

U.S. Agency for International Development

**Environment Program Report:
Africa**

FY 1992-93

Review Draft

December 1993

ENRIC
Environment and Natural Resources Information Center

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Table of Contents

1.0 Africa Bureau Environment Strategy and Regional Programs	1
1.1 USAID’s Environment Strategy for Africa	2
1.2 Funding Levels	2
1.3 Regional Projects	5
2.0 Tropical Forest and Biodiversity Conservation	14
3.0 Efficient and Renewable Energy Production and Use	20
4.0 Environmentally Sustainable Agriculture	21
5.0 Water Resources and Coastal Zone Management	28
Notes	34
Appendix A Environment Program Project List	36

1.0 Africa Bureau Environment Strategy and Regional Programs

Africa faces a troubled future—environmental indicators for agriculture, forestry, and wildlife are declining. Per capita food production has declined 5 percent over the last decade.¹ Each year, an area more than half the size of South Carolina is deforested;² soils on more than one-fifth of Africa's arable land are now degraded.³ In recent years, wildlife populations have declined precipitously.

Economic and demographic indicators are equally ominous. Sub-Saharan Africa's 1990 per capita gross national product of \$340 ranks among the world's lowest, second only to that of South Asia.⁴ Compounding the problem, the region continues to have the world's highest population growth rate—averaging more than 3 percent a year;⁵ despite massive development efforts, the number of poor Africans continues to grow. In addition, perhaps more than on any other continent, Africa's rural poor depend on natural resources for their livelihood. As a result, declining agricultural productivity, deforestation, and the loss of biodiversity have become Africa's most pressing environmental problems.

Declining agricultural productivity. In sub-Saharan Africa, population growth has canceled meager increases in cereal production over the past decade, reaped largely because of expansion onto forested and marginal crop land. Crop yields per hectare are low, in part as a result of restricted and highly variable growing seasons in arid and semiarid regions, where some 70 percent of Africa's agricultural land is located.⁶ Other factors affecting agricultural productivity include soil degradation,⁷ declining global prices for agricultural commodities, policy failures, ineffective extension services, and general economic instability. African farmers, because they use less fertilizer and have fewer irrigated hectares, are also more vulnerable to climatic and environmental factors, such as drought and declining soil fertility, than are farmers in Latin America and Asia.

Deforestation. Each year, Africa loses over 15,800 square miles of forest.⁸ Apart from unsustainable agricultural practices, main contributors to deforestation are commercial logging and fuelwood collection. Fuelwood provides 65 percent of all energy used in sub-Saharan Africa.⁹ Although primary forests are rarely clear-cut for fuelwood, fuelwood

collection still removes woody vegetation at a rate faster than it can be regenerated.

Loss of biodiversity. In the past two decades, well-publicized campaigns to save endangered species such as cheetahs, leopards, and elephants have focused international attention on the poaching of Africa's unique wildlife; however, agricultural encroachment and habitat destruction pose far more serious threats to African biodiversity. Furthermore, wildlife hunting has dietary implications: wildlife is an important source of protein for many Africans. Thus, although approaches to safeguarding biodiversity must address poaching, they also have to deal with larger issues.

Despite efforts by African governments to establish reserves and protected areas, many wildlife populations continue to decline, often because of agricultural encroachment on land in or near reserves. African leaders have begun to reform park management to include buffer zone policies and involve the public in establishing, managing, and protecting parks. USAID is promoting such approaches in Cameroon's Korup National Park, Uganda's Kibale Forest, and Tanzania's Ngorongoro Conservation Area.

1.1 USAID's Environment Strategy for Africa

The Africa Bureau's 1992 *Environment Strategy for Africa*¹⁰ targets the special and urgent needs of the region: widespread poverty, extensive environmental degradation, drought, loss of biodiversity, and inadequate food production. The strategy focuses on two of the five problem areas identified by USAID's general environment strategy: unsustainable agricultural practices and loss of tropical forests and other critical habitats for biodiversity. The Bureau's technical priorities are to prevent vegetation loss and degradation, soil erosion, soil fertility decline, and declines in biodiversity and to promote integrated pest management.

1.2 Funding Levels

The distribution of environment and natural resource obligations (see table) in the Africa Bureau's regional and field level projects clearly reflects the regional priorities of sustainable agriculture and tropical forest and biodiversity conservation. Over the FY 1991-93 period

sustainable agriculture obligations averaged \$33 million, and tropical forest and biodiversity conservation obligations averaged \$40 million.

Unlike the other regional bureaus the Africa Bureau employs a special interest code, the Natural Resources Management (NRM) code, to track obligations from the Development Fund for Africa (DFA) that support sustainable natural resource management. The NRM code covers natural resource-related activities in all projects. The code also serves to cover the Bureau's contribution to the Agency's general environment strategy. In FY 1993 NRM-

**USAID Environment Strategy Obligations by Focus Area,^a
Bureau for Africa, FY 1991-93**

Focus Area	Obligations (\$ millions) ^b		
	1991 Actual	1992 Estimated	1993 Estimated
Forest and Biodiversity Conservation	30.8	54.4	33.8
Efficient and Renewable Energy Production and Use	0.2	0.2	1.7
Environmentally Sustainable Agriculture	28.8	47.0	23.1
Water Resources Management	5.8	2.4	2.3
Urban and Industrial Pollution Prevention and Control	0.0	0.4	0.5
Environmental Planning and Policy	24.0	44.4	44.0

