land policies.

- o Macroeconomic Policy: The range of macroeconomic policies -- from overall development strategies to government fiscal deficits, interest rates and capital availability, and balance of payments policies and debt management -- have important ENR influences. Macroeconomic policy affects land use (for example promotion of export crops), rates of extraction of domestic natural resources, migration (rural to urban and rural to frontier areas), level and sectoral distribution of capital investment and consumption, and many other aggregates and individual and corporate decisions.

The above ENR issues and policy research modules were selected based on assessment of which areas in the AID Initiative on the Environment have multi-region relevance, global and regional ENR trends (which give more weight to urban and industrial environmental issues for example), and what research is being undertaken under other auspices (including other AID projects). The design team took into account other experts' economic/ENR research priorities, particularly those enumerated in the LEEC survey for PPC. The Technical Annex presents a more complete discussion of the rationale for the choice of priorities.

Exhibit II-3, taken from the Technical Annex, presents a matrix of the proposed EPAT Priority Areas and Research Modules. The matrix highlights which research modules are most relevant to each of the Priority Areas.

The design team also has characterized types of research to be undertaken within each research module:

- o **Problem Identification and Valuation**, in which researchers will compile and analyze existing data and undertake new field analyses to permit more precise identification of the policy causes and monetary value of ENR degradation, and the value of remedial policies designed to reverse degradation or enhance the environment; Examples of valuation issues include the health impacts of air and water quality degradation; benefits of sustainable, multiproduct use of tropical forests, fisheries, and other renewable resources; and the benefits of conservation and other non-marketed ENR outputs.
- o **Analysis of Economic and Social Policy Instruments**, emphasizing techniques to evaluate alternative policy instruments. This module will address both ENR sector economic policy options (for example, pricing and user fees) and broader policies which have ENR impacts (for example, direct or indirect promotion of migration into fragile frontier areas).

- o **Policy Change** will include two components. Decision process research will address both how and why current environmentally degrading (or, conversely, environmentally enhancing) policies come into being and the political aspects of changing those policies. An important aspect of such research will be identification of the incidence of costs and benefits to specific population sub-groups of particular policies - for example, subsidization of cattle ranching in the Amazon or maintaining artificially low stumpage fees in various southeast Asian countries. Research into behavioral responses to policy change recognizes that frequently social, political, cultural and microeconomic factors are decisive. The objective is to improve understanding of how individual and corporate actors respond to specific changes in prices/fees, tenure arrangements, etc.
- o **Policy Implementation and Impact** research will address legal, institutional, and other factors which bear on effective implementation, and will identify and analyze policy and implementation options which have the potential to be effective in the context of these constraints. Primary among these will be market-based options which take advantage of individual and corporate incentives.

These research types essentially describe the policy change process, and the factors which must be taken explicitly into account in choosing among policy options if host countries are to have confidence that policies are feasible of implementation, and that, once implemented, they will actually influence behavior in desired ways.

## 2. **Applied Country- and Region-Specific Research**

Under the core research component, substantial in-country empirical research will be carried out, with the concurrence of Missions, to enable researchers to develop and test analytical methods and policy hypotheses in light of actual experience. Upon request of (and with funding from) individual Missions or regional bureaus, the project may also undertake research and analysis to address adverse market or policy impact on ENR quality in particular countries. In doing so, the project will give precedence to countries and ENR issue areas which support EPAT core research priorities; but it also may engage in research outside these priority areas in instances in which

- a. economic policy is thought to have important impacts for sustainable development in a particular country or region,
- b. host countries are receptive to policy change, and
- c. AID Missions and geographic bureaus welcome EPAT assistance.

Applied in-country research can help governments and Missions identify impacts of specific market or policy failures and provide a basis for assessing the costs and benefits of alternative policy measures, designing and implementing specific policy interventions (including reversal of present policies which contribute to unsustainable ENR degradation), or monitoring the impacts of market and policy changes. Consequently, while not a requirement, applied in-country research generally is likely to be closely tied to and support Mission policy dialogue. It also is likely to be tied to the institutional strengthening component of the project, by providing host country institutions with better data and analytical techniques and in many cases by having such institutions collaborate in conducting in-country research. An explicit purpose of such collaboration will be interchange of methodological approaches and insights between U.S. research institutions and host country collaborators.

To assure that research and analysis are directed to priority country needs, the project generally will require that research priorities be based on an assessment of ENR problems and the extent to which market characteristics or government policies appear to impact such problems. In most countries, such an assessment already exists as a result of EPM, NRMS, APAP, or other activities supported by AID and others. Where it does not, the Mission should start by supporting such an assessment, to be conducted under EPAT or another project.

The line between core and applied in-country research should be blurred. Applied in-country research will provide needed practical underpinning for the core substantive research. It also will provide a valuable opportunity to field-test and improve the analytical methods developed, refined and disseminated under the core research component. Moreover, to some extent the core research itself will be shaped by selection of target countries, which in turn will be based in part on the level of Mission interest and support. It is likely -- and should be encouraged as a matter of policy -- that project research often will involve blending core and applied research on priority market and policy failure issues in priority countries and regions. Thus, even most applied in-country research is likely to address EPAT core research priorities -- for example, changes in ENR pricing or access as means of influencing carbon emission trends in countries which are key contributors to global climate change or options to promote efficiency of water, energy, or forest use in countries where current use patterns are unsustainable.

### **3. Information and Dissemination**

A principal focus of EPAT is building awareness and capacity of, and ultimately influencing, host country economic policymakers to develop and implement policies which benefit rather than degrade natural resources and the environment. This focus dictates a major emphasis on information and dissemination. Host-country economic policymakers as well as local NGOs, international PVOs, other donors and their advisors, and AID staff will become more aware of ENR quality issues and the role of policy in contributing to ENR degradation or enhancement. Moreover, transfer of methodological tools and analytical insights can lead to improved decision-making in the future.

This project component will support wide dissemination of research and analysis findings in the form of publications, seminars, conferences, workshops, etc. It will place particular emphasis on dissemination of models and other analytical methods and of insights gained from project research. It also will support production of a periodic newsletter to keep AID/W, Missions, participating U.S. and host country institutions, and others informed about all aspects of the project.

#### **Publications and Dissemination**

The participating research, training and policy dialogue support institutions will devote considerable resources to dissemination of materials of use to policymakers or to NGOs and others in a policy-influencing role. Each core research project will include a dissemination plan and budget which normally will set out, at a minimum, publications and inputs to training and technical assistance activities.

Specific dissemination efforts will target not only researchers/analysts but also host country government and donor policy makers and NGOs.

Where appropriate, such efforts also will target AID and other donors. Indeed, one of the most effective means of achieving broad host country policy influence is to influence the perspectives of other AID projects and their institutions (for example, the macroeconomics IQC contractors) as well as other donors such as the World Bank which are providing policy advice to host countries. The project will place heavy emphasis on tailoring publications and workshops to the particular needs of each targeted audience. Thus, materials for busy senior government policymakers, in-country NGOs, or specialists in the field will differ greatly from one another.

To the extent requested by a Mission, the project will fund targeted dissemination of research and analysis findings within a specific country. In-country dissemination approaches will be developed in collaboration with and approved by the Mission.

The project will produce a newsletter semi-annually or more often and will disseminate it to AID/W, Missions, host country economic and ENR ministries,

collaborating U.S. and host country institutions, other donors, NGOs, and other researchers and analysts addressing economic/ENR interface issues. This audience easily could require distribution of 2500 or more copies per issue.

#### **4. Support for Policy Dialogue**

The project will draw on its own and others' research and analysis to support both general and, at the request of Missions, country-specific policy dialogue with host country, regional and international policymakers, and NGOs that influence policy.

The project will use its research and analysis results as the basis for products which can be used by AID, international, and developing country policy analysts and decision makers in many countries. It will employ conferences, seminars, publications and other means to engage international, regional and multi-country groups in discussion of policy issues and options, and, upon request, will provide support to multilateral fora considering policy reform at the international level. Such support will not be based only on EPAT-sponsored research and analysis. Its purpose is to foster closer communications and interchange among government and international policy makers, other donors, researchers, and interested NGOs, and to raise the level of awareness and understanding of how economic policies influence ENR quality. EPAT also will maintain dialogue with other relevant AID projects (e.g., "Macroeconomic Policy" and "Implementing Policy Change").

In addition, upon request the project will provide technical support to specific Missions or regional bureaus, to be funded by buy-ins to the project. Such support often will include transfer of analytical methods developed or refined under the state-of-the-art research component. EPAT technical experts will help USAID and host-country staff draw on such methods to identify key issues, priorities, and policy or market intervention options and to analyze the costs, benefits, uncertainties/risks, and feasibility of implementation of such options. In addition to helping Missions and host countries address specific issues, such support is intended to encourage developing country governments to embed identification and analysis of ENR implications in their policy analysis and decision processes.

Policy dialogue support may be provided through workshops or seminars, direct discussions with Mission or regional bureau staff, participation in policy discussions with host country governments, provision of short-term analytical or project/NPA design or evaluation assistance, or provision of longer-term technical assistance to host country agencies in key economic or natural resource policy roles.

Country-specific policy dialogue support often will flow from and be closely related to country-specific empirical research. However, it is not a condition that provision of such support be preceded by in-country research. As in the case of the country-specific research component, policy dialogue support should be preceded by or incorporate identification and assessment of ENR problems and how market limitations or government policies appear to impact them. Indeed, one way EPAT can most usefully support Mission policy dialogue is

to assist the Mission in the initial stage of identifying priority areas of economic/ENR interface and devising appropriate policy analysis and dialogue strategies.

## **5. Institutional Strengthening**

The project will contribute to general institutional strengthening of host country and regional government, academic, research, and other nongovernmental organizations by means of seminars and other forms of networking, information sharing, and dissemination of the results of methodology development and empirical research. Where appropriate, and subject to Mission approval, host country government, research, or NGO institutions also will be invited to participate in collaborative country-specific research and analysis, both as a form of institutional strengthening and as a means of insuring relevance and practical application of the research.

At the request of -- and with buy-in funding from -- individual Missions, the project also will directly support strengthening of government institutions that shape host countries' economic policies. In most cases this will mean the Ministries of Finance and/or Planning or Presidential or Cabinet level economic policy coordinating agencies. The project also may help strengthen ENR ministries or agencies, where such institutions play an important role in formulation or implementation of economic or market intervention policies, or NGOs whose involvement the Mission feels is important to democratize, bring an environmental perspective to, or otherwise contribute to improving the economic/environmental policy decision process itself. In large, ecologically diverse countries, and at Mission request, the project may support any of the above types of institutions at the sub-national level. Finally, in selected instances where so requested by Missions or the cognizant regional bureau, the project may contribute to strengthening regional institutions which clearly influence economic policy in the participating countries.

The intention in all cases is to strengthen such institutions' ability to:

- o identify priority policy or market "failures" which contribute to ENR degradation;
- o analyze the ENR -- as well as economic and sociopolitical -- implications of present or proposed policies;
- o formulate and analyze feasible economic or market policy options to reverse or ameliorate ENR degradation or enhance ENR quality; and
- o oversee, monitor and evaluate implementation of the option(s) selected.

Project institutional support will start with an assessment of the strengths and weaknesses of the organization to be assisted, conducted either for the organization itself

or for (and generally in collaboration with) the cognizant Mission. This assessment will address the organization's present and potential roles in decisionmaking (including its access to decisionmakers, its ability to contribute to public education, and other broader aspects of the decision process), its capacity to analyze economic and ENR policy issues and to use such analysis to influence policy decisions, and any particular institutional policy biases or outside influences which are relevant. The assessment also will include organization and management analysis; an analysis of numerical adequacy, capabilities, and motivation of staff members; and a training needs assessment.

Following the assessment, the project will develop a long-term institutional strengthening plan in close collaboration with the institution itself and the Mission or, in the case of regional institutions, other appropriate AID organizations. The plan will define assistance to be provided by EPAT or by other AID projects (e.g. "Implementing Policy Change"). Subsequent EPAT institutional strengthening activities will be based on this plan.

Institutional strengthening activities may include training (addressed in the subsequent project component), collaborative research or policy analysis activities, strategic planning support, assistance in organization and management restructuring, or short- or long-term technical assistance. Once approved in the plan, institutional strengthening activities may range beyond those specified in the descriptions of the other project components. For example, the plan may include -- and therefore with Mission buy-in support EPAT may undertake -- in-country collaborative research on issues not included as one of the core research priorities or long-term training which would not otherwise be provided under the training component of the project. It also could provide, for example, for temporary assignment of policy or regulatory staff members to the EPA or to a state regulatory agency in the U.S.

In the course of implementing the various project components, the project also will be providing institutional strengthening support to selected U.S. institutions. There are a number of small but expanding centers of excellence in the U.S. as well as in other OECD countries. These are found in both universities and non-profit institutions such as the World Resources Institute and Resources for the Future. The project will encourage collaboration among such emerging centers and, through its support particularly of core research and training, may provide some long-term funding for a few such centers. It also will encourage funding by foundations and others that have expressed interest in supporting development of centers of excellence in ecological economics.

## **6. Human Resources Development**

### **Economic/ENR Training**

A major project purpose is to increase capacity of LDC institutions to conduct economic/ENR policy studies and to formulate and execute appropriate policies which promote environmentally sustainable development. Implicit in this purpose is the need to

build human capacity. The human resources development (HRD) component of the project will develop the skills of individuals in institutions engaged in economic and ENR policy research, formulation and implementation. It will enable them to conduct effective policy analysis and research as well as design and implement effective policy and regulatory programs. The project also will help develop indigenous capacity to conduct economic/ENR policy training.

The project initially will support the development of two policy-related U.S.-based core courses, one on economic policy and the environment and the other on environmental policy and regulation. These short courses, of three- to six-week duration, will be offered initially in the U.S. Then, at the request of Missions or regional bureaus, they will be adapted for presentation in particular regions or countries.

Once the first two core courses are developed, EPAT will support the development of a shorter "environmental education" course which draws material from the core courses. This course will be intended for senior government and non-governmental officials who have limited time and require an appreciation and understanding of issues and options rather than a working knowledge of analytical methods.

The project also may "spinoff" components of the core courses into separate courses in order to address important topic areas in greater detail. Examples would be natural resource pricing and Environmental Impact Assessment.

The project will rely upon a global inventory of economic/ENR training resources and opportunities and a survey of ENR training needs to help identify priority areas for designing additional courses. The training resource inventory and needs assessment is expected to be carried out under the rubric of another S&T project. The information generated by the survey will also aid Missions and other institutions in placing individuals in training programs which are appropriate to their needs.

Finally, EPAT will use the same advisory process used for the core research component -- the internal AID Project Committee and the external Technical Advisory Group (TAG) -- to periodically review HRD needs, priorities and activities and to recommend changes in the training programs. A primary purpose of this process will be to consider needs for additional courses or modifications in existing ones.

U.S.-based Core Courses: U.S.-based core courses will be designed to expose a large number of key individuals from all AID regions to economic and ENR policy issues. The courses also will have a second purpose of providing a forum for core U.S. researchers to become more familiar with the issues, problems, perspectives and capabilities of policy-related institutions and individuals from a large number of countries. The courses will be interactive and promote a two-way exchange of information and ideas. An initial outline for each course is provided below.

### Course on Economic Policy and the Environment

#### Goal:

Provide participants with the ability to (1) identify priority policy or market failures which contribute to ENR degradation, (2) analyze ENR implications of present and proposed policies, and (3) formulate and analyze the implementation feasibility and likely impacts of economic and market policy options to ameliorate present ENR degradation or to achieve both economic and ENR benefits.

#### Content:

Impacts of policy and market failures  
 Natural resources valuation  
 Natural resource pricing/fees  
 Consideration of ENR in national income accounting  
 Costing waste discharges to air and water & solid waste disposal  
 Resource tenure issues  
 Policy research & analysis methodologies  
 Information collection and management  
 Analysis of policy options for feasibility of implementation and likely impacts

#### Participants:

Economists in Finance and Planning Ministries  
 Planners and Policy Specialists in ENR Ministries  
 University/Research Economic and Policy Specialists

This course will be developed and undertaken by the core research cooperating institutions. Curriculum development for the course therefore will be tied closely to the state-of-the-art research agenda. The initial course design will integrate information from the synthesis of current experience, including current analytical methods as well as case studies and guideline documents. The course content will be evolutionary, starting with current approaches and methodology. The lessons and results generated from EPAT research and from analyses of others' experience will be woven into the course in subsequent years.

### Course on Environmental Policy and Regulation

#### Goal:

Provide participants with the ability to (1) design effective environmental policy and regulatory programs and (2) describe current state of the art and trends in regulatory techniques, laws and institutional arrangements for ENR management.

**Content:**

- Environmental impact assessment
- Regulatory options for air, water, and solid/toxic wastes
- Market-based options
- Legal and institutional arrangements for environmental management
- Environmental economics
- The role of public participation
- Analysis of policy options for feasibility of implementation and likely impacts
- Impact monitoring

**Participants:**

- Personnel of Environmental Agencies

This course will focus on the brown side of environmental management. It will be particularly applicable to newly industrialized nations and to Eastern Europe, where environmental regulation, control and technology lags far behind the state of industrial development. It will address the impacts of market failures and will examine regulatory, market-based, and other options to internalize costs of environmental degradation including air and water pollution and generation of toxic wastes. Because of the heavy regulatory policy content of the course, it may be developed and undertaken by EPA.

Each of the courses will be implemented with the same basic strategy. The first 9 to 12 months will be spent undertaking curriculum development, course planning and advertising, with implementation starting early in the second year. EPAT core funds will be used to support curriculum development, course planning and advertisement. The bulk of the costs for implementation, room and board, and participant travel are expected to be funded by sponsoring agencies, including, but not limited to, Missions. To attract host country students already pursuing relevant graduate degree training in the U.S., some courses will be offered in the summer. Depending on demand, the courses will be adapted for presentation regionally or in-country after sufficient experience is gained in the U.S. These will be funded wholly through buy-ins. Regional and in-country courses will be modified to focus on local issues and to take into account the capacity of participants and institutions in the area. Experienced, local training institutions will be brought in as collaborators.

Once the two core courses are developed, the project will develop an environmental education workshop or training course for senior policy makers and NGOs which addresses economic/ENR relationships and regulatory policy options (i.e., the content of the two core courses). The workshop/course will be short (less than one week) and will focus on high-level policy issues: broad economic/ENR linkages; identification and analysis of economic policy options and "regulatory" options (broadly defined to include market-based approaches); government fiscal losses resulting from failure to adequately price natural

resources; potential implementation obstacles (including institutional weaknesses, social, political, cultural and microeconomic considerations), and options to overcome them; and the policy change process itself (including potential roles of NGOs.)

A purpose of the EPAT project is to enhance the capabilities of U.S. institutions to assist developing countries in this field. Project research and training results should be incorporated back into U.S.-based curricula and courses. This internationalization of U.S. curricula will be an explicit evaluation criteria in selecting core institutions since it offers distinct benefits in attracting U.S. and international students to university economic/ENR programs.

U.S.-based short courses should become self-supporting and institutionalized within the organizations which implement them. EPAT core funding will be utilized only for initial program development and curriculum development and, later, for startup costs to take courses to the field. Missions (or other organizations sending participants) will pay a participant course fee to defray implementation costs, participant travel, room and board.

Global Survey and Needs Assessment: As indicated, an inventory of current opportunities for ENR education and training in the U.S. and elsewhere including, but not limited to, environmental and natural resource economics training will be conducted under a separate S&T sponsored project. A survey to characterize host country demand for ENR training will be conducted concurrently with the supply survey.

The needs assessment will cover a broad range of ENR concerns, both "green" (e.g., natural forest management) and "brown" (e.g. treatment and control of metal finishing wastes). Design of the survey and assessment will be undertaken in close collaboration with regional bureaus and other S&T offices to assure that all areas of concern and potential resources are included.

The supply survey will include not only universities but the myriad of private sector courses being offered in hazardous wastes and other "brown" fields. It also will cover on-the-job training opportunities in state and federal agencies and the private sector. Finally, it will include major regional developing country training institutions such as the Asian Institute of Technology (AIT) in Thailand.

A synthesis of the inventory and demand studies will identify gaps in ENR training opportunities and priority areas for possible development of additional training programs beyond the initial core courses. To the extent that training needs so identified related to EPAT goals and purposes, EPAT may sponsor development of additional courses. Other needs will be met using the resources of other projects.

### Clearinghouse/Information Referral :

Outside of the EPAT framework, S&T may establish and operate an ENR training clearinghouse/ information referral service. The service initially would use information gathered during the course of the aforementioned global survey and needs assessment. This information would be used to construct a computer data base which could be updated regularly and, as needed, expanded to incorporate new ENR concerns. The clearinghouse would work closely with Missions and with OIT and others that provide administrative support to Missions in arranging and overseeing U.S. participant training.

#### **D. Integration and Focus of Project Elements**

Project elements are conceived and will be undertaken as mutually reinforcing activities focused on the project purposes of building environmental awareness and analytical capabilities of, assisting, and ultimately influencing developing country policy analysts and decision-makers.

The project will focus much of its research, policy dialogue support and institutional strengthening on host countries, selected in collaboration with Missions and regional bureaus that (a) have pressing ENR problems identified as EPAT priorities which are not already being effectively addressed by Mission and other AID/W projects, (b) appear amenable to pursuing policy change relating to these priority problems, and (c) where the Mission desires EPAT participation. Possible target countries include:

- o Those which have an important role to play in dealing with the threat of global climate change (e.g., Brazil, Indonesia, Zaire, India and Eastern Europe);
- o Those with tropical forest protection problems (Indonesia, Philippines, Brazil, etc.);
- o Those with major urban and industrial pollution problems (most Asian NICs and countries in Eastern Europe); and
- o Those which are of major interest to regional bureaus.

## **E. Relationship to Other Projects**

AID is implementing a number of ENR projects which in some ways are similar to EPAT. Others are being designed. This section reviews possible redundancies and synergistic impacts likely to result from implementing EPAT.

Exhibit II-3 characterizes some of the existing and proposed projects which either are in the Agency's ENR portfolio or, as in the case of APAP, are in other portfolios but have important ENR components. Components of EPAT are listed across the top of the matrix to compare and contrast EPAT and other AID projects.

A review of each project suggests there is relatively limited overlap between EPAT and the rest of AID's ENR project portfolio. Many projects have geographic limitations (e.g., NRMS II) and/or thematic limitations (e.g., APAP, ACCES, IPC and RAPID III) which, while appropriate, mean that they cannot be expected to accomplish the purpose of EPAT. Of all the projects reviewed, only one (APAP) has an economic policy focus remotely similar to that of EPAT, and it is limited to the agriculture sector. The principal global ENR project, EPM, occasionally addresses policy (mainly descriptively) but focuses primarily on biophysical data and relationships. The design team therefore concludes that EPAT will fill an important niche not served by AID's current portfolio.

The Agency's Initiative on the Environment speaks to the crucial importance of addressing economic and ENR policy issues as a first step to resolving the apparent conflict between environmental stewardship and economic development. EPAT alone is designed to address these issues on an integrated basis through research, development of analytical methods, training and institutional development.

EPAT can play a unique role within the constellation of AID activities because it is the only project which will provide a framework to help cooperating countries identify the entire range of policy and market failures that may have adverse ENR impacts and devise policy change strategies based on such a framework. Thus, in addition to providing valuable analytical methods and research and analytical support on specific issues, EPAT provides a needed vehicle for government policy analysts and decision-makers and the general public to span the entire range of government and market activities to identify, analyze and influence policies which have significant ENR impacts.

At the same time, EPAT has the potential to draw from the experience, lessons learned, results generated, data and activities of other AID projects, and thus provide substantive insights into the interaction of ENR and economic development. The results of specialized projects, such as the Coastal Zone Management and DESFIL, can provide valuable inputs to development of new policies and analysis methodologies which will inform the economic/ENR policy development process.

While EPAT provides a needed overall framework, analytical methods, and specialized research and analysis in many areas not addressed by AID's current portfolio, it should not try to duplicate the specialized expertise resident in other projects. Once the overview analysis in a particular country identifies priorities for further in-depth policy research, it may be appropriate to refer, for example, land tenure analysis to the ACCESS project, coastal zone issues to the Coastal Zone Management project, or agriculture pricing issues to APAP. EPAT initial site visit teams will work with Missions to determine which project or projects are the most appropriate sources of assistance in given areas and then plan for services to be provided under EPAT. EPAT's Project Committee will provide a forum for the Project Officer and others with management responsibility for related projects to keep each other informed about activities underway and planned under the auspices of the full range of A.I.D.-supported policy and policy related projects.

## EXHIBIT II-3

## SOME RELATED PROJECTS

Global & Regional Env. Projects	SOA Substantive Policy Research	Country Regional Research	Support for Mission Policy Dialogue	Institutional Strengthening NGO/Acad/US and LDC	Training
DESFIL	Yes, through synthesis report	Soil mgmt/land use policy in LAC	Indirect	Mission buy-ins re land/soil mgt.	Fragile lands issues under buy-ins
Coastal Resource Management		Multiple use mgt. plans	Yes (Coastal)	Yes	On coastal issues (buy-in)
NRMS I	Yes, in natural resource fields		Assessments for use in policy dialogue	For AFR NGOs - both indigenous and US	In-country workshops
Environment Training			Indirect		Short-term for AID and counter-parts
EPM	Yes	Yes	Short-term policy review		
Biodiversity	Research limited to biodiversity	Yes, limited scope		?	
RRIG/Env. IQC's		Possible	Possible	Possible	Possible
ANE/TR		Yes	Yes	Yes	Limited
APAP II	Focus on methods development	Under buy-ins	Yes		
ACCESS	Yes	Buy-ins	Yes		
RENARM		Yes, for Central America	Yes, for Central America	Institutional development in C.A.	Through regional institutions

### III. COST ESTIMATES AND FINANCIAL PLAN

#### A. TOTAL PROJECT BUDGET, FY 1991 - FY 2000

It is estimated that over 10 years a total of \$75,500,000 will be needed to fund EPAT activities -- \$35,500,000 in S&T core and \$40,000,000 in buy-ins. The following section briefly presents the results of the more detailed analysis in the Financial Annex, covering expected costs, human resource requirements, and means of financing.

Table III-1, entitled Summary 10-Year Budget by Project Element for both S&T Core and Buy-in Costs, presents anticipated EPAT budgetary allocations for each activity over the life of the project. These financial inputs are based upon the A.I.D. design team's budget principles and relative apportionment among project elements (see below and Annex B.2. for more detail). A more graphic representation of these budgetary shares by project element are presented in Graphs III-1 to III-3.

In translating envisioned activities into an allocation of resources necessary for their implementation, we kept the following principles in mind:

- \* Sufficient **Level of Effort** (LOE) must be allocated to accomplish the activities proposed to meet the project's objectives, bearing in mind the perspectives of the regional and central bureaus, and the field missions.
- \* Realistic assumptions must be made about **person-month and related costs**; these include adequate provision for payment of salaries above FS-1 levels, when appropriate, and anticipated future cost increases due to inflation.
- \* Appropriate levels of **management, supervision, administrative support and evaluation** must be available, both in A.I.D. and in the project's implementing institutions.

#### B. PROJECT PERSONNEL REQUIREMENTS

Summary level of effort estimates for project activities are presented in Table III-2. These estimates reflect the design team's best judgments, factoring in the views of a wide spectrum of Agency personnel, both in Washington and in the field concerning the project's priorities. In particular, the table reflects the following conclusions with respect to appropriate levels and

Table III-1 Summary 10-Year Budget by Project Element/Activity  
 including Core and Buy-In Costs, and Total Distribution  
 Environmental and Natural Resources Policy and Training (EPAT)  
 AID/ST/FENR, Project Number 936-5555

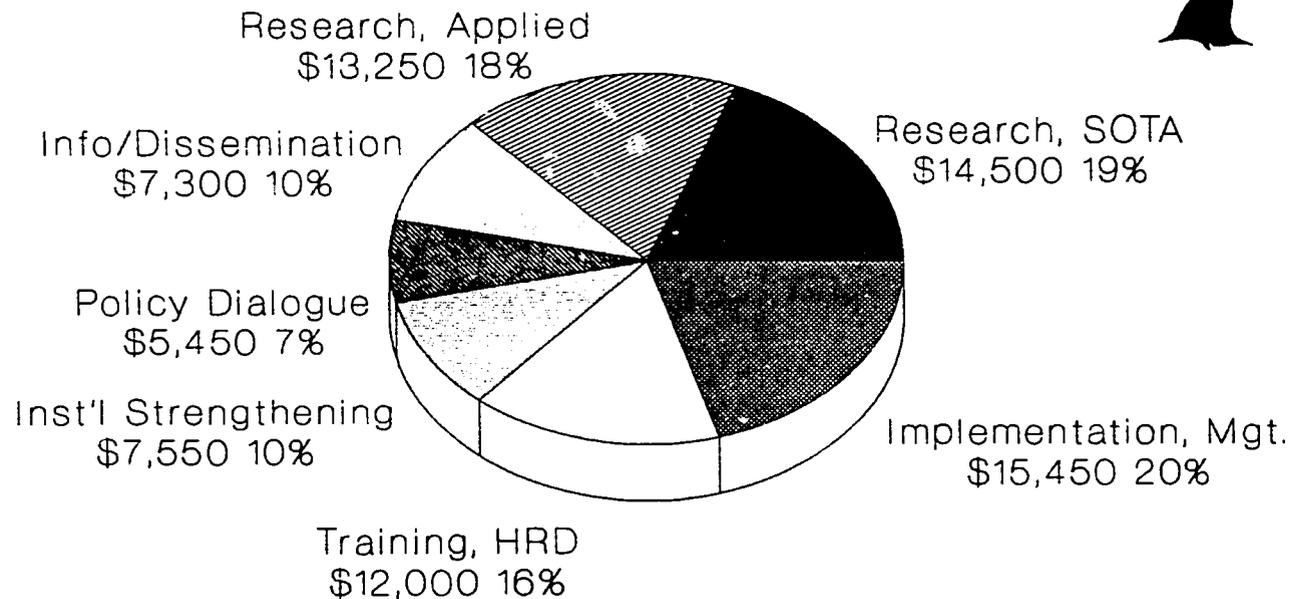
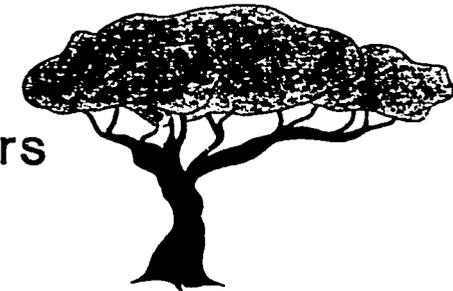
Project Element/Activity	ST/FENR CORE	BUY-IN	TOTAL	PERCENT TOTAL
	-- \$000	---- \$000	---- \$000	-- %
1. State of the Art Research	14,500	0	14,500	19.2%
2. Applied Country/Regional Research	750	12,500	13,250	17.5%
3. Information and Dissemination	4,800	2,500	7,300	9.7%
4. Support for Policy Dialogue	1,700	3,750	5,450	7.2%
5. Institutional Strengthening	500	7,050	7,550	10.0%
6. Human Resources Development	3,000	9,000	12,000	15.9%
7. Implementation/Management	10,250	5,200	15,450	20.5%
TOTAL	35,500	40,000	75,500	100.0%

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# EPAT Core & Buy-In Funding

Life of Project: 1991-2000  
By Activity (\$000) and Percentage

Project Total Resources  
Estimated **\$75.5 Million, 10 Years**

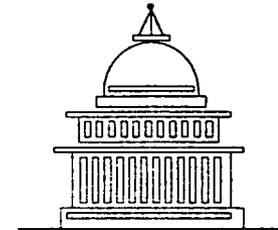


**Environmental & Natural Resources  
Policy and Training Project (EPAT)**

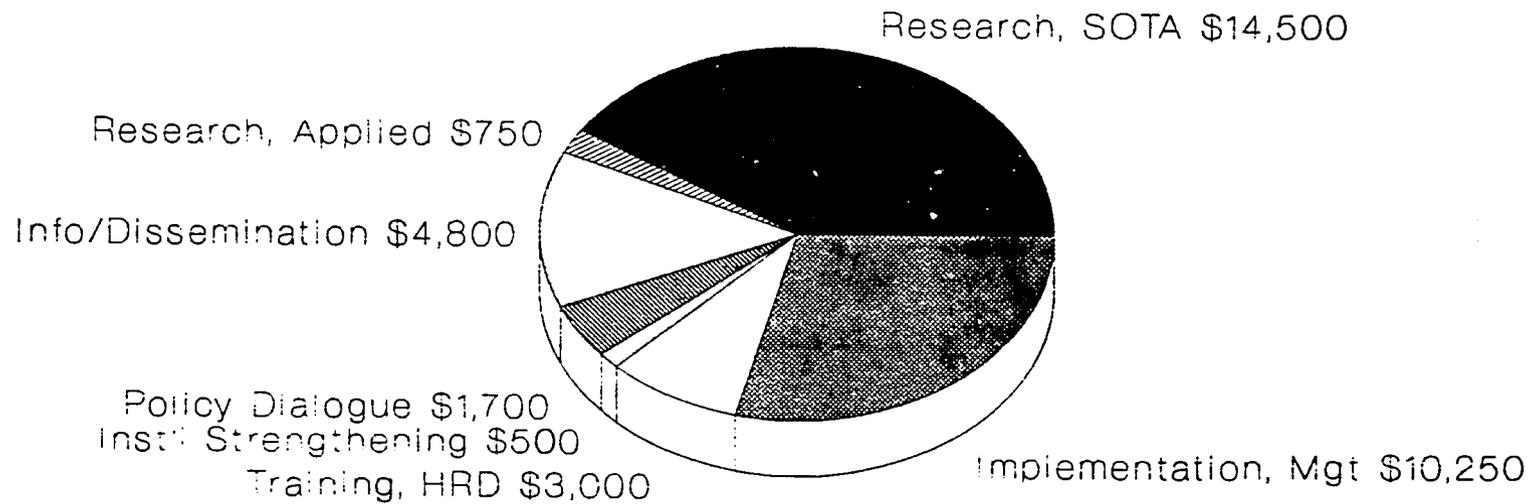
CHART4: RM revision of WRG, 1-30-91

# EPAT Core Funding

Life of Project: 1991-2000  
by Activity & Funding Levels



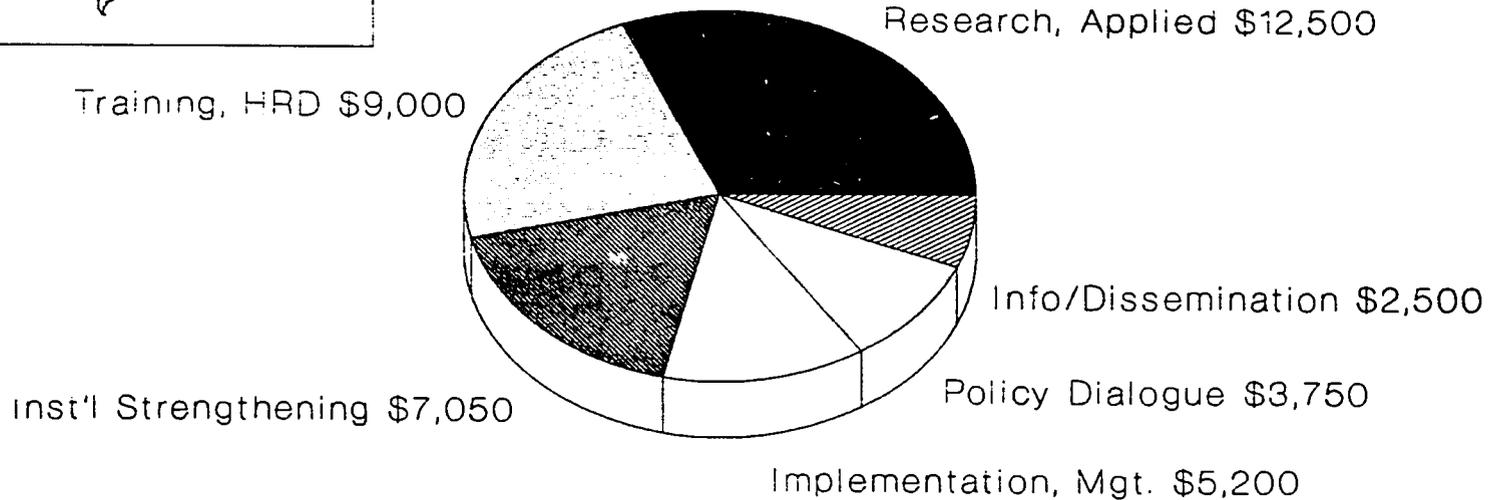
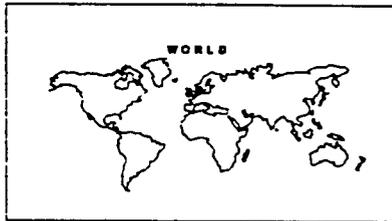
S&T/FENR Core Funding  
Estimated **\$35.5 Million, 10 Years**



**Environmental & Natural Resources  
Policy and Training Project (EPAT)**

CHART 2: RM revision of WRG, 1-30-91

# EPAT Buy-In Funding Life of Project: 1991-2000 by Activity and Funding Level



Regional Bureau and USAID Buy-Ins  
Estimated **\$40.0 Million, 10 Years**

## allocation of effort:

- o Strong **core research** and **methods development** are required and warrant S&T core support. This effort should begin with a **review** and **synthesis** of work completed or currently ongoing under other auspices. It should also include new research designed to shed light on the relationship between economic policy and ENR degradation/depletion (see the Technical Annex for an in depth discussion of the research agenda). It should produce and distribute a series of documents useful to practitioners, policy makers, educators and researchers in the area of economic/ENR policy. Approximately 7.5 person years per project year will be dedicated to these activities.
- o There is a definite need to advance stated EPAT goals through **applied field research** and related **technical assistance** to USAID missions and A.I.D.-assisted countries. Almost 45 person years will be dedicated to applied country and regional research. While EPAT will attempt to be responsive to the shorter term needs of missions, the preferred mode will be through longer term agreements with selected missions.
- o Applied research will often be closely linked to host country **institutional strengthening**, and may involve the assistance of long-term resident advisors. This activity will utilize roughly 25 person years during the life of the project.
- o Both field activities will be supported by 2-3 person months per year funded by S&T to insure linkage to the core research program and enhance integration of different project elements.
- o The strongest felt need of regional bureaus and Missions (see next section) for S&T investments is in the area of **human resources development**. Emphasis for S&T funds will be placed on cooperating with U.S. institutions to develop core training modules, while resources to support host country participants and to implement courses in the field will be provided by Missions and/or regional bureaus. Approximately 18 person months per year on average will be devoted to the development of EPAT training modules, while Missions are expected to utilize about 3 person years per project year in training activities.

Table III-2 Summary 10-Year Level of Effort by Project Element/Activity  
 estimated in Person Months of Professional LOE  
 Environmental and Natural Resources Policy and Training (EPAT)  
 AID/ST/FENR, Project Number 936-5555

Project Element/Activity	ST/FENR CORE	BUY-IN	TOTAL	PERCENT TOTAL
	-----Person Months-----			%
1. State of the Art Research	900	0	900	24.0%
2. Applied Country/Regional Research	36	500	536	14.3%
3. Information and Dissemination	270	120	390	10.4%
4. Support for Policy Dialogue	80	120	200	5.3%
5. Institutional Strengthening	24	300	324	8.6%
6. Human Resources Development	180	360	540	14.4%
7. Implementation/Management	560	300	860	22.9%
TOTAL	2,050	1,700	3,750	100.0%

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- o The process of **policy reform** including the delineation of the policy agenda, analysis of options, and **policy dialogue** on options requires specialized resources. This element will focus on several levels -- global, multilateral, bilateral and regional -- requiring a broad array of expertise. Core funds will be used to support 8 person months per project year for these activities, while Missions are expected to request 12 person months/year from the EPAT team in specialized, and usually high level, consultations in this area.
- o The EPAT design team was unanimous in its resolution to insure that sufficient level of effort and funding was dedicated to **information** and **dissemination** of the work done under, and experiences encountered in, the project. From core resources, over 2 person years/project year will be dedicated to these tasks, in part supporting the publication of reports from the core and applied field research, the development of networks and rosters of professionals in the ENR policy arena, publishing a newsletter and technical bulletins series, experimenting with new audio-visual techniques, and organizing senior seminars and more popular workshops.
- o Finally, it is imperative that the **management** of the policy process and of the project not be short changed and become the limiting factor. Provision of external technical advice, direction and supervision from within the Agency, and execution and administration of our implementing agreements is to be treated as a separate project element with adequate staff and funding. AID expects to establish RSSA agreements with USDA and/or EPA to provide needed professional staff to work in S&T/FENR in a technical capacity, and the EPAT Project Officer will be supported by a research assistant and support staff. Separate budget lines are defined for the cooperators and contractors to hire project coordinators, research directors and module leaders, technical assistance coordinators, training officers and dissemination directors. Funding is also available for office staff and equipment.

Table III-3 Summary of Averaged 10-Year Person Month Costs \*\*  
 by Project Element for Core and Buy-Ins  
 Environmental and Natural Resources Policy and Training (EPAT)  
 AID/ST/FENR, Project Number 936-5555

Project Element/Activity	ST/FENR CORF	BUY-IN	TOTAL
----- \$ Costs/Person Month -----			
1. State of the Art Research	16,111	0	16,111
2. Applied Country/Regional Research	20,833	25,000	24,720
3. Information and Dissemination	17,778	20,833	18,718
4. Support for Policy Dialogue	21,250	31,250	27,250
5. Institutional Strengthening	20,833	23,500	23,302
6. Human Resources Development	16,667	25,000	22,222
7. Implementation/Management	18,304	17,333	17,965
TOTAL	\$17,317	\$23,529	\$20,133
	=====	=====	=====

\*\* Total Burdened Professional Person Month includes salary, benefits, overhead, travel, equipment and other expenses, G&A, fees, inflation and other contingency factors.

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### C. COST ESTIMATES

The *cost factors* for the different activities and associated levels of effort have been extrapolated over the 10-year life of project period based upon past expenditure patterns for similar S&T core project activities, and for analogous buy-in undertakings in the various regions. For purposes of the summary presentation, the unit of cost is the "total burdened professional person month" which includes not only the expected salary level, but also includes benefits and overhead, average travel related expenses, equipment and supplies, general & administration, fees and other contingent costs. Allowances have been made for inflation (assumed to be 5 percent per annum). These are displayed in summary form for the different EPAT project activities over the life of project in Graph III-4, and averaged for the life of project for both core and buy-in activities in Table III-3.

Table III-4 amplifies on the previous budgets by providing estimates in terms of **expenditure groups** -- salaries, benefits and overhead costs; travel, supplies, equipment and contingencies; and, a line item for general & administration, fees and other costs -- for the activities in Phases I (first five years) and II (second five years). Approximately 60 percent of the total cost is related directly to personnel; another 25 percent is for travel, supplies and contingencies; and the remainder is fees, G&A, etc. Costs in Phase II are expected to average over 25 percent higher than in Phase I.

### D. PROJECTED FINANCIAL REQUIREMENTS & PHASING

In order to depict expected yearly financial needs - both for planning obligations and anticipating expenditures for the project's components and contractual arrangements - Tables III-5.1 through III-5.3 have been constructed. These tables present the separate funding needs of S&T and the expected effective demand from buy-ins, for Phases I and II, and per annum estimates for the first five years. The next section examines in more detail some of the information used in estimating projected buy-in demands.

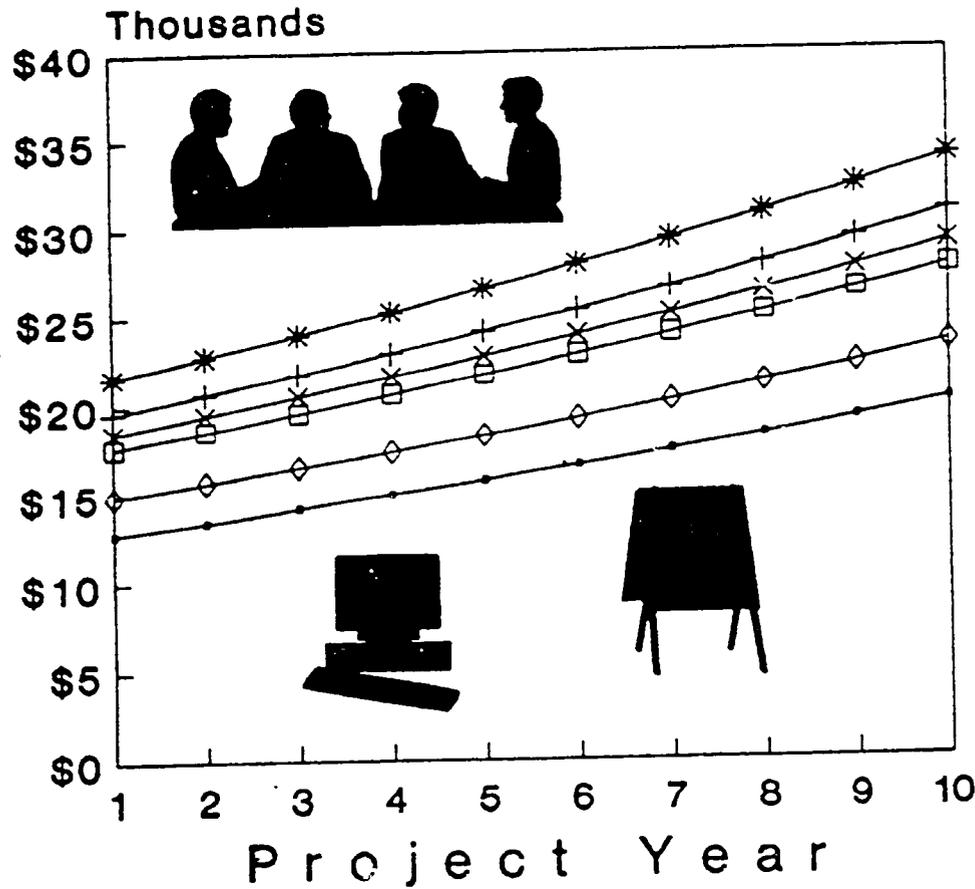
### E. MISSION AND REGIONAL BUY-INS

There is ample reason to believe that the demand for buy-ins will be high:

- o More than thirty Missions so far have responded to a cabled request for comments on the project. While not providing quantitative estimates of buy-in demand, most Missions expressed strong interest in the project and estimated a generally high level of buy-in demand. Estimated demand was highest for, in order of general Mission priority, training,

# EPAT, Professional Costs by Activity

## Costs per Person Month over LOP



### Project Activity

- SOTA Research
- +— Field Research
- \*— Policy Support
- Training, HRD
- x— Institutional Build
- ◇— Info/Dissemination

Total burdened costs, including salary, benefits, OH, travel & perdiem, equipments and support costs

**Table III-4 EPAT Summary Funding Estimates, Phases I & II  
by Project Element and Cost Line Items  
including both Core and Buy-In Costs  
Environmental and Natural Resources Policy and Training (EPAT).  
AID/ST/FENR, Project Number 936-5555**

Project Element	Phase I Years 1-5 Funding	Phase II Years 6-10 Funding	Project TOTAL Funding
1. State of the Art Research	6,500	8,000	14,500
Salaries, Benefits, Overhead	4,802	5,911	10,713
Travel, Supplies, Contingency	885	1,089	1,974
General & Administrative	813	1,000	1,813
2. Applied Country/Regional Research	5,750	7,500	13,250
Salaries, Benefits, Overhead	2,933	3,825	6,758
Travel, Supplies, Contingency	1,783	2,325	4,108
G&A, Fees, Other	1,035	1,350	2,385
3. Information and Dissemination	3,500	3,800	7,300
Salaries, Benefits, Overhead	1,960	2,128	4,088
Travel, Supplies, Contingency	910	988	1,898
G&A, Fees, Other	630	684	1,314
4. Support for Policy Dialogue	2,250	3,200	5,450
Salaries, Benefits, Overhead	1,193	1,696	2,889
Travel, Supplies, Contingency	675	960	1,635
General & Administrative, Fees	383	544	927
5. Institutional Strengthening	3,250	4,300	7,550
Salaries, Benefits, Overhead	1,788	2,365	4,153
Travel, Supplies, Contingency	894	1,183	2,076
G&A, Fees, Other	569	753	1,321
6. Human Resources Development	5,000	7,000	12,000
Salaries, Benefits, Overhead	2,700	3,780	6,480
Travel, Supplies, Contingency	1,500	2,100	3,600
General & Administrative, Fees	800	1,120	1,920
7. Implementation/Management	6,800	8,150	14,950
Contractor related			
Salaries, Benefits, Overhead	2,437	2,921	5,358
Travel, Supplies, Contingency	1,132	1,356	2,488
G&A, Fees, Other	783	939	1,722
AID related			
Salaries, Benefits, Overhead	1,909	2,289	4,198
Travel, Supplies, Contingency	539	645	1,184
Evaluation and Audit	250	250	500
Total Salaries, Benefits, Overhead	\$19,722	\$24,914	\$44,636
Total Travel, Supplies, Contingency	\$8,316	\$10,646	\$18,963
Total General & Administrative, Fees	\$5,012	\$6,389	\$11,401

Table III-5.1 EPAT Phase I & II Funding Estimates  
 Summary 5-Year Phase I Budget by Project Element  
 including Core and Buy-In Costs  
 Environmental and Natural Resources Policy and Training (EPAT)  
 AID/ST/FENR, Project Number 936-5555

Project Element	Project Year 1 Funding	Project Year 2 Funding	Project Year 3 Funding	Project Year 4 Funding	Project Year 5 Funding	Phase I Years 1-5 Funding	Phase II Years 6-10 Funding	Project TOTAL Funding
	----- in \$000 -----							
1. State of the Art Research	1,200	1,350	1,500	1,250	1,200	6,500	8,000	\$14,500
2. Applied Country/Regional Research	650	1,000	1500	1600	1000	5,750	7,500	\$13,250
3. Information and Dissemination	500	700	850	900	550	3,500	3,800	\$7,300
4. Support for Policy Dialogue	350	450	500	500	450	2,250	3,200	\$5,450
5. Institutional Strengthening	250	900	1000	750	350	3,250	4,300	\$7,550
6. Human Resources Development	400	1,000	1500	1200	900	5,000	7,000	\$12,000
7. Implementation/Management	1,200	1,400	1,350	1,550	1,550	7,050	8,400	\$15,450
<b>Total</b>	<b>4,550</b>	<b>6,800</b>	<b>8,200</b>	<b>7,750</b>	<b>6,000</b>	<b>\$33,300</b>	<b>\$42,200</b>	<b>\$75,500</b>

Table III-5.2 EPAT Phase I & II Funding Estimates: S&T CORE COSTS  
 Summary 5-Year Phase I Budget by Project Element  
 Environmental and Natural Resources Policy and Training (EPAT)  
 AID/ST/FENR, Project Number 936-5555

Project Element	S&T Core Year 1 Funding	S&T Core Year 2 Funding	S&T Core Year 3 Funding	S&T Core Year 4 Funding	S&T Core Year 5 Funding	Phase I Years 1-5 Funding	Phase II Years 6-10 Funding	S&T Core TOTAL Funding
	----- in \$000 -----		----- in \$000 -----		----- in \$000 -----			
1. State of the Art Research	1,200	1,350	1,500	1,250	1,200	6,500	8,000	\$14,500
2. Applied Country/Regional Research	50	75	75	50	50	300	450	\$750
3. Information and Dissemination	350	450	500	500	450	2,250	2,550	\$4,800
4. Support for Policy Dialogue	75	150	200	150	125	700	1,000	\$1,700
5. Institutional Strengthening	25	50	55	45	25	200	300	\$500
6. Human Resources Development	250	275	300	275	200	1,300	1,700	\$3,000
7. Implementation/Management	800	975	900	1,075	1,025	4,775	5,475	\$10,250
<b>Total</b>	<b>2,750</b>	<b>3,325</b>	<b>3,530</b>	<b>3,345</b>	<b>3,075</b>	<b>\$16,025</b>	<b>\$19,475</b>	<b>\$35,500</b>

Table III-5.3 EPAT Phase I & II Funding Estimates: BUY-IN COSTS  
 Summary 5-Year Phase I Budget by Project Element  
 Environmental and Natural Resources Policy and Training (EPAT)  
 AID/ST/FENR, Project Number 936-5555

Project Element	Buy-In Year 1 Funding	Buy-In Year 2 Funding	Buy-In Year 3 Funding	Buy-In Year 4 Funding	Buy-In Year 5 Funding	Phase I Years 1-5 Funding	Phase II Years 6-10 Funding	Buy-In TOTAL Funding
	----- in \$000 -----		----- in \$000 -----		----- in \$000 -----			
1. State of the Art Research	0	0	0	0	0	0	0	\$0
2. Applied Country/Regional Research	600	925	1,425	1,550	950	5,450	7,050	\$12,500
3. Information and Dissemination	150	250	350	400	100	1,250	1,250	\$2,500
4. Support for Policy Dialogue	275	300	300	350	325	1,550	2,200	\$3,750
5. Institutional Strengthening	225	850	945	705	325	3,050	4,000	\$7,050
6. Human Resources Development	150	725	1,200	925	700	3,700	5,300	\$9,000
7. Implementation/Management	400	425	450	475	525	2,275	2,925	\$5,200
Total	1,800	3,475	4,670	4,405	2,925	\$17,275	\$22,725	\$40,000

country-specific collaborative research, and support for Mission policy dialogue efforts. Mission responses are summarized in Table III-1, which follows this narrative.

- o Buy-in demand for ENR components of other S&T projects generally has exceeded projections. For example, the APAP II contract established a buy-in ceiling for natural resource-related activities which was reached after less than two years of the five-year contract period. The contractor has had to stop providing further assistance in this area. The APAP contractor believes that, were it not constrained, the buy-in demand could be three times the current ceiling. The buy-in ceiling for EPM has had to be raised more than once to satisfy greater than anticipated Mission demand; the current EPM buy-in ceiling is \$5 million.
- o Other bureaus have expressed potential interest in substantial buy-ins into EPAT as a means of furthering their own project objectives. The Africa Bureau has expressed strong interest in buy-ins to EPAT under NRMS II, which is currently being designed. The former Asia and Near East Bureau, which is designing the Regional Environmental Activities II project, has stated interest in buying into EPAT for training and other activities and more generally in possibly using certain of the research and analysis institutions engaged under EPAT. The Bureau for Private Enterprise expressed interest in possible incorporation of an "environmental PEDS" (Private Enterprise Development Support) component in EPAT.
- o Both economic policy reform/adjustment and ENR issues have grown in relative importance as a priority for both AID and many host governments. The conjunction of these two areas itself has emerged as a high priority for assistance, beginning in Asia where a few Missions (for example, Thailand, Indonesia and Sri Lanka) have or are designing ENR projects with a heavy economic policy emphasis. Other Missions increasingly are deciding to initiate activities combining economic and ENR policy. Much of the APAP II demand, for example, was due to desire of the Missions in Central America to initiate economic and natural resource policy assessments to identify priority areas for assistance. As Missions' priorities evolve in this area, demand for EPAT services

should grow beyond what Missions currently are projecting.

Two factors are likely to have a substantial influence on the level of Mission buy-in demand:

1. **Quality and Responsiveness of EPAT Teams.** Projects such as APAP have had a high level of buy-in demand in part because they have responded quickly to Mission needs and have established a reputation for fielding highly competent teams and tightly managing those teams. Projects in S&T and elsewhere which the Missions do not perceive as having these attributes have not approached their buy-in projections. This seems to be the case particularly where projects combine research and technical assistance in a single set of institutions which view research as their primary mission. (Conversely, the design team encountered criticisms that projects combining research and technical assistance under a prime contractor which viewed technical assistance as its prime mission did not give sufficient priority to research.)
2. **Ease of Buy-Ins.** A major determinant of response time is not just the contractor or cooperating institution but AID itself. Mission and regional bureau persons interviewed stressed that buy-ins will be higher if the buy-in process itself is administered rapidly and efficiently by S&T/FENR and the grants or contracts office supporting S&T/FENR. Also, there are a number of projects with ENR components throughout FENR, Agriculture, Rural Development, and other S&T offices; a Mission with a given need may not be at all certain which of these projects is most appropriate as a source of assistance. As a consequence, there is a strong desire to have some mechanism for rapidly helping Missions determine the appropriate project(s) to buy into. These twin needs for rapid AID/W response and for assistance in routing buy-in requests imply a need for substantial AID/W administrative support.

Because of the likely high buy-in demand for EPAT services and the history of grossly underestimating demand for similar types of services under APAP, EPM and other projects, it appears prudent to authorize a very liberal buy-in ceiling for this project. Also, as experience with APAP and other projects has shown, multiple ceilings -- on aggregate dollars, aggregate person-months and, thus, expenditures by topic area as well as by project element -- would overconstrain and seriously limit EPAT's ability to respond constructively to Mission needs.

TABLE III-6  
Buy-In Interest

	RESEARCH	COUNTRY RESEARCH	INSTITUTIONAL DEVELOPMENT	TRAINING	POLICY DIALOGUE	COMMENTS
<b>AFRICA (cont.)</b>						
Mali	--	--	--	Possible	Possible	Land tenure center currently researching forestry code
Morocco	Possible	Possible	Possible	Possible	Possible	High interest Too early to determine buy-ins
Mozambique	Low	Low	Low	Low	Low	
Niger	--	--	--	--	--	High interest Depends on start up time of the project and ASDGII
Nigeria	--	--	--	Possible	--	Interest in collaboration w/EPA and FEPA
Rwanda	--	--	High	High	--	

	RESEARCH	COUNTRY RESEARCH	INSTITUTIONAL DEVELOPMENT	TRAINING	POLICY DIALOGUE	COMMENTS
<b>AFRICA (cont.)</b>						
Senegal	--	--	--	--	--	Interested but waiting on NRMS assessment
Tanzania	Low	Low	Possible	Possible	Low	
Togo-Benin	--	--	--	--	--	High interest - suggested looking at OAR/TOGO document
Tunisia	--	Low	Low	Low	--	
Zaire	--	Possible	Possible	Possible	--	High interest FY91
Zimbabwe	--	Possible	--	Possible	--	High interest
REDSO/ESA	--	--	--	Possible	Possible	Cannot predict buy-ins from all Missions in region
REDSO/WSA	--	--	--	--	Possible	Cannot predict buy-ins

	RESEARCH	COUNTRY RESEARCH	INSTITUTIONAL DEVELOPMENT	TRAINING	POLICY DIALOGUE	COMMENTS
<b>LATIN AMERICA</b>						
Barbados	Medium	--	--	Medium	Medium	
Costa Rica	--	--	--	--	High	Possible interest in other areas FY92
Dominican Republic	--	Possible	Possible	Possible	--	Too early to determine
El Salvador	Low	Medium	High	High	Medium	
Ecuador	--	Possible	Possible	--	Possible	Work w/ existing projects - FUNDAGRO IDEA, SUBIR
Guatemala	--	--	Possible	Possible	--	Overlap with RENARM?
Jamaica	--	Possible	Possible	Possible	--	Interested, too early to determine
Mexico	Low	Low	Low	Low	Low	

	RESEARCH	COUNTRY RESEARCH	INSTITUTIONAL DEVELOPMENT	TRAINING	POLICY DIALOGUE	COMMENTS
<b>LATIN AMERICA (cont.)</b>						
Panama	Low	Low	Low	Low	Low	Designing NRM project to access local policy research and training
Peru	--	--	Possible	Possible	--	Public institutions in transitional period
ROCAP	High	High	Low	High	Medium	
<b>ASIA</b>						
Indonesia	Medium	Medium	Medium	Medium	Medium	May overlap with NRM project
Thailand	Low	Low	Low	Low	Low	

## **IV. IMPLEMENTATION AND MANAGEMENT**

### **A. Implementation Options and Recommendations**

The design team identified and evaluated a variety of implementation options in terms of the following objectives set forth in collaboration with S&T/FENR:

- o To assure responsive technical assistance while at the same time protecting core research activities;
- o To support sufficient core research at a few institutions to make a significant contribution to development of their multidisciplinary economic and environmental policy programs while at the same time being able to access a broader range of research and analysis capabilities at other institutions;
- o To foster competition among prospective participants, with one of the major competitive evaluation criteria for the research and training being the commitment of institutions to develop their programs in these areas, as evidenced by research cost-sharing, development of curricula for their own courses, or other measures;
- o To assure that AID has a substantial voice in planning and project direction;
- o To achieve close collaboration among participating research, training and technical assistance institutions while at the same time having clearly defined lines of responsibility and accountability for performance; and
- o To limit the number of institutions reporting directly to AID to one which S&T/FENR can administer and oversee effectively.

Two options were evaluated in detail. Each has pros and cons in terms of the above objectives. The two options are portrayed graphically in Exhibits IV-1 and IV-2.

The first option is competitive award of a single contract to carry out all activities under the project, including state-of-the-art and applied country research, information and dissemination, support for Mission policy dialogue, institutional strengthening, and training.

Under this option, the prime contractor would manage one or more subcontractors, presumably including both university or other research institutions and private technical assistance providers.

The second option is to have (a) one or more cooperative agreements to undertake core research and directly related applied in-country research and training activities and (b) a separate contract to provide responsive technical assistance, applied in-country research which is less closely tied to the core research agenda and associated training. This option would require mechanisms for achieving needed coordination between the cooperator(s) and the contractor.

We gave consideration to the first option because, at first blush, it appeared simpler and less demanding on AID's scarce managerial staff. However, on further reflection we concluded that there is no way to determine a priori which option imposes the heavier burden on AID. By separating implementation of the core research, dissemination and associated training from Mission and regional bureau driven technical services, option 2 imposes on AID the task of developing and implementing a process for assuring close coordination and collaboration among the various implementing parties. While this is doubtless a major undertaking, we doubt that option 1 -- a single umbrella contract to implement all project components -- would lighten the burden. To carry out all phases of the project, the umbrella contract would have to include a substantial number of institutions of different kinds. Assuring the coordination and collaboration needed for project success without a heavy AID management input would require a very strong lead management institution which is prepared to put aside its own institutional interests in one or more components of the project, and to manage it strictly on AID's behalf. We do not think this is realistic. If the lead institution is a private firm, it is likely that competition for resources between institutions within the umbrella contract would generally be resolved in favor of technical support for Missions. Conversely, if a university or research institution were to be chosen for the lead role, there is substantial danger that resources would gravitate to core research at the expense of responsive support for Missions and regional bureaus. Perhaps AID could intervene in these intra-contractual dynamics to assure a "level playing field," but it would be very difficult and time consuming. The upshot is that under either option the responsibility for assuring that all project elements are carried out well, and that implementing institutions collaborate in ways necessary to achieve overall project purposes must rest with AID management.

Based on the design team's recommendations and our own assessment of what is required for project success, we have chosen the second option -- one or more cooperative agreements for core research and related activities and a separate contract for technical assistance and associated activities primarily in support of Missions and host countries. The primary reasons for selecting this option are that:

- o It will better insulate core research from the demands of responsive technical assistance, while at the same time ensuring that resources are

available to support Missions (a strong criticism of projects combining research and technical assistance under a single contract is that one or the other suffers);

- o Research planning and management really should be flexible and collaborative rather than fixed, as is required in a contract scope of work, particularly in a field as young as and evolving as rapidly as the environmental economics field;
- o The collaborative agreement mechanism best allows for both cost sharing by U.S. institutions and support of collaborating LDC institutions once they are selected; and
- o In a field as rapidly evolving as this one, AID should maintain a greater role in program direction and management than it would have with a single contractor as project manager.

The remainder of this section discusses implementation of each of the project activities.

EXHIBIT IV-I - IMPLEMENTATION OPTIONS  
OPTION 1

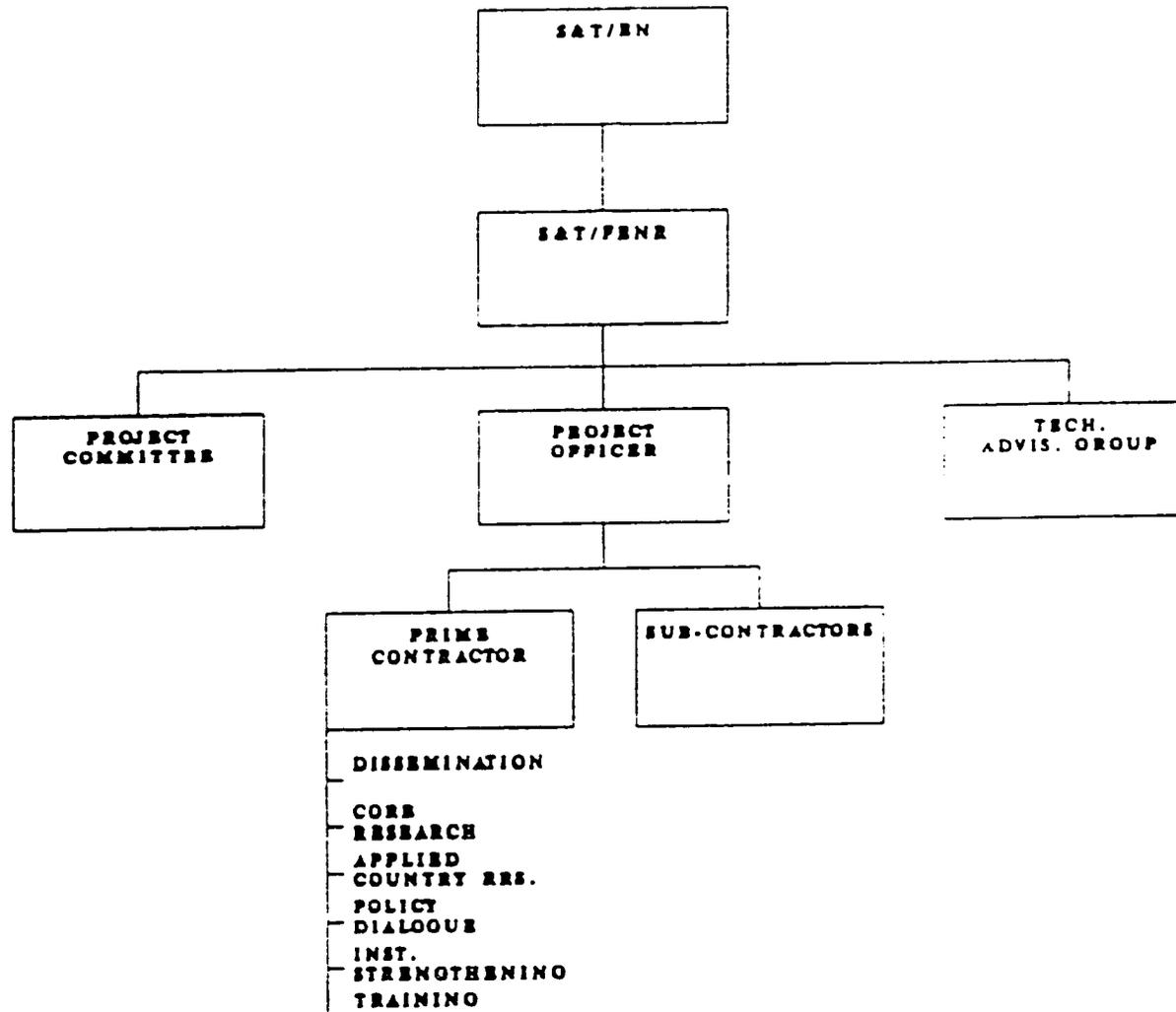
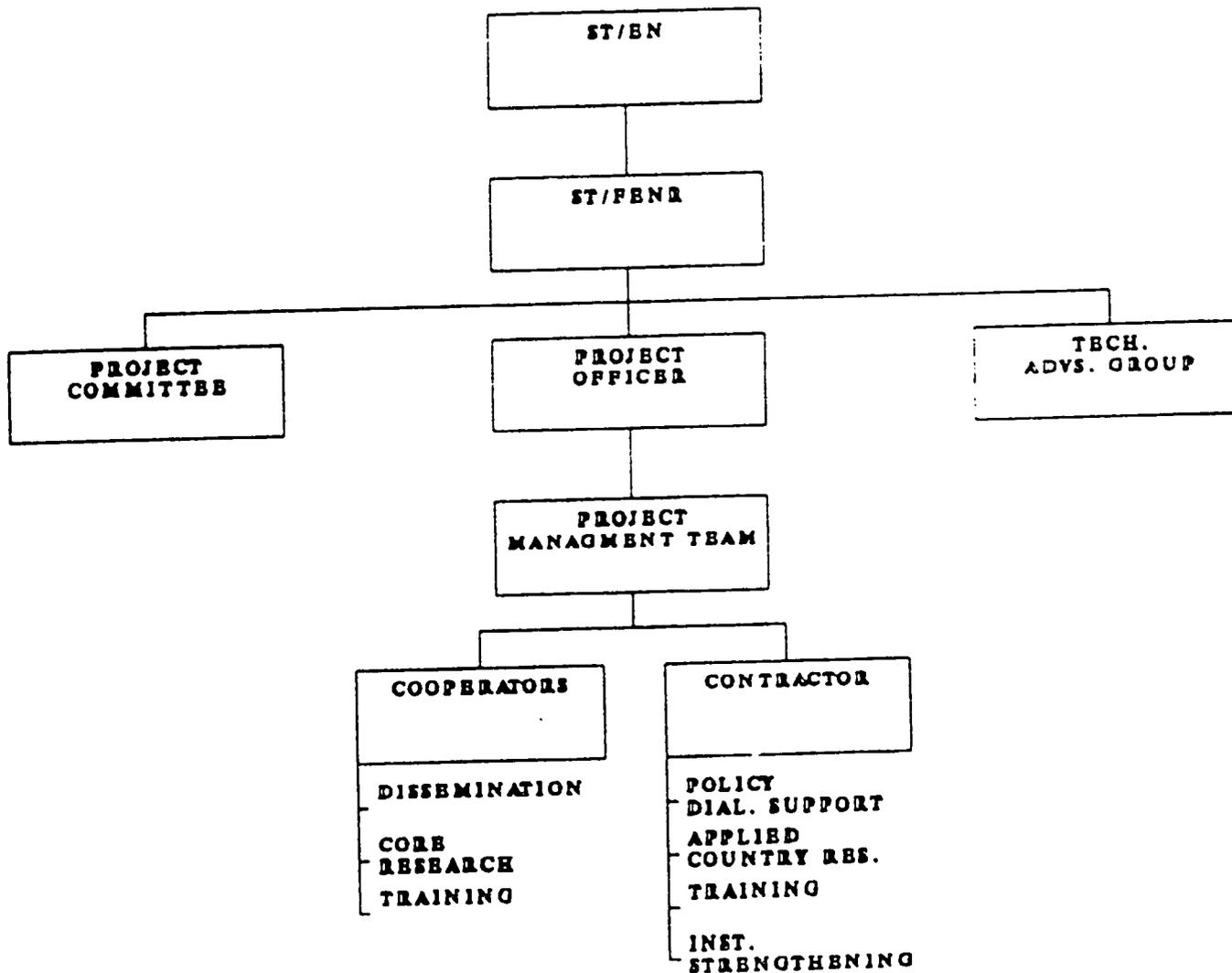


EXHIBIT IV-2 - IMPLEMENTATION OPTIONS  
OPTION II



## 1. Core State-of-the-Art Research

The interaction between government/economic policy and ENR quality has been a formal area of research, analysis and academic training in the U.S. for at least the last thirty years, beginning with pioneering analysis of government subsidies related to water resource pricing in the West and Southwest, National Park Service entrance fees, various U.S. Department of Agriculture programs, and Bureau of Land Management grazing and mining permits and fees.

Within the past decade, small centers of research into similar relationships in developing countries have begun to emerge at many institutions in the U.S. and Europe. More recently, a few universities in the U.S. have developed or are considering general undergraduate courses, advanced degree specializations, and postdoctoral programs dealing with economic and environmental relationships in developing countries. Similar programs are emerging in other countries. A recent survey for AID identified more than 200 institutions worldwide with some activity underway in these areas.<sup>1</sup> Few if any represent truly integrated, multidisciplinary scholarship into developing country economic and ENR relationships.

Table IV-1 presents a partial list of U.S. institutions with a commitment to and expertise in this area. The list includes academic institutions (both Title XII and other), non-profit research institutes, private contractors, and private voluntary organizations (PVOs).

Because of the multiplicity of emerging centers and the fact that many institutions appear willing to provide significant support for such centers from their own resources, this project will provide partial support to a number of institutions rather than concentrate support on one.

Another reason for supporting a number of institutions is that the field of economic/environmental interactions in developing countries still is in its infancy, and many of those now working in the field have strong and generally differing views of optimal policy prescriptions. Moreover, few have incorporated a multidisciplinary approach to assessing the institutional, political, cultural, social and microeconomic factors which determine the feasibility of implementing remedial economic policy options. For these reasons, rather than supporting one or a few points of view, AID can best contribute to knowledge-building by supporting research and analysis from a number of perspectives as well as by fostering discussion and collaboration among those working on similar problems.

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<sup>1</sup> IIED/UCL London Environmental Economics Centre, Directory of Environmental Economics Research in the Developing Countries: Report to the U.S. Agency for International Development, May 1990.

## ILLUSTRATIVE INSTITUTIONS

Non-profit policy institutions	Academic Institutions	Host Country/Regional Institutions	Implementation Oriented PVO's
Resources for the Future (RFF)	Harvard/HIID	Host Country Ministries of: -Natural Resources -Agriculture -Finance -Planning	WWF
International Institute for Environmental Development (IIED)	Duke/UNC/NC State	Indigenous PVO's	Nature Conservancy (NC)
International Food Policy Research Institute (IFPRI)	Tufts - Center for Envr. Management	CATIE	Conservation International (CI)
World Wildlife Fund (WWF)	University of Michigan		Missouri Botanical Gardens
National Research Council (NRC)	UC Berkeley		Debt for Development Coalition
National Academy of Sciences (NAS)	Yale		Smithsonian Institution
Institute for International Economics (IIE)	Stanford		Natural Resources Defense Council (NRDC)
Academy for Educational Development (AED)	MUCIA, SECID, CID		Sierra Club
World Resources Institute (WRI)	Organization of Tropical Studies (OTS)		Environmental Defense Fund (EDF)

The most appropriate vehicle for the project to support core long-term research, analysis and related activities is the **cooperative agreement**. This vehicle enables AID to have a strong voice in planning and management of research and analysis, accommodates co-financing by the cooperating institutions themselves, and offers the flexibility to alter research and training programs as more is learned over the ten-year life of the project. The design team felt that the Collaborative Research Support Program (CRSP) mechanism, which currently is being used by S&T/AG to launch a new initiative in sustainable agriculture, provides too little AID involvement in research planning and management to accomplish EPAT objectives. The field is evolving so rapidly that the specificity of a contract scope of work fixed for even half the project's ten-year life would unduly constrain the research effort and make it difficult to respond to new research priorities as they emerge. Subcontracting research to universities or non-academic research institutions under a prime contract which also includes technical assistance could endanger the long-term research activities as the prime contractor endeavors to respond to an expected high level of buy-in demand for short-term technical assistance. The single-contract option also probably would preclude cost-sharing by the research institutions.

AID could award one or a limited number of cooperative agreements based on proposals that respond to a competitive solicitation. The decision whether to enter into one or more cooperative agreements can be based on review of Expressions of Interest already submitted by prospective participating institutions, and of proposals to be received in response to an RFP.

Presumably, any cooperative agreement will be with a group of collaborating institutions. Since AID experience with award of cooperative agreements or CRSPs to consortia has not always been satisfactory, it is important that the Request for Proposals identify management arrangements and clear responsibility and accountability as a major evaluation criterion. Should AID decide to have more than one such agreement, it also is important to provide a mechanism for regular consultations and collaboration among the participants in all cooperative agreements. Similarly, there also must be a mechanism for collaborative work planning and project review involving AID, the lead institution for each cooperative agreement, and the technical assistance contractor.

Cooperative agreements will fund core state-of-the-art research (including initial synthesis/guidelines and methods development), core training, and associated dissemination activities. Cooperative agreements also will provide for Mission buy-ins for applied in-country research and for short-term assistance in support of Mission policy dialogue where it relates closely to core research.

Cooperative agreements will be based on competitive proposals. Judging by the large number of responses to a solicitation inviting institutions of all types to submit expressions of interest, it is highly likely that AID will receive many competitive proposals. Whether it selects one, two or three competitive proposals, therefore, AID will be limiting itself to a relatively small subset of institutions working in areas of interest. At the same time, the

range of issues to be addressed and expertise required over the initial five years of the project -- the duration of the first cooperative agreement(s) -- is extremely broad and cannot be foretold with accuracy at this time. To provide access to a broader range of U.S. expertise when it is needed, and also to provide a mechanism for supporting collaborating LDC institutions as they are selected, any cooperative agreement should include provisions for entering into sub-agreements. The provisions -- to be worked out in conjunction with the AID Contracts Office -- should probably specify both a minimum and a maximum percentage of the total cooperative agreement value. The limit should be at least 20 percent of the cooperative agreement total.

Once implementing organizations are selected and cooperative agreements are negotiated, research planning and execution will proceed as described in Section IIC above. (The TAG and Project Committee and their roles in research planning are discussed later in this section.)

The design team projects a relatively small number of outputs, instead concentrating core research on a few priority areas (the draft research agenda recommends only five core research modules, although within each 3 or 4 priority ENR problem areas would be addressed). The design team projects the following outputs of the core research project element:

- o Publication of at least 7 methodological or research synthesis documents -- including an economic/ENR policy manual for USAIDs, computer models or other tools for identifying and analyzing priority areas for policy intervention, valuation methods or models, methods for establishing natural resource prices or user fees, and synthesis of research and field experience in at least 3 topic areas -- within the first 24 months of the project. An additional 6 improved methods/models or synthesis documents will be disseminated by the end of the project; and
- o Core research completed in 6 priority areas (assuming one is added later based on TAG recommendations), each with field research in at least three countries.

**2. Applied In-Country Research**

Applied in-country research, which will be largely funded by buy-ins, may be carried out by the core research cooperator(s) where such research either relates closely to planned core research or is in a subject area which AID and the cooperator(s) feel could become an EPAT priority. Where carried out by the core cooperator, applied research will supply valuable case study materials and insights to underpin the core research.

Outside these bounds, applied in-country research will be carried out by a requirements contractor. Most applied research is likely to be closely related to policy dialogue, to require rapid mobilization of research teams and to be subject to time pressures which cannot always be foreseen. The contractor is better able to respond in such an environment; and its use for this purpose enables core research to proceed undiverted.

Despite these distinctions, delineation of contractor and cooperator roles will not always be clear. Nor should they be. Even within APAP (the single-contractor model), the contractor must send prospective analysis or technical assistance teams to one or two of the core research/training institutions to absorb analytical methods and insights before going out to the field. There also are occasions where it is desirable to field mixed contractor-research teams. The AID coordinating and management process must provide some assurance that these types of decisions will be made and implemented in a timely manner. Otherwise, Missions are likely to take their business elsewhere.

Projected outputs for this component are:

- o Applied in-country research completed in 12 countries (which, assuming a nine-year life to this project component and that each research project lasts on average 18 months, implies an average of 2 applied in-country research projects underway at any one time).

### 3. Information and Dissemination

The cooperating institution(s) undertaking the core research program will undertake its (their) own dissemination. It may receive support from an ENR Information Center described below. In the same way, the contractor will undertake dissemination of its products (policy analyses, applied in-country research reports) which have applicability beyond the immediate client. Each research or technical assistance project will have a dissemination plan that includes, at a minimum, publications tailored to the purpose and audience of the research and inputs to training and other technical assistance activities. Each research plan will also include a liberal budget for dissemination (one highly respected ENR research institution budgets fully 1/3 of its research and analysis budget for dissemination).

S&T/FENR plans to establish (outside of EPAT) an ENR Information Center inter alia to collect and disseminate useful information on economic and ENR trends, research findings, and project experience to developing and developed country policymakers, advisors, project managers, and others, and to facilitate information sharing among the many A.I.D. project and NPA activities which relate to ENR issues. While the Center has yet to be fully elaborated, we assume that its products will include:

- o An inventory of all AID ENR projects, updated at least annually;

- o A database of key ENR indicators;
- o An annual report on Agency ENR activities; and
- o An ENR newsletter.

If the Center is formed, EPAT should contribute funding to provide services including supporting contractor and collaborator report production and dissemination activities, establishing an economic/ENR data base, and producing regular newsletters on EPAT activities, issues and accomplishments. If the Center is not formed, these functions should be carried out by the EPAT contractor.

#### **4. Mission Policy Dialogue Support, Institutional Strengthening, and Related Activities**

Upon request of individual Missions or regional bureaus, the project will support short- and long-term technical assistance to help host governments identify, analyze and implement policy actions which have the potential to slow or reverse ENR degradation and to develop host country institutional capabilities in these areas. The project will provide core funding for initial site visits to countries to identify problems and options, set priorities, and prepare and negotiate scopes of work for more intensive work. Thereafter, technical assistance will be supported by Mission or regional bureau buy-ins.

**Buy-Ins to Other Projects.** In many cases, initial discussions with Missions will determine that the most appropriate source of desired assistance is not EPAT but another project such as EPM, APAP, the new Sustainable Agriculture CRSP, or other AID projects. In such cases, the EPAT project team will work closely with Missions to identify appropriate sources of assistance for each request.

EPAT also will provide the ability to access EPA, USDA, and other U.S. government institutions via RSSA or other appropriate mechanisms. It will maintain open lines of communication and cooperation with these organizations, in order to respond quickly to Mission needs. Where appropriate, EPAT will include someone from EPA, USDA or other agencies on initial site visits.

**Requirements Contract.** To carry out the technical assistance which is to be provided directly by the project itself, as well as related training and dissemination activities, AID will competitively award a requirements (Q) contract. A contractor or other institution with a history of providing such services is considered best able to put together and manage responsive, applied research and technical assistance, and to carry out related training, institutional strengthening and dissemination activities.

The requirements (Q) contract, which does not specify either a ceiling or a contractual level of effort, is the most flexible vehicle for accessing contractor technical

services when, as in the case of EPAT buy-ins, the precise level or nature of Mission demand cannot be estimated with any precision. However, the Q contract should include provision for a Chief of Party who devotes full time to the project, including coordination with the research team, and a full-time assistant to help prepare scopes of work (in concert with design experts sent out under core S&T/FENR funding), recruit technical assistance teams, and monitor team progress, costs and reporting. If this requirement cannot be stipulated in the scope of work of the Q contract itself, AID should issue an RFP for and award to the same bidder combined Q and core-funded contracts, with the latter covering the core staff and other core functions.

**Collaboration with Research Institution(s)** . It is important to assure collaboration between research and technical assistance implementing organizations. Technical assistance should be based in part on research results (including improved analytical methods), and technical assistance findings should feed into the research program. At a minimum, both the Q contract and cooperative agreement scopes of work should mandate close coordination with the other parties. This will have to be supported by a formal coordination/collaboration process to be managed by AID itself. This process is described later in this section. In addition, the project should have, and be encouraged to use, a mechanism for drawing on core research personnel for technical assistance assignments in their areas of expertise and to enable U.S. cooperators to participate in the process of strengthening of in-country research and training institutions. Since technical assistance is to be funded almost entirely by buy-ins, this could be accomplished by authorizing buy-ins to the research cooperative agreement(s) to provide technical assistance services. Since Missions and AID/W bureaus can buy into the project as a whole, where necessary S&T/FENR can split buy-in funding between the contractor and cooperator(s).

The design team estimates that the project will provide short-term (1 to 6 months) assistance to six Missions per year and longer-term policy dialogue or institutional strengthening support, averaging 18 months, to an average of three Missions per year. Short- and long-term assistance will be provided primarily by the Q contractor, but also by collaborating research institutions or by EPA and other government agencies accessed via RSSAs or other means.

## **5. Training**

Developing and presenting the Economic/ENR Policy course will be the responsibility of the primary core research institution. This course will draw heavily on the core research component of the project, and trainers should be drawn in part from the core researchers.

The Environmental Policy and Regulation course may be implemented by EPA through a RSSA. The latter is an easy way to tap into the depth of expertise and experience available at EPA and would have the additional benefit of establishing informal linkages

between EPA personnel and staff in the numerous, fledgling, EPA-like organizations around the world. If it is not undertaken by EPA, this course should be developed by a primary core research institution addressing environmental regulatory policy issues.

Both these courses will be developed in the first year of the project and initially offered in the second year. By the third year, they will be able to be offered in the field if there is sufficient demand.

The short Environmental Education workshop/course for senior policy makers and NGOs should be developed by the contractor, drawing on the substance of the other two core courses. It also may be desirable for the contractor to use instructors from one or both of those core courses in the Environmental Education course.

This course will be developed after the other two courses have been fully developed (i.e., in the second year of the project).

Decisions regarding support for future modifications of core courses or development of new ones will be made by S&T/FENR, taking into account the views of the Project Committee and the TAG, and the findings of the training needs and resources survey described in Section IIC above. FENR will also need to determine which institutions should be engaged in the work of course preparation/modification.

Presented below is a projection of training outputs.

Expected Products

	Total # Courses	Total # Participants
Econ Policy & the Env.	9	180
Environ. Policy & Reg.	9	180
Environ. Education	<u>6</u>	<u>180</u>
	24	540

(Includes courses developed or modified with EPAT support. "Participants " include all course participants, not only those supported through EPAT).

Exhibit IV-3 summarizes time-phased component outputs discussed in this section.



**B. AID Project Management**

AID management responsibilities for EPAT will be assigned to a Project Officer within S&T/FENR. The responsibilities of the Project Officer are substantial and must be carried out effectively if the project is to succeed.

Specific responsibilities of the A.I.D. Project Officer include:

- o Overseeing technical aspects of cooperative agreement and contract solicitation and selection;
- o Reviewing and approving the project's core research, dissemination and training programs;
- o Overseeing contractor/cooperator collaborative work planning, and review and approving the EPAT annual work plan and any revisions in project component activities;
- o Receiving and reviewing all requests from the field and AID/W for EPAT services and obtaining field mission clearance for travel of all project personnel;
- o Overseeing the technical review of all project outputs, except interim research reports, before they are distributed within and outside A.I.D.;
- o Reviewing and approving any proposed changes in core project personnel;
- o Reviewing and approving the selection of consultants proposed by the cooperator or contractor;
- o Obtaining mission or appropriate AID/W office evaluations of all buy-in funded activities under the project; and
- o Scheduling and coordinating Project Committee and Technical Advisory Group activities, internal management reviews, and external project evaluations.

The Project Officer will be assisted in the performance of these functions by staff to be recruited under RSSAs, IPAs, AID hiring mechanisms or, in the case of support personnel, contracts. The project officer will also be assisted by an EPAT Project Committee composed of the Director of S&T/FENR as Chairman, the EPAT Project Officer as Vice Chairman, and representatives of appropriate S&T offices and other AID/W bureaus. The

Project Committee will be convened as determined by the Chairman, but no less frequently than semi-annually (and more frequently in the initial stages of the project). The Committee will review and comment on:

- o Cooperator long-term research and training development plans;
- o EPAT annual workplans and cooperator/contractor progress reports;
- o Efficacy of dissemination and other activities to influence host country and international policies;
- o Effectiveness of EPAT efforts to collaborate with and draw on the expertise of other A.I.D. projects.

Additionally, the Committee will serve as a forum for interested AID offices to discuss economic and environmental policy issues of mutual concern.

The Project Officer will chair an internal project planning and implementation team, hereinafter called the Project Management Team (PMT), composed of the lead research cooperator (or, if there is more than one cooperative agreement, the lead of each cooperator group), and the contractor Chief of Party. The PMT will meet frequently during the initial work planning and project start-up phases to assure coherence and integration of plans and start-up activities. The PMT will meet at least quarterly during the second and subsequent years to review project progress and activities and recommend changes as appropriate. PMT members also will consult together frequently by phone.