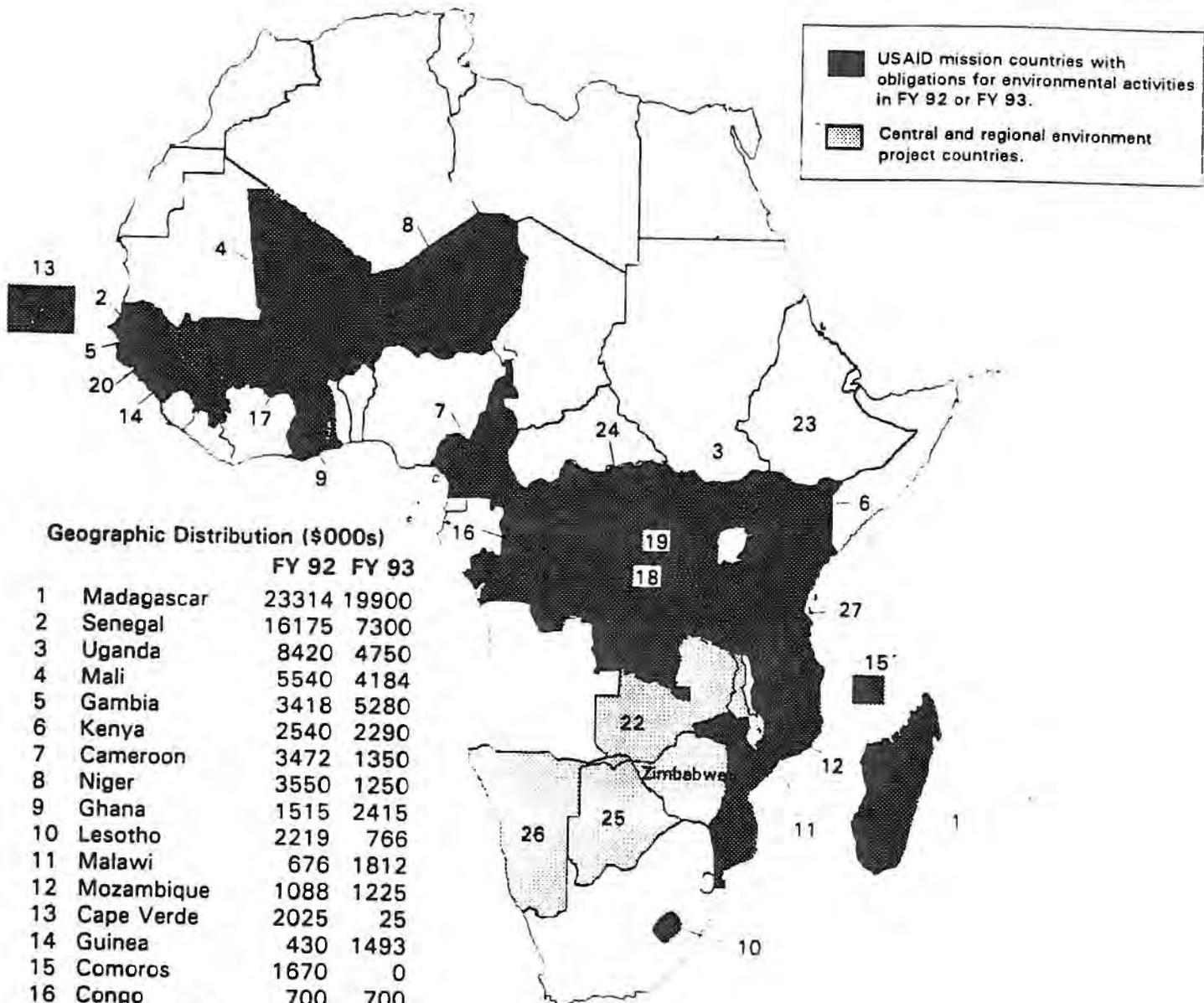
^a Appendix A describes methods used to compute focus area figures.

^b FY 1991 figures are from the 1993 CP; FY 1992 figures are from the 1993 OYB; FY 1993 figures are from the 1995 ABS. Due to rounding, figures may vary +/- \$0.1 million.

coded obligations in the Africa Bureau totaled \$95 million. This total included \$10 million of Africa Bureau funds transferred to the Research and Development Bureau's technical support projects to pay for technical assistance for the Africa Bureau.

Support for improved soil and water resources management in agriculture is an important emphasis in the region. The NRM code has been used to identify obligations

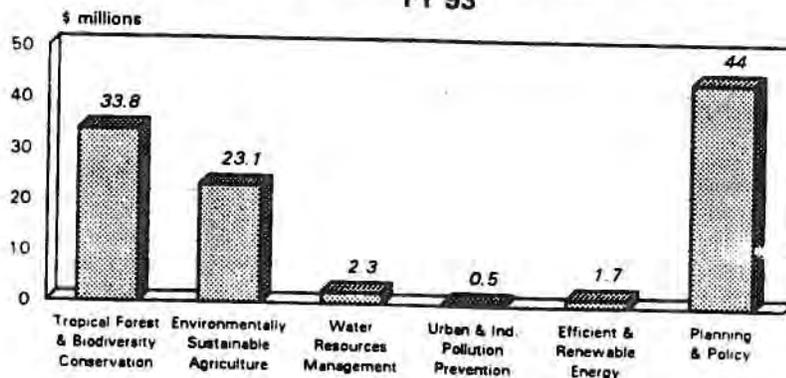
Bureau for Africa, FY 1992/1993 Environment Program Obligations



Geographic Distribution (\$000s)

	FY 92	FY 93
1 Madagascar	23314	19900
2 Senegal	16175	7300
3 Uganda	8420	4750
4 Mali	5540	4184
5 Gambia	3418	5280
6 Kenya	2540	2290
7 Cameroon	3472	1350
8 Niger	3550	1250
9 Ghana	1515	2415
10 Lesotho	2219	766
11 Malawi	676	1812
12 Mozambique	1088	1225
13 Cape Verde	2025	25
14 Guinea	430	1493
15 Comoros	1670	0
16 Congo	700	700
17 Burkina Faso	310	750
18 Burundi	600	420
19 Rwanda	0	675
20 Guinea-Bissau	165	484
21 Eritrea	0	565
22 Zambia	0	385
23 Ethiopia	0	300
24 Zaire	220	0
25 Botswana	75	62
26 Namibia	79	0
27 Tanzania	0	28
--- Regional	---	---
SADCC	13360	6000
Africa	9809	8734
Redso-West	0	1125
Total	101374	74271

**Distribution by Environment Strategy Focus Area
FY 93**



Note: Actual total. Overlapping obligations have been eliminated.

Note: Some obligations overlap between focus areas.

dedicated to such activities, which contribute to the sustainability of agriculture. Projects with NRM codes attached to agriculture activities totaled over \$9 million in FY 1993. In addition, water conservation—often in support of sustainable agriculture—plays a significant role in the Bureau's activities.

Figure 2.1 shows the distribution of Africa Bureau obligations supporting the environment strategy in FY 1992 and FY 1993. Six countries account for 59 percent of the Bureau's environment obligations. Madagascar alone accounted for 27 percent of the total in FY 1993.

1.3 Regional Projects

To help missions throughout Africa implement the Bureau's objectives for the environment, natural resources, and sustainable development, the Africa Bureau has provided technical support through the *Natural Resources Management Support* (NRMS) project and its successor, the *Policy Analysis, Research, and Technical Support* (PARTS) project. The NRMS project sparked rapid development of natural resource management projects throughout the region. The PARTS project continues to support those programs through an agenda of research on key design and implementation issues. In large part because of NRMS, USAID funding for natural resource management projects in Africa doubled—from \$44 million in FY 1988 to \$95 million in FY 1993—making USAID the major donor for this sector in many countries.