The PMT, or more accurately, the process of which the PMT is a part, is critical to the success of EPAT because the research and technical assistance components of the project will be carried out under separate implementing arrangements. Distinctions between the two arrangements, in many instances, will be blurred. It may be desirable, for example, to have a contractor team member participate with the core researchers in preparation of guideline documents (as APAP did). In many cases, contractor-led applied research, policy dialogue support, and institutional strengthening teams are going to have to spend considerable time at the cooperator institution(s) in order to absorb analytical tools and insights developed by the researchers; and the researchers must get practical, field feedback and suggestions from the contractor teams. Training courses may include instructors from both the cooperator(s) and contractor, and some courses -- especially when moved to the field -- may be transferred from the cooperator(s) to the contractor.

The S&T/FENR Project Officer will be assisted by AID direct hire, RSSA, and/or contract staff as appropriate who, in addition to carrying out Project Officer responsibilities (as previously enumerated) under delegations of authority, will provide administrative support including but not limited to:

- o Using a computer information system to track project core and country-specific research, training and technical assistance activities and to monitor the progress of project buy-in requests;
- o Providing a manual information system to store and track project reports, published materials, and other printed outputs;
- o Providing administrative support in the preparation of budgets, buy-ins and other documents necessary to execute buy-ins to other projects or PASAs/RSSAs to access services of U.S. Government agencies;
- o Administratively supporting the various project planning and coordination mechanisms including the EPAT Project Committee, the PMT, and the Technical Advisory Group;
- o Project monitoring; and
- o Providing general project administrative support.

### **C. Technical Advisory Group**

Following award of the cooperative agreement(s) and Q contract, S&T/FENR will form a Technical Advisory Group (TAG) composed of 6-10 experts in economic and environmental policy. These experts may be affiliated with academic or research institutions, private voluntary organizations (PVOs), private for-profit companies, other donors or other organizations. However, in their capacity as TAG members, they will not represent any particular institution, class of institution or geographic area. The TAG will be convened by S&T/FENR at least semiannually. It will review and comment on:

- o Overall project priorities and work planning;
- o The core research agenda and training plans;
- o EPAT annual workplans and cooperator/contractor progress reports;
- o Research proposals submitted by the cooperative agreement institutions;
- o Core research in process;
- o Policy research findings and reports;
- o Research dissemination plans;

- o Project evaluations, including summaries of evaluations of buy-in activities; and
- o Possible changes in direction or priorities of EPAT in light of trends in host countries, and international needs and policies.

The TAG will not be a statutory government board. TAG members will be chosen by the Director of S&T/FENR based on their individual qualifications. At the same time, FENR understands the need for institutional balance and to plans to give favorable consideration to participation of LDC experts in considering individual nominations.

#### **D. Implementation Plan**

##### 1. Implementation Schedule

May 1990	EPAT PID reviewed by EN Sector Council
July 1990	IQC Task Orders for project design signed
January 1991	EPAT Project Paper reviewed by EN Sector Council
"	Project authorized
April 1991	FENR RSSAs with USDA and EPA signed
June 1991	Cooperative agreement(s) and Q contract awarded
August 1991	Cooperative agreement(s) and Q contract signed
January 1992	FY 1992 funds obligated
January 1993	FY 1993 funds obligated
September 1993	First external evaluation of all project components
January 1994	FY 1994 funds obligated
January 1995	FY 1995 funds obligated
September 1995	Second external evaluation of all project components
January 1996	FY 1996 funds obligated

August 1996	Cooperative agreement(s) and Q contract signed for second five years of project
January 1997	FY 1997 funds obligated
January 1998	FY 1998 funds obligated
September 1998	Third external evaluation of all project components
January 1999	FY 1999 funds obligated
January 2000	FY 2000 funds obligated
September 2000	Final external evaluation of all project components
August 2001	Project Assistance Completion Date

## 2. Schedule of Major Activities and Implementing Agencies

<u>Date</u> <u>Action Begins</u>	<u>Action</u>	<u>Responsible</u> <u>Agency</u>
July 1990	Cables sent to AID Missions worldwide summarizing project and seeking input	AID
Sept. 1990	Expressions of interest in EPAT solicited	AID
Dec. 1990	Second cable sent to Missions updating information and asking for specific information on host country and Mission interest	AID
January 1991	Pre-solicitation conference	AID
February 1991	Project Committee meets	AID
March 1991	RFPs completed	AID
"	Bidders ' conference	AID
June 1991	TAG selected	AID
July 1991	Initial meeting of TAG	AID/TAG

August 1991	Negotiations of workplans with cooperative agreement institutions and Q contractor	AID/implementing institutions
"	Initial meeting of PMT	"
Sept. 1991	Work begins on	
	- preparation of syntheses and guidelines	cooperators
	- methods development	"
	- core research modules	"
	- design of core courses	"
	- applied country/regional research	Q contractor
	- support for policy dialogue	"
	- institutional strengthening	"
Dec. 1991	Review of training needs assessment and resources survey; decision on new core courses to be designed under EPAT	AID
Jan. 1992	First EPAT newsletter distributed	AID/PMT
Sept. 1992	Publication of first synthesis documents	cooperators
Dec. 1992	Dissemination of first synthesis guidelines	"
Jan. 1993	Core courses offered for the first time	"
Feb. 1993	Begin adaptation of core courses to make them suitable for presentation to senior policy makers and NGOs	"
Oct. 1993	First presentation of adapted courses for senior policy makers and NGOs	"
Jan. 1994	First presentation of core courses in the field	"
March 1996	RFPs completed for rebid of cooperative agreement(s) and Q contract	AID

### 3. Procurement Activities

#### a. Commodities

Each implementing and project management institution will be responsible for procurement of the office equipment and supplies which it requires to carry out its responsibilities under the applicable cooperative agreement, contract of RSSA. Likewise, grants to, and sub-agreements and sub-contracts with other institutions will include provisions describing procurement arrangements. Missions and/or regional bureaus are expected to provide all equipment and supplies needed to support work done by EPAT implementing institutions under buy-ins. As appropriate, this may include funding (or partially funding) for commodities and services procured for use by implementing institutions outside the applicable country or region.

#### b. Research and Technical Assistance

AID will issue RFPs to procure technical services as described in Section IIC of this document. One or more cooperative agreements and a requirements (Q) contract will be awarded following technical review of proposals submitted. It is likely that awards will be made to groupings of U.S. universities, research institutions, NGOs, and private for-profit firms.

Pursuant to Section 579 of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1990 (Public Law 101-167) and AID Acquisition Regulation (AR) Notice 90-2, the RFP for the Q contract will contain language to the effect that not less than ten (10) percent of the dollar value of the contract must be subcontracted to disadvantaged enterprises as that term is defined in the aforementioned AIDAR notice (unless the contracting officer, with the concurrence of the Director of AID's Office of Small and Disadvantaged Business Utilization, certifies that there is no realistic expectation of U.S. subcontracting opportunities and so documents the file).

The RFP for the core research and related dissemination and training elements of the project will indicate that each cooperative agreement awarded (if more than one) will contain cost-sharing provisions consistent with AID regulations and the purpose of the project.

The lead management institution under each cooperative agreement will be expected to enter into sub-agreements with other U.S. institutions where elements of its work plan agreed to by AID can best be carried out by institutions outside the cooperative agreement. Cooperative agreements will probably indicate both a floor and a ceiling for such sub-agreements in terms of a percentage of the dollar amount of the agreement over its life. To assure broad participation, the ceiling should be at least 20 percent.

Sub-agreements (including grants or sub-contracts) with host country institutions are also anticipated in instances in which:

- the latter can make a useful contribution to in-country case studies undertaken as part of the core research program, and
- (perhaps) in-country or regional training institutions need to be engaged to adapt and present core courses overseas.

If the research and/or training agenda changes substantially over the life of the project in ways which suggest to AID that institutions other than those with which cooperative agreements were originally signed are better qualified to implement a major portion of the work, AID may, at its discretion, enter into new cooperative agreements, contracts, grants or RSSAs.

The Q contractor also will need to purchase technical services from various sources -- mainly U.S. firms, NGOs and academic institutions -- to meet the specific needs of particular AID-assisted countries where such technical expertise cannot readily be accessed from the institutions which hold the contract. For that purpose, a major responsibility of the contractor will be maintenance of a roster of individuals and institutions with skills and experience in subject matter and geographic areas of interest to EPAT.

Generally, agreements with host country institutions for applied in-country research, provision of training services, dissemination, or services ancillary to any of the above will be entered into by AID Missions. However, in some instances, e.g. Eastern Europe and "key countries" in which AID maintains little or no resident staff, it may be advisable for the Q contractor to enter into agreements using funds provided by Missions or regional bureaus.

Achievement of EPAT project goals will frequently require the participation of individuals with the highest academic qualifications, broad experience and acknowledged expertise. In this regard, it needs to be stressed that 1) the relationship between economic policy and ENR degradation/depletion in developing countries (and conversely the use of economic policy instruments to ameliorate/reverse degradation/depletion) is a relatively new area, and 2) contributing to policy change in developing countries and at the international level requires both acknowledged subject matter expertise and the ability to interact constructively with individuals at all levels, including the highest. Accessing individuals with the requisite preparation, experience, disposition and skills will often require compensation at levels exceeding the maximum provided for under AID regulations. We therefore anticipate frequent requests to waive maximum compensation regulations.

### c. Training

Design and conduct of EPAT-sponsored core courses will be the responsibility of the cooperator(s). In some instances, elements of the courses are already offered by training institutions in the United States and overseas. (We should have a better fix on this following completion of a training resources survey to be undertaken outside of EPAT.) Where this is the case, the cooperator(s) will enter into sub-agreements which will supplement the resources of the training institution to strengthen courses and adapt them for LDC audiences.

Selection of participants and related services, such as testing, orientation, travel and evaluation, will probably be handled by an institution contracted (outside of EPAT) to manage the growing volume of AID-sponsored environmental participants. The expenses of participants will be covered by sponsoring institutions, including Missions and regional bureaus under buy-ins.

## V. PROJECT MONITORING PLAN

### A. Project Monitoring Responsibilities

The ST/FENR Project Officer has the primary responsibility for monitoring the progress of this project and all its parts on behalf of AID. The Project Officer will be assisted by the Project Management Team (PMT), which he/she chairs.

The PMT is responsible for, among other things, developing and coordinating annual work plans and objectives and overseeing day to day implementation of the plan. As leader of the PMT, the ST/FENR Project Officer plays a leadership role in assuring that the PMT conducts periodic and, as necessary, special technical, administrative and financial reviews of progress and direction under the project.

The TAG will also be responsible for monitoring overall project progress and, in more detail, progress of the research and training elements. As described in Section IV, the TAG will meet at least semi-annually to review and advise ST/FENR on the core research agenda, policy research findings and reports, training course development, and cooperator(s)/contractor progress reports and plans. It will recommend appropriate actions for shifts in emphasis in overall EPAT direction, work plans and operating relationships as they might effect the research and training agendas and process.

As appropriate, but at least semiannually, the S&T/FENR Project Officer will convene meetings of the EPAT Project Committee to assure continual oversight of the project.

### B. Monitoring Baselines

At the time of project start-up, the PMT, under the direction of the ST/FENR Project Officer, will prepare a project work plan which integrates the work plans of the core research and training cooperator (s) and the technical services contractor. It will enumerate the objectives of the overall project, means of reaching these objectives, planned project milestones and expected timing of outputs. This strategic plan will provide the basis for coordinating individual units' work plans and a means of tracking progress toward achieving project purposes. Finally, the plan will serve as the basis for monitoring the performance of the contractor and cooperators.

### C. Reporting Requirements

EPAT will have three general forms of reports that the PMT and the Project Officer can use to monitor the project. These cover technical, administrative and financial issues

and will be prepared by the implementing organizations on a scheduled basis. To reduce unnecessary redundancy, technical, administrative and financial reports will be combined in the quarterly and annual editions.

- o Annual Project Reports. Each major operating unit represented on the PMT will be responsible for annual documentation of past activities and work plans for the coming year. This major report will be due on the anniversary of the project. Elements of the report should include:
  - Project status report;
  - Expenditure records for the past period by contract or cooperative agreement line item and by activity;
  - Plans for the coming year;
  - Expenditure forecasts for the coming year by line item and by activity; and
  - Technical assistance and other buy-in activities.

These reports will include both retrospective and prospective analyses of the project which will be useful to the ST/FENR Project Officer in forming judgements as to the effectiveness and appropriateness of the planned activities. Each report should detail key constraining and/or facilitating factors as well as trends and conditions that have an impact on the success of the project.

- o Annual Collaborative Research Report. Beginning with the first anniversary of the project, and each year thereafter, the organization holding the cooperative agreement(s) for core research and training will be responsible for the preparation of a report on the status of research financed under the project. The purpose of this report is to provide both the ST/FENR Project Officer and the TAG with information essential for their review of the progress of collaborating organizations toward fulfilling the project's research agenda and research institution building activities. It will be the principal documentation tracking progress of the project's research program and its elements.
- o Quarterly Action Reports. Each operating unit represented on the PMT will be responsible for preparation and delivery of quarterly action reports that review the past quarter's activities, plans for the

following quarter and current financial status of their unit. Each unit's report will contain:

- A complete financial accounting to date, and a forecast of the next quarter's financial requirements;
- A record of the "burn rate" for financial resources and, as appropriate, level of effort allowances;
- The information needed to identify the use of project resources during the coming quarter, expected results and their relationship to the project's activities, purposes and goal.

#### **D. Continual Recordkeeping Requirements**

There are several records which should be available to the S&T/FENR Project Officer on an as-needed basis. These include financial records; information on specific activities undertaken for each research, training and technical services assignment in the work plan; correspondence with Missions and host country institutions; and reports, curricula, models, and other technical information generated under each of the elements of the project.

## VI. SUMMARY OF PROJECT ANALYSES

The Technical Analysis addresses key issues of project feasibility, namely the role of policy in the environment, whether one can influence policy in the right direction, factors influencing policy formation, and reasonable expectations of EPAT policy influence given resources available. It also presents a proposed research agenda. The Economic Analysis assesses expected economic costs and benefits of the project. Important social, political, and other factors influencing policy formulation, implementation, and response are presented in the Social Soundness Analysis, together with identification of projected beneficiaries of the project. The Administrative Analysis analyzes AID administrative requirements to effectively manage and coordinate the project. The Financial Annex indicates resources which will be required for project implementation by project element and time period.

### A. Technical Analysis

There is evidence from both industrialized and developing countries that changes in economic policy can have a measurable, positive environmental impact, particularly where policies focus narrowly on discrete pollution control problems. The record is less clear with respect to policies intended more broadly to promote environmental rehabilitation and sustained resource management. Policy change itself rarely is a sufficient condition to bring about improvements in ENR quality. Issues of enforcement, social, cultural, and institutional obstacles, political will, and other factors bearing on the feasibility of policy implementation must also be addressed.

For purposes of EPAT, policy change can be viewed as a process which begins with problem identification and valuation of the impacts of current policy and proceeds through identification and analysis of alternative policy instruments (options), the policy change process itself (i.e., the process of proposing and adopting particular policy initiatives), and policy implementation. EPAT must address each step in this process if it wishes to change policy in a direction which achieves tangible ENR benefits.

Figure 4.1 of the Technical Annex portrays priority areas identified in the AID Initiative on the Environment (tropical deforestation, coastal degradation, global climate change, etc.) and nine research modules (environment as a waste sink, open access natural resources, natural resources pricing, etc.). The Technical Annex draws conclusions about EPAT's comparative advantage with respect to the priority areas and research modules based on analysis of research needs, activities of other AID projects, research ongoing under other auspices, and other factors. Based on this analysis, the design team recommends that the project focus on five research modules. Three - environment as a waste sink, open access natural resources, and natural resources and product pricing - address specific ENR-related areas in which further policy research is urgently needed. Two - macroeconomic

policy and population and ENR - relate more to linkages between ENR and overall development strategies and policies.

A brief draft research agenda has been prepared for each of these five research modules. Within each, the draft agenda identifies priority areas (from the AID Initiative) to which the research module relates, ranks the relative importance of research addressing each stage of the policy change process (problem identification and valuation, choice of policy instruments, the policy change process, and policy implementation), and identifies indicative research topic areas.

The design team recommends that the Technical Annex be distributed broadly for comment, particularly relating to the basic research conception and draft research agenda, and that the draft agenda be revised based on comments received.

## **B. Financial Analysis**

While the economic analysis strives to determine if investments are optimum in terms of society's costs and benefits, the financial analysis and costing of implementation examines the the appropriate amount and mix of financing to meet the goals and objectives of the project. Financial and cost analysis endeavors to minimize costs necessary to achieve desired outputs and to allocate them appropriately. In particular, this analysis seeks to facilitate the leveraging of USG funds to increase impact and/or reduce A.I.D. financial inputs, determine the level of effort and associated costs necessary to achieve EPAT goals and purposes, allocate those costs between S&T, other AID entities and other institutions in an appropriate way, and promote smooth, efficient implementation by highlighting possibly costly delays.

The EPAT design team was very careful in its attempts to estimate unit costs, adequate levels of technical, professional, managerial and support personnel, and associated logistical needs. At the same time, project managers will strive to lever core funding with resources from U.S. institutions, utilize Mission and regional bureau funds for collaborative research and technical efforts as appropriate, while seeking to establish longer term linkages with host country institutions and key policy makers that will yield high returns. The following are the most salient points from the financial and cost analyses:

- o Generally, research is best conducted by U.S. research and educational institutions linked with host country institutions and, perhaps, with multilateral organizations. This should greatly lever core funding, while building capacity for policy research in the countries in which it is conducted, and increasing the likelihood that the results of the analyses will influence policy.

- o The benefits of policy change are more likely to be sustained if cost-effective investments in institutional strengthening are coupled with country- and region-specific analysis. Previous experience has indicated that this can best be accomplished by integrated packages of technical assistance which include long-term advisors together with shorter-term specialists in the more technical aspects of policy and research.
- o High and sustained returns to policy understanding and reform are expected not only from institutional strengthening, but also through a cost-effective program of human resource development. Returns to S&T's investment in designing core courses can be maximized by collaborating with U.S. educational institutions which already have invested in technical and didactic expertise. Subsequent payoffs to our programs and to host countries will be realized to the extent that AID Missions and host countries are willing to support participants or conduct courses and workshops in the field.
- o Finally, it is imperative that the management of the policy process and of the project not be short-changed and become the limiting factor to the flow of project benefits. Provision of external expert technical advice, direction and supervision from within the Agency, and execution and administration of our implementing agreements with adequate staff and funding will assure maximum value to project expenditures. AID expects to establish RSSA agreements with USDA and/or EPA as a cost-effective means to provide needed professional staff to work in S&T/FENR in a technical capacity. The A.I.D. Project Officer will be supported by a research assistant and support staff to ensure timely implementation. Sufficient resources will be allocated for the cooperators and contractors to hire effective project coordinators, a research director and module leaders, a technical assistance coordinator, a training officer and dissemination director, and office staff and equipment.

For additional detail on financial matters, costs and budgets, see Annex B.2. and Chapter III.

### C. Economic Analysis

Projections of economic benefits of the project necessarily are conjectural, for a number of reasons. One cannot know with any certainty which policy or market changes

in which countries will be introduced in part as a result of EPAT activities. Even were specific policy or market changes known beforehand, there would be substantial uncertainty about how individual and corporate/communal decisionmakers would respond to them. Finally, techniques for either identifying and quantifying in physical terms the ENR impacts of particular policy or market changes or for placing monetary values on such impacts are not well-developed (which is why valuation is an important component of the draft research agenda).

While the annex does not estimate a specific benefit-cost ratio for the project, it does provide examples of benefit-cost ratios or net benefits of specific policy actions in specific countries based on documentation of historical experience. The annex indicates that it is reasonable to expect that several of the countries in which the project is involved on an intensive basis would implement beneficial market and policy changes based in part on EPAT involvement. It is likely that these countries would achieve very substantial average net benefits, inter alia as a result of:

- o Increased capture of the portion of economic rents from use of natural resources (forests, water, energy) which in fact represents compensation for external costs of ENR damage from such use.
- o In eastern Europe, Asian NICs and elsewhere reduction in adverse health impacts and other costs of air, water, and toxic waste emissions which far exceed the incremental costs of environmental controls introduced to alleviate these problems.
- o Reduction in soil losses, water quality degradation, and other impacts as measures are taken to reduce rates of deforestation.
- o Benefits, such as reductions in carbon emissions to the atmosphere, which are external to the host country but which represent a net benefit to the global society.

#### **D. Social Soundness Analysis**

There are a number of cultural, social, microeconomic and other factors which will influence behavioral responses to prospective or actual market and policy changes, and which make projecting impacts of such changes difficult. One such factor is the capacity and willingness of government institutions charged with enforcing regulations. Many policies and most regulations are not self-enforcing. Another is the political process which influences government consideration of particular market or policy changes. Virtually all "market and policy failures" benefit someone; and many such failures -- for example, subsidies of natural resource use or lack of environmental emission controls -- bestow substantial benefits on small but politically powerful business elites. Just as western U.S. farmers have been able

to maintain ridiculously low irrigation water fees for decades, these groups will use their political power to resist initiatives to eliminate such "failures". A third important factor is the whole subject of land and resource tenure and access. Gender access constitutes an important subset of land and resource tenure issues, since women both bear much of the burden of present ENR degradation (for example, by being forced to travel further to sources of firewood or water or to increase labor intensity or acreage under cultivation in order to maintain income in the face of declining soil productivity) and rarely have secure access to land or resources no matter what the formal tenure system. A fourth major factor is the distribution of benefits between groups within society. These and other considerations argue for multidisciplinary research and technical assistance which addresses site-unique political, institutional, microeconomic, cultural, social, legal and other obstacles to adoption and effective implementation of environmentally beneficial market and policy change.

Some of the same arguments - namely the typical concentration of benefits of present market and policy failures in the hands of a few, and the lack of secure access of women and other marginal groups to resources of any kind, including land, water, trees, or credit - suggest that initiatives to eliminate or mitigate such market and policy failures will benefit the poor, women and other groups that receive few or none of the benefits of present failures but which bear many of the costs of the ENR degradation caused by such failures.

#### **E. Administrative Analysis**

EPAT is fairly complex because it includes both core research and technical support for Missions in areas which have not been well-studied. Project success depends importantly on close coordination and cooperation among the various implementing institutions, and between those institutions and AID. Also adding to project complexity are a likely high level of buy-ins and the need for a process to assess requirements and, as appropriate, refer Missions to other AID projects and to access other government agencies such as EPA.

To assure effective management of and provision of administrative support to the various project components, S&T/FENR will require more intensive staffing than it normally employs on projects which it administers. Project success depends heavily on effective S&T/FENR direction of the Project Management Team and on timely processing of buy-in requests, approvals of contractor/cooperator proposed staffing and field visits.

For similar reasons, the project will place more than normal administrative burdens on the Offices of Contract Management and Financial Management.

## VII. EVALUATION ARRANGEMENTS

### A. Overview

Over the ten-year life of the EPAT project, a number of events and conditions are expected to affect the course of the project. In addition to the question of general capabilities and efficiency of the implementing institutions in relationship to published work plans, environmental policy research per se is a rapidly evolving field.

The human and financial resources marshalled under this project will point toward policy alternatives and avenues for policy research which are not now being explored. Further, the needs for environmental policy research, such as the Agency's new concerns for industrial pollution control and hazardous and toxic waste management (most notably an issue in Eastern European cooperating countries), may well change by the year 2000.

The project evaluation process is designed to be used as a means of improving the performance of all activities to be carried out under EPAT. On the micro level, formal external evaluations will be made for each project element, reviewing performance against expectations described in this project paper as well as in project component work plans. Also, task level evaluations will be made following technical support and training activities. On the macro level, the TAG and AID Project Committee will provide oversight and evaluation of EPAT in general terms, reviewing its achievement of project level purposes and objectives.

Given the variety of contracting vehicles, project activities planned and objectives sought, more than one approach to evaluation is needed. Accordingly, the project will provide EPAT managers with a variety of evaluative mechanisms and arrangements to measure progress under the various elements of the project and to help in making appropriate course corrections as needed. The following describes plans for scheduled evaluation activities during the life of the project.

### B. Evaluation of Core Research and Training Activities

There will be two forms of evaluation of the core policy research and training elements of the project. The first will be the ongoing review of the Technical Advisory Group (TAG). The TAG will meet semi-annually or more often to review plans, progress reports and policy research findings and to examine possible changes in direction or priorities for the research agenda. The TAG will be the first line of evaluation of project effectiveness and efficiency.

The second form of evaluation will involve four formal external evaluations over the life of the project. The first will be undertaken at the end of the second year of the cooperative agreement following preparation and dissemination of environmental policy synthesis reports. Also, by this time, core courses will have been developed and the first courses held. The purpose of this evaluation will be to review synthesis reports, baseline data, trend analyses, training course designs and feedback and the project's research and training agenda to determine whether the research and training being carried out and planned effectively address technical and policy issues.

The second, third and final evaluations will be carried out at the end of the fourth, seventh and ninth year of the project and will focus on the progress and direction of research and training, the efficacy of the means by which they are carried out and indicators of appropriateness of the then current core research and training agendas. These evaluations will cover all organizations involved including the primary cooperating organization responsible for policy research and training, the requirements contractor (Q) and the cooperating country institutions involved in country and regional level research and training.

Baseline data to be used during the evaluation of the research and training elements will be developed during the first 18 months of the project. Data to be developed include baseline information on policy and methodology in the form of synthesis reports to be prepared by the lead research organization. The training needs assessment and training resources survey will provide baseline information for elaboration of training activities, and later for evaluation of the training component. A third source of data, that pertaining to physical, social and ecological trends, will be made available to the evaluators from an information clearinghouse to be designed separate and apart from EPAT by S&T.

### **C. Evaluation of Technical Support and In-Country Training Activities**

Technical support and in-country training activities may be crucial to achieving environmentally appropriate economic policy change at the national level. It is by these means that, with financial and political support from A.I.D. Missions, cooperating countries will receive the support necessary to design, evaluate and enact policy changes. Hence, two performance factors are of particular interest to EPAT project managers.

The first measure of performance is the effectiveness of EPAT institutions in the delivery of technical support and in-country training. Evaluators will examine the responsiveness and quality of technical support and training operations, with special attention to the "customer" perceptions of AID Missions and collaborating institutions. Evaluations of performance will be carried out by two means. The first will be through review of "end of assignment," task level evaluations to be prepared by the AID Mission or office or collaborating institution using or overseeing the technical support and training services. End of assignment evaluations will be requested, monitored and maintained by the

EPAT implementing institutions and the Project Officer.

Measurement of performance against the project's purpose will be the basis of four formal external evaluations to be carried over the project's ten year life (after the second, fourth, seventh and ninth years of the project). During these evaluations, Missions and cooperating institutions will be surveyed to determine whether they perceive project services were delivered in a timely fashion and that technical and administrative support was of the required quality. They will also be asked for recommendations for improving the technical support and in-country training aspects of the project. This evaluation also will identify intermediate outputs such as numbers of persons trained.

However, the primary purpose of these evaluations is to assess the extent to which the project's technical support and in-country training activities have contributed to environmentally beneficial policy changes in those countries receiving project sponsored services. Such evaluation is difficult: by its nature policy change is slow and influenced by many factors (of which EPAT assistance is only one). Similarly, changes in measures of environmental quality may be due to many factors of which policy change is only one set. Nonetheless, it should be possible to identify specific policy changes influenced in part by EPAT and to gain at least some sense of the environmental, government fiscal, equity, and other impacts of such changes.

#### **D. Evaluation Schedule**

Every effort should be made to conduct external evaluations of the various project components simultaneously. When completed, S&T/FENR will convene a Project Committee meeting, possibly under the auspices of the appropriate Sector Council, to review the results and to receive recommendations from the evaluators and other AID bureaus and offices.

Est. Completion: FY 2000

Date of Revision: December 1990

Design Team: IRC, DAI, URI, SAI/PTNR

Narrative Summary (NS)	Measurable Indicators (OVI)	Means of Verification (MOV)	Important Assumptions
<p>Goal:</p> <p>1. Cooperating countries adopt economic policies which promote sustainable use of natural resources and preservation and enhancement of environmental quality.</p>	<p>1.1 Natural resource stocks maintained intact (or rate of depletion slowed).</p> <p>1.2 Deterioration of environmental quality arrested (or slowed).</p> <p>1.3 Introduction/passage of legislation along lines recommended in project sponsored research.</p> <p>1.4 Regulatory reforms studied and introduced.</p> <p>1.5 Increased use of economic incentives and disincentives.</p>	<p>1.1 Baseline and follow-on surveys of natural resources stocks.</p> <p>1.2 Baseline and follow-on surveys of environmental quality.</p> <p>1.3 Interviews with host country decision makers and policy analysts, and with mission personnel.</p> <p>1.4</p> <p>1.5 " ; baseline and follow-up policy inventories.</p>	<p>(goal to supergoal)</p> <p>1. Sustainable development requires sustainable use of natural resources and the environment.</p> <p>2. Host countries demonstrate requisite commitment.</p> <p>3. Necessary financial resources mobilized from domestic and international sources.</p>
<p>Purpose:</p> <p>1. To advance recognition by LDC policy makers of the linkages between economic policy, sustainable ENR use and development, and to assure that they have available to them requisite analyses to develop appropriate policy options, and the technical resources to perform such analyses.</p>	<p>1.1 EPAT-sponsored research, policy dialogue support or institutional strengthening completed in 12 countries and favorably regarded by policy makers and analysts in-country and elsewhere.</p> <p>1.2 Increase in the number of well-trained individuals working on economic/ENR policy analysis issues in at least 24 countries.</p> <p>1.3 Host countries in which EPAT research or institutional strengthening activities completed generating sound analyses to inform policy formulation process.</p> <p>1.4 Host country personnel, training and personnel support budgets increased.</p> <p>1.5 Project sponsored research completed, disseminated, and acclaimed.</p> <p>1.6 Participating U.S. institutions have expanded programs involving economic/ENR policy research, technical support to LDCs, and training.</p>	<p>1.1 Evaluations and project activity reports; interviews with policy makers and analysts.</p> <p>1.2 Surveys of staff numbers and qualifications</p> <p>1.3 Interviews with mission personnel; review of mission documentation.</p> <p>1.4 Over time comparison of budget allocations</p> <p>1.5 Publications; invited presentations; interviews with researchers, development specialists, policy makers.</p> <p>1.6 Interviews with U.S. and host country institutions and with mission personnel; review of annual reports, catalogues and similar publications of participating U.S. institutions.</p>	<p>(purpose to goal)</p> <p>1. Economic policy failures are important in explaining environmental problems.</p> <p>2. Economic policies can be useful in changing behavior in ways which promote sustainable ENR use.</p> <p>3. LDC failure to formulate and execute effective policies is often due to lack of awareness of the relationship between policy and ENR quality and inadequate capacity to do requisite analyses to underpin development of appropriate policies.</p>

Narrative Summary (NS)	Measurable Indicators (OVI)	Means of Verification (MOV)	Important Assumptions
<p><b>Outputs:</b></p> <p>1. Research synthesis/guideline documents produced and disseminated.</p> <p>2. State-of-the-art research projects completed.</p> <p>3. Applied in-country research completed.</p> <p>4. Short-term technical assistance for policy dialogue support.</p> <p>5. Long-term institutional strengthening support.</p> <p>6. Training courses designed and carried out.</p> <p>7. Seminars, workshops, and conferences for dissemination of research findings, support for policy dialogue, institutional strengthening, training and strengthening awareness of relationship between economic policy and ENR.</p>	<p>1. 7 documents broadly disseminated.</p> <p>2. 18 (6 priority areas x 3 countries)</p> <p>3. 12 projects</p> <p>4. 54 engagements (6/year x 9 years).</p> <p>5. 12 institutions</p> <p>6. 24 courses, 540 participants</p> <p>7. 27 (3/year x 9 years)</p>	<p>1.1 Documents themselves</p> <p>1.2 Dissemination records.</p> <p>2.1 Periodic and final reports by implementing agents(s).</p> <p>2.2 Mid-term and final evaluations.</p> <p>3. "</p> <p>4. "</p> <p>5. "</p> <p>6. "</p> <p>7. "</p>	<p>(output to purpose)</p> <p>1. AID commits personnel to effectively manage project, and supports them with necessary hardware, software, etc.</p> <p>2. Requisite skills for strengthening organizations and human resources in host countries can be brought to bear.</p> <p>3. Host countries prepared to free up and support qualified candidates for training.</p> <p>4. Requisite skills for interdisciplinary analysis can be brought to bear.</p> <p>5. Awareness, consensus, capacity, and political will for policy reform present (or can be developed).</p> <p>6. U.S. institutions prepared to develop their economic/ENR research and training capabilities.</p> <p>7. Coordination between project research and technical assistance elements is effective.</p>
<p><b>Activities:</b></p> <p>1. Implementing agents staffs for project components.</p> <p>a. State-of-the-art research</p> <p>b. Applied country research</p> <p>c. Information &amp; dissemination</p> <p>d. Support for policy dialogue</p> <p>e. Institutional strengthening</p> <p>f. Human resources development</p> <p>g. Implementation &amp; management</p> <p>2. FENR project management.</p> <p>3. Microcomputer hardware and software for analysis, report generation, and communication</p>	<p><b>Inputs/Resources:</b></p> <p>75 person years</p> <p>45 person years</p> <p>32 person years</p> <p>17 person years</p> <p>27 person years</p> <p>45 person years</p> <p>46 person years</p> <p>26 person years</p> <p>assorted</p>	<p>1. Implementing agents vouchers and reports</p> <p>2. AID staff pattern; RSSA agreements and reports</p> <p>3. Inventories</p>	<p>(activity to output)</p> <p>1.1 AID interest in policy work remains high.</p> <p>1.2 Qualified personnel are willing to participate.</p> <p>1.3 Cost estimates are good.</p> <p>1.4 AID commits necessary funding on timely basis.</p> <p>2.</p> <p>3. *(except item #1.2)</p>

## **Annex B.1: Technical Analysis**

# **The Policy Context**

*For Sustainable Environment and Natural Resources Management*

**Asif M. Shaikh  
Samuel Hale, Jr.  
Anil Markandya  
Swarupa Ganguli**

**INTERNATIONAL RESOURCES GROUP, LTD.**

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**Technical Annex for the Environmental and Natural Resources Policy and Training Project  
United States Agency for International Development  
Bureau for Science and Technology**

# 1. Introduction

## 1.1 Objectives of This Annex

The objective of this Technical Annex is to support the Environmental and Natural Resources Policy and Training (EPAT) Project Paper's strategy and conclusions through a structured analysis of A.I.D. natural resources and environment priority areas, the stages of the policy decision process and related research needs and opportunities.

The organization of this document follows a single train of thought:

*What is the role of policy in environment? Can we influence policy in the right direction? How can we categorize factors affecting policy? How are different types of policies, the factors which influence them and the instruments through which to change them related? With the resources available to the EPAT project, what should reasonable expectations of policy influence be, and over what time frame? Given options, available resources and uncertainties, what is the suggested research agenda for the project?*

Every attempt has been made to keep this presentation focussed, and to build upon rather than repeat the substantial volume of analysis and research cited as references.

## 1.2 The Economic and Policy Dimensions of Environment and Natural Resources

### The relevance of environment to sustainable development

The relationship between economics, public policy and environment and natural resources is at the core of one of the major development challenges of our time. It is equally relevant to countries at all levels of development, and goes beyond environmental protection to include resource enhancement and the sustainability of future income streams and growth. Simplistic analyses of the tradeoff between environment and economic growth will not suffice: ENR degradation is already constraining current production in a variety of ways. To take one example, much of Eastern Europe faces severe soil damage through decades of massively excessive fertilizer use. Yet simple assertions about the importance of protecting the environment miss the point: relative prices, incentives, economic and income opportunities, secure property rights and consistent policy signals condition, much more than does the stated intent of public policy, the thousands of individual decisions through which effective environmental protection must occur.

### The range of potential policy issues

The quality of the environment and natural resources is influenced by a broad range of policies, many of which have no intended environmental impact (positive or negative). For example, the insecurity of resource tenure is widely thought to lower the incentive for investments in sustainable resource management, and to distort relative market prices of the

natural resource base. Yet tenure systems typically reflect the existing distribution of social, economic and political power. If they are to succeed, proposed changes in resource tenure cannot be argued simply on their environmental merits. Similarly, there are strong arguments to be made for environmental reasons, in favor of revised national income accounts, open markets coupled with market valuation of resources and decentralization. In each of these examples, environmentally-driven policy reforms would herald much broader and more fundamental changes in economic structure if successful. On the negative side, however, if the thrust of proposed policy reforms is based exclusively on such encompassing issues as national income accounts, overall market liberalization and decentralization, positive environmental impact may both be slower and less likely to occur.

### **The diversity of environment-development linkages**

Given the broad range of policies potentially at issue, generalizations about the need for policy reform can be misleading. First, there are severe, and often varying, environmental problems in countries of every economic system and at all levels of development: socialist, market-oriented, industrialized, developing and subsistence economies. Second, even where problems are similar, the root causes may differ greatly by country: industrial pollution in Poland has been strongly influenced by inefficient production, general economic stagnation and a closed and undemocratic decision-process; industrial pollution across the border in Germany has been more driven by economic success and problems of enforcement related to decentralized decision-making. Third, there are important differences in how much is known about different types of policy measures, and on what models for successful policy change can be drawn upon: there is a rich source of data and precedents in direct pricing of air, water and soil pollution; there is a shortage of both data and policy options with respect to behavioral responses; user fees in controlled access situations have been successfully applied and refined in a number of settings; pricing and control of open access resources continue to pose major problems.

### **The role and limits of correcting market failures**

Much of the focus of the PID for this project is on market failure, policy failure, and how these might be corrected to achieve less environmental degradation without sacrificing the economic growth that developing countries both need and want. While this must remain an important underpinning for the project, it would be a mistake to concentrate solely on issues of market and policy failure. Market failure means that markets do not function freely in a way that allocates goods and services to balance supply and demand. For many items that affect human welfare and company profits, such markets do not exist. These include air pollution, disposal of waste into open access environmental resources, or the rights to exploit natural resources such as forests, fisheries and wildlife. In many cases markets cannot be created for such commodities. Solutions then are to be found in attempting to modify behavior so as to achieve a more efficient allocation of them. If that is to be achieved in an effective way, we must understand the behavioral responses at the micro level, as well as the social, cultural, institutional, and political contexts in which the

individuals, households and firms act. Formulating policy in this broader framework may not have much to do with correcting the market failure as such; it may have more to do with selecting economic instruments which operate within the existing framework, or providing an increased interventionist role for the public sector, through the provision of infrastructure. A priori it is impossible to say what the appropriate policy will be. Each case has to be looked at individually.

### **The diverse influences on policy decisions**

Much the same applies to policy failure. While it is undoubtedly true that many existing government policies in developing countries are environmentally damaging, it has to be recognized that (a) there is a rationale for the policies that exist and (b) an attempt to alter them will have to face up to the same political, cultural, institutional, and social constraints that governed the policies being replaced. Policies such as low irrigation charges that result in excessive water use and waterlogging are the result of a political system that allocates water rights according to patronage, or with social equity goals in mind, a social system that often regards water as a free good, and a bureaucratic system that has a very limited capacity to collect fees. In the face of these constraints, the policy 'failure' will have to be addressed very differently than it would be without them.

## 2. The Impact of Policy on Environment and Natural Resources Quality

### 2.1 Preconditions to Policy Change

There is evidence from both industrialized and non-industrialized countries that changes in economic policy can have a measurable positive environmental impact. In general, it has been easier to detect clear cut positive environmental impacts when the policies have been narrowly focussed, and where they have been aimed at pollution control rather than sustainable management of renewable natural resources. For example, changes in standards, regulations and incentives in the 1970s resulted in significant measured improvements in water quality in the United States. Higher energy prices and conservation incentives in the wake of the second oil price shock of 1979 altered trends in energy consumption per dollar of GNP in the industrialized and advanced developing nations. Stricter environmental standards have reduced pollution emissions per unit of output around a number of industrial sites in the United States and Western Europe.

However, the record has been less clear with respect to policies to promote environmental rehabilitation and sustained resource management. This has been a result of a combination of several factors which include

- a) Lack of information and analysis
- b) Lack of enforcement
- c) Market and Policy failures

Information and Analysis are essential for ENR improvement. There are a number of instances where policy change is intended to provide incentives for new patterns of behavior (water harvesting, erosion control, soil enhancement, tree planting). In such instances, enforcement per se is often not the issue, since policy success will depend upon the decentralized decisions of thousands (or more) of individual decision-making units acting in their own perceived self-interest. Policies of this type are at the heart of many of the proposed corrections of "market and policy failures" and hold tremendous promise for improved ENR. Yet many such well-motivated policies have either failed or have had perverse impacts because of insufficient or incorrect analysis of the decision processes which the policies are designed to influence. One of the most notable deficiencies has been the weakness of economic and financial analyses from the resource users' (managers') perspective in support of policy decisions. In Morocco, Nepal, Kenya and Mali, for example, millions of dollars and countless policy incentives have been committed on the premise that small farmers could solve pressing firewood shortages through village or homestead firewood plantations. Financial analyses have, however, frequently revealed that in terms of both financial return and risk management, firewood production may be a bad investment from an individual farmer's perspective.

Policy change itself is rarely a sufficient condition to bring about improvements in environmental quality or resource management. Enforcement is often needed as well. Where there is controlled access to resources or where pollution emanates from sizable point sources (factory smoke stacks, for example) which can cost-effectively be monitored, the combination of policy change and enforcement has often been effective<sup>1</sup>. Lack of capacity or will to enforce have been key obstacles to policy change for open access resources. Perhaps the best known example in developing countries has been the inability to curtail forest exploitation or to collect fines or stumpage fees, irrespective of government-adopted policies<sup>2</sup>. The brown end analogy has been the inability to control point sources of pollution for air, water and soil degradation when such sources are dispersed. The enforcement issue itself can be seen as having several subcomponents, including the capacity to cost-effectively monitor, the budgetary resources to do so, the political will to enforce when violations are detected<sup>3</sup> and the political leverage to impose effective sanctions<sup>4</sup> when warranted. Particularly, but by no means exclusively, in the LDC environment, a discussion of enforcement would be incomplete without raising the issue of corruption, which can undercut successful policy even when all other conditions are favorable.

There is a rich body of evidence and analysis with respect to more general "market and policy failures" which are thought to have contributed directly to resource degradation. In Asia, Africa, Latin America and Eastern Europe, this evidence is sufficiently strong to support the conclusion that current policies are an obstacle to better ENR management, and in some cases may provide powerful incentives to degrade the environment. It would be an overstatement, however, to say that the link between correcting negative policies and actual improvements in ENR quality is clearly proven. This is an important point which should not be glossed over in the EPAT design: many of the most important policy reforms being considered are driven by the perceived failure of existing policies rather than by the availability of obvious alternatives to replace them. There are tremendous gaps in the physical and socioeconomic data on which to appraise existing policies, let alone correct them and devise new ones. In some cases the basic research has to be carried out, while in others it exists but has to be collected, reviewed and documented. Hence a central focus

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<sup>1</sup> *When other conditions, such as the socio-political consensus to enforce, the data with which to assess costs and fines, etc., are present.*

<sup>2</sup> *Examples include the failure of the forestry fine system throughout the West African Sahel, the fact that official fuelwood and timber permits account for 15-20% of estimated urban supply in Nepal and the acceleration of forest degradation in response to a total ban on logging in Thailand.*

<sup>3</sup> *Many Eastern European countries, for example, have had very progressive environmental policies. There was simply no political commitment to monitor or enforce. This issue in turn is tied to a number of others -- including the inability in a closed political society of locally-affected populations to lobby or otherwise influence decision-makers.*

<sup>4</sup> *on multinational corporations who may threaten to move operations elsewhere; on powerful individuals who can circumvent regulations; etc.*

of this project must be to support research into these activities.

Because of the strong ties between resource management and overall economic decision-making, information gathering and analysis must be sufficiently broad-based to permit an understanding of the socio-economic context of decisions, even though this need makes successful policy change appear much more complex. What social obstacles affect decisions about resources? What opportunity costs do decision makers face? What other policies (subsidized fertilizer, commodity prices, relative input costs, etc.) might counteract environmental policies? How do risk and uncertainty affect decisions? And how does new policy affect risk and uncertainty?