Natural Resources Management Support (NRMS). This six-year (FY 1987-92), \$22 million project concluded most of its activities in FY 1992. Major accomplishments over the life of the project have included:

- increased USAID and African capability in natural resource analysis and program implementation,

- greater institutional capacity of nearly 300 African nongovernmental organizations (NGOs) to develop and implement natural resource projects and programs,
- increased understanding of the role and importance of biodiversity and its relation to rural development through support of a series of biodiversity intervention studies,
- developing bilateral natural resource management projects and programs within the context of USAID mission development programs,
- special studies, analyses, and workshops for missions and NGOs, and
- key analytical work to assess natural resource management program impacts as required under the Development Fund for Africa (DFA).

The private voluntary organization (PVO) and NGO component of NRMS has enhanced the technical and organizational capacities of PVOs and NGOs working in natural resource management. The project's cooperative agreement with three PVOs—World Learning Center, CARE, and World Wildlife Fund (WWF)—supported new approaches to improve soil fertility and vegetative cover, integration of sustainable development activities and conservation in buffer zones around national parks, and improvements in local NGO technical and managerial skills. Officials of more than 300 PVOs and NGOs in the four focus countries participated in project-sponsored national coordination committees, technical symposiums, and workshops that trained hundreds of mid-level African NGO community-resource managers in environment and natural resource management skills.

During FY 1992–93, several major activities were undertaken via the PVO-NGO NRMS.

- In March 1993 the project published a multicountry assessment, based on fieldwork done in 1992,¹¹ of African NGOs working in natural resource management. Using such indicators as NGO experience and needs, government policy and institutional support, and government and donor trends, the analysis ranked countries according to their potential for future PVO-NGO/NRMS-style activities that could be undertaken by USAID or other donors. Twelve of the 18 countries offered strong

opportunities for NGO work in natural resource management.

- A workshop, the "Training Seminar on Environmental Information," was funded by USAID and organized by the Paris-based office of the international NGO, the Panos Institute, in June 1992, bringing together representatives of the media and the NGO community. Its purpose was to improve the media's knowledge and analyses of natural resource management issues and NGO approaches to addressing them. Participants included newspaper, radio, video, and theater representatives who visited NGO project sites. Articles, radio shows, a play, and a video were produced, presented, and discussed during the course of the workshop; a summary publication is in progress.
- In preparation for the Global Forum NGO meeting that occurred simultaneously with the Earth Summit in Rio de Janeiro in June 1992, the four PVO-NGO/NRMS country coordinators jointly reviewed and analyzed their work in the four focal countries and disseminated lessons learned to USAID and NGOs in Washington. In Rio de Janeiro, each country coordinator presented the activities of NGOs in natural resource management. The coordinators received feedback on methodology and program implementation and information on other NGO approaches to natural resource management around the world.
- Ways to improve livelihoods in Africa's pastoral sector and to help herders sustainably manage natural resources were assessed. A manual entitled *Non-Governmental Organizations and Natural Resource Management in Africa's Pastoral Sector: Where to Go from Here?*¹² synthesizes the findings of two background assessments and a workshop on African pastoralism.
- To help develop a strong network of conservation experts and leaders in southern Africa and share natural resource management methodologies, the project (through WWF) held a February 1993 workshop in Zimbabwe for 20 managers of community-based natural resource management programs in eight countries.

Other PVO-NGO/NRMS activities in FY 1992-93 included:

- two workshops on integrating women in natural resource management,
- workshops on agroforestry, project development, and proposal writing,

- technical assistance to help a Malian NGO design contour dikes,
- an analysis of NGO opportunities to integrate natural resource management more effectively into irrigation planning,
- monitoring an Africare program in Mali that rents chain-link fencing to communities to protect their gardens from sheep and goats while a living fence consisting of closely spaced thorny shrubs is planted and takes root (once the living fence is well established, the metal fence is rented to another community), and
- publication of *Designing Integrated Conservation and Development Projects*,¹³ which analyzes how conservation and development objectives can be integrated with the dual goals of improving natural resource management and improving quality of life—a joint effort with WWF's Wildlands and Human Needs Program and the Biodiversity Support Project.

Another component of the NRMS project funded small biodiversity grants to support activities, research studies, and pilot activities (mainly in parks) that have led to full-scale bilateral projects. For example, an activity in the Tsavo West National Park in Kenya addressed the problem of cattle grazing in the park. Masai communities were encouraged to cooperate in park conservation by grazing cattle only in adjacent areas. Steps were taken to develop options for the Masai to benefit directly from wildlife management through wildlife tourism initiatives (safaris and tented camp concessions) and nontourism initiatives (beekeeping and hay sales). In 1991, a \$450,000 follow-on project was approved to develop conservation and local development activities from a percentage of tourist gate receipts, which are being channeled to local communities.

Another notable NRMS achievement was creating a Natural Resources Management Framework to monitor the impact of USAID-funded activities. The framework has been put to use and refined under the PARTS project. It is quickly becoming an important tool for monitoring the Africa Bureau's environment and natural resource projects; seven missions have used it to design and/or monitor their projects. An ongoing Bureau study of institutional structure and reform is also using the framework to examine the requirements of

effective natural resource management agencies. Moreover, the framework is now being used by the USAID Center for Development Information and Evaluation in evaluating the entire Agency's environment and natural resource portfolio. (For more detail, see section 1.5.3).

Natural resource policy analysis. The follow-on project to NRMS, the seven-year, \$74 million *Policy Analysis, Research, and Technical Support* (PARTS) project, began in June 1992. PARTS is designed to support the Bureau's Development Fund for Africa (DFA) objectives of achieving sustainable increases in income and/or productivity through better management of natural resources, improving the management of African economies, strengthening competitive markets, and improving food security.¹⁴ PARTS aims to meet these DFA goals by developing more effective strategies, policies, and programs in key agricultural and natural resource areas. PARTS activities focus on research and analyses covering sectoral, cross-sectoral, and synthesis studies and impact evaluations.

PARTS activities are organized according to the Africa Bureau's analytical agenda, developed in response to the expressed needs of USAID missions, host-country governments, PVOs, and other development agencies for more information on, and technical analyses of, various aspects of resource management. The analytical agenda is a systematic approach to evaluating actions on—and constraints to—promoting sustainable natural resources. Guided by the Natural Resources Management Framework, the analytical agenda is divided into five analytical units: agricultural marketing and agribusiness, natural resource management, environmental protection, food security and productivity, and technology development and transfer. Theme areas under these analytical units are then based on field initiatives, interests, or the continuation or expansion of previous Bureau activities. In FY 1993 seven collaborating organizations carried out activities and studies related to the environment and natural resources themes identified in the FY 1992–93 analytical agenda. The table below shows a sample of these theme areas.

FY 1992–93 Analytical Agenda, Natural Resource Management Activities

Theme Areas	Sample Activities
1. Improving natural resource management through policy and institutional strengthening; improving socioeconomic conditions	<p>Field studies of innovations and practices in local governance and natural resource management that foster self-reliance</p> <p>Study of institutional policies and conditions leading to improved natural resource management</p> <p>Exploration of alternative financing for sustainable natural resource management activities</p> <p>Study design and implementation issues of National Environmental Action Plans (NEAPs)</p> <p>Analysis of land tenure issues and the role of decentralization in improving natural resource management</p>
2. Improving natural resource management practices and their impacts on the productivity of the natural resource base	<p>Study of changes in farmer attitudes and practices due to integrated conservation and development projects</p> <p>Analysis of USAID's effectiveness in strengthening PVOs and NGOs working in natural resource management</p> <p>Analysis of factors limiting private sector participation in development</p>
3. Analyzing environmental quality issues in sub-Saharan Africa	<p>Analysis of the impact of biodiversity conservation projects in Africa</p>

USAID has found that field efforts to improve natural resource management practices and technologies can fail if they are undertaken without appropriate policy, institutional, legal, and/or economic support (see box 1). As one Africa Bureau study noted, neglecting land tenure issues may doom a field effort: farmers often are reluctant to plant and tend trees if they do not hold clear title to the land or trees, as they doubt they will benefit from the trees.¹⁵ NRMS and PARTS have funded research on resource tenure—especially tree tenure—since 1989. Researchers from the University of Wisconsin Land Tenure Center have found that an overly restrictive forest code, combined with inadequate forest guard training, severely limited incentives for farmers to plant, maintain, or properly harvest trees—even

those grown on their own farms.¹⁶ Study results are being used to plan a USAID/Mali-funded program, to begin in FY 1994, which will support policy reform in natural resource management.

PARTS is continuing its research on land tenure issues. During FY 1992-93 three case studies on tenure innovations in The Gambia and Senegal and a conceptual model of land tenure change¹⁷ addressed the relationship between changing customary tenure arrangements and national law in the Sahel. Another series of case studies will be conducted on tenure relations in selected agro-ecological zones in The Gambia through a cooperative agreement with the *Access to Land, Water and Other Natural Resources II* (ACCESS II) project.

In collaboration with the U.S. Forest Service, PARTS has undertaken a yearlong study focusing on how USAID can increase the effectiveness of NGOs implementing natural resource management activities in Africa. The results of this study, to be completed by December 1993, include several reports. A literature review¹⁸ and an issues/priorities report¹⁹ on NGOs in natural resource management in Africa were presented as background to a November 1992 conference on USAID and NGO collaboration in natural resource management. The study is also addressing options for involving the voluntary and commercial sectors in the public policy decision-making process. A synthesis of lessons learned from this study will be published in January 1994 to provide guidelines on working more effectively with NGOs implementing natural resource management projects in Africa.

Other PARTS studies are examining the relationship between decentralization, local autonomy, and sustainable natural resource management. One report, after analyzing conditions for achieving sustainable natural resource management (such as the ability of local users to innovate and adapt to changing conditions), has recommended policies and programs

Box 1

Nonproject Assistance and Environmental Policy Reform

Policy dialogue and reform are playing an increasing role in USAID projects in Africa. Most of the Africa Bureau's new environment and natural resource funding over the last three years has been linked to policy reform through nonproject assistance funding.

Nonproject assistance differs from traditional USAID development assistance in that large sums are disbursed rapidly for specific host-government activities. In return for this aid, the Agency may ask that the recipient meet certain conditions, commonly enacting some sort of policy reform. One condition in USAID/Uganda's Action Program for the Environment, for example, was preparation of a National Environmental Action Plan that would, through a participatory process, identify and recommend to parliament key environment and natural resource policy reform. Nonproject assistance conditions, although binding, are flexible to permit response to changing needs.

Nonproject assistance funds are most often used to supplement the national government's budget such as to pay government salaries or to cover expenses such as gasoline or machinery—although USAID may require that the host government set aside an equivalent sum in local currency to be used for mutually agreed natural resource projects. Nonproject assistance projects supporting environment and natural resources have been initiated in Ghana, Madagascar, Niger, and Uganda. These projects share common characteristics:

- Funding levels have exceeded the average for natural resource projects.
- Nonproject assistance is paired with project assistance that covers costs, such as training, technical assistance, and grants to PVOs.
- Nonproject assistance is disbursed more quickly than project assistance.

Although nonproject assistance-funded natural resource activities have been under way only a few years, initial results indicate that they have been effective, in part because these activities link project assistance to support for implementation of policy reform with specific nonproject assistance-supported policy reforms. Because it deals with substantial sums of funding and arrangements are made at the highest levels of government, nonproject assistance has been particularly advantageous in addressing problems that extend beyond the mandate of a single ministry. This mechanism is appropriate for dealing with natural resource management issues that involve an array of institutions.

to preserve and promote indigenous institutional capability, decentralize public authority, and legalize the ability of community-based organizations to make and apply rules and mobilize resources.²⁰ A related series of studies is examining communities that pursue ecologically sound self-development to identify the causes and key relationships of their efforts (including such issues as local leadership, viable institutions, and appropriate technology). These case studies are complemented by policy studies examining how national policy affects local resource management.²¹ Research results and policy implications are being shared with other villages, national decision makers, NGOs, and the international development community. Over the long term these findings will promote policies for decentralized small-scale natural resource management, influence the allocation of development resources, and foster self-reliance and sustainability.

Using Participatory Rural Appraisal (PRA), an analytical tool developed in Kenya in 1988, PARTS in collaboration with Clark University is conducting action research on community-based development. PRA teaches community groups how to gather their own data, rank problems, set up and execute local action plans, and define ways in which external governments and nongovernmental agencies can offer assistance. PARTS research has shown that the PRA approach can be effective in many different settings and helps sustain community-based activities. In response to these findings, several international agencies, African universities, NGOs, international research institutes, and African government ministries are using PRA to carry out natural resource management project design, implementation, and evaluation.

PARTS is also supporting a study, in collaboration with the *Environment and Natural Resource Policy and Training* (EPAT) project (see section 2.6.2) to explore options for sustainable development financing by establishing endowment institutions. Many countries in Africa have weak national institutions and are unable to cover recurrent costs associated with development programs and activities. Endowment funds (as opposed to grants) can earn interest to cover such costs. Case studies on endowments are under way, following a report on guidelines for programming local currency endowments.²²

Other PARTS studies have examined the role of public sector institutions in natural resource management reforms in Africa;²³ analyzed ten natural resource management practices used in Africa, including contour planting and game ranching;²⁴ and examined problems of international ecotourism, including competition in the world market and the social and ecological impacts of ecotourism.