The implications of the above discussion are that the research agenda has to be guided less by theoretical principles than by the social, economic, and historical context in which each country is formulating its economic and environmental policies. The discussion lays the initial groundwork for the topology of policies to be considered which is developed in Chapter 3 of this annex. It supports three tentative conclusions relative to the potential impact of policy change on environment:

- o that policy change is not synonymous with improved environment and natural resources quality; it is one means to that end.
- o that the questions of how effective a given policy change might be if implemented, and of what complementary actions are required, is best addressed in the context of a specific country and set of issues.
- o that even in a specific case context, there are important differences to be considered between types of policy change, including differences in information needs for formulating policy, in ease of implementation, in likelihood of positive ENR impact and in the range and complexity of complementary issues to be resolved in order to achieve positive impact.

## **2.2 Bottlenecks to Improved ENR quality**

The preceding section examines the link between policy and ENR quality by establishing the preconditions to successful policy formulation. This section takes a step back and asks how EPAT's research agenda can succeed in influencing policy change in the right direction by identifying the specific bottlenecks that impede policy formulation, change or implementation from taking place. In doing so, it lays the remainder of the groundwork for the topology presented in Chapter 3.

Scratching beneath the surface in almost any AID-recipient country reveals that there are a number of bottlenecks that obstruct policy from its most basic level to its actual

implementation.

## **A. Bottlenecks at the formulation level**

### **Information Gaps**

- o Gaps in the information and analytical base are important throughout. However, this is by no means all that is preventing adoption of more sustainable environmental policies. It is particularly important to underscore this fact in the EPAT strategy, even though it should seem obvious, because of the natural tendency of research-oriented institutions to focus on "advancing the state of knowledge" rather than addressing less theoretically exciting practical obstacles.

### **Underlying Development Philosophy**

- o The market and policy failures discussions underscore the fact that environmental policies are closely tied to overall development philosophy. While market economics is emerging as the dominant development strategy throughout the world, a number of countries retain a more "directive" philosophy which is deeply rooted in national political and administrative instincts. When price controls, for example, have been used for decades as a primary expression of political commitment to the welfare of the poor majority, they are extremely difficult to abandon for environmental or even developmental reasons, as public policies in the Egyptian energy sector demonstrate.

Similarly, both government and donor attitudes since the 1960s (and particularly in the poorer countries which gained independence in the sixties) have fostered the views that: (i) an activist public sector must take the initiative in "making development happen" and (ii) the private sector -- including business, farmers and local communities -- must be dragged into the Twentieth Century. The end result is well-known: huge public irrigation schemes, centrally-managed reforestation drives, complex public commodity production and marketing programs, false starts in industrialization through bloated public enterprises. In sum, an accretion of public political and budgetary burdens which are impelled to trade efficiency for job creation, which were often initiated for political rather than economic reasons, and which would not survive the test of the marketplace without yet further layers of subsidy, regulation and central planning. The failure of this approach has created pressure to endorse liberalized economies; however, neither political nor administrative instincts have necessarily changed, and

domestic pressure to sustain patronage has, if anything, grown with economic stagnation.

Decision-makers are faced with the need to balance pressure for choosing better environmental management with the compelling need for improved standards of living and economic competitiveness. Some of these choices are economic, and are not simply driven by political expediency. Several fast-growing Asian economies which are extremely efficient economically have consciously sacrificed air and water quality in order to minimize production costs and spur exports and growth. The Eastern European nations massively sacrificed environment and spectacularly failed at growth. The need to address pocket-book issues is likely to receive higher priority in the medium term<sup>5</sup>. Whether policy-makers will perceive the sustainable growth benefits of dealing with both environment and economics simultaneously remains to be seen.

### Issues of Institutions

- o A basic premise of Soviet reforms and of associated changes in Eastern Europe is that open societies are better equipped to detect and correct fundamental problems of waste, inefficiency, corruption and misallocation of resources. The increasingly articulate discussion of ENR/economic policy questions in the LDCs largely focusses on the same issue<sup>6</sup>. It is noteworthy that this same premise, implicitly, is an extremely important part of environmental thinking in the West: public disclosure of environmental impacts, public debate and the opportunity, through democratic institutions, for community input on actions which adversely affect the environment.<sup>7</sup>

Therefore, the growth of democracy in developing nations may be as important a determinant of effective environmental choices available to those societies as technological and market driven options. While possibly self-evident, it bears repeating that "equity", like "economic

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<sup>5</sup> with the added caveat that medium term investment choices often condition longer term environmental outcomes.

<sup>6</sup> albeit more from the economic (open markets, market and policy failures, structural adjustment, etc.) than the political (open societies) side.

<sup>7</sup> In fact, community disclosure through democratic institutions is an explicit part of many E.P.A. programs. It underlies much of the U.S. environmental regulatory framework and has allowed much of the litigation through which environmental protection has been strengthened.

value" has less rigid and more diverse definitions in a pluralistic, market-based society. What value is placed on negative environmental impacts will partially depend on how the political process allocates and "values" local vs. national vs. international concerns. This is evident at the "brown" end, where immediate health consequences on local populations in industrial areas in Poland carried little weight against the "national" imperative for industrialization. It is equally evident at the "green" end, where logging rights in the Far East, for example, may be controlled by political interests which are largely immune to "development philosophy" -- whether centrally-planned or market-based.

### **Issues of Political Allocation**

- o The roots of environmental consciousness appear to run no deeper than the roots of political power; when decision-makers are faced with a choice which threatens to uproot one or the other, they have clear incentive to uproot environment. Even in the democratic countries, where political legitimacy is more firmly entrenched, short to medium term constraints -- such as recession or a major oil price shock -- can slow progress towards more sustainable environmental standards.

### **B. Bottlenecks at the implementation level**

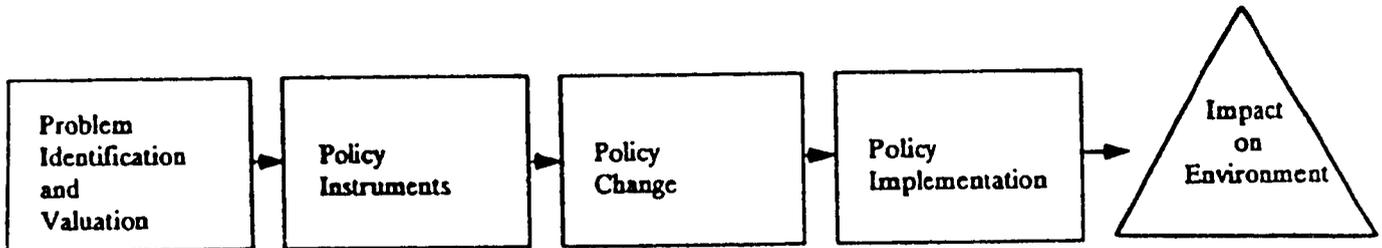
- o There are enormous gaps in implementable, tested alternative policies available to decision-makers. While it is true that economic theory can make an effective contribution even when it abstracts from reality, it is also true that policy-makers face problems which may be more pressing in practice than in theory.

Land tenure in Africa provides a useful example. There has been a great deal of economic and environmental work to suggest that secure property rights can make an important contribution to sustainable resource management by small farmers. However, there is an equally important set of findings by tenure specialists, sociologists and others which shows that tenure reform is an extremely complex issue which may not, for practical reasons, hold as much promise as was hypothesized. It is not just an issue of powerful interests opposing the redistribution of wealth. There are real concerns about whether to override local social traditions and impose national tenure policies which may be ill-suited to local conditions and be unenforceable in practice. There is an equal concern that decentralization -- also an important objective for ENR sustainability -- would be undercut

through sweeping national tenure dictates. There is evidence from peri-urban areas that legal title (which is "alienable" in that it can be bought and sold) is leading to increased concentration of land holding as highly leveraged small-farmers succumb to rich buyers or creditors. In sum, there is little guarantee that the locally-adapted mosaic of tenure policies which is likely to emerge will have a meaningful impact on the environmental problems which provided much of the initial impetus for changing tenure in the first place.

### 3. Issues of Policy Valuation, Instruments, Change and Implementation

Schematically, the steps from research to policy change, and from policy change to positive ENR impact, can be abstracted as follows:



The goal of the research is to formulate policy instruments, explore the required changes and finally implement the appropriate measures with the end result being improved environmental quality. Each element in the process may be undertaken as a discrete activity, but losing sight of the interrelationships will promote misallocation of project resources, which are already very scarce relative to the needs.

Even with a disciplined vision of what it seeks to achieve, the EPAT project will need a means of evaluating options for commitment of project resources. It is counterproductive, in the project paper design, to rigidly define all research tasks: some of the best opportunities will be identified in the course of the project; individual governments and AID Missions must also be able to influence the research agenda. Nevertheless, it will be important in defining the research agenda to be able to compare candidate policies on such criteria as information needs, ease of implementation, interrelationship to other policies, cost and time frame and potential for positive environmental impact. In effect, it will be valuable to be able to do at least a conceptual "cost-benefit" analysis before committing project resources to a given research topic.

The response cables from AID field missions provide valuable feedback on what missions consider to be the highest priorities for the EPAT research agenda. The following observations based on those cables seem especially worth noting:<sup>8</sup>

- o There is mixed receptivity to "state of the art" research for its own

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<sup>8</sup> This section does not purport to summarize the mission cables, but instead to pick out comments (some from one mission, some from several) which are especially relevant for this annex.

sake. A number of missions expressed concern that such research would be of little practical value. Yet certain missions (especially in Asia) did want state-of-the art analysis/information on narrowly-defined topics.

- o A number of missions felt that a lot of information has already been gathered on ENR and exists at the country-level. While there continues to be a need to collect new information and compile cross-country and regional data, there are questions as to whether this should be done centrally or in individual countries.
- o In addition to the question of what research should be performed, there is an equally important question of who should be involved in performing it. Building a core of national research and "policy formulation" (lobbying) capacity is an important element.
- o Beyond identifying problems and devising solutions (including policy change), two much more difficult issues should also receive research attention: (i) building the consensus to make the necessary changes, and (ii) assuring that the changed policies actually get implemented.

Based on this feedback, and on the discussion in sections 2.1 and 2.2, we would propose to view potential areas of research interest as falling into four broad categories: problem identification and valuation, policy instruments, policy change and policy implementation and impact. Each of the four categories is discussed below.

### **3.1 Problem Identification and Valuation**

At its most basic level, the EPAT project has to focus on gathering the rudimentary data for the formulation of policy. This includes research not only on physical and socioeconomic data but also on examining the quantitative impact of environmental degradation. Past experience suggests that due to the lack of data and familiarity with the appropriate techniques, the valuation of the environmental impacts (both positive and negative) of projects has not been extensive in developing countries. There is considerable scope to change this and in fact major donors are aware of the need to improve their valuation techniques. Thus, with better physical and socioeconomic data, monetary valuation of environmental damage should be possible in the areas of tropical deforestation, soil and water degradation, energy efficiency and the sustainable use of natural resources.

### **3.2 Policy Instruments**

After the data has gathered and the required valuation has been performed, there is a need to formulate the appropriate policy instruments. The most pressing example is the degradation of open access resources. An obvious suggested policy option has been land

reform with the premise that owners of land have more of an incentive to protect it than users. At this stage, it is worthwhile to note that when real world policies are at issue, it is often the case that the greater the level of specificity of the research, the more likely it is to yield implementable results. Taking the land tenure case again, governments often face the dilemma between formalizing property rights to the traditional landowner or to the farmers who enjoy usufruct rights. Thus research should focus not just on land titling but on how to effectively allocate those titles.

### **3.3 Policy Change**

A number of AID Mission cables point out that in many areas lack of information on what policies to formulate is not as imperative as researching changing existing policies. For example, many states in the developing world have made it a national policy to provide farmers with free irrigation water, the consequences of which are not only the inefficient and wasteful use of water, but also the inability of the state to recover capital, operation and maintenance costs. This results in serious environmental problems such as sedimentation, soil salinization and waterlogging due to watershed degradation and over-irrigation. Such a situation calls for a change in the national policy of providing free water, and for research on how to price water.

### **3.4 Policy Implementation and Impact**

In an August, 1990 natural resources meeting to discuss country ENR reviews in Mali, Burkina Faso, Niger and Tchad, actual policy implementation was cited to be the biggest single obstacle to improved ENR policies. This was echoed in one of the AID mission response cables which articulated that there were tremendous gaps and bottlenecks between stated policy changes at the national level and the actual implementation of the new policies at the local level where they must be carried out. Thus, it is strongly suggested that implementation is a fruitful area of research with the following potential topics:

- o How widespread is the problem of non-implementation of environmental policies?
- o Under what set of circumstances have new environmental policies been successfully implemented?
- o What can be done to empower and motivate local communities to acquire a sense of ownership of national policies so that they will have a stake in their successful implementation?
- o What political, social, cultural, legal, institutional and microeconomic factors should be taken into account in assessing the implementability of, and behavioral responses to, economic policy instruments designed to address environmental degradation and natural resource depletion?

704

### 3.5 Summary Matrix

The following matrix summarizes the interrelationships between the stages of the ENR policy change and implementation process. For a policy to be successfully implemented it is crucial to go through these proposed stages.

The methodology suggested by the matrix not only calls for a systematic analysis of all the phases from problem identification and valuation to implementation, but also of the corresponding bottlenecks associated with each phase. For example, the link between monetization of the rural economy and natural resource use patterns has often been cited as a germane area of research with the resulting policy instrument of increasing the availability of rural credit. However, during the implementation phase, it has been discovered that lack of collateral and the high transaction costs associated with rural credit prevent the policy from being effective.

105

**FIGURE 3.1**

**Summary Matrix on ENR Research**

<b>Problem Identification and Valuation</b>		<b>Policy Instruments</b>		<b>Policy Change</b>		<b>Policy Implementation</b>
	<b>B O T T L E N E C K S</b>		<b>B O T T L E N E C K S</b>		<b>B O T T L E N E C K S</b>	

## 4. Setting EPAT Research Priorities

### 4.1 Statement of the Problem

The preceding sections, and the considerable body of analysis from which they draw, establish that:

- o environmental degradation threatens sustainable development
- o protecting and enhancing the resource base can contribute significantly to economic development
- o a broad range of policies potentially affect environment and natural resources
- o further research is urgently needed to "midwife" policy reform

In short, the goal of the project is sound. What remains to be proven is that the EPAT project, as a project, is manageable. EPAT will not be manageable unless it succeeds in defining working priorities and in narrowing the range of issues on which to focus project resources.

### 4.2 A.I.D.Environment and Natural Resources Priorities

A.I.D.'s Environmental Initiatives policy paper identifies eight priority areas:

- o Tropical Deforestation
- o Coastal Degradation
- o Urban and Industrial Environment
- o Sustainable Agriculture
- o Biological Diversity
- o Energy Efficiency and Use
- o Watershed and Water Management
- o Global Climate Change

As a first criterion, EPAT research should be relevant to one or more of these eight

areas. While the breadth of the areas does not substantially narrow the potential research, the organization of priorities into eight categories will be useful in determining those areas in which EPAT has a comparative advantage relative to other A.I.D. projects.

### 4.3 Potential Research Modules

Even within the narrower set of priority areas defined in the preceding section, there is a broad array of research issues which could be pursued. EPAT cannot, however, define its research agenda in terms of a disparate set of subjects. We have attempted to group potential research topics into nine research modules. Each module represents a coherent set of interrelated subjects. In addition, we have applied the criterion that a research module must bear a clear and direct<sup>9</sup> relationship to what public policy can influence. This means that for each research module, there are issues to be considered at each of the four stages of the policy reform process: problem identification and valuation, policy instruments, policy change and policy implementation.

Nine potential research modules which we believe capture the highest priority research areas are briefly presented below. It is recognized that the same priorities could be grouped under different headings, but we believe that this list results in an internally-coherent set of modules, and fairly represents the most important research priorities which have been suggested for EPAT. Finally, the research modules identified below are not presented in order of priority.

**Environment as a waste sink.** Essentially, the set of issues related to degradation of air, water, soil and other resources through discharge of the waste products of production and consumption activities.

**Open access natural resources.** Focussing on the range of free access natural resources which serve as inputs to production or consumption activities.

**Natural resources pricing.** Pricing issues which may cut across all resources and priority areas.

**Product/factor prices.** Similar to the "natural resources pricing" module, but focussing on broader research into the relationship between overall factor and product pricing (as opposed to just natural resources pricing) and ENR.

**Resource access and tenure.** The full set of issues related to security of resource tenure, to inclusion of resources into the marketplace, and to incentives for efficient resource use. The topic is closely tied to open access natural resources<sup>10</sup> and to

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<sup>9</sup> *to the extent possible*

<sup>10</sup> *Resource tenure may be an appropriate response to the open access problem.*

long run resource pricing issues (proper resource valuation in market prices).

**Macroeconomic policy.** The range of macroeconomic policy issues -- from growth strategies to interest rates to balance of payments -- which directly or indirectly affect environment and natural resources.

**Uncertainty and risk analysis.** A decidedly cross-cutting research module which could be treated as a core part of the approach to research within any module. However, there are sufficient gaps in current research on risk/uncertainty and ENR decision-making to justify a separate research initiative in this area.

**Externalities.** Again, a cross-cutting research module. The importance of externalities to ENR management -- on both the cost and the benefit side -- justifies a separate research focus to identify, value and analyze potential impacts.

**Population, Migration and ENR.** A major influence on long term resource management options; an area where public policy can have an impact; a potential alternative to direct intervention in one or more resource areas.

#### 4.3 Linkages between Priority Areas and Research Modules

Figure 4.1 arrays the A.I.D. priority areas against potential research modules. In principle, each cell within the matrix represents the intersection between a priority area and a research module, and defines a potential area for EPAT research. However, in practice, the linkage between a given priority area and research module may be stronger or weaker: population policy has a stronger link to tropical deforestation than to energy efficiency, for example. Research into the relationship between population policy and deforestation would therefore be a higher priority than research on the link between population and energy efficiency. In this way, we can identify an initial set of "priority intersections".

Figure 4.1 uses a three-level classification to rank the importance of the relationship of a given priority area to the corresponding research module: no shading represents the weakest link; gray is intermediate, and black denotes a strong link. Three points on this classification need to be made:

FIGURE 4.1

Linkages Between A.I.D. ENR Priority Areas and Potential EPAT Research Modules

EPAT PRIORITY AREAS	POTENTIAL EPAT RESEARCH MODULES								
	1	2	3	4	5	6	7	8	9
Tropical Deforestation		█	█	█	█	█	█	█	█
Coastal Degradation	█	█	█	█	█	█	█	█	█
Urban & Industrial Envir.	█		█	█	█	█		█	█
Sustainable Agriculture		█	█	█	█	█	█	█	█
Biodiversity		█	█	█	█		█	█	█
Energy Efficiency and Use	█		█	█	█	█		█	█
Watershed & Water Mgmt.		█	█	█	█		█	█	█
Global Climate Change	█	█	█	█	█	█	█	█	█

- LEGEND:**
- 1 = Environment as a Waste Sink
  - 2 = Open Access Natural Resources
  - 3 = Natural Resources Pricing
  - 4 = Population and ENR
  - 5 = Macroeconomic Policy
  - 6 = Product/Factor Prices
  - 7 = Resource Access and Tenure
  - 8 = Uncertainty and Risk
  - 9 = Externalities

- o First, it is necessarily subjective. However, we believe that there can be fairly strong consensus on the vast majority of rankings we have accorded. Moreover, the process defined by the matrix allows for adjustment of priorities, at the margin, to reflect a different consensus. Finally, the objective is more to assure that EPAT pursues uniformly high priority research topics<sup>11</sup> than to assure that every potentially high priority is pursued.
- o Second, the "scale" used is ordinal. A cell with no shading (weakest link) does not suggest that there is no link, or even necessarily a weak link; rather, that the link is not as strong as in other cells.
- o Third, the potential range of research, even if limited to the highest priorities suggested by the matrix, is far too broad to constitute a workable research agenda for EPAT. It should be emphasized that each research module and priority area itself includes a number of sub-areas. The following sections consider how the research agenda can be narrowed further.

#### **4.4 EPAT comparative advantage with respect to priority areas**

Sustainable agriculture. The APAP project has a clear comparative advantage with respect to sustainable agriculture. EPAT could make a valuable contribution, but APAP has the sector expertise, the institutional connections and the physical, socioeconomic and related data which have been built up over a number of years. *EPAT has no comparative advantage in this area.*

Coastal resources and degradation. The University of Rhode Island, through its cooperative agreement with S&T, has been taking the lead on coastal resources research for years. While its effort has not been as specifically focussed on policy and economics as EPAT will be or APAP has been, the basis for taking the policy lead on coastal issues clearly exists. Because there is a substantial difference between physical, economic, access, tenure and degradation issues on coastal vs. land-based resources, EPAT would have to duplicate much of the research capacity which has already been developed through URI to make a useful contribution. *No EPAT comparative advantage.*

Biological diversity. A.I.D. is providing major funding for research on biodiversity worldwide. In addition, a number of major NGOs are heavily involved in biodiversity research and analysis. Historically, the focus of these NGOs has not been on the policy and economic issues, but this generalization is less true than it was as recently as a year ago. There is, we believe, a compelling case to be made that biodiversity

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<sup>11</sup> which, in their sum, also represent the most efficient allocation of project resources given the range of topics to be covered, relationships to other projects and bureau priorities.

stands somewhat apart from other priority areas in that: the economic incentives for preserving biodiversity are less direct; conservation behavior is less responsive to general economic and market signals (prices, subsidies, taxes, etc); links to the macroeconomy are more tenuous (or at least more subtle); the requirements for technical expertise are more case specific. While biodiversity is a high priority and an area in which there is an enormous gap in policy research, organizations with long established expertise in the field may be better able to develop a policy capability than is EPAT to develop a biodiversity capability. *EPAT does not have a clear comparative advantage.*

This leaves five priority areas:

- o Tropical Deforestation
- o Urban and Industrial Environment
- o Energy Efficiency and Use
- o Watershed and Water Management
- o Global Climate Change

In each, there are one or more projects actively involved in analysis and implementation. There is, however, no clear better (and already established) alternative effort in policy and economic research.

Moreover, and equally important, the five remaining priority areas form a coherent whole with two basic components and one cross-cutting component:

- o Analysis of tropical deforestation and watershed management share similar technical expertise, information sources, behavioral response patterns, national institutions and potential policy precedents. There is a community of specialists familiar with both fields, allowing EPAT to achieve some economies of scale and to develop a "deeper" (vs. a "broader") core of the technical, institutional and socioeconomic capability needed for sound policy research.
- o Energy efficiency, while not fully a subset of urban and industrial environment issues, has a great deal in common with them. Engineering, economics and finance will be important skills for both; host government ministries are often the same (energy and industry); data sets on each are directly relevant to the other; many of the major urban/industrial pollution problems can be partially addressed through energy efficiency; many of the energy efficiency problems can best be

addressed through switching to different industrial processes, etc. Moreover, in the A.I.D. regional bureaus in which energy efficiency is a priority, the principal energy issues are urban and industrial.<sup>12</sup>

- o A.I.D.'s global climate change initiatives are directly tied to energy efficiency improvement and to curtailing tropical deforestation. Therefore, each of the two components above, while having internally reinforcing elements, will also reinforce the data base, analytical skills and policy insights of the global climate change component.

#### **4.5 Suggested Focus with Respect to Research Modules**

Figure 4.2 arrays the priority areas suggested in Section 4.4 above against the nine research modules. However, at this point, it is necessary to narrow our research modules. The following subsection gives the rationale for the exclusion of three research modules.

##### **4.5.1 Modules recommended for exclusion from EPAT research agenda**

**Product/factor prices.** While of great importance, this module is similar to but broader than the natural resources pricing module. Outside natural resources themselves, the most relevant factor and product prices are in agriculture; and these are already being addressed by the APAP project. We recommend that the project define its research module as being "natural resources pricing", but allow for research into the relationship between natural resources and other pricing as individual cases require. We believe that research into natural resources pricing will, in any event, necessarily involve looking at the broader pricing picture. The narrower focus will sharpen the research agenda and provide a criterion for assuring direct relevance to project goals.

**Resource access and tenure.** There is a separate and coherent set of issues to be researched under the heading of resource access and tenure. To some extent, this research is being pursued by the University of Wisconsin Land Tenure Center (LTC). However, the general area of research remains too important to be excluded entirely from the EPAT agenda.

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<sup>12</sup> *In Africa, there is a major set of issues related to the efficiency of rural cookstoves. However, energy efficiency is not an Africa Bureau priority and is not likely to be the subject of A.I.D. initiated policy dialogue in Africa.*

**FIGURE 4.2**

**Linkages Between A.I.D. ENR Priority Areas and Potential EPAT Research Modules**

EPAT PRIORITY AREAS	POTENTIAL EPAT RESEARCH MODULES								
	1	2	3	4	5	6	7	8	9
Tropical Deforestation		■	■	■	■	■	■	■	■
Urban & Industrial Envir.	■		■	■	■	■		■	■
Energy Efficiency and Use	■		■	■	■	■		■	■
Watershed & Water Mgmt.		■	■	■	■		■	■	■
Global Climate Change	■	■	■	■	■	■	■	■	■

- LEGEND:**
- 1 = Environment as a Waste Sink
  - 2 = Open Access Natural Resources
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  - 5 = Macroeconomic Policy
  - 6 = Product/Factor Prices
  - 7 = Resource Access and Tenure
  - 8 = Uncertainty and Risk
  - 9 = Externalities

We therefore recommend that resource access and tenure be an important sub-component of the open access natural resources module. The two modules are fundamentally linked, and research into one cannot exclude the other. However, in practical terms, this approach will limit EPAT research to a much narrower range of research topics than would inclusion of this module as a free-standing agenda item. For example, a major sub-topic of "open access natural resources" is likely to be the approach of bringing open access resources under the sponsorship of local communities. This is an access and tenure issue. However, EPAT is better equipped to focus on the natural resources implications of these alternative approaches, whereas LTC is better equipped to consider the full range of legal and institutional changes which must take place in a given location.

By retaining the EPAT focus on "open access" resources, the project can concentrate on the natural resources side of the question, while allowing for possible collaborative research with LTC in looking at the stages of policy change and policy implementation.

**Uncertainty and risk analysis and Externalities.** Both topics could support separate research modules. As Figure 4.2 shows, each has strong links to the majority of priority areas retained. However, we believe that it is also impossible to exclude either subject from many of the other research modules. Therefore, rather than standing apart, we recommend that they be treated as a basic tool (for uncertainty and risk analysis) or a sub-component (for externalities) of other research modules.

In practical terms, this means that the research with respect to these two subjects will be driven by other topics: the project will neither be under pressure to perform such research for its own sake, nor will it be evaluated on this criterion. However, it must consider both issues at a number of levels, and may sponsor research -- including state-of-the-art research -- into one or both subjects where needed.

#### **4.5.2 Modules recommended for inclusion in the EPAT research agenda**

The research agenda therefore includes five recommended modules:

**Module 1. Environment as a waste sink.** This is the key set of issues which relate to three of the priority areas: urban and industrial, energy efficiency and global climate change. Most "brown end" questions will be directly addressed within this research module. It will be of the greatest relevance to the APRE and ENE Bureaus, and, to a lesser extent, to the LAC Bureau. The most important cross-fertilizations of data, research results and policy precedents between the industrialized and

aid-recipient nations will occur within this module.

**Module 2. Open access natural resources.** This module is most directly relevant, although not limited to, natural resources at the "green end". It will have strong links to the social sciences as well as to technical disciplines, including such subtopics as resource tenure. It will be a major interest of Africa Bureau, but also extremely relevant to LAC and both APRE and ENE.

**Module 3. Natural resources and product pricing.** This module considers the full range of pricing issues, from the problem of valuation and effective implementation of pricing mechanisms for open access resources (stumpage pricing, for example), to such areas as energy pricing and the relationship between conventional fuels pricing and the sustainable management of the rural natural resources base. The module is directly relevant to all bureaus and to each of the five priority areas.

Modules 1-3 cover specific ENR-related areas in which further research is urgently needed. Modules 4 and 5 are aimed more at research on the linkages between environment and natural resources and overall development strategies.

**Module 4. Macroeconomic policy.** Natural resource concerns, even at the policy level, do not exist in a vacuum. The case is amply made in recent policy research that macroeconomic policy and development strategy are closely tied to ENR. The links run in both directions: ENR impacts on the economy; and the economy impacts on ENR.

Two important aspects of this relationship should be noted here:

- o The issues go well beyond avoiding environmental degradation, to include questions of how to contribute to income generation and economic growth through enhancing the resource base. This is, in effect, the link between sustainable resource use and sustainable development.
- o The opportunity costs of resource degradation have an enormous influence on how much degradation takes place and on what types of resources are degraded. These opportunity costs, are in, turn, strongly influenced by what alternative income generation opportunities exist, and by the margins of survival which determine the tradeoff between current and future income.

This research module is directly relevant to all bureaus, and can tie in to state-of-the-art research being performed on the same topic in industrialized countries as well.<sup>13</sup>

**Module 5. Population and ENR.** There are arguments in favor of excluding population policy from the EPAT research agenda, including the following:

- o There are offices within A.I.D. and several projects which have a greater comparative advantage.
- o Population policy concerns much more than natural resources and environment.
- o Suggested policy changes in this area cannot be based on ENR concerns alone.

We nevertheless believe that population policy should receive priority attention as a stand-alone research module within EPAT, for the following reasons:

- o Existing A.I.D. programs have focussed more on ENR as one element of population policy. There has been much less work on the importance of population policy relative to other options available for improving environmental and natural resources management.
- o In a future-oriented sense, and with a 20 year minimum timeframe, population may well be the single most important variable affecting tropical deforestation, watershed management, urbanization, industrial pollution and global climate change.
- o Even if EPAT does not recommend changes in population policy, population dynamics will determine what issues should receive priority. Given the long lead times for policy development, change and implementation, factor scarcities (of land, labor and capital), relative factor prices, land use patterns,

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<sup>13</sup> As Herman Daly, Robert Repetto, Theo Panayotou, Anil Markandya, David Pearce and others have pointed out, the growth strategies of industrialized countries are no longer available either to those countries or to developing nations. There is, therefore, a need to revisit how economics as a discipline understands and treats environment as part of macroeconomic decision-making.

resource consumption, waste generation and transport and market opportunities must all be calculated based on what they will be in ten years, not on what they are now. Without a solid grounding in the population-environment future, project research may well be outdated even before it has a policy impact.

In short, (i) of the policy tools available to address ENR concerns, population policy is amongst the most important and (ii) of the underlying forces affecting future ENR management options, population dynamics is probably the most important.

## **5. Recommended EPAT Research Agenda**

### **5.1 Framework**

Figure 5.1 lays out the framework for the recommended research agenda.

The matrix shows two dimensions of what, conceptually, is a three-dimensional matrix. The third dimension is the stage of the policy reform process to be addressed. Within a given cell of the matrix (such as, for example, research in the "open access" module on tropical deforestation related policy issues), research may focus on one or more of four stages: problem identification and valuation, development of policy instruments, policy change and policy implementation and impact, as shown in Figure 5.2.

Section 5.2 below provides a narrative description of each recommended research module. In their sum, the five research modules constitute the proposed research agenda for EPAT.

Section 5.3 -- the concluding section of this annex -- proposes an approach to operationalizing the research agenda, while maintaining the twin needs to keep the project focus narrow enough to be manageable and retaining flexibility to respond to changing needs and new opportunities.

**FIGURE 5.1**

**Framework for the Recommended EPAT Research Agenda**

28

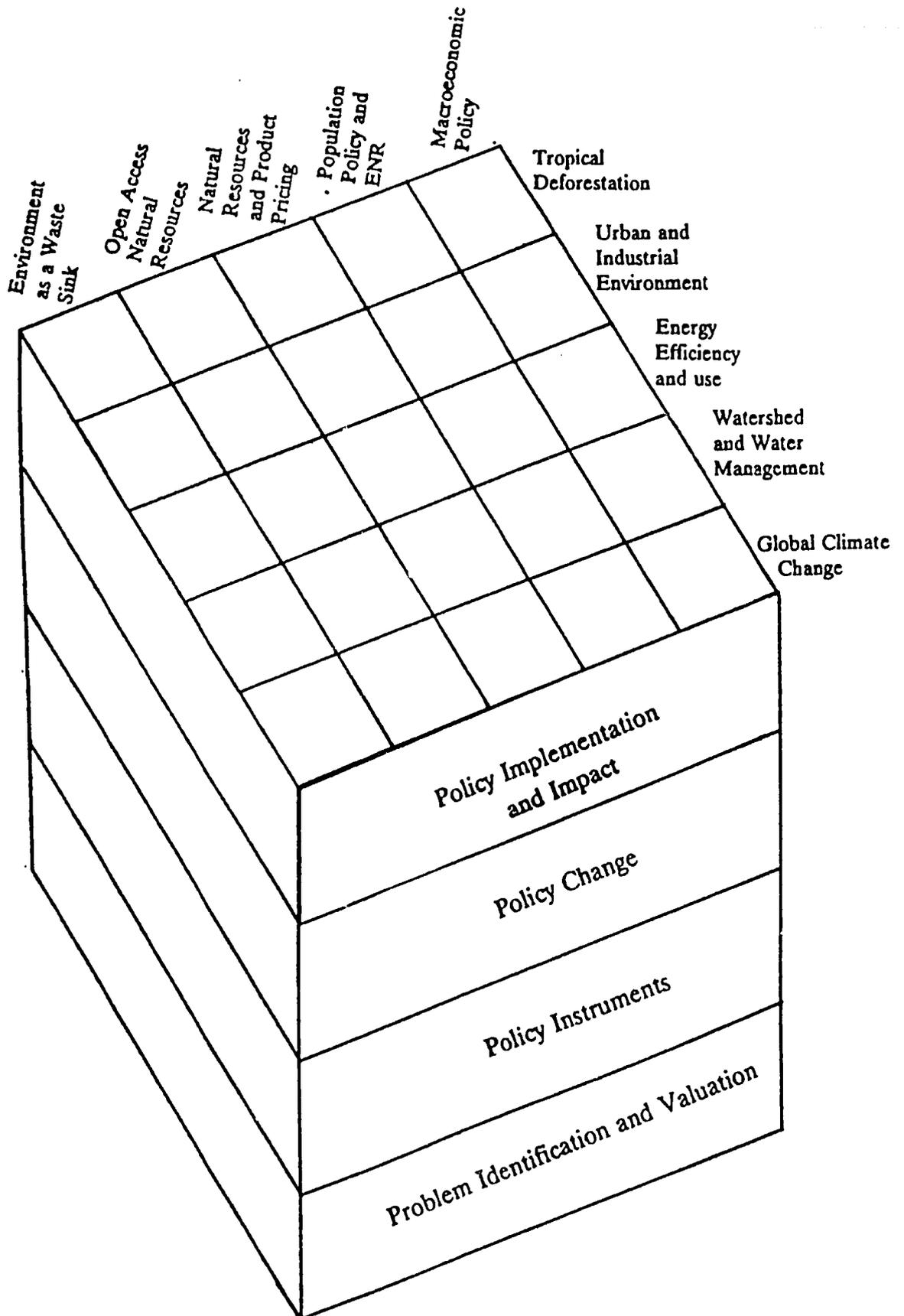
EPAT PRIORITY AREAS	POTENTIAL EPAT RESEARCH MODULES				
	1	2	3	4	5
Tropical Deforestation		■	■	■	■
Urban & Industrial Envir.	■		■	■	■
Energy Efficiency and Use	■		■	■	■
Watershed & Water Mgmt.		■	■	■	■
Global Climate Change	■	■	■	■	■

- LEGEND:**
- 1 = Environment as a Waste Sink
  - 2 = Open Access Natural Resources
  - 3 = Natural Resources and Product Pricing
  - 4 = Population and ENR
  - 5 = Macroeconomic Policy

111

Figure 5.2

Policy Context and ENR Impact-A Conceptual Framework



1/6

## 5.2 The Research Agenda

### Module 1: Environment as a Waste Sink

**Priority areas:** urban and industrial environment, energy efficiency and use, global climate change.

**Stages:**<sup>14</sup> valuation (A)  
policy instruments (A)  
policy change (B)  
policy implementation and impact (B)

#### Indicative Research Topic Areas:

- impact of mobile and fixed sources of pollution
- impact of household and industrial waste on surface and underground water
- the relationship between energy efficiency improvement and pollution control
- incentives for environmental regulation, including the incidence of costs and benefits of pollution control
- values of health impacts using indirect valuation techniques

### Module 2: Open Access Natural Resources

**Priority areas:** tropical deforestation, watershed and water management, global climate change

**Stages:** valuation (A)  
policy instruments (A)  
policy change (A)  
policy implementation and impact (A)

#### Indicative Research

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<sup>14</sup> Each stage of the policy reform process is assigned a ranking (A-C) which represents the suggested priority to be given to research on that stage within this module. A = highest priority; C = lowest priority. It is recognized that this ranking may be different for a given priority area (i.e. tropical deforestation, urban and industrial, etc.) within the module, but that is a level of detail which is best addressed during implementation.

**Topic Areas:**

- stumpage fees and other economic rent collection schemes
- options for bringing open access resources under sponsorship of local communities
- relationship between regulatory framework, market forces and traditional authorities and rights
- gender roles in access and resource management rights
- the impact of risk and uncertainty on smallholder resource management decisions
- land tenure, land access and resource degradation

**Module 3: Natural Resources and Product Pricing**

**Priority areas:** tropical deforestation, watershed and water management, energy efficiency and use

**Stages:** valuation (A)  
policy instruments (B)  
policy change (B)  
policy implementation and impact (A)

**Indicative Research  
Topic Areas:**

- estimation techniques for determining stumpage values
- impacts of fertilizer and pesticide pricing on sustainable land use and land degradation
- relationship between pricing, fiscal and tariff policies and pollution control imports/investments
- impacts of relative fuel prices on rural resource degradation and incentives for sustainable resource management
- pollution permits, valuation, permit trading and implications for product pricing
- environmental externalities and

122

implications for pricing and the potential role of market allocation mechanisms

#### **Module 4: Macroeconomic Policy**

**Priority areas:** tropical deforestation, watershed and water management, urban and industrial environment, energy efficiency and use, global climate change

**Stages:** valuation (A)  
policy instruments (A)  
policy change (B)  
policy implementation and impact (B)

#### **Indicative Research Topic Areas:**

- the role and long term macroeconomic potential of debt-for-environment swaps
- mechanisms for translating macroeconomic and global environmental gains into localized incentives
- stabilization policy, structural adjustment and environmental degradation
- macroeconomic impacts of environmental policy instruments, including trade and international competitiveness impacts
- benchmark review of macro policies which affect environment and natural resources
- macroeconomic impacts of soil and water degradation, especially on long term productivity
- macroeconomic tradeoffs between balance of payments vs. rural resource/productivity declines from fuel switching between traditional and imported fuels.

## **Module 5: Population and ENR**

**Priority areas:** tropical deforestation, watershed and water management, urban and industrial environment, global climate change

**Stages:** valuation/analysis (A)  
policy instruments (B)  
policy change (B)  
policy implementation and impact (B)

### **Indicative Research Topic Areas:**

- future-oriented analysis of impact of demographic changes on relative factor scarcities, land use, resource degradation, pollution and new market opportunities
- comparative analysis of impact of reduced population vs. other ENR policy options
- the evolution and likely importance of urban vs. rural ENR priorities, given population growth
- the impact of rural to rural migration on environmental degradation and local resource management

### **5.3 Operationalizing the Research Agenda**

Moving from a proposed research agenda to the funding of specific research proposals will require further guidelines as to how individual research proposals might be evaluated. This section presents some of the factors which should be taken into consideration. Each of the items discussed below draws on issues raised earlier in this document. The objective here is to bring together issues in a format which serves as an initial checklist for assuring that funding decisions (for supporting a given research proposal) correspond to project priorities, and that project resources are efficiently utilized.

**Relevance to research agenda.** What research module does the proposal fall under? Does it relate to the priority areas for that module? What stage of the policy process does it address? Given what other research exists, is that stage the highest initial priority? What is the policy change the research hopes to leverage, and what ENR impacts can be expected if the research successfully promotes policy change?

**Feasibility of the proposed research.** If the research is successful, what complementary research would be needed to bring about policy change and ENR impact? Over what time frame? Are existing data sufficient to support the proposed research? What other inputs will be required?

**Research data.** EPAT should not, as a separate objective, generate primary data (through resource assessments, for example) on physical or socioeconomic variables. The task is too large and will only dilute project resources. Availability of secondary data should be one criterion for judging research proposals. However, in some instances, it may be advisable to supplement the efforts of the proposed S&T information center by collecting and organizing basic data on the project's five priority areas. Such data should be organized in a way which permits updating of databases as research collects or generates new data.

**Collaborative research.** EPAT should actively seek out opportunities for collaborative research with other programs (LTC, APAP, etc.) and with other agencies (World Bank, UNEP, ICRAF, etc). In general, research into policy change and policy implementation is likely to benefit most from collaboration with institutions which have broad experience in these areas. For example, research on implementation of land tenure reforms could best be done in collaboration with the Land Tenure Center. Direct participation in the research by host country or regional organizations should be given particular emphasis, particularly with respect to implementation issues.

**Level of specificity.** Is the research specific enough to yield useful answers to (or insights on) specific policy changes which might be adopted by individual countries?

**"Replicability".** How widespread is the problem being addressed? Can the research, with adaptation, be relevant to other countries as well? To other research modules? To more than one priority area?

**Audience and distribution.** It is recommended that all research proposals be held to the criterion of having a specific, identified target audience. The audience can be the research community, government decision-makers (broken down by line ministries, economics and finance ministries, heads of state, etc.), donors, project personnel, etc. The proposed target audience should have a strong influence on the type of research which is conducted, the format in which the research results are presented and the dissemination of research results. EPAT research will have little impact if target audiences do not know of its results, and if they are not kept abreast of their implications for decision-making. Therefore, it is also recommended that all research proposals include (i) a proposed distribution list for research results and (ii) a plan and an adequate budget for distribution, publicity and dissemination.

**It is not sufficient to distribute research results once (i.e. when they first become available) because the policy community is not composed of a fixed set of individuals. The project itself should develop a longer term strategy for information dissemination and outreach.**

**ANNEX B.2: FINANCIAL ANNEX**

**William Goodwin**

## FINANCIAL AND COST ANALYSIS

### **A. PURPOSE OF ANALYSIS**

While the economic analysis strives to determine if investments are optimum in terms of society's costs and benefits, the financial analysis and costing of implementation examines the the appropriate amount and mix of financing to meet the goals and objectives of the project. Financial and cost analysis endeavors to minimize costs necessary to achieve desired outputs and to allocate them appropriately. In particular, this analysis seeks to facilitate the leveraging of USG funds to increase impact and/or reduce A.I.D. financial inputs, determine the level of effort and associated costs necessary to achieve EPAT goals and purposes, allocate those costs between S&T, other AID entities and other institutions in an appropriate way, and promote smooth, efficient implementation by highlighting possibly costly delays.

The EPAT design team was very careful in its attempts to estimate unit costs, adequate levels of technical, professional, managerial and support personnel, and associated logistical needs. At the same time, project managers will strive to lever core funding with resources from U.S. institutions, utilize Mission and regional bureau funds for collaborative research and technical efforts as appropriate, while seeking to establish longer term linkages with host country institutions and key policy makers that will yield high returns.

### **B. METHODS AND APPROACHES EMPLOYED**

This section briefly presents the methods and approaches used in determining the appropriate cost items and budget structures, the human and financial resource requirements, and the means and timing of financing to accomplish EPAT objectives. The conclusions reached are based upon a combination of empirical analysis of the experience of similar projects and activities, and judgments of a highly qualified technical team that extensively interviewed and consulted with a broad group of persons and institutions.

In translating envisioned activities into an allocation of resources necessary for their implementation, we kept the following principles in mind:

- o Sufficient **Level of Effort** (LOE) must be allocated to implement the activities proposed to meet the project's objectives, bearing in mind the perspectives of the regional and central bureaus, and of the field Missions.
- o Realistic assumptions must be made about **person-**

month and related costs; these include adequate provision for payment of salaries above the FS-1 level, when appropriate, and anticipated future cost increases due to inflation.