Additionally, a research grant component of PARTS has sponsored studies relating to biodiversity. Grants are managed by the Biodiversity Support Program and the National Science Foundation. Research topics in FY 1992 include assessing the feasibility of using butterfly prevalence as an indicator of biological richness in Madagascar and analyzing the economic pressures affecting rhino conservation in Namibia.

To promote greater African participation in research and analysis activities and facilitate networking among African and U.S. professionals, the PARTS project provides annual fellowships in agriculture and natural resources for African scientists and decision makers. The fellowships are awarded to African scientists interested in issues on the analytical agenda, who are then paired with USAID staff and/or research collaborators conducting research in the same theme areas. By providing USAID missions with a better understanding of organizations working in resource management, the directory will be a tool for increased collaboration.

2.0 Tropical Forest and Biodiversity Conservation

The productivity and well-being of Africa's agrarian and pastoral peoples are—perhaps more than on any other continent—directly linked to the wise use and conservation of the natural resource base; however, that natural resource base continues to be seriously threatened and degraded. USAID's programs in Africa—particularly in sub-Saharan Africa—target special and urgent problems: widespread poverty, extensive environmental degradation, drought, loss of biodiversity, and inadequate food production.

The Environment Strategy for Africa,²⁵ launched by the Bureau for Africa in 1992,

focuses on loss of tropical forests and other critical habitats for biodiversity. The Bureau's technical priorities emphasize preventing loss and degradation of vegetation and stemming declines in biodiversity. The strategy explicitly joins agricultural and environmental issues, integrating forestry, biodiversity conservation, crop production, and soil and water conservation into planning, policy, and institutional reform and field activities.

New activities. In FY 1992-93, USAID introduced several new activities promoting the conservation of biodiversity and tropical forests in Africa:

Madagascar: policy reform for biodiversity conservation. In FY 1993 USAID launched a major effort to bring about sustainable changes in natural resource management in Madagascar, which contains some of the world's most important habitats for biodiversity. The three-year, \$36 million *Knowledge and Effective Application of Policies for Environmental Management* (KEAPEM) project seeks to improve the array of resource management options available and strengthen local capacity to implement them; reform the resource policy and pricing framework to provide better signals to resource users; and help local people understand their own self-interest in sustainably managing these resources.

KEAPEM, the largest USAID policy reform program in Africa, is part of a complex 15- to 20-year effort coordinated with NGO projects, Madagascar's National Environmental Action Plan, and other USAID efforts, including the *Sustainable Approaches for Viable Environmental Management* (SAVEM) project launched in 1990.

KEAPEM is providing \$27 million in nonproject assistance to strengthen Madagascar's natural resource management capabilities. The Ministry of Finance will use \$21 million of this sum to service Madagascar's \$3 billion external debt. Another \$9 million will provide technical assistance and short-term training and commodities to support policy and institutional reforms through the National Office of the Environment. Reforms to be financed include efforts to improve revenue fees from logging and reserving a portion of gate

fees to protected areas to finance their maintenance. To provide a continuous source of financing for environmental activities, the government will use \$12 million of the nonproject assistance in local currency to establish an endowment fund to be managed by a Malagasy foundation. This design is being closely studied by other donors.

To facilitate donor coordination, a multidonor secretariat, housed at the World Bank in collaboration with USAID, coordinates annual conferences of donors. This system has proved so successful that it has been expanded to several other countries in Africa.

Ghana: castles and parks. In Ghana, USAID is backing creation and development of Kakum National Park—whose high levels of biodiversity and endemic species are under extreme pressure—and restoration of nearby historic forts and castles. The five-year (FY 1991–95), \$9 million *Natural Resource Conservation/Historic Preservation* project will create jobs and stimulate the local economy while reducing pressure on natural resources. The combination of ecotourism in the park, the restored forts and castles, and nearby beaches is expected to increase tourism and raise revenues to maintain the historic sites and park.

A debt-for-nature swap purchased and received donations of blocked funds (profits from multinational corporations that cannot be repatriated because of foreign exchange restrictions) in Ghanaian currency, tripling the funds available to finance restoration of the historic sites, development of the park, and preparation of the visitors' program. In addition, U.S. entertainers Dionne Warwick and Isaac Hayes have set up a \$20 million foundation to complete the forts' restoration.

During its first year of operation, the project stimulated private sector investments in area hotels, food services, and resorts. Two assistant game wardens were sent to Malaysia to be trained in wildlife management methods. Activities were coordinated with other donors through a major tourism development program funded by the Government of Ghana, the United Nations Development Programme, and the private sector.

Studies will be carried out to assess the needs and expectations of the people living in 20 surrounding villages. Project staff have created a community outreach program to train villagers in improved farming techniques. To improve management of the park, reports on the natural resources of the park and the buffer zone and an inventory of plants and wildlife are planned.

The Gambia: community resource management. Establishing and managing national parks, promoting community-managed forests and pastures, and improving soil fertility are the goals of the six-year, \$22 million *Agriculture and Natural Resources Management* project launched in 1993 in The Gambia, a priority country for USAID's Africa Bureau in terms of sustainable agriculture. To boost agricultural productivity and rural incomes, USAID will support policy reform measures and institute rural action programs in the sustainable use and protection of the environment, all designed to support the implementation of the 1992 Gambian Environmental Action Plan. Some \$10 million in nonproject assistance will help The Gambia repay its external debt, whereas the remaining \$12 million in planned project activities will promote adoption of community resource management agreements. These agreements will establish shared control and management between the government and local villages over agroforestry, biodiversity conservation, fisheries management, and tropical forests.

Ongoing projects. USAID is supporting continued progress in several important projects in Africa, as described below.

Natural resource management in southern Africa. Helping local communities gain an interest in protecting natural resources by sharing in the benefits of protected areas is the aim of the \$38.5 million, seven-year (FY 1989-95) Southern Africa Development Coordinating Committee (SADCC) *Regional Natural Resources Management* project. The project operates at local, national, and regional levels. In each country, different models have been developed, adapting common themes to regional variations. Overall, the program

compensates local communities for damage to crops caused by wildlife and foregone subsistence opportunities, such as hunting and grazing in the parks.

Activities are under way in Botswana, Namibia, Malawi, Zambia, and Zimbabwe. In the border regions shared by Botswana and Zimbabwe, conserving and protecting elephants is a major objective of project activities. The five-year (FY 1989-94), \$8 million Zimbabwe component is working to establish a management system in which rural communities and wildlife can coexist. Implemented by three NGOs—Zim Trust, the Center for Applied Social Studies, and World Wildlife Fund—the project provides local communities with revenue from hunting safaris, jobs through an antipoaching program, and compensation for crops damaged by wildlife. Cottage industries using natural resources, such as beekeeping and handicrafts, are also being promoted. Local awareness of the need for resource management and conservation at the community level is increasing, according to a 1992 assessment.²⁶

The nine-year (FY 1988-96), \$7 million component in Botswana promotes community-based wildlife utilization through tourism, hunting, research, environmental education, processing and marketing of animal products, and use of grassland and forest products. In 1992 a series of conservation workshops began for teachers, as did the production of radio broadcasts to support the themes of Botswana's National Conservation Strategy. The Botswana component has also promoted policy reform, resulting in two critical laws related to natural resources: a tourism act and a wildlife conservation and natural parks act. USAID authorized \$5.9 million for a field-based, community-focused extension service and to help strengthen the Department of Wildlife and Natural Parks.

In Zambia community-based efforts are also under way in a six-year (FY 1990-95), \$3 million component. In Namibia the USAID mission has been instrumental in promoting national legislation to enable rural communities to retain the benefits of natural resource management initiatives. Community-based initiatives are one thrust of the five-year, \$11 million *Living in a Fragile Environment* (LIFE) project recently authorized. In Malawi baseline studies of wildlife and socioeconomic surveys on the residents and institutions in the

Box 2

Natural Resource Policy Reform in Niger

In the drought-prone Sahelian country of Niger, USAID is supporting changes in natural resource management to attain sustainable agriculture. A \$28 million second phase of its Agriculture Sector Development Grant is being undertaken in two parts: a project component to support technical assistance, special studies, training, monitoring, and evaluation; and a policy component to help the government establish a new regulatory framework for land ownership and individual investment. The program's main policy objectives are to establish the following:

- *A coordinated national natural resource management (NRM) strategy* by (1) establishing a natural resource management donor coordination committee, (2) providing funds and a scope of work for a biodiversity assessment and the preparation of a National Conservation Strategy, and (3) establishing agreements with the government and donors for program funding.
- *Secure property and resource access rights* for local communities that agree to practice sustainable management of national forest areas. The project has also started to revise Niger's Rural Code to provide the legal means for local governments to become involved in decision making about local resources.
- *An open climate for NGO involvement in NRM activities*, supported through government/NGO roundtable discussions and study tours of model natural resources activities in Niger.
- *Decentralized NRM decision making and increased participation by local populations* through studies on requirements for administrative reforms and sponsoring of NRM training workshops and seminars for administrative authorities.
- *A shift in the role of forest agents* from enforcement to extension work through a pilot project to test alternative roles for forestry agents.

project area are under way. The \$1.5 million component also facilitates and coordinates efforts in Botswana, Namibia, Zambia, and Zimbabwe.

Mali: on-farm tree planting. A long-running forestry project in Mali is demonstrating the benefits of reforestation. The 12-year (FY 1981-92), \$3 million *Village Reforestation* program had modest beginnings. The original pilot project was designed to test the

hypothesis that small-scale programs to plant trees at the village level would be both more cost-efficient and effective than large-scale industrial programs in increasing both tree cover and the supply of wood products in arid and semiarid areas. In addition, the project aimed to help Mali's Forest Service evolve from a forest police force to a forest extension service.

What began as a five-year effort in FY 1981 has been extended twice. Originally designed as a village woodlot program, the effort shifted its focus to emphasize tree planting by farmers on their own land when the community woodlots proved to be neither socially nor economically viable. The project has maintained discussions on changing a system in which U.S. Forest Service agents impose fines on villagers and keep a percentage of the fines to pay their own salaries—a legacy of the French colonial system. Discussions will continue in the next project.

As a result of increased awareness about the value and benefits of trees, villagers have planted and protect useful indigenous trees to supplement the exotic species provided by the project. Individual farmers have established small tree nurseries on their garden plots, which provide income and increase the supply of seedlings in the area. To provide poles for construction, farmers are now establishing and managing small agroforestry woodlots. Research carried out in conjunction with the project has demonstrated the dramatic effects on tree growth of using water-harvesting techniques, intercropping, and large planting holes.

3.0 Efficient and Renewable Energy Production and Use

USAID has no energy projects in Africa; however, small amounts of support for improved wood- and charcoal-burning stoves are channeled through private voluntary organizations (PVOs) and the U.S. Peace Corps and through the fuelwood components of the *Natural Resource Management* project in Guinea. Issues of energy efficiency are also being addressed as components of the *Action Plan for the Environment* in Uganda and the regional *Policy Analysis Research and Technical Support* project.

One initiative funded by the *Renewable Energy Applications and Training* (REAT)

project, Research and Development's renewables program (see section 5.4.5) through its Energy and Infrastructure Office, may bring more significant activities in this area to Africa. *Renewable Energy for Africa* seeks to promote rural electrification through small-scale power generation based on renewable energy resources. The effort, previously known as Africa 1000, is implemented as a collaboration between the U.S Export Council for Renewable Energy, Africare, and Volunteers in Technical Assistance, Inc. Within the next five years, the project seeks to facilitate the provision of clean water, vaccine refrigeration, lighting, and communications to 1,000 African villages and to enable renewable energy systems to become commercially viable in Africa on a long-term basis.

4.0 Environmentally Sustainable Agriculture

USAID supported 142 projects in sustainable agriculture in FY 1993. Many of these emphasized research and development work focusing on the problems of resource-poor areas, particularly in sub-Saharan Africa and Latin America. The emphasis on sustainability has provoked changes in agricultural project design, which now includes provisions for gathering baseline information on socioeconomic and biophysical environments, often through field studies, as well as activity impact monitoring.

Africa's farming systems differ across regions and agro-ecological zones. For example, the systems and products of Rwanda, with rich volcanic soils but high population pressure, are different from those in Niger, which is constrained by poor soils and low, erratic rainfall. In Malawi sustainable agriculture is based on maize, while in Mali it is a mixed system. Nonetheless, there are certain characteristics common to sustainable agriculture throughout Africa:

- Sustainable agriculture does not mean subsistence agriculture. On the contrary, sustainable management is often linked to intensification and shifts from subsistence crops to market crops.
- Sustainable agricultural systems often incorporate forage crops and trees. The link between on-farm trees, livestock, and soil fertility is exploited by many farmers to lower risk and maximize returns.

- The diffusion of sustainable systems is driven by demographic pressure. In the Sahel farmers are switching from extensive to intensive practices in areas where arable land is limited. In some areas land markets are developing for sites that were once degraded but have now been reclaimed.

The practices of sustainable agriculture have old roots in Africa, African farmers are innovative, practices and technologies are not lacking, and research continues to develop new technologies. The Africa Bureau therefore has focused on identifying enabling conditions for wider diffusion of existing technologies and appropriate systems.