- o Appropriate levels of **management, supervision, administrative support** and **evaluation** must be available, both in A.I.D. and in the project's implementing institutions.

Level of effort requirements were considered first by the technical design staff and subsequently within A.I.D. These personnel requirements are detailed in the following section. Person month and related project costs were the subject of an extensive in-house analysis of similar projects. Modifications were then made to take into account the unique features of EPAT and future contingencies, especially inflation. The results are presented in Section D below. Management requirements were a constant concern given the difficulties and complexities experienced by S&T in managing projects which combine U.S.-based research with Mission responsive technical assistance. These considerations are reflected in the level of effort and overall cost and budget estimates.

### C. PROJECT PERSONNEL REQUIREMENTS

Summary and detailed *level of effort* estimates for the project activities or elements are presented in Tables 1 and 2. Over 300 person years of technical and managerial expertise are expected to be provided through EPAT during its ten year life. Approximately 55 percent of this total will be financed by central funds and the other 45 percent by institutions which buy into the project. These tables provide not only our best thinking about the total work effort required, but also indicate its deployment by project component for each of the first 5 years (Phase I), the period for which competitive procurement activities will begin after project authorization. The estimates in the tables reflect our expectation of sustained funding from core sources and the natural ebb and flow of outside interest. They were made after factoring in the views of a wide spectrum of Agency personnel, both in Washington and in the field, concerning the project's priorities. In particular, they reflect the following conclusions with respect to appropriate levels and allocation of effort:

- o Strong **core research** and **methods development** are required and warrant S&T core support. This effort should begin with a **review** and **synthesis** of work completed or currently ongoing under other auspices. It should also include new research designed to shed light on the relationship between economic policy and ENR degradation/depletion (see

the Technical Annex for an in depth discussion of the research agenda). It should produce and distribute a series of documents useful to practitioners, policy makers, educators and researchers in the area of economic/ENR policy. Approximately 7.5 person years per project year will be dedicated to these activities.

- o There is a definite need to advance stated EPAT goals through **applied field research** and related **technical assistance** to Missions and A.I.D.-assisted countries. Almost 45 person years will be dedicated to applied country and regional research. While EPAT will attempt to be responsive to the shorter term needs of Missions, the preferred mode will be through longer term agreements with selected Missions.
- o Applied research will often be closely linked to host country **institutional strengthening** and, in some instances, will probably involve the assistance of long-term resident advisors. This activity will utilize roughly 25 person years during the life of the project.
- o Both field activities (the two preceding ones) will be supported by 2-3 person months per year funded by S&T to ensure linkage to the core research program and enhance integration of different project elements.
- o The strongest felt need of regional bureaus and Missions for S&T investments is in the area of **human resources development**. Emphasis for use of S&T funds will be placed on cooperating with U.S. institutions to develop core training modules, while resources to support host country participants and to implement courses in the field will be provided by Missions and/or regional bureaus. Approximately 18 person months per year on average will be devoted to the development of EPAT training modules, while Missions are expected to utilize about 3 person years per project year for training activities.
- o The process of **policy reform**, including the delineation of the policy agenda, analysis of options, and **policy dialogue** on options, requires specialized resources. This element will focus on several levels -- global, multilateral, bilateral and regional -- requiring a broad array of expertise. Core funds will be used to support 8

person months per project year for these activities, while Missions are expected to request 12 person months/year from the EPAT team in specialized, and usually high level, consultations in this area.

- o The EPAT design team was unanimous in its resolution to ensure that sufficient level of effort and funding was dedicated to **information** and **dissemination** of the work done under, and experiences encountered in, the project. From core resources, over 2 person years/project year will be dedicated to these tasks, in part supporting the publication of reports from the core and applied field research, the development of networks and rosters of professionals in the ENR policy arena, publishing a newsletter and technical bulletins series, experimenting with new audio-visual techniques, and organizing senior seminars and more popular workshops.
- o Finally, it is imperative that the **management** of the policy process and of the project not be short-changed and become the limiting factor to the flow of project benefits. Provision of external technical advice, direction and supervision from within the Agency, and execution and administration of our implementing agreements are to be treated (collectively) as a separate project element with adequate staff and funding. AID expects to establish RSSA agreements with USDA and/or EPA to provide needed professional staff to work in S&T/FENR in a technical capacity, and the EPAT Project Officer will be supported by a research assistant and support staff. Separate budget line items will be defined for the cooperators and contractors to hire project coordinators, a research director and module leaders, technical assistance coordinators, a training officer and dissemination director. Funding will also be available for office staff and equipment.

#### D. COST ESTIMATES

The cost factors for the different activities and associated levels of effort have been extrapolated over the 10-year life of project period based upon past expenditure patterns for similar S&T core project activities, and for analogous buy-in undertakings in the various regions. The project design team was particularly fortunate to have access to the financial records of the

Agricultural Policy Analysis Project (APAP), which gave a picture of almost 7 years of implementation in a similar technical area involving both U.S. based research, teaching and dissemination, as well as an extensive overseas technical assistance and applied research operation that spanned all the major A.I.D. regions.

The unit of cost employed by the design team is the "total burdened professional person-month," which includes not only the expected salary level, but also benefits and overhead, average travel related expenses, equipment and supplies, general and administration, fees and other contingent costs. Since the total burdened professional person month costs vary considerably depending upon the type of activity (see Table 3), institutions involved, and geographic region of activity, project priorities as gleaned from Table 6 -- which incorporates both expected level of effort and unit costs -- differ somewhat from those derived from Table 1, which looks at level of effort only.

Person-month costs in Table 3 are based upon projections made from the APAP experience (see Graph 1), with allowances for inflation (assumed to be 5 percent per annum). In addition, APAP and other projects' experiences with the different types of activities to be undertaken under EPAT were calculated and used to make projections for EPAT. These are summarily displayed in Graph 2. Amounts differ depending upon the experience and mix of skills needed and the array of support and institutional costs involved.

Table 4 provides additional detail at the **element and activity levels** and, for each, estimates life of project expenditures -- core, buy-in and total. Table 5 amplifies on the previous budgets by providing estimates in terms of **expenditure groups** -- salaries, benefits and overhead costs; travel, supplies, equipment and contingencies; and, a line item for general and administration, fees and other costs -- for each component by year for Phase I (first five years) and in summary form for Phase II (second five years). Approximately 60 percent of the total project cost is related directly to personnel, another 25 percent to travel, supplies and contingencies, and the remainder to fees, G&A, etc. Costs in Phase II are expected to average over 25 percent higher than in Phase I.

#### **E. PROJECTED FINANCIAL REQUIREMENTS & PHASING**

Table 6, entitled "Summary 10-Year Budget by Project Element for both S&T Core and Buy-in Costs," presents the anticipated EPAT budgetary allocations for the project elements for the life of the project. These financial inputs are based upon the A.I.D. design team's previously presented budget principles (see page 1 of this annex), apportionment among project elements (see Section C above) and projected unit costs (Section D). A more graphic

representation of these budgetary shares by project element is presented in Graphs 3 through 5.

In order to depict expected yearly financial needs -- both for planning obligations and anticipating expenditures for the project's components and implementing arrangements -- Tables 7 through 9 have been constructed. These tables present the separate funding needs of S&T and the expected effective demand from buy-ins for the life of the project, for Phases I and II separately, and by year for the first five years. Graph 6 depicts the anticipated ebb and flow of financial needs for the life of the project, both for S&T core and for buy-ins.

The next section examines in more detail the information used in estimating buy-ins.

#### **F. MISSION AND REGIONAL BUY-INS**

There is ample reason to believe that the demand for buy-ins will be high:

- o More than thirty Missions have responded to our first cabled request for comments on the project. While not providing quantitative estimates of buy-in demand, many Missions expressed strong interest in the project and estimated a high level of buy-in demand. Estimated demand was highest for, in order of general Mission priority, training, country-specific collaborative research, and support for Mission policy dialogue efforts.
- o Buy-in demand for ENR components of other S&T projects generally has exceeded projections. For example, the APAP II contract established a buy-in ceiling for natural resource-related activities which was reached after less than one and a half years of the five-year contract period. The contractor has had to stop providing further assistance in this area. The APAP contractor believes that, were it not constrained, the buy-in demand could be three times the current ceiling. The buy-in ceiling for EPM has had to be raised more than once to satisfy greater than anticipated Mission demand; the current EPM buy-in ceiling is \$5 million.
- o Other bureaus have expressed potential interest in substantial buy-ins into EPAT as a means of furthering their own project objectives. The Africa Bureau has expressed strong interest in buy-ins to EPAT under NRMS II, which is currently being designed. AFR is currently engaged with EPM in

research related to ENR indicators. Under EPAT, we expect to build upon this work. The former Asia and Near East Bureau, which is designing the Regional Environmental Activities II project, has stated interest in buying into EPAT for training and other activities and, more generally, in possibly using certain of the research and analysis institutions engaged under EPAT. The Bureau for Private Enterprise has expressed interest in possible incorporation of an "environmental PEDS" (Private Enterprise Development Support) component in EPAT.

- o Both economic policy reform/adjustment and ENR issues have grown in relative importance both for AID and many host governments. And the conjunction of these two areas has emerged as a high priority for assistance, beginning in Asia where a few Missions (for example, Thailand, Indonesia and Sri Lanka) have begun, or are designing, ENR projects with a heavy economic policy emphasis. Other Missions increasingly are deciding to initiate activities combining economic and ENR policy. Much of the APAP II demand, for example, was due to a desire of the Missions in Central America to initiate economic and natural resource policy assessments to identify priority areas for assistance. Other regions have also expressed a strong interest in conducting ENR policy inventories. As Missions' priorities evolve in this area, demand for EPAT services should grow beyond what Missions currently are projecting.

Two factors are likely to have a substantial influence on the level of Mission buy-in demand:

1. **Quality and Responsiveness of EPAT Teams.** Projects such as APAP have had a high level of buy-in demand in part because they have responded quickly to Mission needs and have established a reputation for fielding highly competent teams and tightly managing those teams. Projects in S&T and elsewhere which the Missions do not perceive as having these attributes have not approached their buy-in projections. This seems to be the case particularly where projects combine research and technical assistance in a single set of institutions which view research as their primary mission. (Conversely, the design team encountered criticisms that projects combining research and technical assistance under a prime contractor which viewed technical assistance as its prime mission did not give sufficient priority to research.)

2. **Ease of Buy-Ins.** A major determinant of response time is not just the contractor or cooperating institution but AID itself. Mission and regional bureau officers interviewed stressed that buy-ins will be higher if the buy-in process itself is administered rapidly and efficiently by S&T/FENR and the grants or contracts office supporting S&T/FENR. Also, there are a number of projects with ENR components throughout FENR, Agriculture, Rural Development, and other S&T offices; a Mission with a given need may not be at all certain which of these projects is most appropriate as a source of assistance. As a consequence, there is a strong desire to have some mechanism for rapidly helping Missions determine the appropriate project(s) to buy into. These twin needs for rapid AID/W response and for assistance in routing buy-in requests imply a need for substantial AID/W administrative support.

Because of the likely high buy-in demand for EPAT services, and the history of grossly underestimating demand for similar types of services under APAP, EPM and other projects, it appears prudent to authorize a very liberal buy-in ceiling for this project. Also, as experience with APAP and other projects has shown, multiple ceilings -- on aggregate dollars, aggregate person-months and, thus, expenditures by topic area as well as by project element -- would overconstrain and seriously limit EPAT's ability to respond constructively to Mission needs.

#### G. CONCLUSIONS

The following are the most salient points from the financial and cost analyses:

- o Generally, research is best conducted by U.S. research and educational institutions linked with host country institutions and, perhaps, with multilateral organizations. This structure should greatly lever core funding, while building capacity for policy research in the countries in which it is conducted, and increasing the likelihood that the results of the analyses will influence policy.
- o The benefits of policy change are more likely to be sustained if cost-effective investments in institutional strengthening are coupled with country- and region-specific analysis. Previous experience has indicated that this can best be accomplished by integrated packages of technical assistance which include long-term advisors together with shorter-term specialists in the more technical aspects of policy and research.

- o High and sustained returns to policy understanding and reform are expected not only from institutional strengthening, but also from a cost-effective program of human resource development. Returns to S&T's investment in designing core courses can be maximized by collaborating with U.S. educational institutions which already have invested in technical and didactic expertise. Subsequent payoffs to our programs and to host countries will be realized to the extent that AID Missions and host countries are willing to support participants or conduct courses and workshops in the field.
  
- o Finally, it is imperative that the management of the policy process and of the project not be short-changed and become the limiting factor to the flow of project benefits. Provision of external expert technical advice, direction and supervision from within the Agency, and execution and administration of our implementing agreements with adequate staff and funding will help assure maximum returns to project expenditures. AID expects to establish RSSA agreements with USDA and/or EPA as a cost-effective means to provide needed professional staff to work in S&T/FENR in a technical capacity. The A.I.D. Project Officer will be supported by a research assistant and support staff to ensure timely implementation. Sufficient resources will be allocated for the cooperators and contractors to hire effective project coordinators, a research director and module leaders, a technical assistance coordinator, a training officer and dissemination director, and office staff and equipment.

Table 1. Summary 10-Year Level of Effort by Project Element/Activity  
 estimated in Person Months of Professional LOE  
 Environmental and Natural Resources Policy and Training (EPAT)  
 AID/ST/FENR, Project Number 936-5555

Project Element/Activity	ST/FENR CORE	BUY-IN	TOTAL	PERCENT TOTAL
	-----Person Months-----			%
1. State of the Art Research	900	0	900	24.0%
2. Applied Country/Regional Research	36	500	536	14.3%
3. Information and Dissemination	270	120	390	10.4%
4. Support for Policy Dialogue	80	120	200	5.3%
5. Institutional Strengthening	24	300	324	8.6%
6. Human Resources Development	180	360	540	14.4%
7. Implementation/Management	560	300	860	22.9%
TOTAL	2,050	1,700	3,750	100.0%

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1/31

Table 2. EPAT Phase I & II Level of Effort (LOE) Estimates  
 Summary 5-Year Phase I Person Months by Project Element  
 including both Core and Buy-In Work Force Requirements  
 Environmental and Natural Resources Policy and Training (EPAT)  
 AID/ST/FENR, Project Number 936-5555

TOTAL PROJECT LOE Project Element	Project Year 1 LOE	Project Year 2 LOE	Project Year 3 LOE	Project Year 4 LOE	Project Year 5 LOE	Phase I Years 1-5 LOE	Phase II Years 6-10 LOE	Project TOTAL LOE
===== in Person Months per Year =====						== PM ==	== PM ==	== PM ==
1. State of the Art Research	94	100	106	84	76	460	440	900
2. Applied Country/Regional Research	33	48	69	70	41	262	274	536
3. Information and Dissemination	34	45	52	52	30	212	178	390
4. Support for Policy Dialogue	16	20	21	20	17	94	106	200
5. Institutional Strengthening	14	46	49	35	15	159	165	324
6. Human Resources Development	23	54	77	58	42	253	287	540
7. Implementation/Management	87	88	88	89	91	443	417	860
Total EPAT LOE	300	401	461	407	313	1,882	1,868	3,750

S&T CORE Project Element	S&T Core Year 1 LOE	S&T Core Year 2 LOE	S&T Core Year 3 LOE	S&T Core Year 4 LOE	S&T Core Year 5 LOE	Phase I Years 1-5 LOE	Phase II Years 6-10 LOE	S&T Core TOTAL LOE
===== in Person Months per Year =====						== PM ==	== PM ==	== PM ==
1. State of the Art Research	94	100	106	84	76	460	440	900
2. Applied Country/Regional Research	3	4	4	3	2	16	20	36
3. Information and Dissemination	25	30	32	30	26	143	127	270
4. Support for Policy Dialogue	4	8	11	8	6	37	43	80
5. Institutional Strengthening	2	3	3	2	1	11	13	24
6. Human Resources Development	19	20	20	18	12	89	91	180
7. Implementation/Management	58	58	59	59	60	294	266	560
Total, S&T Core	204	224	235	203	185	1,052	998	2,050

BUY-IN LOE Project Element	Buy-In Year 1 LOE	Buy-In Year 2 LOE	Buy-In Year 3 LOE	Buy-In Year 4 LOE	Buy-In Year 5 LOE	Phase I Years 1-5 LOE	Phase II Years 6-10 LOE	Buy-In TOTAL LOE
===== in Person Months per Year =====						== PM ==	== PM ==	== PM ==
1. State of the Art Research	0	0	0	0	0	0	0	0
2. Applied Country/Regional Research	30	44	65	67	39	245	255	500
3. Information and Dissemination	9	14	19	21	5	68	52	120
4. Support for Policy Dialogue	11	11	11	12	11	56	64	120
5. Institutional Strengthening	12	43	46	32	14	148	152	300
6. Human Resources Development	8	35	55	40	29	165	195	360
7. Implementation/Management	29	29	30	30	31	149	151	300
Total, Buy-In	99	177	225	202	129	831	869	1,700

15

Table 3. Estimated Total Burdened Professional Person Month Costs by Project Activity/Element over Life of Project--10 Years for Core, Buy-In and Total Expenses; By 5 Year Phases Environmental and Natural Resources Policy and Training (EPAT) AID/ST/FENR, Project Number 936-5555

TOTAL PROJECT	PROJECT YEAR, PHASE I					Phase I	PROJECT YEAR, PHASE II					TOTAL
Project Activity	1	2	3	4	5	AVERAGE	6	7	8	9	10	AVERAGE
SOTA Research	12,795	13,468	14,177	14,923	15,708	\$14,214	16,514	17,340	18,207	19,117	20,073	16,111
Field Research	19,631	20,665	21,752	22,897	24,102	\$21,809	25,338	26,605	27,935	29,332	30,799	24,720
Info/Dissem	14,865	15,647	16,471	17,338	18,250	\$16,514	19,186	20,145	21,152	22,210	23,321	18,718
Policy Support	21,640	22,779	23,978	25,240	26,569	\$24,041	27,931	29,328	30,794	32,334	33,951	27,250
Inst'l Support	18,506	19,479	20,505	21,584	22,720	\$20,559	23,885	25,079	26,333	27,650	29,032	23,302
Training/HRD	17,648	18,576	19,554	20,583	21,667	\$19,606	22,778	23,917	25,113	26,368	27,687	22,222
Mgt/Implement	13,805	14,532	15,297	16,102	16,949	\$15,337	17,818	18,709	19,645	20,627	21,658	17,384
<b>TOTAL Cost/Month</b>	<b>\$15,883</b>	<b>\$16,719</b>	<b>\$17,599</b>	<b>\$18,525</b>	<b>\$19,500</b>	<b>\$17,645</b>	<b>\$20,500</b>	<b>\$21,525</b>	<b>\$22,601</b>	<b>\$23,731</b>	<b>\$24,918</b>	<b>\$20,000</b>
=====												
S&T CORE ELEMENTS	PROJECT YEAR, PHASE I					Phase I	PROJECT YEAR, PHASE II					TOTAL
Project Activity	1	2	3	4	5	AVERAGE	6	7	8	9	10	AVERAGE
SOTA Research	12,795	13,468	14,177	14,923	15,708	\$14,214	16,514	17,340	18,207	19,117	20,073	16,111
Field Research	16,545	17,415	18,332	19,297	20,313	\$18,380	21,354	22,422	23,543	24,720	25,956	20,833
Info/Dissem	14,118	14,861	15,643	16,467	17,333	\$15,685	18,222	19,133	20,090	21,095	22,149	17,778
Policy Support	16,876	17,764	18,699	19,683	20,719	\$18,748	21,781	22,870	24,014	25,215	26,475	21,250
Inst'l Support	16,545	17,415	18,332	19,297	20,313	\$18,380	21,354	22,422	23,543	24,720	25,956	20,833
Training/HRD	13,236	13,932	14,666	15,438	16,250	\$14,704	17,083	17,938	18,834	19,776	20,765	16,667
Mgt/Implement	13,827	14,554	15,320	16,127	16,975	\$15,361	17,846	18,738	19,675	20,659	21,692	17,411
<b>TOTAL Cost/Month</b>	<b>\$13,559</b>	<b>\$14,272</b>	<b>\$15,023</b>	<b>\$15,814</b>	<b>\$16,646</b>	<b>\$15,063</b>	<b>\$17,500</b>	<b>\$18,375</b>	<b>\$19,294</b>	<b>\$20,258</b>	<b>\$21,271</b>	<b>\$17,073</b>
=====												
BUY-IN ACTIVITY	PROJECT YEAR, PHASE I					Phase I	PROJECT YEAR, PHASE II					TOTAL
Project Activity	1	2	3	4	5	AVERAGE	6	7	8	9	10	AVERAGE
SOTA Research	0	0	0	0	0	\$0	0	0	0	0	0	0
Field Research	19,854	20,899	21,998	23,156	24,375	\$22,056	25,625	26,906	28,252	29,664	31,147	25,000
Info/Dissem	16,545	17,415	18,332	19,297	20,313	\$18,380	21,354	22,422	23,543	24,720	25,956	20,833
Policy Support	24,817	26,123	27,498	28,945	30,469	\$27,570	32,031	33,633	35,314	37,080	38,934	31,250
Inst'l Support	18,662	19,645	20,679	21,767	22,913	\$20,733	24,088	25,292	26,556	27,884	29,279	23,500
Training/HRD	19,854	20,899	21,998	23,156	24,375	\$22,056	25,625	26,906	28,252	29,664	31,147	25,000
Mgt/Implement	13,765	14,490	15,252	16,055	16,900	\$15,292	17,767	18,655	19,588	20,567	21,595	17,333
<b>TOTAL Cost/Month</b>	<b>\$18,686</b>	<b>\$19,669</b>	<b>\$20,704</b>	<b>\$21,794</b>	<b>\$22,941</b>	<b>\$20,759</b>	<b>\$24,118</b>	<b>\$25,324</b>	<b>\$26,590</b>	<b>\$27,919</b>	<b>\$29,315</b>	<b>\$23,529</b>
=====												

\*\* Total Burdened Professional Person Month includes salary, benefits, overhead, travel, equipment and other expenses, G&A, fees, inflation and other contingency factors.

121

Table 4. Summary 10-Year Budget by Project Element and Activity  
 including Core and Buy-in Costs  
 Environmental and Natural Resources Policy and Training (EPAT)  
 AID/ST/ENR, Project Number 936-5555

Project Element	ST/ENR CORE	BUY-IN	TOTAL
1. State of the Art Research	14,500	0	14,500
Synthesis/Guidelines	1,000	0	1,000
- Survey & Synthesis	500		
- Program Manuals	250		
- Policy Handbooks	250		
Methods Development	2,000	0	2,000
- Instruments Survey & Assessment	400		
- Data Indicators/Inventories	400		
- Multidisciplinary Methods	400		
- Methods/Model Development	800		
Long Term Core Research	11,000	0	11,000
MODULES			
- Environment as Waste Sink	1,500		
- Open Access to Natural Resources	1,000		
- Natural Resources & Product Pricing	1,500		
- Population/Demographics & ENR	1,000		
- Macroeconomic Policies	2,000		
- Other Related Topics	4,000		
Technical Advisory Group	500	0	500
2. Applied Country/Regional Research	750	12,500	13,250
Reconnaissance/Field Visits	450	500	950
Program development	300	500	800
Policy Inventories		2,000	2,000
Applied Research		8,500	8,500
Reports/Workshops		1,000	1,000
3. Information and Dissemination	4,800	2,500	7,300
Publications, Reports	2,000	2,500	4,500
Newsletter, Audio-Visuals	1,200		1,200
Professional Roster/Networks	250		250
ENR Information Center	1,000		1,000
Senior Seminar/Workshops	350		350
4. Support for Policy Dialogue	1,700	3,750	5,450
Global/Multilateral Policy Support	700		700
Policy Agenda, Analysis/Methods, TA	400	2,500	2,900
Policy Change/Implementation/Impact	400	1,000	1,400
Conferences/Seminars/Workshops	200	250	450
5. Institutional Strengthening	600	7,000	7,600
Institutional Assessments	150	1,000	1,150
Strategic Planning	150	750	900
Training Assessments, Provision	200	800	1,000
Long Term Technical Assistance		4,500	4,500
6. Human Resources Development	3,000	9,000	12,000
Initial Courses	1,250	3,500	4,750
Other Core Courses	1,750	5,500	7,250
7. Implementation/Management	10,250	5,200	15,450
Contractor-related	6,225	5,200	11,425
- Project Coordinator	525	350	875
- Research Director	875	400	1,275
-- Module Leaders	750	500	1,250
- Tech. Assistance Coordinator	600	1,200	1,800
- Training Officer	750	750	1,500
- Dissemination Director	450	300	750
- Office managers/staff	1,000	500	1,500
- Administrative Support	1,125	1,100	2,225
- Equipment & Supplies	150	100	250
AID-related	4,025	0	4,025
- AID Project Manager	0		0
- ENR Professional Staff	1,980		1,980
- Research Assistant	450		450
- Administrative Support	350		350
- Travel/Conferences	100		100
- Equipment & Supplies	150		150
- Communications	90		90
- Office/meeting Space	200		200
- Other/Contingency	225		225
- Evaluation and Audit	500		500
GRAND TOTAL	35,500	40,000	75,500

145

Table 5 EPAT Summary Funding Estimates, Phases I & II  
 by Project Element and Cost Line Items  
 Including both Core and Buy-In Costs  
 Environmental and Natural Resources Policy and Training (EPAT)  
 AID/ST/FENR, Project Number 936-5555

Project Element	Project	Project	Project	Project	Project	Phase I	Phase II	Project TOTAL Funding
	Year 1 Funding	Year 2 Funding	Year 3 Funding	Year 4 Funding	Year 5 Funding	Years 1-5 Funding	Years 6-10 Funding	
	in \$000		in \$000		in \$000			
1. State of the Art Research	1,200	1,350	1,500	1,250	1,200	6,500	8,000	14,500
Salaries, Benefits, Overhead	895	1,004	1,110	919	875	4,802	5,911	10,713
Travel, Supplies, Contingency	155	177	202	175	175	885	1,089	1,974
General & Administrative	150	169	188	156	150	813	1,000	1,813
2. Applied Country/Regional Research	650	1,000	1,500	1,600	1,000	5,750	7,500	13,250
Salaries, Benefits, Overhead	332	510	765	816	510	2,933	3,825	6,758
Travel, Supplies, Contingency	202	310	465	496	310	1,783	2,325	4,108
G&A, Fees, Other	117	180	270	288	180	1,035	1,350	2,385
3. Information and Dissemination	500	700	850	900	550	3,500	3,800	7,300
Salaries, Benefits, Overhead	280	392	476	504	308	1,960	2,128	4,088
Travel, Supplies, Contingency	130	182	221	234	143	910	988	1,898
G&A, Fees, Other	90	126	153	162	99	630	684	1,314
4. Support for Policy Dialogue	350	450	500	500	450	2,250	3,200	5,450
Salaries, Benefits, Overhead	186	239	265	265	239	1,193	1,696	2,889
Travel, Supplies, Contingency	105	135	150	150	135	675	960	1,635
General & Administrative, Fees	60	77	85	85	77	383	544	927
5. Institutional Strengthening	250	900	1,000	750	350	3,250	4,300	7,550
Salaries, Benefits, Overhead	138	495	550	413	193	1,788	2,365	4,153
Travel, Supplies, Contingency	69	247	275	206	96	894	1,183	2,076
G&A, Fees, Other	44	158	175	131	61	569	753	1,321
6. Human Resources Development	400	1,000	1,500	1,200	900	5,000	7,000	12,000
Salaries, Benefits, Overhead	216	540	810	648	486	2,700	3,780	6,480
Travel, Supplies, Contingency	120	300	450	360	270	1,500	2,100	3,600
General & Administrative, Fees	64	160	240	192	144	800	1,120	1,920
7. Implementation/Management	1,200	1,275	1,350	1,425	1,550	6,800	8,150	14,950
Contractor related								
Salaries, Benefits, Overhead	430	457	484	511	556	2,437	2,921	5,358
Travel, Supplies, Contingency	200	212	225	237	258	1,132	1,356	2,488
G&A, Fees, Other	138	147	156	164	179	783	939	1,722
AID related								
Salaries, Benefits, Overhead	337	358	379	400	435	1,909	2,289	4,198
Travel, Supplies, Contingency	95	101	107	113	123	539	645	1,184
Evaluation and Audit	0	125	0	125	0	250	250	500
Total Salaries, Benefits, Overhead	\$2,812	\$3,995	\$4,839	\$4,475	\$3,600	\$19,722	\$24,914	\$44,636
Total Travel, Supplies, Contingency	\$1,075	\$1,665	\$2,095	\$1,971	\$1,510	\$8,316	\$10,646	\$18,963
Total General & Administrative, Fees	\$662	\$1,141	\$1,266	\$1,304	\$889	\$5,262	\$6,639	\$11,901
Grand Total	\$4,550	\$6,800	\$8,200	\$7,750	\$6,000	\$33,300	\$42,200	\$75,500

Table 6. Summary 10-Year Budget by Project Element/Activity including Core and Buy-In Costs, and Total Distribution Environmental and Natural Resource Policy and Training (EPAT) AID/ST/FENR, Project Number 9036-5555

Project Element/Activity	ST/FENR CORE	BUY-IN	TOTAL	PERCENT TOTAL
	-- \$000 ---	\$000 ----	\$000 ----	%
1. State of the Art Research	14,500	0	14,500	19.2%
2. Applied Country/Regional Research	750	12,500	13,250	17.5%
3. Information and Dissemination	4,800	2,500	7,300	9.7%
4. Support for Policy Dialogue	1,700	3,750	5,450	7.2%
5. Institutional Strengthening	500	7,050	7,550	10.0%
6. Human Resources Development	3,000	9,000	12,000	15.9%
7. Implementation/Management	10,250	5,200	15,450	20.5%
TOTAL	35,500	40,000	75,500	100.0%

revised fkk;12-27-90

*1992*

Table 7. EPAT Phase I & II Funding Estimates  
 Summary 5-Year Phase I Budget by Project Element  
 including Core and Buy-In Costs  
 Environmental and Natural Resources Policy and Training (EPAT)  
 AID/ST/FENR, Project Number 936-5555

Project Element	Project Year 1 Funding	Project Year 2 Funding	Project Year 3 Funding	Project Year 4 Funding	Project Year 5 Funding	Phase I Years 1-5 Funding	Phase II Years 6-10 Funding	Project TOTAL Funding
	----- in \$000 -----							
1. State of the Art Research	1,200	1,350	1,500	1,250	1,200	6,500	8,000	\$14,500
2. Applied Country/Regional Research	650	1,000	1500	1600	1000	5,750	7,500	\$13,250
3. Information and Dissemination	500	700	850	900	550	3,500	3,800	\$7,300
4. Support for Policy Dialogue	350	450	500	500	450	2,250	3,200	\$5,450
5. Institutional Strengthening	250	900	1000	750	350	3,250	4,300	\$7,550
6. Human Resources Development	400	1,000	1500	1200	900	5,000	7,000	\$12,000
7. Implementation/Management	1,200	1,400	1,350	1,550	1,550	7,050	8,400	\$15,450
Total	4,550	6,800	8,200	7,750	6,000	\$33,300	\$42,200	\$75,500

Table 8. EPAT Phase I & II Funding Estimates: S&T CORE COSTS  
 Summary 5-Year Phase I Budget by Project Element  
 Environmental and Natural Resources Policy and Training (EPAT)  
 AID/ST/FENR, Project Number 936-5555

Project Element	S&T Core	Phase I Years 1-5 Funding	Phase II Years 6-10 Funding	S&T Core TOTAL Funding				
	Year 1 Funding	Year 2 Funding	Year 3 Funding	Year 4 Funding	Year 5 Funding			
	-----	-----	-----	-----	-----			
	in \$000							
1. State of the Art Research	1,200	1,350	1,500	1,250	1,200	6,500	8,000	\$14,500
2. Applied Country/Regional Research	50	75	75	50	50	300	450	\$750
3. Information and Dissemination	350	450	500	500	450	2,250	2,550	\$4,800
4. Support for Policy Dialogue	75	150	200	150	125	700	1,000	\$1,700
5. Institutional Strengthening	25	50	55	45	25	200	300	\$500
6. Human Resources Development	250	275	300	275	200	1,300	1,700	\$3,000
7. Implementation/Management	800	975	900	1,075	1,025	4,775	5,475	\$10,250
	-----	-----	-----	-----	-----			
Total	2,750	3,325	3,530	3,345	3,075	\$16,025	\$19,475	\$35,500
	=====	=====	=====	=====	=====	=====	=====	=====

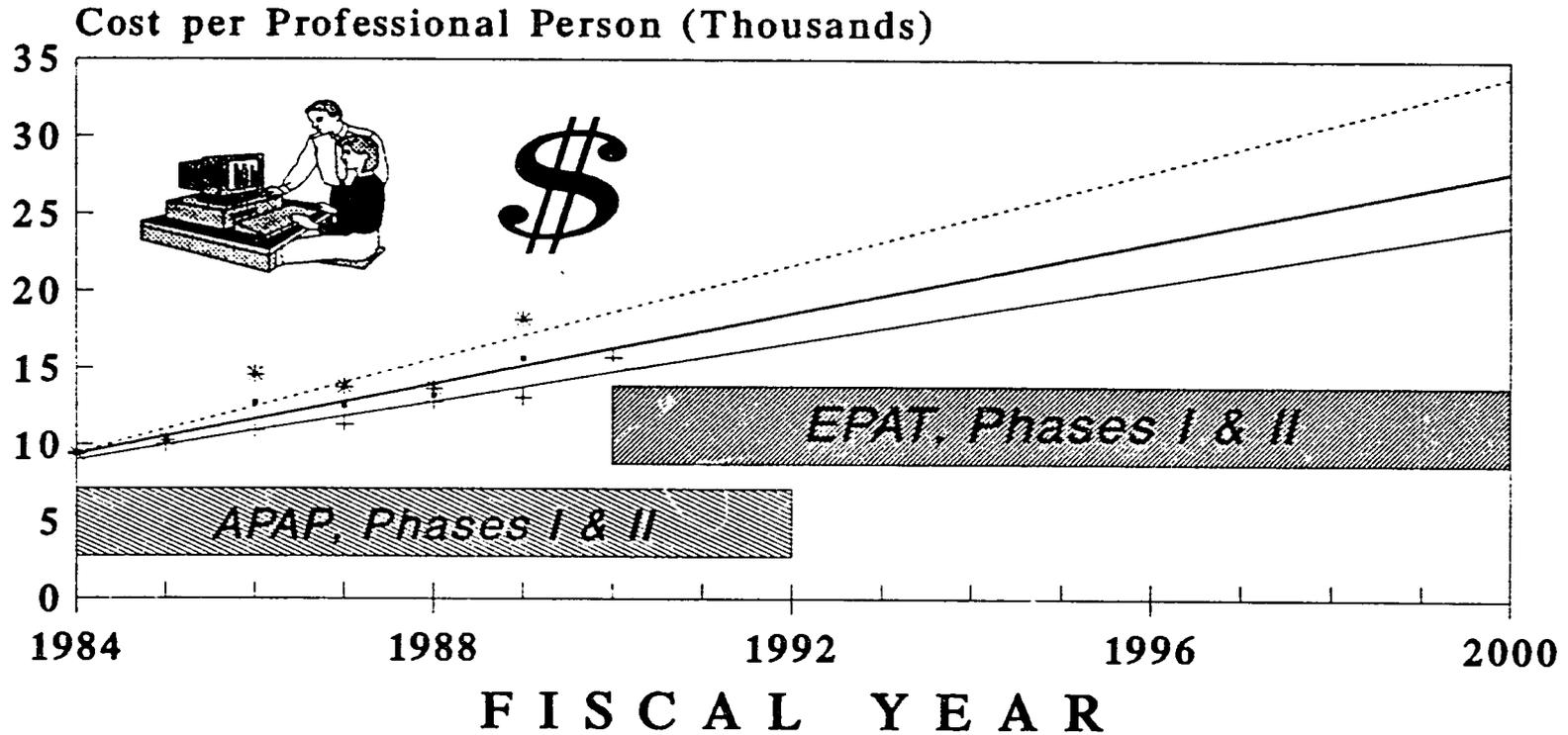
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Table 9. EPAT Phase I & II Funding Estimates: BUY-IN COSTS  
 Summary 5-Year Phase I Budget by Project Element  
 Environmental and Natural Resources Policy and Training (EPAT)  
 AID/ST/FENR, Project Number 936-5555

Project Element	Buy-In Year 1 Funding	Buy-In Year 2 Funding	Buy-In Year 3 Funding	Buy-In Year 4 Funding	Buy-In Year 5 Funding	Phase I Years 1-5 Funding	Phase II Years 6-10 Funding	Buy-In TOTAL Funding
	----- in \$000 -----		----- in \$000 -----		----- in \$000 -----			
1. State of the Art Research	0	0	0	0	0	0	0	\$0
2. Applied Country/Regional Research	600	925	1,425	1,550	950	5,450	7,050	\$12,500
3. Information and Dissemination	150	250	350	400	100	1,250	1,250	\$2,500
4. Support for Policy Dialogue	275	300	300	350	325	1,550	2,200	\$3,750
5. Institutional Strengthening	225	850	945	705	325	3,050	4,000	\$7,050
6. Human Resources Development	150	725	1,200	925	700	3,700	5,300	\$9,000
7. Implementation/Management	400	425	450	475	525	2,275	2,925	\$5,200
Total	1,800	3,475	4,670	4,405	2,925	\$17,275	\$22,725	\$40,000

GRAPH ONE

# Person Month Costs\*, Policy Projects Actual, APAP; Projected, EPAT

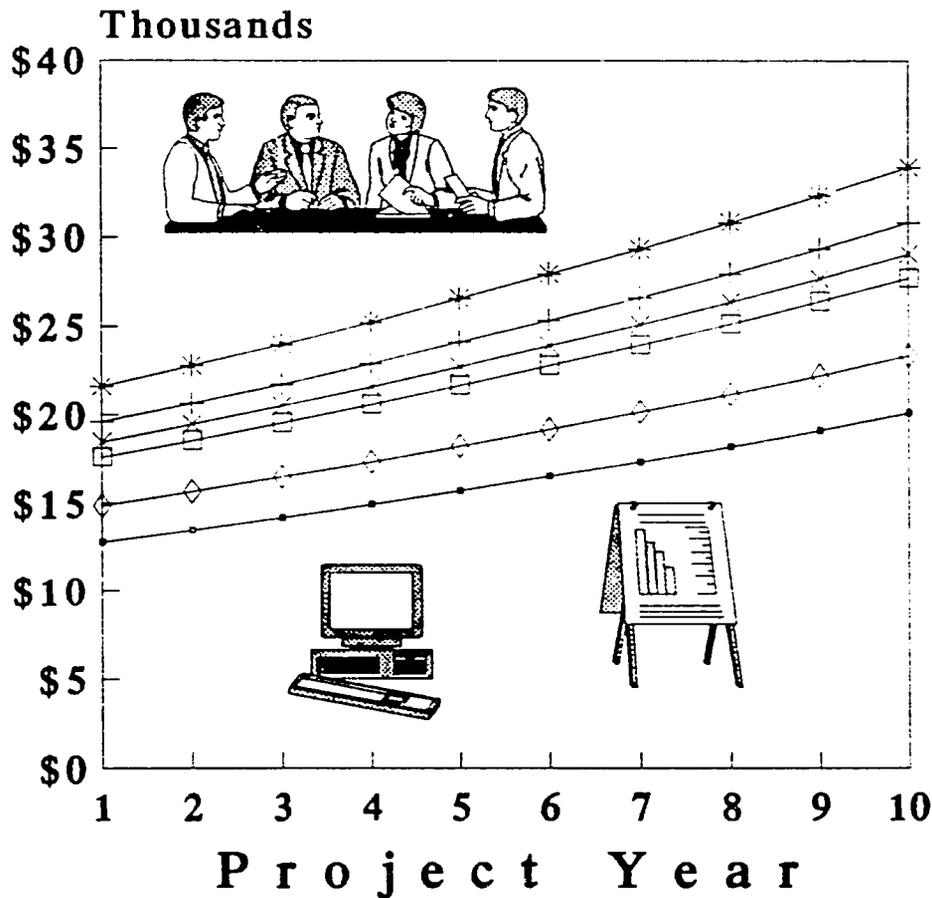


— Project Average    + S&T Core    \*--- Buy-In Average

\*Total Burdened Cost, Including Salary, Benefits, OH, Travel & Per Diem, Equipment, Support Staff, Other Costs.