Nowhere in Africa is promotion of sustainable agriculture more critical than in the Sahel, and important strides are being made. USAID activities in Mali (see box 3), Senegal, and Niger (see box 2) provide examples. In two small West African nations, USAID helped establish a vital crop protection technology (in Cape Verde) and a model soil and water conservation unit (in The Gambia).

Niger. USAID is helping the government establish conditions that increase incentives for smallholders to improve their management of soils and vegetation. The funding mechanism for these efforts is nonproject assistance, which was selected over project assistance based on the mission's experience in policy reform: namely, that sectoral policy programs are best supported through incremental resources released on satisfaction of certain conditions.

The \$20 million *Niger Agriculture Sector Development Grant II* (FY 1990–96) combines dollar transfers tied to policy reform with project components focusing on both policy and institutional reform. Some aid accompanies the nonproject assistance to provide technical assistance, training, and studies that support the program, funded through a six-year, \$8 million project with the same title, also begun in 1990. Policy and institutional reforms are also being monitored and their effects analyzed.

Senegal. The \$8 million *Kaolack Agricultural Enterprise Development Project*, begun in 1992, is a five-year activity in the semiarid Kaolack region of Senegal. The project, being implemented by Africare, a U.S. private voluntary organization, will benefit from functional linkages with other projects and institutions active in the region.

The project aims to increase incomes through the introduction of sustainable agricultural production techniques and the establishment of agriculture-based enterprises to diversify income sources. Seventy-two village groups will be involved. Participating village organizations will be trained in the use of sustainable agricultural production through the establishment and operation of a demonstration field, which will include features such as "living fences," windbreaks, in-field trees, and nitrogen-fixing plants, which have a proven capacity to restore soils and increase yields.

The extent to which group members begin using these measures (resulting in increases in yields and income) will be among the measures of project achievement. Agriculture-based enterprises supported by the project will also be managed to enhance the environment and increase incomes. For example, animals will be fattened in feedlots to reduce damage to soils and permit storage of manure for use in gardens and fields as well as more efficient use of feed in weight gain.

Cape Verde. Locusts and grasshoppers pose a double threat to a secure food supply: they can destroy crops in a matter of days, but chemical pesticides present long-term dangers. The Bureau's \$33 million *African Emergency/Locust Grasshopper* project is tackling this challenge throughout semi-arid Africa. In Cape Verde project researchers have turned to biological control methods, using the fungus *Beauveria bassiana*, a common, naturally occurring pathogen. Working in conjunction with the Instituto Nacional de Investigaçã Agraria, USAID researchers introduced this tested North American technology on the Cape Verde Islands. Laboratory tests followed by field trials demonstrated that the fungus can be

Box 3

Conserving Soil and Water in Mali

The Menaka district of northeastern Mali is a harsh environment. Decreasing rainfall over the past 20 years, major droughts in 1973 and 1988, and habitual misuse of natural resources severely degraded the environment and led to a collapse of the traditional pastoral economy. Because farmers and herders have stripped the soils of their vegetative cover, scarce rainfall runs off rather than being absorbed by the soil.

With a USAID grant, World Vision, a U.S.-based private voluntary organization, launched a project in Menaka in 1986 to recharge the water table and restore the land's productivity. Menaka's Intadeny Valley was typical of many watersheds in Mali, with dying forests, gullies, and bare, windswept soils. The project's first phase was the construction of a series of contour earth dikes on a 40-hectare sloping plain south of the village. World Vision worked closely with several literate members of the community, providing training in using a simple leveling device and laying out contours. All construction was performed by community members using hand labor.

The first rains arrived in mid-July, one month after the work began, and breached the dikes. The workers then doubled the number of spillways and built a protective cutoff dike. The last rain of the season also breached the contour dikes, but by this time the system had contained several runoff episodes, and the soil was well-watered. Sorghum planted in mid-August on a two-hectare plot grew well on the residual moisture and yielded about 250 kilograms per hectare in December—a significant improvement for these fields.

Enthusiastic about their experience, the next year the people of Intadeny built a small dam in the valley that runs past the village. At the end of the rainy season the water level in the village's wells was two meters higher than in the preceding year. Success at Intadeny multiplied. In one year, the project protected more than 400 hectares with dikes and small dams. At one site, sorghum yield jumped to 1.7 tons per hectare.

Today, this effort to introduce sustainability is flourishing over a wide area. World Vision staff attribute the project's success to the efforts to promote local leadership, raise awareness in creative ways, and emphasize short-term benefits. The technical team from Intadeny has now been formally organized as a Malian nongovernmental organization and is performing contract work for other donors.

The project demonstrates the importance of cooperation between outside technical experts and local farmers in developing workable local variations of technologies. The project also demonstrates the need for a significant time commitment to a project to manage inevitable complications and that innovations can be adopted rapidly when local people can clearly see their benefits.

Box 4

Controlling Crop Parasites Without Chemicals

Striga, a parasitic weed that draws nutrients from the roots of host plants, causes a 5 to 15 percent loss of sorghum crops worldwide; in some areas crops are completely destroyed. In sub-Saharan Africa alone, an estimated 845,000 metric tons of sorghum are lost to *Striga* each year.

Researchers at the \$50 million *Sorghum/Millet Collaborative Research Support Program* (INTSORMIL CRSP) (FY 1979-95) centered at Purdue University have developed a rapid nondestructive bioassay to assess sorghum resistance and a process to identify *Striga*-resistant strains of sorghum. Using a mix of biotechnology and traditional research, INTSORMIL scientists identified a sorghum cultivar (SRN 39) with superior *Striga* resistance. After establishing how this gene was inherited, they developed a quick laboratory assay to screen germ plasm. The genes for *Striga* resistance have been incorporated into improved, higher-yielding varieties of sorghum; in Sudan, 360 tons of seed with the SRN 39 cultivar were harvested in 1992; this seed will plant 36,000 hectares in 1993.

In laboratory tests and field trials in Sudan and Niger, SRN 39 has demonstrated broad resistance to different strains of *Striga*. Compared with a local variety, yields of SRN 39 increased 340 percent, and *Striga* germination was reduced by 98 percent. In addition to *Striga* resistance, SRN 39 is drought-tolerant and has good food quality attributes.