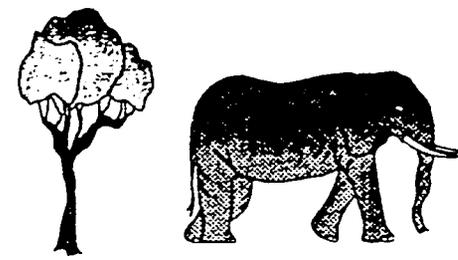
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# EPAT, Professional Costs by Activity Costs per Person Month over LOP




**Project Activity**

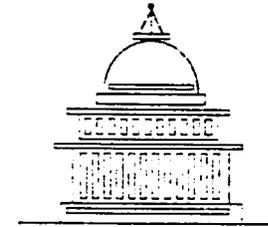
- SOTA Research
- +— Field Research
- \*— Policy Support
- Training, HRD
- x— Institutional Build
- ◇— Info/Dissemination



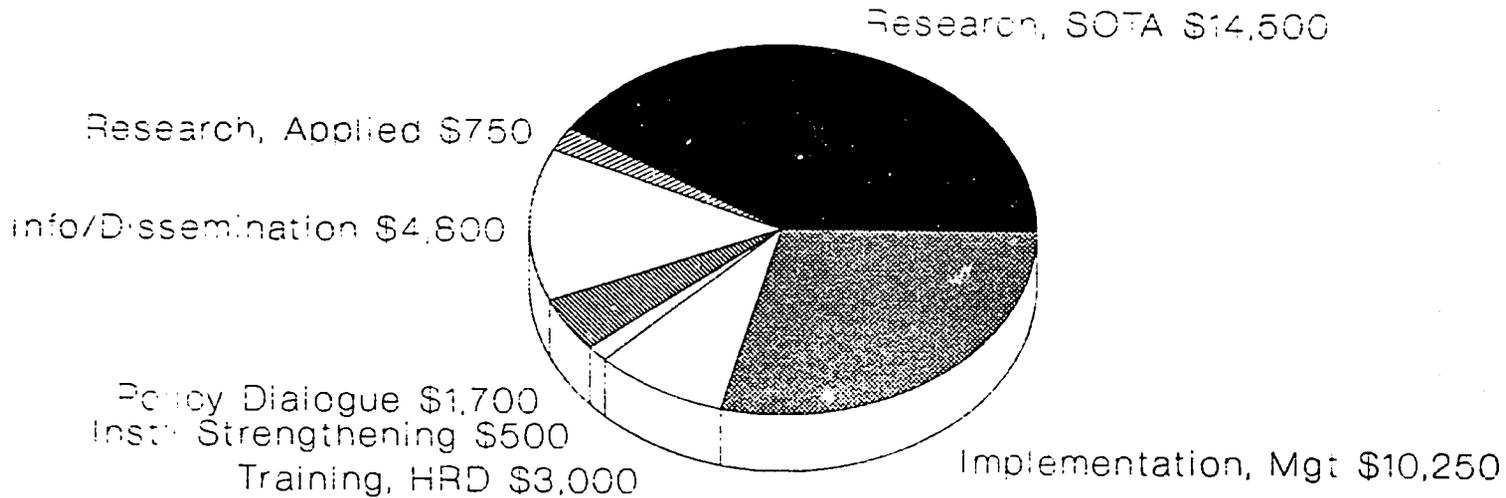
Total burdened costs, including salary, benefits, OH, travel & per diem, equipments and support costs

20

# EPAT Core Funding Life of Project: 1991-2000 by Activity & Funding Levels



S&T/FENR Core Funding  
Estimated **\$35.5 Million, 10 Years**



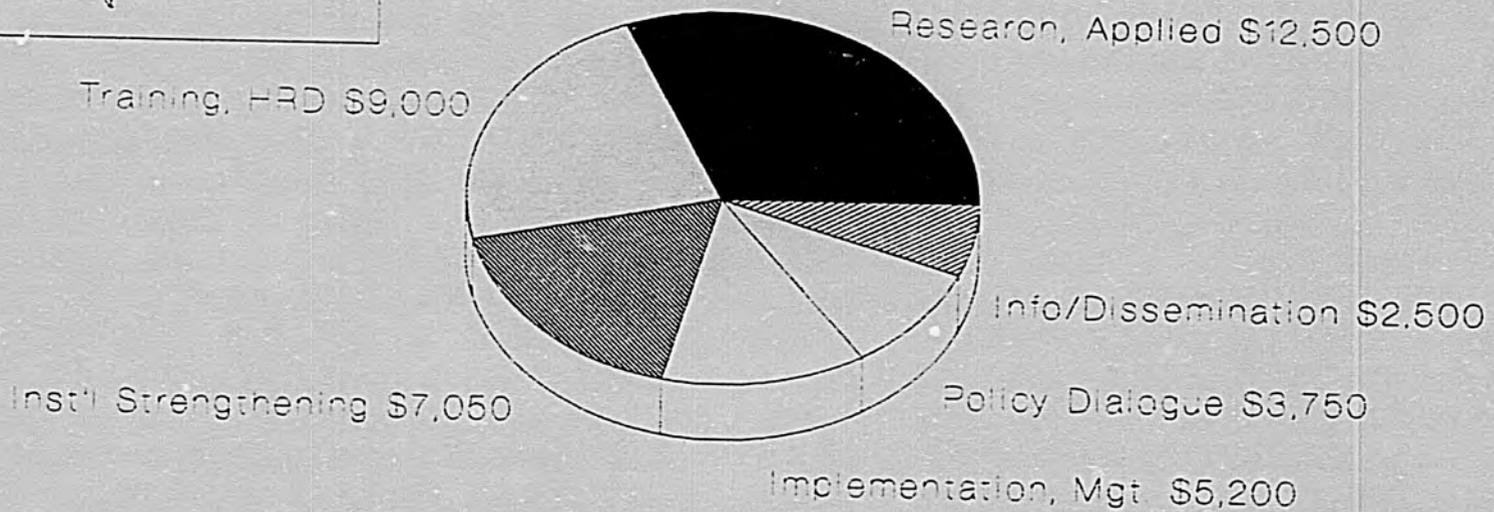
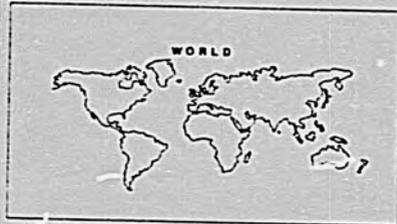
21

**Environmental & Natural Resources  
Policy and Training Project (EPAT)**

CHART 2: RM revision of WRG, 1-30-91

148

# EPAT Buy-In Funding Life of Project: 1991-2000 by Activity and Funding Level



Regional Bureau and USAID Buy-Ins  
Estimated **\$40.0 Million, 10 Years**

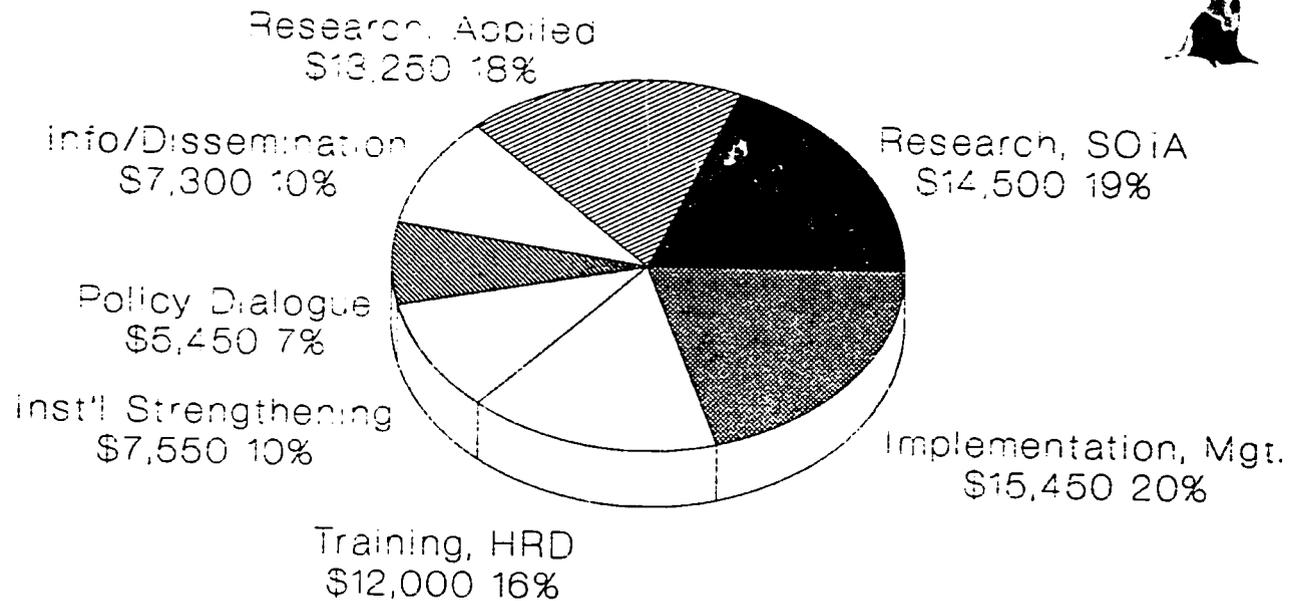
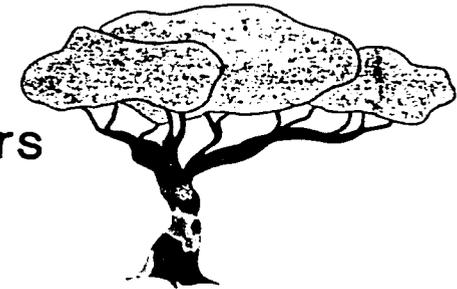
Environmental & Natural Resources  
Policy and Training Project (EPAT)

1991

# EPAT Core & Buy-In Funding

Life of Project: 1991-2000  
By Activity (\$000) and Percentage

Project Total Resources  
Estimated **\$75.5 Million, 10 Years**

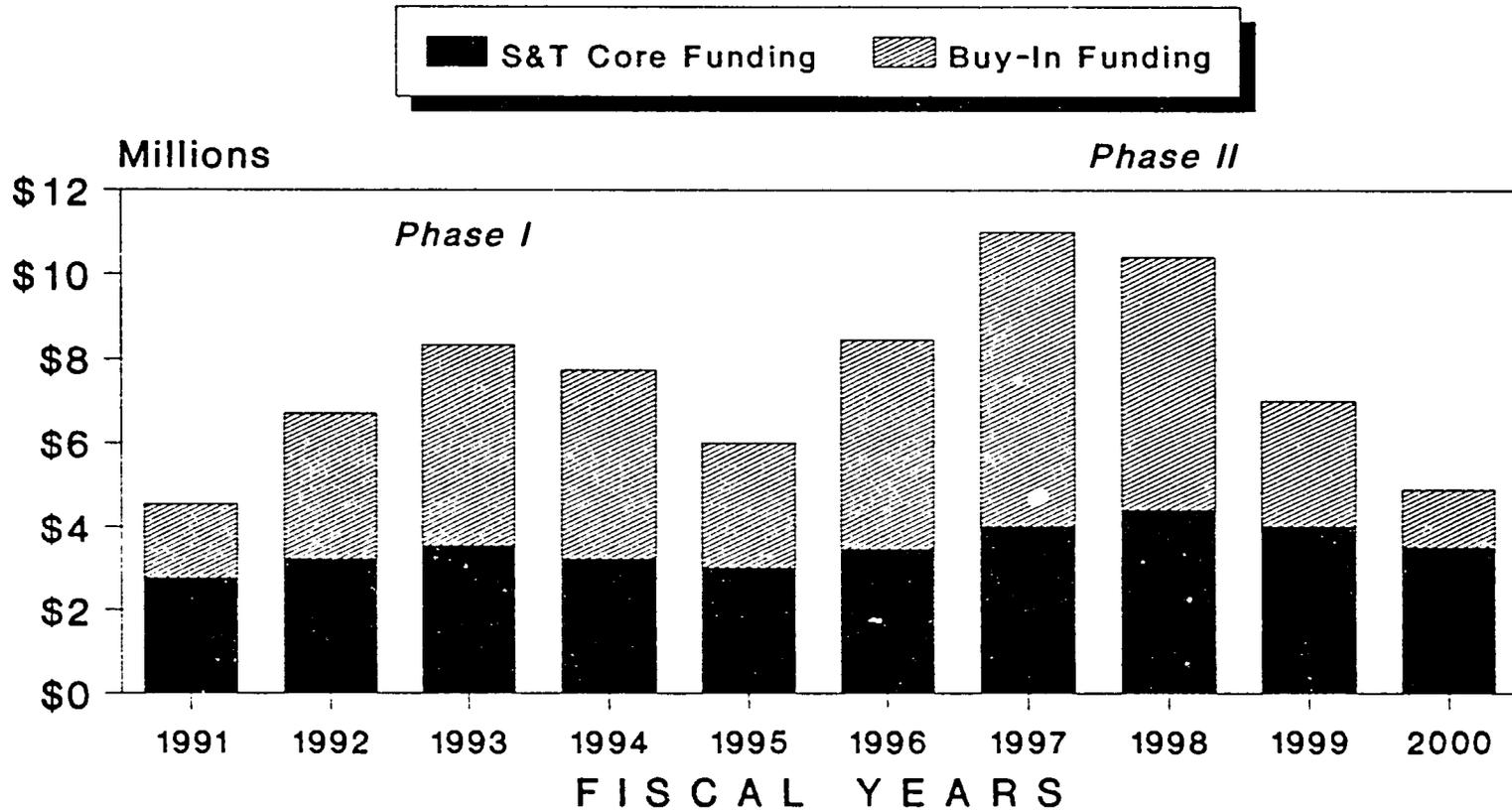


Environmental & Natural Resources  
Policy and Training Project (EPAT)

150

GRAPH SIX

**\*EPAT: Estimated Funding, FY 1991 - 2000**  
**S&T Core and Buy-Ins Funding**  
**--Regional Bureaus & USAIDs--**



•Environmental & Natural Resources  
Policy & Training Project (EPAT)  
Project # 936-5555

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15

**ANNEX B.3: Costs and Benefits of Policy Initiatives to Promote Enhanced Environmental and Natural Resource Quality**

**Samuel Hale, Jr.  
Asif M. Shaikh  
Margaret Morgan  
Swarupa Ganguli**

**ECONOMIC ANNEX**

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102

**Economic Annex for the Environmental and Natural Resources Policy and Training Project**

## **1. Economic Principles Underlying the EPAT Project**

In the past, countries viewed environmental quality and economic growth as directly competitive. Each year, however, it becomes more clear that environmental and natural resource degradation is constraining economic growth in most developing countries.

There is a growing realization that a host of government policies help shape the hundreds of thousands of individual decisions which, in the aggregate, determine environmental protection or degradation. These policies include those which influence the horizon of individual and corporate income and employment opportunities, relative prices, tax and other incentives, and legal regimes governing rights to land and other resources. As Dr. Theodore Panayotou and others have shown, environmental and natural resource degradation often is the result of rational behavior by individual economic actors in response to irrational, or at least ill-advised, market and policy signals. Basic to this body of work is the notion, in Panayotou's terms, that many economies are working well within their production possibilities frontiers. That is, economic efficiency as well as environmental sustainability are being sacrificed. Therefore, there is considerable room to improve both without a tradeoff between environment and development.

Examples of market or policy failures include:

- o Ill-defined or totally absent property rights, threats of expropriation, or other sources of insecurity in private/communal ownership or use of land or other resources;
- o Treating the air, water, and other resources -- including forest, range or similar resources nominally controlled by government but in fact treated as open access resources -- as free goods to be extracted and used, or as waste sinks;
- o Failure of markets to incorporate external costs or benefits of producing or using particular goods or services ("externalities");
- o High transaction costs which inhibit emergence of markets or result in uninformed decisions;
- o Below-cost pricing of public goods which have high capital costs and historically have been considered to be best provided by public or publicly-regulated monopolies (energy, drinking water, large-scale irrigation systems, etc.);
- o Uncompetitive or imperfectly competitive markets, often the result of government monopolies, tariff barriers limiting international competition, or other anti-competitive policies;

- o Government-imposed market distortions in the form of price controls, taxes, subsidies, discriminatory regulations, etc.

In many cases, governments explicitly choose short-term economic growth realizing that there is a price in terms of long-term environmental degradation. That is, they assume that they are at the production possibilities frontier and that, rather than having options which jointly would improve both their economic and ENR position, they are forced to confront economic/ENR tradeoffs. A prime example is southeast Asian countries that have chosen not to impose industrial air and water pollution controls in order not to hamper growth of export-oriented industry. Now, governments are beginning to recognize the costs of such pollution -- increased drinking water and health care costs, for example -- that previously were unrecognized or grossly underestimated.

While there is growing qualitative recognition of such costs, and consequently of the prospective economic as well as ENR benefits of policy change, there still is relatively little empirical evidence supporting the Panayotou hypothesis that many prospective actions to address market and policy failures would have economic as well as ENR benefits. This absence of concrete data, together with an underlying lack of appreciation for or analysis of economic-ENR interactions, is a principal rationale for EPAT. However, it also makes it more difficult to project economic benefits of the project.

It also is important to keep in mind that in most developing countries (as well as in developed countries) there are substantial political, social, cultural, institutional, and other constraints to translation of the "market and policy failure" approach into operationally effective policies and programs. These constraints are addressed in the Social Soundness Annex. However, since they influence the likelihood of beneficial policies being adopted or effectively implemented, they temper the economic analysis as well.

## **2. Framework for the Economic Analysis**

The problems presented in attempting to analyze the economic costs and benefits of the proposed EPAT project relate largely on estimation of the likely benefits of policy change. There are a number of problems associated with such estimation. Namely, one cannot know in advance:

- o which policy changes in which countries will be proposed or adopted,
- o what the role of EPAT will have been in supporting such policy initiatives (since actual policy change, as opposed to providing research and other support for the policy change process, is the responsibility, in the first instance, of the host country itself, and in the second instance, of the Mission, not EPAT), and

- o actual individual and corporate responses to particular market or policy actions.

Also, as reflected in the draft EPAT research priorities, substantial work needs to be done to improve methods of identifying, quantifying, and valuing economic benefits of particular types of ENR quality improvements and to generate empirical data to support such valuation methods.

Estimation problems also exist on the cost side. The costs of a particular policy which is implemented include:

- o The entire range of EPAT research, training, technical assistance, and other costs, allocated over the range of policy initiatives which are adopted and implemented;
- o Mission policy dialogue costs (including costs of EPAT buy-ins), including costs of unsuccessful policy dialogue;
- o Government and possibly NGO policy analysis costs and other direct host country costs of considering, promoting, adopting, and implementing policy changes -- by far the largest component of total costs;
- o The economic costs of the individual policy actions themselves (for example, the additional costs of more stringent standards on air pollutant emissions from powerplants or factories).

Although the above caveats suggest the limitations of cost-benefit analysis, important insights nevertheless can be gained through the use of this tool to assess likely economic costs and benefits of EPAT.

First, we do know quite a bit about the direct economic benefits of certain types of actions. Foremost among these are changes in prices or user fees for natural resources themselves (energy, wood from forests, water, etc.) and the allocation of "economic rent." Second, there is at least suggestive or anecdotal information on the magnitude of economic benefits and costs of particular types of actions to promote ENR enhancement or to avoid additional ENR degradation. Finally, cost-effectiveness and allocation efficiency criteria, along with cost-benefit analysis and similar methods, are tools which can offer insights into costs and benefits associated with EPAT. These tools will be used later in the analysis to evaluate the potential effects of EPAT.



## 2.1 Prices/Fees and Economic Rent

To oversimplify, "economic rent" is the excess of actual revenues over the minimum revenues required to keep an enterprise in business, including earning a 'fair' profit. Rents exist for a number of reasons including lack of competition in a given industry (when, for example, only a limited number of government concessions are awarded to exploit a particular natural resource). Some of what usually are termed economic rents in fact are economic costs, particularly the costs of ENR degradation, which are not internalized. For example, in the case of logging, such external damages as flooding, sedimentation, loss of downstream soil productivity, possibly loss of biological diversity, and possibly even changes in climate all impose economic costs; but these costs are not borne by the logger.

Valuing the various environmental and natural resource degradation costs of logging, for example, presents conceptual and data difficulties which are discussed in the next section (and which EPAT research in part will address). Because of such valuation difficulties, "economic rent" usually is defined, erroneously, to include these costs -- which should have been estimated and charged separately, as a cost of operations, to loggers, mineral concessionaires, or others extracting renewable or exhaustible natural resources.

Assuming economic rent is calculated as described above (i.e., without subtracting ENR costs), a government has two grounds for capturing all or a major part of economic rent:

- o to compensate society for ENR costs which in most cases have not been quantified but are presumed to account for a substantial share of estimated rents, and
- o when a natural resource, whether renewable or exhaustible, is found on public lands and, thus, a resource of society as a whole and not of the company that happens to have a particular time-limited concession or license to exploit that resource.

Analysis of logging concession terms as part of a recent PAAD in the Philippines identified options whereby the government there could capture \$174 to \$348 million (P4 to P8 billion), in terms of present value in 1990, in additional economic rent without influencing the competitiveness of Philippine log exports.<sup>1</sup> One presumes that a significant fraction of this figure in fact represents costs to society of ENR degradation which are not internalized in loggers' concession terms.

Comparative studies by the World Resources Institute (WRI) and others suggest that the Philippines captures a lower portion of economic rent than do other countries in the

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<sup>1</sup> IRG, "Draft Program Assistance Approval Document: Natural Resources Management Program", Annex E ("Economic Evaluation of NRMP"), July 1990.

region but that the problem of inadequate capture of economic rent is prevalent throughout the region. Studies of Indonesia, for example, suggest that in the period 1979-1982 it captured less than 40% of economic rent, representing \$3.3 billion in revenues lost. Low government rent capture during this period and after is considered to have been a major factor fueling the "timber booms" in Southeast Asia which have accelerated deforestation and resource degradation throughout the region.

Translation of increased government collection of economic rents into economic benefits presents important theoretical difficulties. That portion of "rent" which does not, in fact, represent reimbursement for external ENR costs is a transfer payment from industry to government, and conclusions regarding economic efficiency depend in part on what each party does with the rent collected. Since the logging industry in most countries is comprised of multinational corporations and local business elites whose capital is highly mobile, one could make a case that much of the rent left with companies would "leak" offshore. On the other hand, were a portion of such "excess profits" to be reinvested or even invested in other private sector industries, this might be a more productive use of capital than would government expenditure.

That portion which is reimbursement for costs of external ENR damage is substantially easier to justify on efficiency grounds, both to reimburse society for the costs of such damage (although this would be true on efficiency, as opposed to social justice, grounds only if the revenues collected by the government were spent on amelioration of the damage and prevention of further damage) and to force loggers to take such costs into account. With respect to the latter point, the government could structure its fees to give loggers an incentive to reduce ENR damage. Indonesia, for example, for some time has imposed a deforestation fee per hectare, to be returned to the concessionaire if it undertakes reforestation. The fees, unfortunately, were set below costs of reforestation, so concessionaires gave up the fee rather than reforest. However, the fees collected are being used to finance some reforestation; and the government now is working to increase the fee to levels which would create a positive reforestation incentive.

## **2.2 Government Fiscal Impacts**

The government fiscal impacts of allowing private firms rather than the government to capture substantial economic rent are significant. Such impacts are not necessarily obvious in the case of logging or other examples of natural resource extraction, where government revenues are foregone, but there is not an actual out-of-pocket expenditure. The same is true of prices/fees for many other government-controlled natural resources -- witness debates in the U.S. about the fiscal impacts of subsidized fees for grazing or mineral rights on lands controlled by the Bureau of Land Management (BLM). Those who benefit are able to obfuscate the actual fiscal loss to the U.S. Government, and hence to the public, of below-market fees.

Government fiscal impacts tend to be more visible in cases such as subsidies on products including pesticides, imported fertilizers or energy where government receipts and expenditures are more closely linked. In the case of subsidies on energy, fertilizer, or petrochemicals from domestic sources, or of irrigation water, credit, and other products or services, there typically is some, albeit often circuitous, cost-revenue link.

There has been substantial work done on estimation of government fiscal and quantitative ENR impacts, but not necessarily on the costs of such impacts and the failure to capture full economic rents and other types of subsidies such as those enumerated above. Thus, the World Resources Institute estimates that:<sup>2</sup>

- o Pesticide subsidies in the early 1980s in eight countries in Africa, Latin America and Asia cost governments more than \$800 million. Government fiscal pressures together with growing data suggesting increasing health impacts and reduced crop yield benefits from ever-increasing pesticide intensity are causing governments such as Indonesia to scale back the level of pesticide subsidies.
- o Irrigation fees in six Asian countries constituted from 1% to 22% of estimated total capital and operating costs of public irrigation systems. In only one country did fees cover even operating and maintenance costs. However, in these countries, receipts from farmers constituted 5-33% of estimated benefits received by the farmers; the excess is economic rent accruing to the farmers. Over-irrigation, presumably due in large part to such subsidies of water use, generates ENR impacts including waterlogging and salinization. In India and Pakistan, WRI estimates that through 1984 more than 33 million hectares of irrigated cultivable land were lost due to waterlogging and salinization.
- o The cattle subsidy program in Brazil, which WRI research has shown to be the major cause of more than 30% of the deforestation in the Amazon region, is estimated to have cost the government over \$2.5 billion through 1983. Few if any of the cattle ranches established in the region would have been economically viable in the absence of substantial government subsidies.

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<sup>2</sup>World Resources Institute and International Institute for Environment and Development, World Resources 1988-1989, "Policies and Institutions", Basic Books Inc., New York, 1988. The Indonesia forestry rent capture example cited earlier is taken from the same source.

## 2.3 Valuation of ENR Impacts

As the above WRI examples illustrate, it has been easier to estimate fiscal impacts than to place economic values on physical ENR impacts even where, as in the case of cultivable land lost in India and Pakistan, they have been quantified. Dixon<sup>3</sup> has arrayed the types of valuation techniques and provided a few examples of site-specific project analysis applications, but there has been little attempt to value the broader ENR quality changes which would accompany broad economic policy change.

Even anecdotal evidence of the magnitude of a few types of ENR values gives a sense of the potential benefits from the types of policy changes to be promoted by EPAT.

### Health and Other Urban Pollution Impacts

In the U.S. and other developed countries, most work has been done on health and other impacts, of air and water pollutants and toxic solid wastes. For example, beginning in 1981, the U.S. Environmental Protection Agency (EPA) and other U.S. Government agencies were required to prepare Regulatory Impact Analyses (RIAs) for most major regulations. In addition, since well before 1981 EPA has prepared benefit-cost analyses for many of the more than 1000 proposed regulations which were not considered "major" under the definition of RIA requirements.

Many of these analyses include estimation of the monetary value of benefits achieved at alternative levels of environmental control. The greatest single benefit of environmental controls generally is improved health. The monetary valuation of benefit is based on reduced mortality, using labor productivity or willingness to pay for improved health as bases for placing an economic value on human lives saved. Estimated U.S. health care costs avoided and reductions in job time lost as a result of lessened incidence of cancer, emphysema, and other environmentally-related diseases are also used in the analysis. The second major category of monetary benefit is avoided costs of increased maintenance or earlier replacement of equipment or materials damaged by airborne emissions such as particulates or sulfur dioxide or by contaminated water. In the latter case, costs include industrial pretreatment of water for process uses as well as additional costs to treat water for human consumption to meet standards for drinking water.

Examples of the net benefits (i.e., total benefits less the costs of meeting the proposed regulations) include:<sup>4</sup>

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<sup>3</sup> J. Dixon et.al., Economic Analysis of the Environmental Impacts of Development Projects, Earthscan, London, 1987.

<sup>4</sup> U.S. Environmental Protection Agency, "EPA's Use of Benefit-Cost Analysis: 1981-1986", EPA-230-05-87-028, Office of Policy Planning and Evaluation, Washington, D.C., August 1987.

- o National Ambient Air Quality Standards (NAAQS) for particulates: Estimated net present value (NPV) of net benefits over the period 1987-1995 was \$0 to \$1 billion if only health benefits are included, and \$40 to \$260 billion when avoided materials damage is added.
- o Standards for emissions of nitrogen oxide (NOx) and particulates from heavy-duty motor vehicles: Estimated NPV of net benefits over the period 1987-2000 was \$2.4 to \$6.9 billion, with benefits of Nox controls being primarily health-related.
- o Standards for lead in gasoline: Estimated NPV of net benefits for the period 1985-1992 were \$6.7 billion. Benefits include health benefits and compensatory educational costs avoided from reduced lead exposure in children, benefit from reducing pollutants other than lead due to change to catalytic converters (e.g., reduced effects of ozone on agricultural crop losses and on human respiratory problems), and estimated automobile maintenance benefits from using low/no-lead fuel.
- o Iron and steel industry wastewater effluent standards: The estimated NPV of net benefits of adoption "best available technology " (BAT) in the iron and steel on three rivers -- the Black River in northern Ohio, lower Monongahela River in southwestern Pennsylvania, and Mahoning River in eastern Ohio and southwestern Pennsylvania -- were \$18 to \$50 million. These include monetized valuations only of recreation benefits and nonuser (existence-value) benefits. Monetary values for human health and commercial fisheries benefits were not estimated.

In these and other cases, the costs of analyses and policy development typically were less than 1% of estimated net benefits. That is, for practical purposes, analytical and policy/regulatory development costs are an insignificant factor in determining net benefits.

Conclusions of benefit-cost analyses by EPA and others cannot be transferred directly to developing countries due to differences in physical relationships (airborne and waterborne flows, for example), infrastructure in place (for example, water supply treatment and consequent drinking water quality), access to and costs of health care, lifetime labor productivity, and many other factors. Nevertheless, there is considerable potential for application of work done by EPA and others. First, particularly in Europe, there is considerable analytical work -- for example, on the Danube River and on air quality regions in Germany and Austria -- which may have direct application to Eastern Europe. Second, EPA and others have funded important development of analytical methods which can be used at least in NICs. Finally, data on health impacts of emissions from particular types of industrial or other generators can provide a valuable starting point for analysis in NICs and

elsewhere.

The AID Office of Housing and Urban Programs and EPA have collaborated on pilot use of EPA Risk Assessment Methodology to characterize and rank-order health impacts of various urban environmental hazards in Thailand. The assessment identified dangerously high levels of lead in the bloodstream of residents throughout Bangkok, attributable largely to motor vehicle emissions, as the most serious health impact. AID and EPA currently are considering expanding use of the Risk Assessment Methodology to other countries.

There also have been studies documenting physical impacts of airborne and waterborne emissions in a number of countries, particularly in Asia. The number and geographic coverage of such studies are increasing. Examples include projection of air pollutant emissions, wastewater loadings, and solid waste generation in the Han River Basin in Korea (which includes Seoul) and of waste loadings in Laguna Lake, adjacent to Manila.<sup>5</sup> A number of studies also include some benefit-cost analysis. For example, the Laguna Lake Basin study projected a benefit-cost ratio of a proposed 1.2 billion peso wastewater treatment program of 1.2:1 to the year 2000. Projected benefits include avoidance of: loss of productivity of milkfish culture, increased Manila drinking water treatment costs, and health care costs.

Illustrative of the range of urban environmental problems in developing countries is the Klang Valley in Malaysia, which includes Kuala Lumpur. The Asian Development Bank (ADB) cites environmental problems including: serious river, land and coastal zone pollution; a "mini-Los Angeles" smog condition as well as other airborne concentrations which endanger human health; a continuing influx of squatters with inadequate health, sanitation and other facilities; gross erosion in upper watershed, lowland, and coastal mangrove areas; and significant impairment of coastal fisheries as a result of pollution. In this setting, most proposed waste management alternatives investigated have a favorable benefit-cost ratio.

The relationship between physical environmental impacts and economic costs in industrializing developing countries of course will be different than in the U.S. The "unit costs" of mortality, morbidity, equipment and materials damage, and other impacts may be less in developing countries due to lower access to and cost of health care, lower prospective lifetime worker earnings, less embedded capital investment subject to degradation, and other factors. On the other hand, substantially higher population densities (and higher vulnerability of large parts of the population not receiving adequate health care, sanitary services, and drinking water) may tend to increase aggregate urban impacts.

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<sup>5</sup> Asian Development Bank, Guidelines for Integrated Regional Economic-cum-Environmental Development Planning: A Review of Regional Environmental Development Planning Studies in Asia, Volumes I and II, ADB Environment Paper No. 3, Manila, October 1988.

In any case, the magnitude of estimated net benefits is so great relative to the modest levels of analytical and policy development expenditure both under and outside EPAT that there is a strong presumption of substantial net benefits from EPAT initiatives.

### **Changes in "Rural" ENR Quality**

There have been a range of economic analyses of actions that affect environmental and natural resource quality outside the major urban centers. Most analyze project rather than policy interventions.

**Impacts of Emerging Urbanization.** The ADB assessment discussed above<sup>6</sup> includes analyses of changes in ENR quality outside the major industrialized urban centers. An example is a study area on the eastern seaboard of Thailand, surrounding Rayong, with a population in 1986 of 1.2 million but with likely rapid growth due to planned seaport and heavy industrial (including petrochemical) development. An integrated environmental management program was proposed, at a total capital cost of 844 million baht. The program was to provide sanitary engineering infrastructure for rapidly growing, small, semi-urban centers and to preserve water quality, coastal mangrove, coral reefs and other aspects of regional natural resource quality in the face of rapid economic development. Projected benefit/cost ratios of individual actions ranged from 2:1 to 30:1 and were driven by estimates of the loss of coastal tourism revenues if the actions were not taken.

This example points to a pattern throughout southeast Asia and much of the developing world, namely, that changes in economic development and consequent population migration patterns are bringing hitherto "urban" ENR problems to many, formerly rural regions. Understanding these trends will be important to assessment of economic and ENR policy options in these countries.

**Agriculture, Grazing, and Forestry.** There have been a number of studies in Africa and elsewhere of the comparative financial returns to farmers of agroforestry, windbreaks, contour ridges, composting, and other sustainable agriculture practices versus current practices relying heavily on agricultural chemicals.<sup>7</sup> Results are highly site-specific and also very dependent on assumptions regarding, for example, costs and availability of agricultural chemicals and credit. Most also are based on very small data samples.

An example is analysis of proposed management interventions to reverse soil erosion

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<sup>6</sup> Asian Development Bank, op. cit.

<sup>7</sup> See, for example, Asif Shaikh et al., Opportunities for Sustained Development: Successful Natural Resources Management in the Sahel, Vol III: Financial Analysis, Office of Technical Resources and Sahel Office, USAID Bureau for Africa, October 1988.

throughout a small watershed in Nepal.<sup>8</sup> The proposed management program included expansion of management of plantation forests and other government forest lands, actions to improve terrace agriculture productivity as an alternative to expansion of terraced land, and widespread soil conservation actions on both agricultural and grazing lands. Economic values of the principal products -- milk and dung from animals, hay from hayfields, and fuelwood, fertilizer and milk from scrublands and managed, unmanaged and plantation forest lands -- were calculated with and without the proposed management program. The analysts attempted to identify areas of possible divergence of product or factor prices from shadow prices (for example, controlled prices for milk) in order to estimate economic, as opposed to financial, costs and benefits. Calculation of the NPV of benefits and costs over the period 1978-1998 at a discount rate of 10% yielded a benefit/cost ratio of 1.7:1. The projected NPV of net benefits over the period was close to Rs 20 million.

Many of the discrete actions embedded in the Nepal watershed management example actually or potentially relate to policy or market failures. Examples include expansion of government-controlled forest acreage under management (which could be achieved via various concession or other options to convert open access to other forest tenure regimes), and policy options to promote more intensive agricultural practices on terraced lands.

Of rural inland natural resources, possibly the most important are forested lands. They also are among the most complex to analyze because they produce multiple outputs. As in the case of urban and industrial environmental concerns, the U.S. and other industrialized countries have developed methods for economic analysis of forests which can have applicability for developing countries. For example, starting in 1960 but particularly since the mid-1970's, the U.S. Forest Service has been required by legislation to manage its multiple-use forests to assure that each area of land is maximizing the economic value of its aggregate uses. To provide an analytical basis for multiple-use management decisions, the Forest Service has developed FORPLAN, a linear programming package which compares production possibilities, relative economic values of and demand for multiple outputs including timber, recreational uses, maintenance of wildlife (including hunting and nonmarketed "existence values"), production of forage for grazing, and watershed protection and water yields (including protection of watersheds above dams which themselves provide multiple outputs including irrigation, municipal water, and hydroelectricity). Each category of benefit has provided particular valuation problems which have spawned alternative valuation methods -- for example, use of travel-cost or hedonic pricing methods to value recreational quality.

In addition, the analyses at national forests throughout the U.S. highlight the economic values of non-timber outputs. For example, a clear cut timber harvest regime

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<sup>8</sup> Hufschmidt et.al., Environment, Natural Systems and Development: An Economic Valuation Guide, The Johns Hopkins University Press, Baltimore, MD, 1983 and Food and Agriculture Organization of the United Nations, Guidelines for Economic Appraisal of Watershed Management Projects, Rome, Italy, 1987.

which would maximize financial returns if only timber were considered may have economic returns which are 30-50% lower because of decreases in recreational amenity values, water-flow values, and other multiple-use outputs. In some areas of national forest, watershed protection values exceed timber values.<sup>9</sup>

The anecdotal information provided above will serve to complement the valuations given in specific cost-benefit analyses. Moreover, the costs and benefits qualitatively discussed in this section will provide an appropriate background against which the meaning of the cost-benefit analyses may be assessed.

### **3. Methodology Used in the Analysis**

#### **3.1 Objectives of the Analysis**

The underlying objective of the economic analysis of the EPAT project is to determine whether the project as designed is a good investment of AID's resources. There are two components to this issue:

- o Do the benefits more than justify the cost?
- o Is this the best (most efficient) way of achieving the benefits?

The search for meaningful answers to these questions is complicated by the facts that the project will fund research, not "project investments"; that the specifics of the research are themselves to be determined during project life; that a broad range of technical and economic areas will be involved; and that the project has potential worldwide coverage.

To avoid the danger of carrying out a mechanistic cost-benefit analysis which shows a positive, but possibly arbitrary, rate of return, we begin by trying to define how the economic analysis will shed light on the questions of whether benefits justify costs and whether EPAT is the most efficient way of achieving the potential benefits. These issues are developed in the sections below.

#### **3.2 Perspective of the Economic Analysis**

As a prelude to performing the economic analysis of the EPAT project, it is important to note that the "success" of policy interventions may differ depending on whose perspective is used in judging success. There are valid arguments to be made for looking at costs and benefits from a variety of different perspectives. Three principal options may be considered:

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<sup>9</sup> See Michale D. Bowes and John V. Krutilla, Multiple-Use Management: The Economics of Public Forestlands, Resources for the Future, Washington, D.C., 1989.

- o the economic analysis perspective, which essentially looks at the question from society-as-a-whole 's point of view.
- o the financial perspective, which evaluates costs and benefits from the viewpoint of individual decision-making or investment units. We note that, particularly with policy changes which affect the "rules of the game", costs and benefits may differ widely for different (and often competing) actors.
- o the project perspective, that is, will EPAT project expenditures (as opposed to the policies it helps bring about) result in a positive net benefit?

We have not used the financial perspective as the basis for this analysis, not because it is less important, but rather because it is the driving element in policy reform: incentives, correction of market failures, market liberalization and efficiency all relate to making individual decision-makers 'financial self-interest consistent with environmental sustainability and economic development. Much of the EPAT research agenda is designed to find ways in which to do this. It is therefore premature to base the justification of the EPAT project on the financial attractiveness of policy initiatives it has yet to formulate.

The project perspective obviously gets to the heart of the issue of whether potential benefits will offset the cost of the project. We can accurately project costs from the AID budget for EPAT. The obstacle is, however, that estimated benefits from the project as a whole are very conjectural. The analysis risks being driven by so many assumptions that it would be difficult to defend the credibility of results.

We have therefore chosen to conduct the cost-benefit analysis from the economic perspective. This has implications for what questions we are asking and how we frame them.

1. The starting point is the question raised in the Technical Annex: "What is the relationship between policy change and ENR impact?" We take the answer to be that policy can have a positive impact on ENR quality, as discussed in the Technical Annex.
2. The next question becomes: "Is there sufficient evidence that positive ENR benefits outweigh the costs of policy reform -- i.e. that the rate of return is positive?" To answer this question, we first consider three examples of policy reform -- one green end smallholder example, one brown end urban/industrial waste example and one global environment example. The use of specific case examples allows the analysis to draw on detailed cost-benefit case studies where data availability is sufficient to make results credible. We then attempt to generalize the findings from the three examples and draw conclusions

about the potential returns to policy change in general.

3. The final question is: "What are the other advantages and disadvantages associated with policy change as compared to "project " oriented investments of AID resources? " While this discussion is not quantified, we consider it to be key to the economic justification of the EPAT project.

### **3.3 Tools for the Economic Analysis**

To meet the objectives cited in Section 3.1 above, we have used three tools:

- o **cost-benefit analysis** of three specific interventions. The examples have been chosen to be representative of policy changes which could be made at the green, brown and global environment levels. We have deliberately chosen examples which are not simply the easiest and most obvious policy changes which would have high payoffs. The explicit premise of the cost-benefit cases is that there are numerous other examples, cited in the project paper and other annexes, of at least equal or higher payoff.
- o **cost-effectiveness analysis.** Using a non-quantified presentation, this analysis compares policy change to project investments by the public sector, and considers the vital relationship between policy change and the viability of private and public investment in ENR.
- o **allocation efficiency analysis,** which considers the potential benefits and costs associated with ENR policy reform as part of an overall process of improving economic and resource allocation efficiency for sustainable development.

## **4. Cost-Benefit Analysis**

### **4.1 Introduction**

Successful policy implementation requires valuation of its associated costs and benefits to the greatest extent possible given the existence of market and policy failures discussed at the beginning of the chapter. Cost-benefit analysis is a tool that can be used to quantify unpriced factors in order to facilitate investment decision making. Specific examples of cost-benefit analysis demonstrate the usefulness of this tool for assessing various policy options. The following case studies analyze the costs and benefits of policy interventions affecting range management, coastal resource management and global climate change. Each policy intervention represents the type of policy that EPAT could promote through its initiatives.

## **4.2 The Buffalo Range Ranch in Chiredzi, Southern Zimbabwe<sup>10</sup>**

### **4.2.1 Policy to improve ENR: Range Management**

The Chiredzi Buffalo Range Ranch in Southern Zimbabwe illustrates the positive impacts of micro-level management on the environment and on net income. The focus of this illustration will be numbers of immature cattle (calves and wieners) since they provide the best proxy for range productivity. The case is presented over a period of 26 years from 1961 to 1987.

It is well known that the periods 1973-1974 and 1979-1980 were the best rainfall seasons while the periods 1980-1981, 1981-1982 and 1982-1983 were the worst three seasons of drought. However, it is interesting to note that the decline in numbers of immature cattle started well before the drought. (Figure A). Range degradation was seen to be the most likely cause of declines in cattle herd reproduction during the best rainfall years.

Range degradation is directly linked to reduced births, mainly due to the shift from relatively palatable and nutritious grasses to less palatable and nutritious grasses. The impact of these results is severe since declines in herd productivity negatively affects net income from the range. Figure B shows the dramatic shift in the financial returns from profits to losses.

### **4.2.2 How EPAT Could Affect Policy**

The key problem on the Chiredzi Ranch was declining productivity and the ensuing loss of income associated with environmental degradation of the range. Two management policy options were proposed to circumvent these problems: surveying and burning. Surveying provides a range manager with access to information to assess accurately the stocking density of his cattle. An annual survey supplies the necessary information for proper stocking of an area under management.

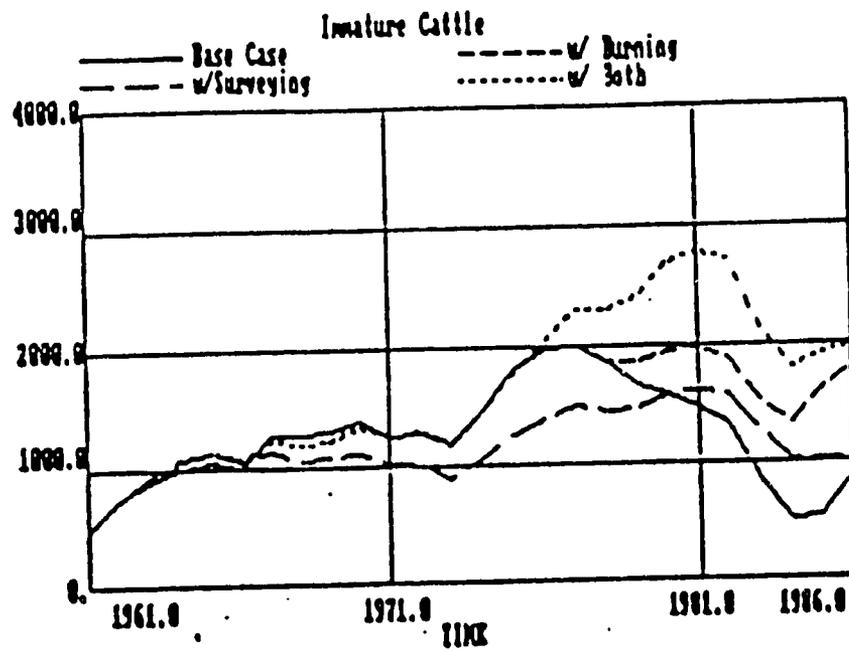
Significant increases in grass productivity can be realized by reducing the bush area, since bushes take up much light. If kept under control, burning is one of the most cost effective ways of clearing the bush.

Management policy intervention effectiveness can be categorized into two components. The first involves a direct correlation between the improvement of the range

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<sup>10</sup> Steve Berwick and Paul Faeth "Planning in The Dark " Illuminating Natural Resources Development with New Systems Process: The Rangelands and Wildlife Case. International Resources Group, Washington DC, 1991 (In Press)

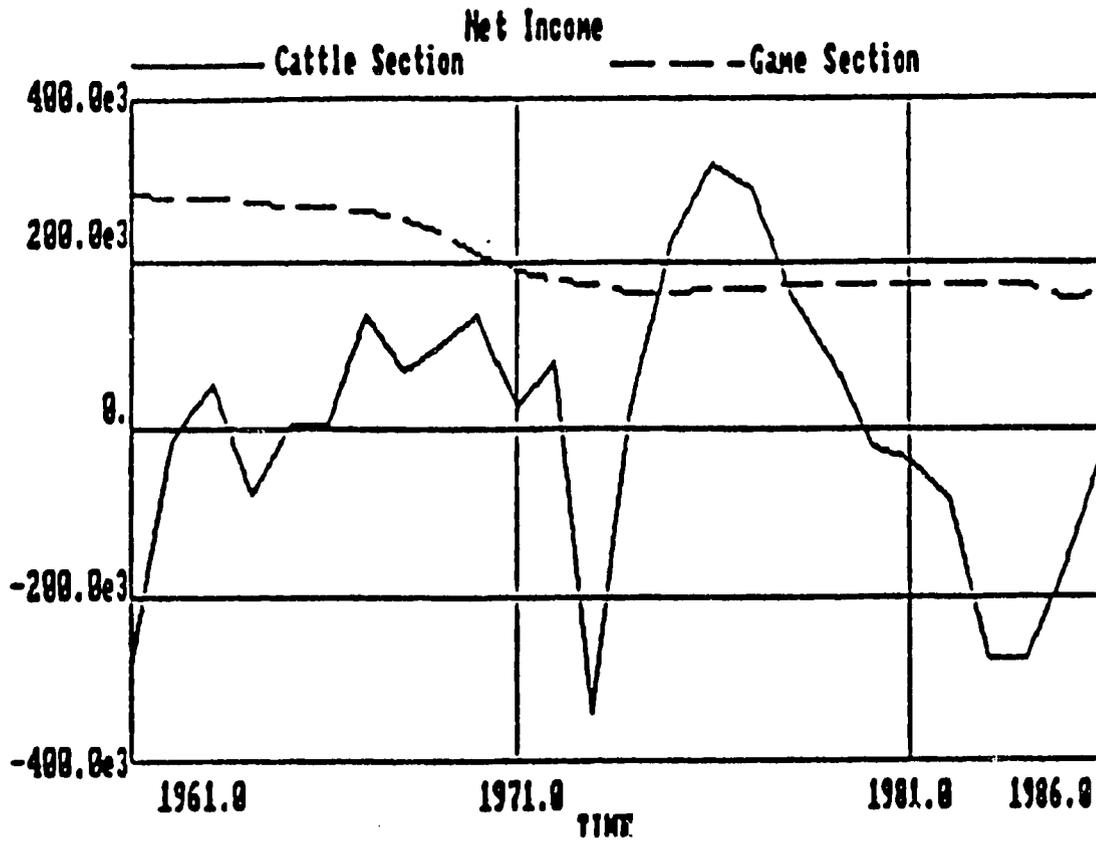
Figure A



RELATION BETWEEN IMMATURE CATTLE PRODUCTIVITY AND POLICY OPTIONS

1611

Figure B



RELATION BETWEEN CATTLE PRODUCTIVITY AND NET INCOME

condition, i.e. the increase in the numbers of immature cattle, and the corresponding policy intervention. The second is an actual cost-benefit analysis of the policies themselves. The study demonstrated that the range experienced the most severe degradation when no policy intervention took place. Some degradation still occurred with surveying and proper use. The degradation was the least prevalent when a combination of burning and surveying was used. (Figure D).

The positive correlation between the numbers of immature cattle and policy intervention is demonstrated by looking at four cases. The first, the base case, in which no policy interventions were introduced, the herd size began to decline in the middle of the good rain years as a result of declining range condition and nutrition. When only surveying was employed, the herd size was smaller until 1979, but the decline was not so precipitous when the drought occurred in 1980-81 as in the base case. The herd sizes were further improved when only burning was used. Finally, a combination of surveying and burning produced synergy. Not only did the range condition improve relative to the base case due to bush control, but with the use of surveying, the ranch manager was in a position to take advantage of the good rains and range improvement and set the herd size at higher levels without damaging the range.

The Chiredzi case is an example of a case in which policy intervention can achieve significant economic and ENR returns, whereas discreet project interventions can only hope to have limited impact. The EPAT project will be crucial in identifying cases, such as the Chiredzi case, in which policy changes can yield such benefits. The research programs associated with EPAT will serve as the main vehicle by which ENR policy can be evaluated. Moreover, the EPAT project will provide the mechanism by which the results of research can be put into practice.

#### 4.2.3 Cost-Benefit Analysis

Correlation studies are informative insofar as they point out the beneficial effects of policy intervention. However, assessing whether a policy needs to be implemented requires a cost-benefit analysis, quantifying the cost of policy implementation and the benefits of improved environmental conditions attributable to the policy. In the Chiredzi case, we have the following cost figures:

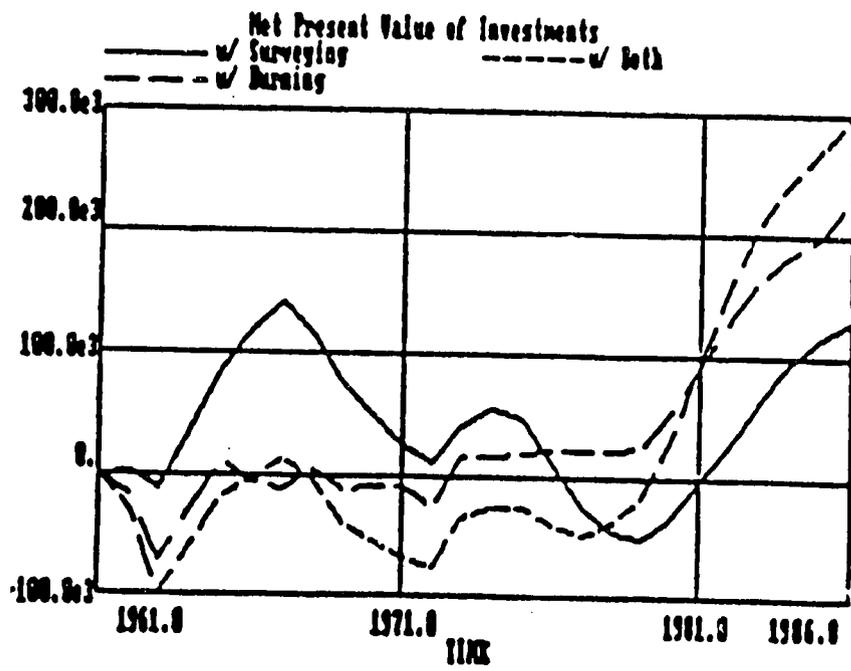
##### Costs of Policy Implementation

Surveying: Z\$2,500 /year

Burning: Z\$10,000/year

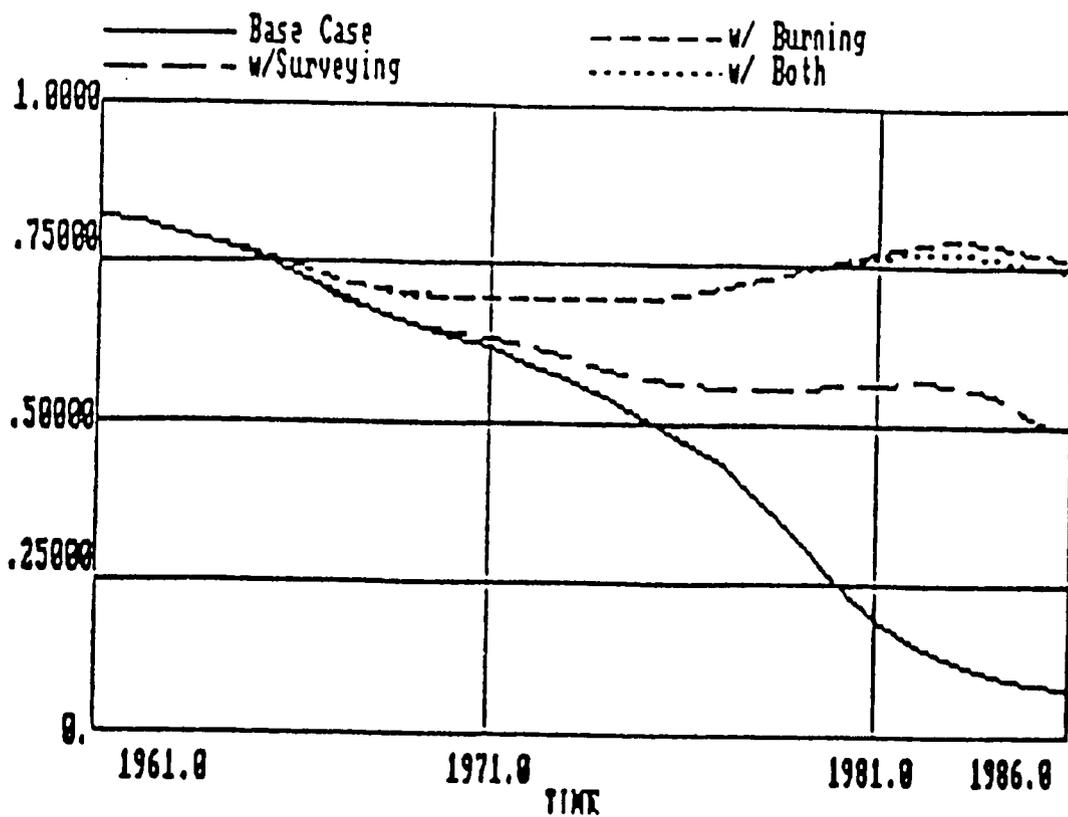
The benefits are summarized in Figure C. Benefits are assumed to be the difference between the net income in the base case and with implementation of each of the policy

Figure C



177

Figure D



Range condition is defined as the ratio of edible grass to total grass biomass, a definition applicable to grazing animals. Thus range condition is optimum when the ratio is 1.

options -- surveying, burning or both -- and are discounted at a rate of 12% to reflect their present value in 1961. Annual results for the net present value are calculated as if the investment were to end in the given year. Figure C reveals that for several years the investment brought negative returns, but if evaluated after 1981, there were very strong returns confirming the fact that investments in policy can pay off well in protecting and sustaining the productivity of range resources. To strengthen this argument, it is imperative to look at the break even point which determines the limit to the expenses of the policy programs. The break even point where the investment has yielded enough benefits to pay for itself, is Z\$9500/year for surveying and Z\$19,000/year for burning.

Our results, both for the correlation and the cost-benefit analysis confirm the positive impact of management policy implementation at the Chiredzi Buffalo Ranch in Zimbabwe.

### **4.3 El Nido Study**

#### **4.3.1 Policy to Improve ENR: Logging Ban**

Dixon and Hodgson's El Nido study represents a case in which economic analysis revealed the failure of the market to achieve economically and environmentally optimal resource allocations. The study assessed the economic effects of a proposed logging ban on three, coastal-based industries in an area of northern Palawan, Philippines. The net present value (NPV) of industrial output with and without the logging ban was calculated for the tourism, fishing and logging industries. NPV was based on assessments of the ecological impact of logging on soil erosion, sedimentation, coral reef communities and fish catches.

#### **4.3.2 How EPAT Can Affect Policy**

There are several ways in which EPAT initiatives would help to promote sustainable development by compensating for market failures. First, research undertaken in conjunction with EPAT would help to identify cases, such as the El Nido case, where government policy interventions could be economically justified. Secondly, dissemination of research findings should generate additional government interest in this type of policy evaluation. Training initiatives provided under EPAT would improve in-country abilities to evaluate economic policies and market failure. Similarly, technical assistance would help to facilitate the implementation of policies which recognize linkages between economic and ENR considerations. Finally, EPAT would promote the institutional strengthening which is necessary for successful implementation of the policies examined.

### 4.3.3 Cost Benefit Analysis

	<u>without ban</u>	<u>with ban</u>
<u>Net Present Value *</u>		
Tourism	6,280	25,481
Fisheries (with tuna)	9,108	17,248
Logging	<u>9,769</u>	<u>0</u>
Total	25,157	42,729 <sup>11</sup>

\* NPV of revenue at 10% discount rate in thousands of US dollars.

Implementation of the logging ban was projected to result in a \$17.57 million increase in revenue for the area in the period 1987-1996, despite the loss of all revenue in the logging industry. The logging industry itself had no incentive to reduce the negative impact of its activities, a classic case of an externality. In such a case, policy intervention is needed to compensate for the environmental and economic losses incurred due to market failure.

## 4.4 Global Climate Change

### 4.4.1 Policy to Improve ENR: Removal of Cattle Subsidies in Tropical Forest Regions

Tropical forest destruction significantly reduces global carbon fixation capacity, a vital component in the prevention of global climate change. The removal of cattle export subsidies in tropical forest regions would help reduce carbon dioxide emissions, by limiting the destruction of tropical forests.

The existence of cattle export subsidies creates an economic distortion which undervalues alternative uses of tropical forest areas, causing 3 million hectares of tropical forest to be cleared for cattle grazing each year. Removal of these subsidies would restructure economic incentives such that the undervaluation of alternative uses of the resource would not continue. Ultimately, the policy would reduce tropical deforestation, and

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<sup>11</sup>J.A. Dixon and G. Hodgson, "Economic Evaluation of Coastal Resources: the El Nido Study," Tropical Coastal Area Management, Metro Manila, Philippines, August 1988.

hence reduce carbon emissions and their effects upon global climate.<sup>12</sup>

#### 4.4.2 How EPAT Could Affect Policy

The EPAT project, through state-of-the-art research, could help identify and evaluate economically and environmentally sound policy proposals, such as the removal of cattle subsidies. Moreover, EPAT's contribution to human resource development through training would promote in-country abilities to make similar policy evaluations.

#### 4.4.3 Cost Benefit Analysis

The cost of implementing this policy is given in terms of government expenditures (associated with the policy) over a 25 year period (1990-2015). Estimates of benefits are given in terms of petagrams of carbon (Pg C) sequestered from the atmosphere and are based on estimates of the carbon fixation accounted for by a hectare of tropical forest. The benefits of carbon sequestration are then related to economic costs which will be avoided as a result of emission reductions.

Total government costs associated with the removal of cattle subsidies are estimated to be 2.2 billion dollars. Implementation of this policy is estimated to result in 6.5 Pg C sequestered (OTA, 1989). Therefore, the unit cost of reducing carbon emissions with this policy is \$0.34 per ton of carbon (t C) sequestered. The \$0.34/t C cost is the **break even price** for this policy initiative. Thus, if an additional ton of carbon in the atmosphere incurs economic costs greater than \$0.34, policy initiatives to phase out cattle subsidies are economically justified.

Over a 25 year period, tropical forest degradation, if it continues at the current rate, can be expected to contribute to the release of between 0.4 and 1.6 Pg C per year into the atmosphere, an overall increase of between 10 and 40 Pg C over 25 years.<sup>13</sup> Since tropical forest degradation has been estimated to account for approximately a third of anticipated carbon releases into the atmosphere, total expected carbon emissions would be in the range of 30 - 120 PG C in the next 25 years<sup>14</sup>.

The economic costs of global climate change are difficult to quantify given the

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<sup>12</sup>Forestry Sector of the Climate Change Assessment, International Resources Group for U.S. Congress Office of Technology Assessment, Washington DC, 1989.

<sup>13</sup> R.P. Detwiler and C.A.S. Hall, "Tropical Forests and the Global Carbon Cycle," Science, 239:42-47, 1988.

<sup>14</sup> R.A. Houghton, W.H. Schlesinger, S. Brown and J.F. Richards, "Carbon dioxide exchanged between the atmosphere and terrestrial ecosystems," Atmospheric Carbon Dioxide and the Global Carbon Cycle (ed. J.R. Trabalka), Department of Energy, Washington DC, 1985.

176

unknown effects of increased global temperatures on the environment and the number of variables involved in calculations of cost. However, the costs of global climate change are generally thought to include forest range shifts (decreasing productive forest area), rising sea level, increase in space cooling energy demand, pest infestation, human health problems,

catastrophic losses due to fire, drought and winter storms, and productivity losses in agriculture.<sup>15</sup>

Despite difficulties in quantifying the costs of carbon-induced climate change, several studies have addressed this issue. For example, a study sponsored by the Canadian government found that a 20% decrease in overall carbon emissions would save \$192 billion in Canada alone, justifying the \$108 billion of expenditure required to achieve the emissions reduction.<sup>16</sup>

Using the figures given above, the benefits (\$192 billion in economic costs avoided) to Canada for reducing emissions would be between \$32/t C and \$8/t C [ $\$192 \text{ billion} / (.2 \times 30 \text{ Pg C})$  and  $\$192 \text{ billion} / (.2 \times 120 \text{ Pg C})$ ]. This analysis indicates that the benefits of implementing any global carbon reduction policies, such as cattle subsidy removal, are likely to far outweigh the costs of implementing the policy (Figure E). In fact, the break even price for the subsidy removal (\$0.34/t C) is far surpassed by the range of values given for the benefits of carbon reduction in Canada, suggesting the economic soundness of this policy. Furthermore, similar cost benefit analyses made globally would combine to yield an even higher valuation for the potential savings from adopting policies to reduce carbon emissions.

Clearly, the monetary costs of implementing the cattle subsidy removal policy are insignificant in comparison with the economic benefits which would be achieved. Even given uncertainty about the magnitude of cost projections related to global climate change, the potential benefits of this policy and other simple policies are substantial. And in addition, this case, given its global scope, represents an area in which individual projects would be unable to achieve the requisite changes; global policy is needed to facilitate the necessary changes.

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<sup>15</sup> OTA, 1989; Policy Options for Stabilizing Global Climate, Draft Report to Congress, Environmental Protection Agency Office of Policy, Planning and Evaluation, Washington DC, February 1989; and P.J. Kramer and N. Sionit, "Effects of Increasing Carbon Dioxide Concentration on Physiology and Growth of Forest Trees," The Greenhouse Effect, Climate Change and U.S. Forests, (eds. W. Shands and J. Hoffmann), The Conservation Foundation, Washington, DC, 1987.

<sup>16</sup> "Canadian Energy Ministers Fail to Agree on Reduction in Carbon Dioxide," International Environment Reporter, September 1989.

# Cost Benefit Analysis

## Cattle Subsidy Removal

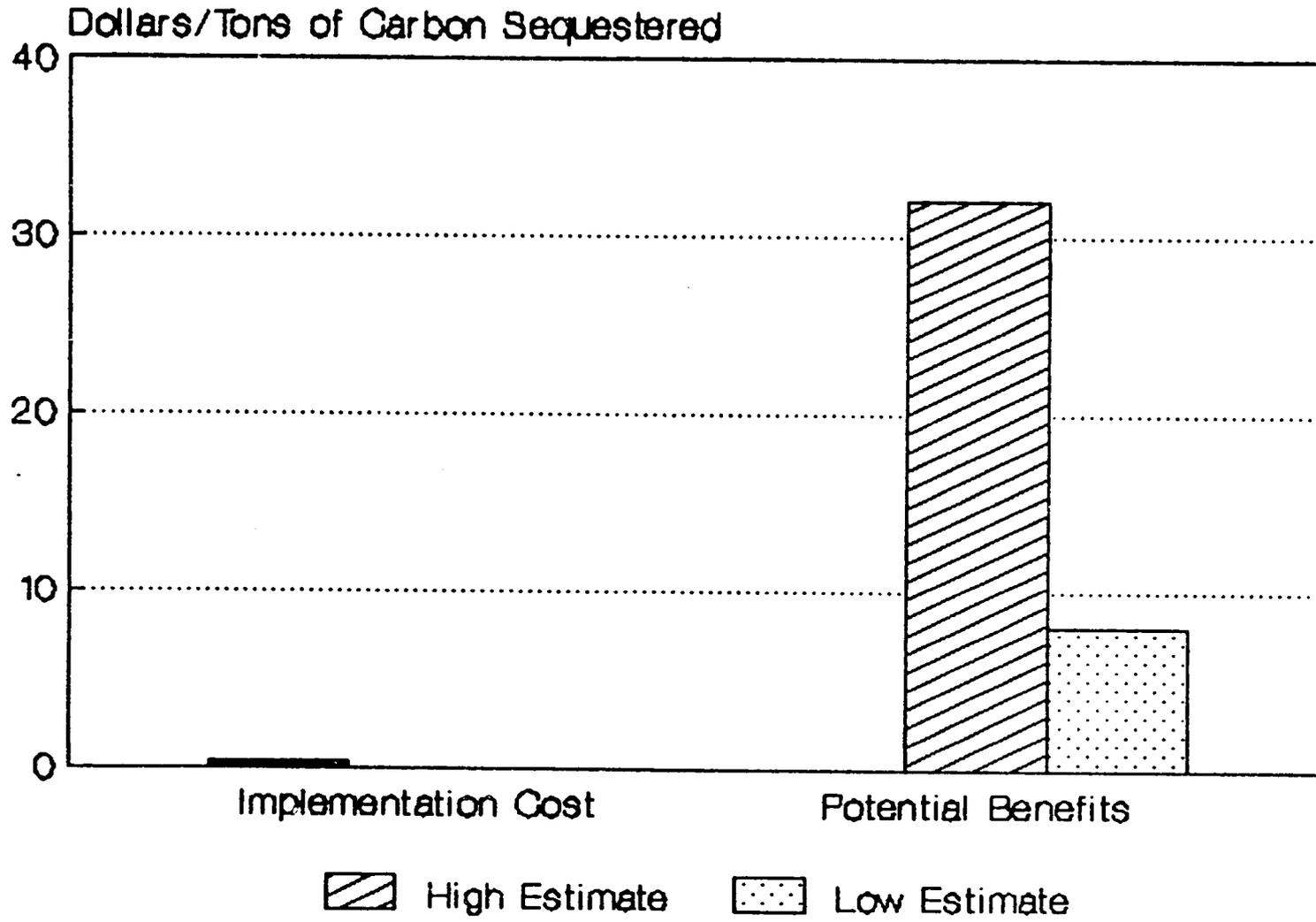


Figure E

25

170

#### 4.5 Conclusions Regarding Economic Benefits and Costs

One cannot now say what policy initiatives will be undertaken with the encouragement and support of EPAT, to what extent such policy initiatives can be attributed to EPAT, nor how effectively those policy initiatives will be implemented. Nonetheless, we conclude, based on admittedly limited evidence, that likely net benefits of economic and ENR policy actions taken partly as a result of EPAT will dwarf costs of EPAT itself. We conclude this for two reasons.

First, cost-benefit analyses of specific policy or project interventions posit net economic benefits on a scale many times the costs of EPAT. This is most clear for urban environmental interventions, where most analytical work has been done; but it also appears to be true for other ENR interventions. This suggests that the universe of potential policy actions includes many with potentially very large net benefits.

Second, one of the analytical improvements to be transferred under EPAT will be the ability to use techniques for valuing changes in ENR quality to prepare more informed benefit-cost analyses of policy options and to select those options with the best benefit-cost relationships. One therefore must presume that policy measures with substantial positive net benefits will be adopted. The magnitude of net benefits of EPA and other regulatory actions and of other non-regulatory policy initiatives suggests that, even after allowing for possibly lower monetary benefits levels in developing countries, the cost of EPAT and other analytical and policy development costs will be insignificant compared to the level of net benefit of individual actions.

A favorable benefit-cost ratio also appears reasonable in light of:

- o Opportunities to help countries capture increased economic rent, a large part of which represent external costs of ENR degradation associated with use of a broad range of natural resources including energy, forests, water for irrigation and for industrial process use, fertilizers, etc. Presuming such revenues are reinvested in ENR improvement (a leap of faith) and that such investment is viewed as moving the economy outward toward its production possibilities frontier (i.e., benefits exceed the costs of such expenditure), the amount captured can be viewed as a proxy for the ENR benefits achieved. (We recognize the obvious circularity of this argument but nevertheless believe it is valid.)
- o Estimates in the U.S. and other industrialized countries which justify current levels of air, water, and toxic waste control on the basis of health care costs avoided and other benefits which substantially exceed the costs of such environmental controls. While per-capita benefits of a given level of environmental control in the U.S. may far exceed those

in the Asian NICs or Eastern Europe, the current levels of environmental control in those parts of the world generally are so low that, presuming a downward curve of marginal benefits attributable to increased levels of environmental control, there is a presumption of substantial net economic benefits from policy changes which would reduce air, water, and toxic waste emissions from current levels.

- o Less well documented prospective benefits of measures to improve environmental and natural resource management in fields other than urban and industrial pollution.

## 5. Cost-Effectiveness and Allocation Efficiency Analyses

### 5.1 Cost-Effectiveness Analysis

"Project" investments in ENR by the public sector (including USAID as a public donor) serve to remedy a specific problem or to demonstrate the effectiveness of an approach. They may also create a "demonstration effect", increase awareness or provide direct financial or other incentives (paid for by the project -- such as through food for work) to private agents through whose actions the problem can be remedied. There are many cases in which direct public intervention is both appropriate and cost-effective. To take one ENR example, a toxic waste site such as Love Canal in upstate New York involves imminent health dangers. Clean up requires, inter alia, high up-front investment, and is best suited to direct public intervention.

"Policy" instruments serve to alter private incentives for ENR management. The policy change itself is typically very low cost, and may even be revenue-positive (such as through an increase in gasoline taxes, for example). The larger costs are associated with information, outreach, monitoring, enforcement and administrative structure needed to implement policy change. Because policy change alters private incentives, its impact: (i) is potentially more generalized; (ii) tends to be future-oriented; (iii) may be longer term; and (iv) is affected by other market and policy signals (incentives) with which private actors are faced.

The cost-effectiveness argument is therefore premised on two conditions:

- o that policy is the appropriate instrument for the problem being addressed -- as the Love Canal example shows, this is not always the case.
- o that the policy instrument selected is sufficiently reliable to have an impact, and is consistent with other incentives.

When these conditions are met, policy change can have a positive impact on ENR goals, and also on the future rates of return of ENR "project " investments by the public sector. It is important to note that policy change is not necessarily an alternative to direct (or project) investments. The two may often be necessary complements to each other.

### 5.1.1 An Example from the Energy Sector

The energy intensity of OECD countries moved in close relation to GNP growth<sup>17</sup> over a long historical period prior to 1973. During much of that period, real energy prices were either stable or declining. "It was long assumed (based on historical data) that there was a stable relationship between the rate of growth of energy use and the rate of growth of GNP ", and that economic structure (amount and types of industry, standard of living, etc) rather than energy prices was the principal determinant of energy intensity. In short, higher levels of energy intensity were thought to be associated with higher levels of development.

In the wake of the post-1973 oil price increases, relative energy prices -- through a combination of higher supply prices and increased taxation -- rose sharply. The second major increases in world oil prices occurred in 1979. After 1981, real international oil prices decreased until August, 1990. The energy intensity of OECD economies has decreased in response to higher prices. Much of this decrease has occurred through increased energy efficiency -- that is, through more efficient allocation of resources given real resource scarcities. The EPA estimates that energy efficiency improvements currently save the U.S. economy \$160 billion annually. According to the U.S. Department of Energy, "Had pre-1972 energy-use trends continued, by 1984 the United States would have been consuming almost 40 percent more energy than it actually did". Figure F shows energy intensity trends in the United States, Japan and West Germany from 1973-1985.

The policy interventions used to encourage reduced energy intensity include higher overall energy taxes, fiscal incentives for energy conservation investments and for renewable energy development and use, special financing packages, taxes on "gas guzzler" vehicles, rebates for energy-efficient appliances, overall average fuel efficiency standards for vehicle manufacturers and, the 55 mile per hour speed limit.

The policy changes at issue in this example are clearly very cost-effective. The example also clearly meets the two conditions cited at the outset of this section: policy is the appropriate instrument, and policy signals are consistent with other incentives (including world market prices). Indeed, the historical data strongly suggest that in the absence of policy change, it is doubtful that any other public intervention could generate the same benefits.

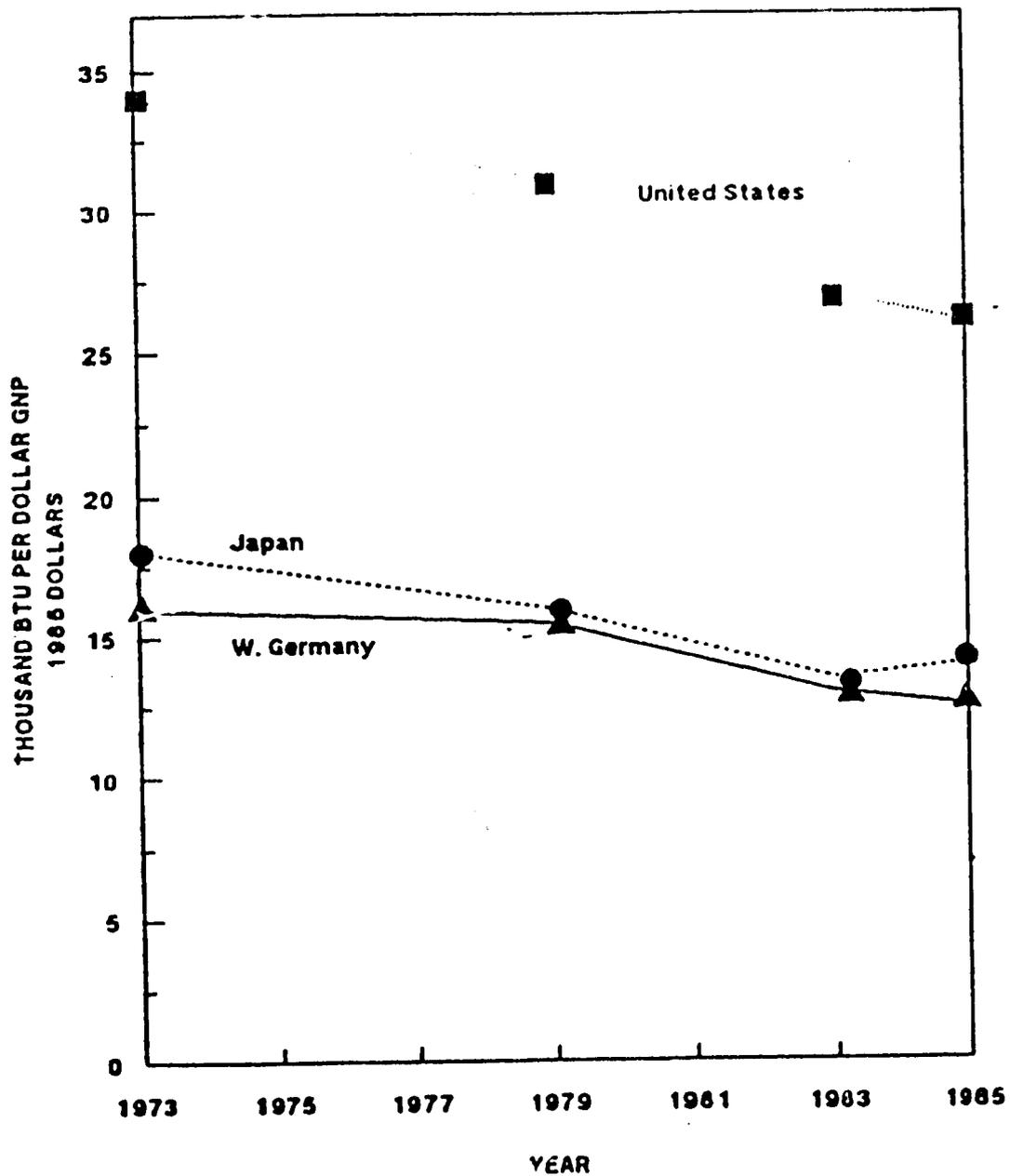
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<sup>17</sup> This section draws directly from the text and data in Policy Options for Stabilizing Global Climate, U.S. Environmental Protection Agency, Office of Policy, Planning and Evaluation, Chapter VIII.

Figure F

### ENERGY INTENSITY REDUCTIONS 1973-1985

(Thousand BTU Per Dollar GNP; 1985 Dollars)



Source: Chandler, et al., 1988

182

However, the pricing mechanism offers examples on the negative side as well, when conditions of appropriateness and consistency are not met. Price controls, for example, have typically been ineffective as a resource allocation mechanism, leading to reduced incentive to supply, to black markets which effectively circumvent official prices, and to market distortions which reduce efficiency throughout the production system. Similarly, taxes to equalize the social and financial costs of supply (such as stumpage fees aimed to bring the financial cost of exploiting open access resources in line with the marginal cost of growing trees) have frequently had limited impact because of government's inability to enforce taxation when access cannot be controlled and shipment cannot effectively be monitored.

### 5.1.2 Deforestation in Morocco<sup>18</sup>

Morocco's estimated wood consumption is in the order of 13 million cubic meters per year. Sustainable supply (supply levels which would not degrade the existing standing volume of forests) is estimated at 7 million cubic meters. There is therefore a deficit of 6 million m<sup>3</sup>/year today. Because forests are an open access resource, excess demand (demand which exceeds sustainable supply) is satisfied through deforestation. As a consequence, sustainable supply is diminishing rapidly and standing forest resources dwindle. At the same time, increasing population increases the gap between demand and sustainable supply, and accelerates the downward trend of supply.

The economic consequences of this imbalance affect far more than the forestry sector, and include soil erosion, destruction of watersheds, increased imports of petroleum fuels, declining agricultural yields, loss of biodiversity, loss of forage and decreasing livestock production, in addition to health and welfare impacts from time spent collecting wood and from inadequate cooking times.

Purely projectized solutions to this problem have been considered and were, for many years, the cornerstone of the government's approach to deforestation. However, attempts at implementing project solutions revealed the twin obstacles of cost and feasibility:

- o **Cost.** At a minimum, publicly-sponsored tree planting costs in the area of \$200 per hectare. With an average yield of 3 cubic meters per hectare, the government estimated the need to plant 2 million hectares (demand of 13 million, minus sustainable supply of 7 million, resulting in a deficit of 6 million m<sup>3</sup>, to be filled by 2 million hectares yielding 3 m<sup>3</sup> each). The minimum cost of such a program, including program management, technical assistance and administrative costs, was

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<sup>18</sup> This example draws directly from Shaikh and Kirmse, Forestry Supply and Demand in Morocco, 1986.

estimated to be in excess of a half a billion dollars.

- o **Feasibility.** In fact, even if the unattainable objective of finding \$500 million to invest in forest plantations was met, with more detailed analysis, it becomes clear that this amount vastly understates the likely costs of massive direct intervention in tree planting: the gap is 6 million cubic meters today, but will be much higher in twenty years. Planting even 2 million hectares over twenty years would do little to resolve the problem. Sustainable supply and demand would remain in serious imbalance (if current trends continue).

Within the last year, the Government of Morocco has reevaluated its forestry strategy. It has found that policies aimed at encouraging private tree planting (changing the incentives for private actors) offer much greater promise than direct tree planting by the government. It is undertaking a comprehensive review (based on regional surveys and data collection) of pricing policies (including of alternative fuels) and of policy incentives for overall rural resource management. Critical to the effort is the finding that public tree planting on a massive scale is not financially viable because wood energy prices (based on free access to forests) will not sustain the costs of wood production. Multi-purpose tree planting by private farmers is financially viable because it can result in increased agricultural yields, by-products and soil protection. The approach of encouraging this private incentive through changes in government policy, combined with policy measures to encourage woodfuel conservation and fuel switching, while slower than government plantations, is the only affordable solution, and is the only solution which is economically and financially viable in the long run.

These two examples demonstrate the sizable potential for policy change as a cost-effective public initiative. Both of them -- energy pricing and conservation incentives, and policies to encourage private initiative for sustainable resource management -- illustrate how policy change can yield paybacks considerably greater than EPAT expenditures.

## 5.2 Allocation Efficiency Analysis

It is important not to overlook the underlying arguments with respect to the overall returns to policy change in support of improved ENR management. We believe these include the following:

1. The vast majority of production, consumption and resource allocation decisions which affect ENR are private.
2. Public authority does not have the capacity -- in any country -- to directly enforce "sustainable resource use". Much of the lesson of modern economics is that in the absence of a smoothly functioning economic system driven by

individual decisions, government does not necessarily even have the capacity to determine what "sustainable resource use" is.

3. Private resource use decisions will, in the long run, be consistent with private incentives -- economic, social or other incentives.
4. Public policy can have a major role, at the margin, in influencing private incentives through prices, subsidies, legislation, regulations and economic structure. This is how government can best leverage its own limited resources.
5. The links between environment and development run in both directions: sustained resource management can contribute to economic development; successful development and rising incomes can, in turn, alleviate many of the most acute pressures for environmental degradation.

The reform of environmental policies cannot be fully successful without assuring that the overall resource allocation system functions smoothly. Major distortions anywhere in the price and market system filter through to all allocation decisions, including allocation for ENR. Any analysis which is too narrowly focussed on a specific ENR policy change and its impact or cost-effectiveness risks missing the point. The most compelling literature on the need for ENR policy reform is based heavily on the linkages between ENR policy and the overall economic and policy framework. The need to provide consistent, stable policy and price signals throughout the economy, the need to "internalize" externalities within market prices, and the need to liberalize markets and more effectively use the pricing system to allocate resources are all important arguments in support of the EPAT project approach.

## 6. Conclusions

The Economics Annex was designed to highlight linkages between economic factors, both at the micro- and macro-levels, and ENR degradation. The analysis revealed that at the micro-level, economic rents, fees, and prices are variables which, when distorted, often induce individual economic actors to make decisions which lead directly to ENR degradation. Similarly, at the macro-level, government fiscal policy has the same impact. Through both literature survey and case analysis, cost-benefit studies demonstrate the vast payoffs of policy implementation for ENR. Moreover, the analysis illuminated many areas in which policy intervention was the only way to achieve sustainable use of the environment and natural resources.

Finally, it is clear that ENR policy is directly linked to economic growth and development. EPAT-sponsored research on ENR policies and economic policies which affect ENR quality, will directly contribute to improving overall economic efficiency by identifying economic distortions which affect ENR degradation. To the extent that this occurs, the benefits include potentially greater gains for sustainable economic development and sustainable resource use.

## **ANNEX B.4: Social Soundness Analysis**

**Peter Bloch  
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The Environmental and Natural Resources Policy and Training (EPAT) project is designed to encourage and assist governments in taking policy actions to redress "market and policy failures" which lead to environmental and natural resource degradation. For policy to have its desired economic and environmental effects, four essential components of policy reform must be addressed. These components are policy identification and valuation of the costs and benefits associated with the problem, policy formulation, policy change, and policy implementation. Simple recognition of problems and subsequent design of policies are necessary, but not sufficient, conditions for fundamental change.

In order to achieve its stated purpose, the EPAT project must address all factors which influence the allocation of resources within a society, since suboptimal resource allocations can lead to economic and environmental losses. As such, social, legal and political issues will affect the soundness of policy initiatives to as great an extent as economic issues. Thus, the technical design of the EPAT project has included measures that will allow for consideration of all factors which influence the ability of a policy intervention to achieve its goals.

Non-economic issues frequently determine whether formulated policies are put into practice. Since EPAT will be concerned with a wide range of discrete policy initiatives, this social soundness annex will highlight ways in which the EPAT design can facilitate identification of social, legal and political obstacles to policy implementation and help to address them.

Three primary issues relating to the social soundness of an AID initiative affect its ability to address market and policy failures which have environmental and natural resource impacts. These are:

- o Land and resource access issues;
- o The incidence of costs and benefits of market and policy failures and of efforts to correct such failures, and the implications for policy change prospects; and
- o Cultural, political, institutional and other obstacles to successful policy implementation.

## **1. Land and Resource Access Issues**

Insecure access (including lack of access) to land and resources is identified by Panayotou and others as one of the principal types of market and policy failures. Moreover, this kind of failure is not readily corrected. In particular, reliance on neoclassical economic principles without careful assessment of site-specific social, cultural and other conditions can lead to interventions which may be inappropriate.

## Market Failure

In many developing countries, whatever the formal legal system, access to land and other natural resources is defined under local, customary arrangements or under nonmarket systems such as collective ownership or co-ownership. Under such systems, individuals may not have total control of land and other resources because other individuals, the community or the state may retain substantial rights to make decisions over these resources.

Even where they legally exist, developing country land markets rarely function as economists hope. Permanent or temporary land transfers occur, but are rarely based on economic considerations - the predominant form of permanent transfer is inheritance - and frequently they are not recorded officially. Moreover, where there is inequitable access to wealth and power and/or an initial disparity in landholding, a well-functioning land market may lead to even greater land concentration and the creation of a landless class whose response to its poor and worsening status may be environmentally destructive. The preconditions for efficient operations of markets - wide availability of information, access to capital, and institutional protection of landholders' rights and enforcement of their obligations - are often absent. Therefore, the major benefits of efficiently operating markets - reallocation of factors of production to their most productive uses - are unlikely to be realized.

The prevailing assumption among economists is that insecurity of land tenure discourages investment, particularly investments with long-term pay-offs, such as conservation, whose benefits may be years away, and conversely that the granting of secure title will lead to investment and conservation. To date, there has been only one study (in northeastern Thailand<sup>1</sup>) which appears to support this hypothesis unambiguously. A review of African empirical evidence concludes that "on balance, there is little evidence to support the hypothesis that (tilling and land registration), through increased tenure security, has increased investment in agriculture. There is also no evidence that the demand for capital increases if tenure is changed to freehold."<sup>2</sup> More recent quantitative research done in Africa by the World Bank and the Land Tenure Center fails to find support for the formal title security-investment link.<sup>3</sup> One should add that there is no empirical evidence from anywhere that tilling and registration will reduce pressures on the natural resource base or improve environmental management. In the ANE region, for example, there is "a striking lack of information and analysis directed at understanding the effects of land tenure systems

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<sup>1</sup>G. Feder, T. Onchan, Y. Chalamwong and C. Hongladoram, Land Policies and Farm Policies in Thailand, Johns Hopkins University Press, Baltimore, 1988.

<sup>2</sup>R. Barrows and M. Roth, "Land Tenure and Investment in African Agriculture: Theory and Evidence", LTC Paper 136, Land Tenure Center, Madison, Wisconsin, 1989.

<sup>3</sup>World Bank, Land Tenure Center and University of Nairobi Population Studies and Research Institute, Rural Land Tenure, Credit, Agricultural Investment and Farm Productivity in Sub-Saharan Africa, Papers for a research dissemination conference, 1990.

and conditions on management and utilization of land and its resources. "4

There are two assumptions embedded in the title-investment link, namely, that state-guaranteed title enhances tenure security and that increased tenure security leads to increased investment and improved conservation practices. The first assumption is based on the proposition that possession of a piece of paper will give farmers confidence that they will be able to retain control of their land for as long as they wish. In fact, African and Latin American experience suggests that in many cases titling programs may in fact decrease the tenure security of some groups, such as landholders who lose land to more influential people during the titling process and those who obtain credit via mortgages and subsequently are unable to repay their debts. In many parts of Africa, an additional and extremely important group is vulnerable to decreased security: women and other family members whose customary rights are not recognized during titling in spite of the fact that they are the principal source of agricultural labor. Furthermore, much recent research has shown that a wide variety of customary tenure systems provide reasonable long-term security to landholders. On the other hand, increasing land scarcity due to population growth and land degradation, or increasing land values engendered by development projects such as irrigation, may contribute to the breakdown of customary tenure systems and hence to a reduction in security. The only generalization that one can make given the present state of knowledge is that tenure security does not necessarily increase along a continuum of tenure systems with customary arrangements at one extreme and state-guaranteed, registered freehold at the other.

Of particular importance is the unfortunately unmeasurable psychological variable which reflects the time horizon over which landholders are confident that they will retain access to and control of a piece of land. Within the neoclassical economics framework, it is assumed to be self-evident that landholders with a long-term view will have an interest in maintaining the productivity of land, whereas those with a short-term view will not. If the latter expect, for example, to lose control of a piece of land within a year or two, it would be rational for them to "mine the soil", maximizing short-run productivity at the possible expense of long-term maintenance. Where access rights are unclear or shared, such as in common property or co-ownership situations, or where they are regulated by governments which lack enforcement capacity, such as in forest reserves, individuals may rationally exploit natural resources. However, market failures may occur even when all landholders in an area have tenure security and respond by investing to maintain or increase productivity, because of "externalities" such as downstream effects of socially inappropriate but individually rational land management practices (erosion caused by mechanization, pesticide and fertilizer runoff, etc.). Such market failures are observed even in developed countries where tenure security is not a serious concern.

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<sup>4</sup> World Resources Institute, "Toward an Environmental and Natural Resources Management Strategy for ANE Countries in the 1990's", Paper for AID/ANE, 1990.

## Policy Failure

An appropriate role of government policy is to mitigate the effects of market failure. If market failure is ascribable to tenure insecurity, governments should take actions to increase security, which may or may not involve land titling. If it is ascribable to common-property or open-access situations, governments should work to clarify access rights and to assist individuals and communities in regulating access. If it is ascribable to inequitable land distribution which forces land-poor farmers on to environmentally sensitive land, governments should implement agrarian reform or other options to broaden access to lands more suitable for agricultural or pastoral uses. In most countries, however, current government policies concerning land tenure and access to other natural resources are in fact often the cause of suboptimal agricultural performance and excessive resource depletion. To cite a few examples:

- o Malawi's policy of encouraging cash crop production via the granting of large, long-term leaseholds to both farmers and non-farmers without enforcing afforestation covenants has led to large-scale destruction of natural forests by leaseholders in search of wood to cure tobacco.<sup>5</sup>
- o Francophone Africa forest codes give the state complete control of forest management and even of rights to trees and tree products on individuals' land. Enforcement is uneven and arbitrary but sufficient to discourage tree-planting by individuals or community concern for neighboring forests.<sup>6</sup>
- o In many Latin American countries, credit policies biased toward large landholders in the latifundio-minifundio system inhibit small farmers from obtaining sufficient productive land on which to survive and thereby force them to exploit marginal lands or emigrate.<sup>7</sup>
- o A former President of Niger announced in a speech to the nation a "land to the tiller" policy. Even though no government action was taken, immediately thereafter many customary elite landowners expelled their tenants in fear of losing their land. The tenants were thereby forced onto marginal, unclaimed land if it existed or to

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<sup>5</sup> C. Dickerman and P. Bloch, "Land Tenure and Agricultural Productivity in Malawi", Land Tenure Center, 1989.

<sup>6</sup> S. Lawry, "Tenure Policy and Natural Resource Management in Sahelian West Africa", LTC Paper 130, 1989 and K. Elbow and A. Rochegude, "A Layperson's Guide to the Forest Codes of Mali, Niger, and Senegal", LTC Paper 139, 1990.

<sup>7</sup> W. Thiesenhusen, "Blaming the Victim: Latin American Agricultural Land Tenure Systems and the Environment Debate", Land Tenure Center, 1989.

emigrate if it did not.<sup>8</sup>

Some policies, on the other hand, are strictly irrelevant because the state has insufficient resources with which to enforce them. For example:

- o Land law in several Sahelian countries prohibits individual ownership of land in most national territory. Yet landholders generally consider themselves owners and act as owners would.<sup>9</sup> Insofar as land degradation is ascribable to human activity instead of to climatic change, it is not the law but rather the behavior of landholders that is responsible.
- o Madagascar prohibits sharecropping for equity and efficiency reasons, yet it is widely practiced and even acknowledged by respondents in the agricultural census.<sup>10</sup>
- o Sri Lanka prohibits chena (slash-and-burn cultivation) by "encroachers" on state lands for environmental reasons. Yet chena continues to expand and to contribute to the degradation of watersheds because other elements of tenure and land management policy are inadequate to provide sufficient land to land-poor small farmers.<sup>11</sup>

In the long run, resource conservation and rural development should be complementary. For resource tenure policy, this implies an effort to internalize as many of the costs and benefits as possible; but internalization does not necessarily imply individualization of land rights or access rights to trees, pasture or water. In many contexts, community natural resource management can work and is working. Examples include the Guesselbodi forest in Niger, Lesotho grazing associations, and water users' groups on irrigation projects in several countries. Individuals can benefit as members of groups, as long as the distribution rules are clear, acceptable, and enforceable by the groups.

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<sup>8</sup> Code Rural, Actes du Seminaire National de Guidiguir, Comite National du Code Rural du Niger, 1990.

<sup>9</sup> P. Bloch, "The Dynamics of Land Tenure on the Bakel Small Irrigated Perimeters: Final Report on the LTC Research Program", Land Tenure Center, 1989.

<sup>10</sup> Land Tenure Center, Land Tenure and Sustainable Development in Madagascar, 1990.

<sup>11</sup> Report of the Land Commission, Government of Sri Lanka, 1987.

## Relationship to Project Components

Clearly, rules of access to land and other natural resources are important determinants of the success or failure of environmental and natural resource management strategies. These rules and their impacts must be better understood than they are now, both in general and in specific country and regional contexts. EPAT should embed consideration of resource tenure issues in its project components. Illustratively:

- o Core research could usefully extend the conceptual framework on the tenure-investment link to the tenure-resource management and conservation link. Neoclassical assumptions linking conservation to secure individualized land, tree, pasture or water tenure should be tested empirically. EPAT also could develop methodologies for the integration of resource tenure considerations into project appraisal techniques. Appraisal methods should not assume that farmers receive all the financial benefits and incur all the costs. Due to tenure insecurity, externalities, gender or other allocations within the farm unit itself, or other reasons, such assumptions may be incorrect.
- o Applied country-specific research could monitor and evaluate the environmental as well as the economic impact of titling programs on both with/without and before/after bases. The project also could conduct research on individual and community management in the context of differing sets of government rules and regulations (forest codes, land codes, etc.) and on different types of land (individual farms, common property areas, and natural reserves). For example, recent research has found that in many situations communities have developed and enforced access rules which have the same effect as government-sponsored titling programs in controlling access to resources, and do so with less cost to government and more likelihood of community acceptance. A first step would be to inventory and monitor cases such as the Guessebodi community forestry system in Niger and taungya systems of controlled swidden in Indonesia and Nigeria. Finally, the project could monitor the evolution of customary tenure in the face of increasing land scarcities and changing technologies. Customary tenure is not static but evolving. Rapid population growth and input-based farming techniques have increased pressures on customary tenure almost everywhere, and in many cases customary arrangements show signs of breaking down. Even in these cases, however, institutional support to reinforce customary systems may be preferable to individualization of tenure.

- o Many countries, including Niger, the Philippines, Tunisia, Guatemala and Vietnam are seriously reevaluating their tenure and resource access systems. EPAT policy dialogue support could assist countries engaged in the process of rethinking the legal and institutional aspects of their tenure system. EPAT profitably could use workshops, guided study tours of other countries' systems, and other means to provide such assistance. EPAT also could help host countries evaluate the costs and benefits of individual titling versus other possibly less expensive tenure options.

It should be noted that the above listing of research areas is illustrative. The Technical Annex discusses a process for determining a research agenda, and draws some conclusions about priorities for EPAT emphasis. The latter, however, is not final. Tenure and access issues (and others discussed in the Technical Annex and elsewhere) will be further considered by the TAG, the Project Committee, other experts and the institution(s) with which AID signs a cooperative agreement for the core research component of EPAT.

## **2. Incidence of Costs and Benefits**

Benefit-cost and other economic analysis methods typically address aggregate benefits and costs. They do not normally address the important issue of who actually receives the benefits and who bears the costs. Such distributional issues are important for three reasons. First, AID must consider distributional and consequent social equity aspects of its actions. Second, governments have certain social equity criteria, however poorly defined and however often overlooked in practice, and policy interventions must be evaluated at least partly in terms of their impacts on these criteria. Third, failure to assess distributional issues often will result in adoption of poorly conceived policies which cannot be implemented, or, if they are, will not achieve the desired objective. For example, many watershed management projects undertaken by the World Bank and others have calculated a positive net present value (NPV). However, for many years project designers overlooked the fact that costs of tree planting, terracing, etc. were borne by farmers in the upper watershed while many of the benefits - of reduced sedimentation and greater regularity of water flows, for example - accrued to farmers in the lower watershed. As a result of such externalities, upper-watershed farmers often had little or no incentive to adopt the measures postulated by the project no matter what donors said about aggregate net benefits. Without some way of compensating upper-watershed farmers for external benefits not received, these farmers would participate half-heartedly if at all.

The same problem of incidence of costs and benefits can and does occur even within individual farm units and often has a perverse gender impact. Thus, for example, in many areas of Africa women gather firewood, haul water, and also provide most of the on-farm agricultural labor. They therefore have the strongest incentive of any members of the farm unit to, for example, plant and tend multipurpose trees which produce firewood and fodder

and also fix nitrogen in the soil. However, in many regions the male "head of household " can veto major female decisions such as what trees to plant. For example, since the man may receive little direct benefit from a woman's decision to plant trees primarily with firewood needs in mind, he may plant an orange tree instead (and reap the benefits of the cash income generated by the sale of oranges, while the woman would pay the cost in terms of additional labor).

Divergences between the incidence of costs and benefits within a society occur frequently and in relation to almost every sector of human activity. However, natural resource management and urban and industrial pollution are two clear cut areas in which distributional considerations must be taken explicitly into account in the process of policy change to help assure that the policy option chosen can be implemented and will have the intended effect.

### Natural Resource Management

The first important point about incidence of costs and benefits is that "market and policy failures " often create benefits for discrete population groups for which those groups do not have to pay. Thus, for example, subsidies in the Amazon which have been decried by Repetto and others<sup>12</sup> enriched less than 500 cattle ranchers at an estimated total cost to the government of \$2.5 billion. Again, as estimated by Repetto, loggers in Indonesia, Sabah and the Philippines received roughly \$4 billion in economic rents (excess of financial returns over a "reasonable " profit sufficient to keep them in business) in just the four years 1979-1982.

This phenomenon is not limited to developing countries. Examples in the U.S. include billions of dollars in water subsidies in the West, below-cost fees for grazing and mineral rights on Bureau of Land Management lands, and below cost timber sales. Such subsidies are justified primarily on grounds that prices would rise and employment would fall if the subsidies were reduced. Yet the very definition of economic rent and numerous economic analyses over many years suggest otherwise. Possibly more important is that the magnitude of benefits received by a comparatively few provide a substantial incentive to lobby and do whatever else is required to maintain such subsidies.

Costs of many such market and policy failures may be borne by the population as a whole, as in the case of U.S. water subsidies which become a cost borne by all taxpayers. However, they also may fall disproportionately on particular groups, in some cases economically vulnerable groups. For example, policies in much of Latin America which historically has had a latifundia system favor large landowners by providing favored access to credit, marketing and extension services and a tax/subsidy framework which favors

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<sup>12</sup> R. Repetto, The Forest for the Trees? Government Policies and the Misuse of Forest Resources, World Resources Institute, Washington, D.C., May 1988

extensive land uses such as cattle ranching. In the context of continued population growth this set of policies forces small farmers to migrate to ever more marginal lands, become tenants or laborers on large landholdings, or emigrate to already overcrowded urban areas.

In assessing the distribution of costs and benefits of EPAT-inspired policy initiatives, one must look at the specific distributional consequences of individual policy options. Some policy options may in fact impose costs on or take benefits from vulnerable groups. Thus, while measures to preserve traditional access to forests or fishing grounds and to maintain the quality of such resources may preserve beneficial distributional aspects, measures to reduce or eliminate logging in open access forests may adversely impact the rural poor in the near term. One cannot a priori presume that, because it overcomes a market or policy failure, a given policy option necessarily will have positive distributional impacts. Also, some options may be positive in a long-term sense but have adverse short-term impacts on particular vulnerable groups. With these caveats, however, one would expect the aggregate of policy initiatives to overcome market or policy failures to achieve a more balanced and equitable distribution of costs and benefits, not least because one of the principal purposes of such initiatives is to eliminate or reduce external costs or benefits.

Since the incidence of costs and benefits is a major element in the determination of an initiative's social soundness, EPAT should promote in-country awareness of and concern for distributional issues. EPAT's role in this process would include strengthening policy research, analysis and development institutions to explicitly consider distributional issues. Moreover, via workshops, seminars and environmental education initiatives targeted at host country NGOs, EPAT could encourage widespread participation in decision making, thereby enabling all affected groups in society to determine the soundness of specific policy interventions. There are many cases in which open access to decision making bodies has improved the distributional effects of policy. For example, the Community Forestry Project in Gujarat, India was structured in such a way that the village panchayat, an elected village body, made most of the major decisions concerning the management of the common forest resource. Decisions were made to ensure that benefits would accrue to the primary laborers in the project, allowing landless laborers, marginal and small farmers to become primary beneficiaries in the project. Proceeds from wood sold at open auction were retained by the panchayat for the support of general village activities.<sup>13</sup> By promoting more democratic participation by all segments of society, many inequalities in resource distribution can be redressed.

### **Urban and Industrial Pollution**

Studies by the U.S. Environmental Protection Agency and others have addressed the incidence of health and other impacts of urban and industrial airborne, waterborne, and

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<sup>13</sup> D. Verma Who Benefits?: A case study regarding flow of benefits from Dhanori Village Woodlot, Community Forestry Project, Baroda, Gujarat, India, 1987.

toxic wastes. A summary of several EPA cost-benefit analyses<sup>14</sup>, for example, concluded that the groups most sensitive to most airborne pollutants (NOx, SOx, CO, etc.) are young children, those with respiratory problems (asthma, bronchitis, emphysema and other chronic respiratory diseases), those with higher than normal risks of cardiovascular disease, and the elderly. However, impacts vary substantially depending on the particular type of airborne emission. Impacts of waterborne pollutants are similarly varied, with many (for example, effluent from organic chemical and plastic plants) falling disproportionately on population subgroups with high cancer risks.

In urban settings typical of most developing countries, one would expect the impact of airborne, waterborne and toxic pollutants to fall differentially on vulnerable groups including children, the elderly and the poor in general. These groups are likely to have little or no access to treated drinking water, no or substandard sanitary facilities, no or little access to health care, and much higher incidence of intestinal, respiratory, and other diseases which are aggravated by various environmental exposures. Their poor health and nutritional status makes them particularly vulnerable to environmentally induced disease.

There are cases where costs of particular policy options fall disproportionately on vulnerable groups. Thus, for example, policies to reduce emissions from diesel buses and vans may raise the price of or reduce access to transport for poor groups (although the most vulnerable groups in many cases cannot even afford public transport). Costs of land use changes to constrain squatter settlements likewise may, in the absence of offsetting policies to improve rural income generation prospects or to expand housing and urban services elsewhere, fall disproportionately on the poor.

### **Relationship to Project Components**

Each of the components of the EPAT project can help to address these important distributional issues.

- o Project research should recognize dichotomies in resource distribution. Particular emphasis should be given to maldistribution resulting from rural vs. urban benefit structures, gender, religious affiliation, and linguistic group. Economic analysis should not ignore distributional issues.
  
- o In-country applied research should seek to identify individual elements which contribute to distributional inequalities. In addition, applied research should reflect attention to issues of particular interest to discrete groups within the society.

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<sup>14</sup>U.S. Environmental Protection Agency, "EPA's Use of Benefit-Cost Analysis: 1981-1986", EPA-230-05-87-028, Office of Policy Planning and Evaluation, Washington, D.C., August 1987.

- o Dissemination of information, both through EPAT and an ENR information center to be established outside the EPAT framework, can facilitate communication between various project participants regarding analytical insights as well as results of EPAT activities and related projects. It also could offer developing country policy makers insight into the importance of distributional issues as well as the overall macroeconomic costs and benefits involved.
- o The training (including environmental education) component of EPAT can be important in promoting democratic decision making by facilitating broad and informed participation of host country NGOs inter alia to limit the domination and exploitation of resources by small segments of society and to take into account the interests of less powerful groups.
- o Finally, EPAT training should be developed with a sensitivity to distributional issues. Attention should be given to factors which influence the effectiveness of training and to coverage in training programs of the importance of analyzing the distribution of benefits and costs of policy choices.

### **3. Cultural, Political, and Other Obstacles to Implementation**

There are a number of potential obstacles to adoption and effective implementation of policies to eliminate market or policy failures. Cultural and political considerations which underlie the allocation of power within a society, between urban and rural groups or between men and women, for example, are fundamental to understanding how physical resources are distributed within a society. Thus, policy can only move from statements of purpose to effective interventions when basic issues of power distribution are addressed. Failure to understand and address the non-economic elements affecting policy may lead to unsound investment decisions. For example, the earlier discussion of land and resource tenure demonstrated a case in which assumptions that government titling will lead to increased investment in conservation may not have been valid in certain cultural and social settings.

There are a myriad of cultural, legal, institutional, social, religious, microeconomic and political obstacles to effective implementation of sound environment and natural resources policy. For the purposes of this discussion, we will refer to obstacles which potentially could be overcome through the EPAT

project mechanism. Obstacles related to interest groups, gender issues, organizational issues and institutional failure will thus be the focus of this section.

## Interest Groups

First, as discussed above, many market or policy failures convey substantial financial benefits on particular groups. If these groups were not politically powerful to begin with (which in many cases explains the existence of the particular policy or market failure), the benefits received give them the financial wherewithal to become so. The existence of powerful groups with a strong self-interest in preserving specific market characteristics or policies from which they benefit constitutes a powerful barrier to policy change.

The power of particular beneficiary groups to resist policy change often is strengthened by decision processes which are closed to outside influence and sufficiently protected from public view that the public, even if it had the power to do so, cannot easily hold its government decision makers accountable. Conversely, the power of such groups can be reduced by making decision processes more transparent, opening such processes to influence by the "informed public" (or more typically NGOs with some perceived mandate to speak for a portion of the public), and working to assure that new participants in the decision process have the information and insight necessary to influence decisions.

## Gender Issues

Similarly, traditional, culturally determined gender relationships often act as key obstacles to policy change. While attention is often given to "women's participation" in development, specific development projects generally do little to alter the inability of women to participate in the decision making process concerning resource allocation. Therefore, one element in determining the social soundness of a given policy intervention will often be the ability of the intervention to afford women greater access to the benefits resulting from the initiative. For example, as part of the Kathama Agroforestry Project in Kenya, initiatives were introduced to encourage the raising of seedlings on farms. The water supply necessary to sustain the seedlings during the dry season was expected to be transported by the women of the community. Lacking the perception that they would benefit from the additional labor, the women were initially reluctant to participate in the project. Ultimately, it was the involvement of women as individual beneficiaries of their own labor, that ensured successful nursery management.<sup>15</sup>

For projects like EPAT, it is necessary to maintain awareness of the gender factor throughout the policy formulation and implementation process. Attention to basic issues such as the distribution of labor and the gender of trainers may prove to be crucial to the successful implementation of a given policy initiative. In the Sudan, recognition of this problem led to a concerted effort to provide on-the-job training in forestry for women

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<sup>15</sup>G. Leach and Robin Mearns, Beyond the Woodfuel Crisis: People, Land & Trees in Africa, Earthscan, London, 1988.

extension agents, in order to address the previous dominance of men in extension.<sup>16</sup> These and similar activities provide examples of concrete ways in which promoting women's participation in policy intervention can facilitate the sustainability of a project.

### **Organizational Issues**

Successful policy implementation can also be hindered by the lack of awareness of how power is distributed between organizations within society. In rural areas, the preeminence of traditional power structures may require sensitivity to the authority of a traditional government. Obviously, inability to convince local authorities of the merits of policy intervention will create a significant obstacle to policy success.

Conversely, within such a framework, cooperation with local organizations may offer a key to sustainable policy implementation. In addition, many societies have traditional self-help organizations which can be used as vehicles for facilitating policy initiatives. The naam self-help groups in Burkina Faso, the dokpwe work groups in West Africa and the panchayat village management structure in India are examples of traditional groups which can act either as useful vehicles or impediments to policy intervention. Allowing these organizations to be part of the policy process often is essential to policy success.

Farmer-led and other in-country initiatives may often prove unworkable without financial and technical support from outside. Yet, these initiatives have the dual advantages that they reflect detailed knowledge of the particular situation and that they may be able to galvanize more local participation than "outsider-led" initiatives. As a result, donor support for local organizations and initiatives could help to overcome some cultural and political obstacles to viable policy intervention. In fact, a common theme among many successful land management programs in Africa has been cooperation between local organizations and development agents.

Especially in the training process, national or local organizations can provide a basic structure which needs only to be expanded and strengthened in order to facilitate transfer of technical skills. For example, in Kenya the NGO consortium KENGO has been involved in training government agricultural extension workers in agroforestry techniques. This initiative has resulted in a wider pool of available extension workers, a resource which could complement donor efforts in agroforestry.<sup>17</sup>

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<sup>16</sup> P. Williams, Taking Chances, Newsletter, Institute of Current World Affairs, Hanover, NH, 1987.

<sup>17</sup> G. Leach and R. Mearns, Beyond the Fuelwood Crisis: People, Land and Trees in Africa, Earthscan, London, 1988.

## **Institutional Failure**

Governments often are better at enunciating or promulgating policies than at implementing them. Policies such as removal of price controls may be relatively self-implementing. But many others, such as imposition of a regulatory standards program, initiation and effective management of forest concessions in a way which provides adequate conservation and reforestation incentives, or institution of arrangements to manage fishery access, may fail due to inadequacies of implementing institutions. A host of elements diminish the ability of a government to successfully implement policy, including lack of motivated and trained staff, lack of funds for vehicles and other operating expenses, or prospects to engage in corrupt ("rent-seeking") behavior. At the most basic level, recognition of the profound effect of government on the success or failure of environment and natural resource policies is vital. Through involvement in institutional strengthening and upgrading AID can help to encourage government reform in ways which complement environment and natural resource initiatives.

In some cases, government incentives undercut the objective of sustainable resource management, making it difficult for fundamental change to occur. For example, many governments offer financial incentives for forestry agents, wildlife managers, and in some cases even paramilitary groups, to act as "resource cops" in order to prevent the depletion of a given resource.<sup>18</sup> However, such incentives do little to restructure resource use to provide for sustainable long term management of the resource. EPAT can play an important role by strengthening policy research and development institutions to consider as an integral part of their work the complex factors which bear on the feasibility of policy implementation. EPAT sponsored research can also help to identify and address areas in which government policies themselves act as impediments to policies designed to promote economic and environmental sustainability.

## **Relationship to Project Components**

If EPAT is to help Missions achieve concrete results, rather than simply provide information and improved analytical methods, analysis of policy options must address these obstacles to policy change. Specific project components attempt to address these issues.

- o The in-country research component of EPAT is a major tool which can be used in the identification of the obstacles referred to in this section. Research undertaken with regional institutions, for example, will certainly help to identify cultural, political and other issues which might affect policy implementation, and which, in turn, should be taken into account in designing policy interventions and choosing between policy options.

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<sup>18</sup> G. Leach and R. Mearns, Beyond the Woodfuel Crisis: People, Land and Trees in Africa, Earthscan, London, 1988.

- o EPAT training initiatives will enable attention to be given to cultural and political issues such as gender and interest groups that might otherwise impede the policy process. Core courses can be designed to give key decision makers a broad base in environmental and natural resource policy issues, while also providing a forum for information exchange, inter alia on factors affecting policy implementation.
- o EPAT's focus on institutional strengthening and upgrading is a mechanism through which many obstacles associated with government can be addressed. Assistance with strategic planning and management restructuring will help to alleviate some of the human resource problems in government. In some cases, institutional inadequacies could be addressed with temporary assignment of policy or regulatory staff members from the EPA or other organizations to assist government agencies. Technical training in economic analysis would further complement the institutional strengthening.
- o Strengthened frameworks for integrating women and other disadvantaged groups into policy dialogue, for example, could be promoted through collaborative efforts with NGOs. EPAT's institutional mission should include promoting democratization of the policy decision process itself, so that the interests of all groups affected by policy change are taken into account.

**ANNEX B.5: ADMINISTRATIVE ANALYSIS**

**Robert Otto  
Samuel Hale, Jr.**

*V*

# 1. INTRODUCTION

## **Purpose of Analysis**

The purpose of this analysis is to consider what kind of administrative arrangements are needed to make EPAT workable and successful.

## **Organizations to Consider**

The following organizations will play a direct role in project administration and management:

- o S&T/FENR - the organization responsible for overall administration, management and direction of EPAT;
- o The EPAT Project Committee - an internal AID committee which will review project planning and implementation and provide a forum for discussion of economic/ENR issues;
- o The Project Management Team - made up of the Chiefs of Party of the project's implementing units is responsible for coordinating the activities of the operational units of the project in areas of research, technical support, institutional strengthening, training and dissemination.
- o The Technical Advisory Group - a select panel of outside experts responsible for advising A.I.D. on EPAT's research and training activities.

The project will have two implementing units:

- o The Core Research and Training Cooperators (s) - the organization(s) responsible for the planning, execution and dissemination of state-of-the-art environmental and natural resources research, policy analysis tools and research synthesis reports and for planning, developing, and presenting of core training courses in the U.S. and at selected field locations; and
- o The Technical Support Contractor - the organization responsible for carrying out specified technical assistance (both short- and long-term) to A.I.D. Missions and cooperating countries in policy research, policy development, policy dialogue and associated institutional strengthening

and training.

In addition to the above organizations, project resources may be used to mobilize other U.S. and LDC institutions engaged in policy research and training. Such institutions will be engaged either by means of sub-agreements under the core research and training cooperative agreement(s) or under separate agreements.

These implementing units are the object of the project's administrative process -- the units being administered -- and are consequently excluded from this analysis.

## **2. ORGANIZATIONAL ANALYSIS**

### **S&T/FENR**

**Responsibilities:** S&T/FENR is responsible for overall implementation and evaluation of EPAT, including assuring effective performance of all of the cooperating organizations, contractors and participating agencies. It is responsible for overall work planning, including the definition of the research agenda and training programs, approval and oversight of research activities and products and of technical support services, effectiveness and cost efficiency of use of project resources, and effective integration of the research, information and dissemination, technical assistance, institutional strengthening, and training elements of the project.

S&T/FENR will designate a Project Officer (PO) from among its staff to carry out the office's responsibilities for managing the project.

On a strategic level, the PO is responsible for achieving several key results. These include 1) assuring that the research program is (and remains) focused on the economic policy dimension of major ENR issues and 2) integrating the research program with EPAT's technical support, institutional strengthening and training activities. Given the type and complexity of activities planned, project management will be a special challenge for the PO and his/her staff.

Specific responsibilities of the PO include, but are not limited to, the following:

- o Serving as the Director of the Project Management Team (PMT) and Vice Chairman of the EPAT Project Committee (See discussion of the PMT and the Project Committee below);
- o Overseeing technical aspects of cooperative agreement and contract solicitation and selection;

- o Reviewing and approving the project's core research, dissemination and training programs;
- o Overseeing contractor/cooperator collaborative work planning, and reviewing and approving the EPAT annual work plan and any revisions in project component activities;
- o Receiving and reviewing all requests from the field and AID/W for EPAT services and obtaining field mission clearance for travel of all project personnel;
- o Overseeing the technical review of all project outputs, except interim research reports, before they are distributed within and outside A.I.D.;
- o Reviewing and approving any proposed changes in core project personnel;
- o Reviewing and approving the selection of consultants proposed by the cooperator(s) and contractor;
- o Obtaining mission or appropriate AID/W office evaluations of all buy-in funded activities under the project; and
- o Scheduling and coordinating Project Committee and Technical Advisory Group activities, internal management reviews, and external project evaluations.

The Project Officer will be assisted in the performance of these functions by staff to be recruited under RSSAs, IPAs, AID hiring mechanisms or, in the case of some support personnel, contracts.

Recommendations: S&T/FENR should appoint a full-time, long term PO to launch and manage the project. He/she should be supported by a core management and administrative unit of up to three professional and three administrative support personnel. These positions can be filled by a combination of AID direct hire, RSSA, and contractor staff.

It is important that the PO be retained for an extended tour to assure continuity during the planning and startup phases of the project. A minimum of a three- and preferably a five-year tour as PO is appropriate given the planned staging of the project's activities.

It is highly desirable that the PO be familiar with the technical aspects of environmental economic policy analysis, policy formulation and policy implementation, as well as the research management process. Experience in managing projects which deliver

short- and long-term technical assistance is also highly desirable.

### **The Project Management Team (PMT)**

**Responsibilities:** The PMT will act as the management committee for EPAT. Members of the PMT include the Chiefs of Party for the cooperating organization(s) implementing the core research and training program and the technical support contractor. The PO will serve as the Director of the PMT and define its agenda and working arrangements.

The PMT will meet on a regularly scheduled basis (as often as weekly in the initial stages of the project) to execute the work plan for the project. Members will confer by phone at least biweekly throughout the project. Each member of the PMT will report on the activities of his/her group during the past period and plans for next steps. Collaborative actions that the PO may require can be defined and put into action through this team management approach. To a large degree, the PMT is the glue that holds the separate elements of the project together. It is the venue for identifying project-wide problems, defining their solution and setting in motion plans of action. Equally important it provides a mechanism for assuring that the insights gleaned from the research program are fully incorporated into the technical support elements of the project (and vice versa).

**Recommendations:** Ideally, the Chiefs of Party for the technical support contractor and the research and training cooperators(s) should be in the Washington area to facilitate the close working relationship needed to make the PMT an effective management unit. However, this may not be feasible for the latter. Therefore, the project should provide substantial budget support for regular management team member travel to Washington and for telecommunications costs.

It will be the PO's responsibility to assure that PMT meetings are productive. Special care should be given to building effective working relationships between the operating units. To facilitate this cooperation, team building exercises should be built into the schedule for project implementation. The first session should be held soon after project start-up.

### **The Project Committee**

The Project Committee provides a forum for interested S&T offices and other AID/W bureaus to review and comment on:

- o EPAT research and training development plans;
- o The efficacy of EPAT's dissemination and other activities to influence host

country and international policies which impinge on environmental quality;

- o The effectiveness of EPAT efforts to collaborate with and draw on the expertise of other A.I.D. projects.

Additionally, the Committee will serve as a forum for interested AID offices to discuss economic and environmental policy issues of mutual concern.

The Director of S&T/FENR will serve as Chairman of the Committee, and the EPAT Project Officer will be Vice Chairman. PPC, each of the regional bureaus, and concerned S&T offices will be represented by individuals with expertise in environmental economics and/or environmental and natural resources planning and management. Additionally, the Office of Financial Management, the Office of Procurement and the Training Division of the Office of Personnel Management will each be invited to nominate a member.

While the Committee will be distinct from the policy sub-committee of A.I.D.'s Environmental Working Group, it is expected that many of the members of the latter will also be on the Committee.

The Committee will be convened as determined by the Chairman, but no less frequently than semi-annually (and more often in the initial stages of the project). Generally, it seems advisable to schedule meetings subsequent to meetings of the TAG so that members can have the benefit of that group's views. However, since the judgment of Committee members will be useful in preparing PIO/Ts and RFPs for competitive procurement, whereas the TAG will not be formed until after cooperative agreements and contracts have been awarded, one or more Committee meetings will be held soon after project authorization.

**Recommendation:** As soon as possible, FENR should form a Project Committee composed of knowledgeable individuals from PPC, the regional bureaus, the Offices of Procurement and Financial Management and the Training Division of the Office of Personnel Management to advise the Project Officer and his/her staff on the conduct of EPAT.

### **The Technical Advisory Group (TAG)**

**Responsibilities:** The purpose of the TAG is to advise EPAT project managers on the design, phasing and conduct of core environmental and natural resources policy research and training. Members of the panel will be selected for their demonstrated capabilities in policy research or training, their familiarity with current thinking in the field and their commitment to advancing the state of knowledge. The TAG will provide its advice to FENR and the PMT.

The TAG will meet at least twice a year to review research and training plans and

201

to advise project managers on appropriate courses of action. Its members will review policy research findings and reports and recommend methods and channels for dissemination of results. They will also review and advise FENR and the PMT on issues concerning policy training as it is addressed under the project. They will not be responsible for providing advice on the conduct of technical support operations except as they may relate to the research agenda. Fundamentally, the TAG will focus on the design of, the planning for and the execution of the research and training agendas.

**Recommendations:** The TAG 's role in EPAT is purely as an advisory panel to assist project managers to select and implement key next steps in the policy research and training process. It is recommended that the TAG 's brief be limited to the conduct of research and policy training. Nevertheless, to facilitate its review of core research and training, the TAG must be apprised of relevant activities under the technical support components of the project.

Bringing together TAG members from around the country and from overseas, will require support, including processing of travel orders, payment of honoraria, making arrangements for lodging, preparation of briefing and meeting materials, reports and the like. These and similar tasks will be undertaken by the PO and his/her staff.

### **Other AID Offices**

While not strictly a part of this analysis, the contributions of other AID offices will be vital to the smooth operation and successful implementation of the project. Most notable among these will be the contributions of the Office of Procurement and the Office of Financial Management.

- o AID 's Office of Procurement will have responsibility for overseeing competitive procurement actions for selection of a technical support contractor, and negotiation of a contract and sub-contracts. It will also be responsible for preparing one or (more likely) more cooperative agreements and sub-agreements, and one or more inter-agency support agreements.

With the amount of contracting activity likely to occur at the time of project start-up, plus amendments to agreements and other routine approvals, it will be important that AID/Procurement dedicate sufficient personnel resources to perform its key project implementation functions. The PO should focus on conveying a clear understanding of the project 's objectives and how they might be achieved to the designated Contracts Officer. To facilitate this transfer, it would be advisable for the Contracts Officer to be made a member of the Project Committee.

- o A sine qua non for successful implementation of a multi-faceted, long term project such as EPAT is an accounting system which will adequately track expenditures. Because we anticipate both numerous buy-ins to EPAT contracts and cooperative agreements, and EPAT buy-ins to other projects, a fairly complex system of accounts will be needed. The PO should meet with AID's Office of Financial Management (FM) at the start of the project to make sure that adequate preparations are made within FM for project accounting. This consultative process should be maintained throughout the life of the project.

Project effectiveness will be greatly enhanced, and the tasks of the Offices of Procurement and Financial Management made easier, if the PO and his/her staff can efficiently and rapidly process:

- o Mission and regional bureau buy-in requests (which, as indicated, are expected to be numerous);
- o Approvals of staffing (including staffing of all short- and long-term technical support teams), and training activities, and other inputs for which PO (and in some cases Contracting Officer) approval is required;
- o S&T/FENR actions required for sub-contracts, sub-agreements and amendments to the technical support contract and cooperative agreement(s) and RSSAs.

### **3. IMPLEMENTATION ARRANGEMENTS**

A key management issue facing the PO and his/her staff from the outset will be the integration of the policy research, training, and technical support activities (in their various forms). Two basic implementation options were carefully considered during project design to achieve this end.

The first option is competitive award of a single contract to carry out all activities under the project, including state-of-the-art and applied country research, information and dissemination, support for Mission policy dialogue, institutional strengthening, and training. Under this option, the prime contractor would manage one or more subcontractors, presumably including both university or other research institutions and private technical assistance providers.

The second option is to have (a) one or more cooperative agreements to undertake core research and directly related applied in-country research and training activities and (b) a separate contract to provide responsive technical assistance, applied in-country research

which is less closely tied to the core research agenda and associated training. This option would require mechanisms for achieving needed coordination between the cooperator(s) and the contractor.

We gave consideration to the first option because, at first blush, it appeared simpler and less demanding on AID's scarce managerial staff. However, on further reflection we concluded that there is no way to determine a priori which option imposes the heavier burden on AID. By separating implementation of the core research, dissemination and associated training from Mission and regional bureau driven technical services, option 2 imposes on AID the task of developing and implementing a process for assuring close coordination and collaboration among the various implementing parties. While this is doubtless a major undertaking, we doubt that option 1 -- a single umbrella contract to implement all project components -- would lighten the burden. To carry out all phases of the project, the umbrella contract would have to include a substantial number of institutions of different kinds. Assuring the coordination and collaboration needed for project success without a heavy AID management input would require a very strong lead management institution which is prepared to put aside its own institutional interests in one or more components of the project, and to manage it strictly on AID's behalf. We do not think this is realistic. If the lead institution is a private firm, it is likely that competition for resources between institutions within the umbrella contract would generally be resolved in favor of technical support for Missions. Conversely, if a university or research institution were to be chosen for the lead role, there is substantial danger that resources would gravitate to core research at the expense of responsive support for Missions and regional bureaus. Perhaps AID could intervene in these intra-contractual dynamics to assure a "level playing field," but it would be very difficult and time consuming. The upshot is that under either option the responsibility for assuring that all project elements are carried out well, and that implementing institutions collaborate in ways necessary to achieve overall project purposes must rest with AID management.

Based on the design team's recommendations and our own assessment of what is required for project success, we have chosen the second option -- one or more cooperative agreements for core research and related activities and a separate contract for technical assistance and associated activities primarily in support of Missions and host countries. The primary reasons for selecting this option are that:

- o It will better insulate core research from the demands of responsive technical assistance, while at the same time ensuring that resources are available to support Missions (a strong criticism of projects combining research and technical assistance under a single contract is that one or the other suffers);
- o Research planning and management really should be flexible and collaborative rather than fixed, as is required in a contract scope of work, particularly in a field as young as and evolving as rapidly as the

**environmental economics field;**

- o The collaborative agreement mechanism best allows for both cost sharing by U.S. institutions and support of collaborating LDC institutions once they are selected; and**
- o In a field as rapidly evolving as this one, AID should maintain a greater role in program direction and management than it would have with a single contractor as project manager.**

**ANNEX C: PEER REVIEW PLAN**

**Russell Misheloff**

## Annex C: Peer Review Plan

Title: Environmental and Natural Resources Policy and Training Project

Project Number: 936 - 5555

Technical Office: S&T/FENR

Date Initial Obl.: FY 1991

Date PACD: FY 2000

**Project Purpose:** To advance recognition by LDC policy makers of the linkages between economic policy, sustainable ENR use and development, and to assure that they have available to them requisite analyses to develop appropriate policy options, and the technical resources to perform such analyses.

### I. Research Program or Topic

Under EPAT auspices, researchers, both in the United States and developing countries, will analyze, and develop and refine methodologies for analysis of, the relationship between economic policy and ENR degradation/depletion. The objective is to devise well-concieved policy options to arrest, or at least slow, such degradation/depletion in the interest of sustainable development.

Initially, emphasis will be placed on synthesis and dissemination of research carried out, and research methodologies developed, under other auspices with a view of making useful work accessible to AID practitioners and those individuals and institutions in LDCs charged with devising policy responses to ENR problems. At the same time, EPAT will initiate a program to respond to the needs of AID Missions and geographic bureaus for assistance in analyzing the economic policy dimension of ENR problems in countries or regions of particular concern.

EPAT will also attempt to extend the frontier of policy relevant knowledge and understanding about the nature of economic policy/ENR relationships by means of a state-of-the-art research program. For a fuller description of that program the reader is referred to the Technical Annex (Annex B.1). It should be noted that the broad research agenda described in that annex is a draft. It was devised with considerable input from AID and outside experts for the dual purposes of giving the research component of the project a sense of direction and providing prospective bidders with sufficient information about AID's interests to respond constructively to an RFP. The agenda will be furthered considered by an internal AID Project Committee (see Annex B.5, the Administrative Annex, for a fuller description of Committee composition and functions), by an external Technical Advisory Group (see below and Annex B.5), and by the institution or (more likely) institutions with which AID signs a cooperative agreement for implementation of the core research

component of the project following technical review of proposals submitted in response to an RFP. Furthermore, it is likely that, during the 10 year life of the project, one or more research modules will be added to those enumerated and discussed in the Technical Annex (and one or more modified, deemphasized or deleted). Decisions to modify the agenda will be made by S&T/FENR, which will take into account the views of the aforementioned groups, and their members. If the agenda is modified in ways which suggest that the expertise of institutions other than those awarded the initial cooperative agreement could usefully be involved in a portion of the research, sub-agreements will be signed under the cooperative agreements and/or one or more additional cooperative agreements, grants or RSSAs will be negotiated.

EPAT is an attempt to respond to a growing appreciation of the close relationship between economic policy and environmental degradation in developing countries world wide, and the consequent needs for systematic analysis to elucidate the nature of that relationship and to develop appropriate remedial policies which are implementable in the context of the institutional, political, social, cultural, and microeconomic constraints of particular countries. As such, the research elements of the project are critical to achievement of its purpose.

## II. Peer Review Mechanisms Used to Approve Research Awards

The bulk of the core research program will be implemented by the institutions which are awarded one or more cooperative agreements in a competitive process. Technical review of proposals submitted in response to an RFP will be done by AID itself -- FENR, in collaboration with economists and ENR management specialists in other S&T offices, PPC and the regional bureaus.

We believe that sufficient expertise resides within AID for this purpose. The decision to review proposals submitted in response to an RFP in-house reflects this belief. It also is a pragmatic response to a difficult competitive situation. Analysis of the relationship between economic policy and ENR degradation/depletion in developing countries is a relatively new, emerging field. There are a limited number of individuals and institutions well-versed in this area. Virtually all of them responded to our solicitation of expressions of interest in participating in EPAT. It would be in no one's interest to disqualify institutions from such participation, or to handicap them in the competitive procurement process by disqualifying prominent members of their staffs.

Following competitive award of one or more cooperative agreements for the core research component of the project, the Director of S&T/FENR will appoint an external (to AID and to the project's implementing institutions) Technical Advisory Group (TAG) to serve project managers in an advisory capacity. The (related) decisions to establish a TAG and to select its members internally were made because it was felt that EPAT project managers should have available on a continuing basis the advice of a group of outside experts who understand the purposes of the project, its history, development and the environment in which it functions, and who have agreed to devote substantial time to their

project responsibilities. It should be noted that the functions of the TAG encompass, but are not limited to, peer review.

If during the course of project implementation it becomes clear to FENR project managers that a substantial modification of the research program is indicated -- perhaps on the advice of the TAG -- and that to carry out new research elements one or more institutions not previously involved in the project should be accessed, the TAG may be asked to review proposals submitted to AID at its invitation, and to advise project managers on the quality of such proposals. However, in all instances, the final decision about award of sub-agreements under an existing cooperative agreement, or new cooperative agreements, contracts, grants or RSSAs will be made by AID. In such cases, care will have to be taken to assure that the advice given by TAG members represents their best professional judgment, and is not colored by other considerations. Where AID receives proposals from institutions with which one or more TAG members are associated, those members will be expected to recuse themselves from TAG consideration of the merits of the proposals. In some instances, AID may create a separate peer review mechanism to assure that it receives objective advice.

### III. Ongoing Small Grant or Subcontract/Subgrant Research

EPAT will not have a small grants component. However, it is anticipated that each cooperative agreement awarded to carry out the project's core research component will indicate a minimum percentage of funding to be used to support research carried out by institutions other than those named in the relevant agreement. The purpose of this arrangement is to assure the widest possible participation in project implementation, i.e. wider than the institutions awarded cooperative agreements as part of a competitive process, consistent with simultaneous achievement of the objective of strengthening U.S. institutions (which objective was one of the main reasons we decided to use cooperative agreements to implement the core research component of the project).

Generally, decisions about which elements of the research agenda should and should not be carried out by the institutions which are part of the cooperative agreement(s) awarded under EPAT will be made by the Project Officer, with advisory input from the TAG and the Project Committee. By the same process, decisions will be made about which institutions to invite to submit proposals for specific pieces of research to be implemented outside the cooperative agreement(s). Once received, peer review of such proposals will be the responsibility of the TAG.

As in the case cited in the preceding section, it may be necessary for individual TAG members to recuse themselves in instances in which the institutions with which they are affiliated are under consideration for an award. While we do not expect this to be a serious problem (since many TAG members will be affiliated with institutions, e.g. the World Bank and/or other multilateral institutions, other governments, private companies not primarily involved in research), from time to time, separate, ad hoc, peer review processes may be

employed in lieu of the TAG, or to review TAG recommendations with which FENR is uncomfortable by reason of a possible conflict of interest.

#### IV. Ongoing Peer Review Mechanisms

Peer review of research to be carried out under the auspices of EPAT is necessary and appropriate for a number of reasons:

- o Research is a major element of the project in terms of funding, and is central to achievement of the project's goal and purpose;
- o The subject matter of the research -- the interface between economic policy and sustainable ENR use in developing countries -- is a relatively new area, one in which AID is not fully conversant;
- o The relatively limited number of institutions and individuals who are well regarded in this area hold strong, often differing views, making it difficult for AID to reach informed, sound conclusions.

Following award of the cooperative agreement(s) and a requirements contract, S&T/FENR will form a Technical Advisory Group (TAG) composed of 6-10 experts in economic and environmental policy and in ENR training. These experts may be affiliated with academic or research institutions, private voluntary organizations (PVOs), private for-profit companies, other donors or other organizations. However, in their capacity as TAG members, they will not represent any particular institution, class of institution or geographic area. The TAG will be convened by S&T/FENR at least semiannually. It will review and comment on:

- o Overall project priorities and work planning;
- o The core research agenda and training plans;
- o EPAT annual workplans and cooperator/contractor progress reports;
- o Research proposals submitted by the cooperative agreement institutions;
- o Core research in process;
- o Policy research findings and reports;
- o Research and research methodology dissemination plans;
- o Project evaluations, including summaries of evaluations of buy-in activities;

and

- o Possible changes in direction or priorities of EPAT in light of trends in host countries, and international needs and policies.

The TAG will not be a statutory government board. TAG members will be chosen by the Director of S&T/FENR, based on their individual qualifications. At the same time, FENR understands the need for institutional balance and plans to give favorable consideration to participation of LDC experts in considering individual nominations.

The Project Officer will be responsible for convening meetings of the TAG, and for setting the agenda for its meetings. The Director of S&T/FENR, the Project Officer and his/her staff may observe TAG meetings, but will not be members of that body.

Funds allotted to EPAT may be used to cover reasonable expenses of TAG members in conjunction with their attendance at TAG meetings (e.g. travel and per diem). No compensation will be paid, but where necessary to secure the participation of highly regarded experts, AID may offer honoraria.