In collaboration with the Sahelian Center (in Niger) of the International Crops Research Institute for the Semi-Arid Tropics and the International Maize and Wheat Improvement Center program in Kenya, INTSORMIL is adapting this technology to breed *Striga*-tolerant varieties of pearl millet and maize. INTSORMIL is also collaborating with the Bean/Cowpea Collaborative Research Support Project at the University of Michigan to develop *Striga*-resistant cowpeas. The development of resistant cultivars and their extension could save more than \$120 million annually in Sudan and more than \$1 billion annually on the African continent.

an effective bio-insecticide for 14 species of grasshoppers and locusts that periodically destroy substantial portions of sub-Saharan crops. Not only is the fungus effective at destroying the insects, but a bio-insecticide based on it can be safely and effectively transported and stored. Moreover, it is cost-competitive with chemical insecticides currently being used. This environmentally safe technology holds substantial promise not only in Cape Verde but across Sahelian Africa.

The Gambia. In a country about the size of Connecticut, The Gambian economy depends on its soil. Except for a peanut-oil processing plant, the country has no industry, no energy resources except for fuelwood, and no precious metals or gems. Agricultural products make up 95 percent of the country's exports, and agriculture is responsible for 85 percent of its employment.

In recent years, however, a growing population and the desire for greater export income have increased the demand for crop production, disrupting the former shifting cultivation system. More cultivated land has been cleared of vegetation and exposed to tropical rains, and soil erosion has greatly accelerated. In addition, during the drought of the 1970s and 1980s seasonal freshwater flowing into the shallow estuaries of the Gambian River dwindled. The resulting intrusion of seawater into swamp rice areas forced farmers to abandon hundreds of productive locations along the river and its tributaries.

In partnership with The Gambian government, USAID, and the Soil Conservation Service of the U.S. Department of Agriculture, a Soil and Water Management Unit was established in 1978 to help the nation's farmers adapt soil and water conservation practices. USAID supported the unit and its soil conservation activities from 1978 to 1991 through the *Soil and Water Management Project*. The unit's projects have helped curb flooding, soil erosion, sedimentation, and saltwater intrusion. The unit surveys and establishes contour lines for farmers to follow in planting their crops. It designs and lays out berms, levees, and dikes needed to divert storm water as well as structures to improve water quality. Village farmers furnish labor for all construction. Thousands of farmers have seen the results and

benefitted from this unit's work.

Lesotho. Grasslands, which comprise 60 percent of Lesotho, were overstocked in the 1970s by a factor of two or three; it was said that this mountainous country's major export was the soil that washed down the rivers to South Africa. Today over 130,000 hectares are managed under a rangeland plan funded by USAID that controls erosion and enhances range productivity. As measured by density and composition of forage cover, range productivity is substantially greater and cattle weights are considerably higher within the managed areas compared to those outside; consequently, incomes are higher.

These changes are a result of work begun under the *Lesotho Land Conservation and Range Development* project (FY 1980-85), continued under the *Agricultural Production and Institutional Support* project (FY 1985-92), and now undertaken by the \$14 million *Community Natural Resources Management* project (FY 1991-99). More than 130,000 hectares of rangeland have been brought under improved management since 1983. Destocking and culling have decreased pressure on the range, increased range quality, and increased value per head. Project activities have included 20 intensive livestock production packages, the formation and training of Range Management Associations, and the start-up and local management of range fees.

Malawi. The *Malawi Agricultural Research and Extension* (MARE) project helped the Ministry of Agriculture improve its institutional capability to increase the productivity of traditional smallholder crops and identify the most viable crops for diversifying smallholder production. One element of this six-year (FY 1986-92), \$12.5 million project was an agroforestry research and extension component. The work has continued as the Malawi Agroforestry Extension (MAFE) program, now funded under the \$15 million *Agricultural Sector Assistance Program* (FY 1991-96).

The strategy of MARE was to identify farmers' needs and then test and recommend a

range of suitable agroforestry species and technologies. These recommendations were subsequently published. Technologies continue to be evaluated on farms in various ecological zones of the country. Successful agroforestry techniques include systematic planting of *Acacia* trees in agricultural fields, alley cropping (planting a crop between rows of trees), fodder banks, contour strips, and live fencing. The MAFE program is continuing this work by increasing the capacity of relevant ministries and community organizations to integrate proven sustainable agroforestry practices in village and family farming systems.

At the family level, the Kahunde family farm in the Dedze area of Ntcheu is illustrative of the project's impacts. The farm customarily bought and used mineral fertilizer for its maize production; however, when approached by agroforestry extension staff associated with the MARE project, the family agreed to plant *Leucaena* between the rows of maize. The prunings from this hedge act as both a mulch and a fertilizer. (Fertilizer is a relatively large expense for Malawian smallholders, and alley cropping is now being adopted as one strategy to reduce the use of inorganic fertilizer.) During the first two seasons, while the *Leucaena* established itself, no differences in maize yield were noted; however, during the following seasons maize yields in the alley cropping scheme were generally higher than yields in fields fertilized with inorganic fertilizers. Convinced of the benefits of alley cropping, the Kahunde family plans to expand the area planted with *Leucaena*. The family has saved money by buying less fertilizer and has maintained good maize yields.

5.0 Water Resources and Coastal Zone Management

Drought and desertification have been devastating to Africa's largely agrarian population. Sparse rainfall in areas already degraded by overgrazing, wind and water erosion, and inappropriate agricultural techniques threaten agricultural productivity. The Africa Bureau's environmental strategy thus focuses on the relationship between agricultural development and environmental degradation. USAID is supporting such water resource management activities as watershed protection in the relatively water-rich areas of the tropical highlands and soil rehabilitation from saltwater intrusion in the Sahel.

Water management in Senegal. The six-year (FY 1989-94), \$18 million *Southern Zone Water Management Project* (SZWMP) in Senegal was developed in response to declining productivity of low lying farmlands in the Casamance River valley. Recurrent drought, especially in the 1980s, reduced river outflow and permitted seawater to penetrate as far as 200 kilometers inland and into rich swamp soils. Sparse rainfall and salinization have reduced crop yields for the 700,000 farmers and villagers whose sole means of survival is agricultural production on these lands. Land loss due to salt intrusion in the Department of Ziguinchor alone is estimated at 77 percent. Lack of technical skills and organizational capacity have prevented the farmers from reclaiming their degraded land.

The project was designed to rehabilitate saline and acid-sulfate soils by building a series of dikes to prevent salt water intrusion and store rainwater for irrigation. During the rainy season, the gates of the downstream dikes are opened and closed to flush dissolved salts and rehabilitate acidified soils. Upstream dikes and contour berms are constructed to increase water infiltration and improve yields. SZWMP expects to work in 60 valleys and as a first step to improve or recover 15,000 hectares of land for rice production.

In 1992 the project, with the assistance of local construction, topographic survey, and soil survey firms, built nine dikes in two valleys, providing improved water management potential on 700 hectares of land. It is now constructing 14 dikes in three valleys as part of the 1993 construction program to rehabilitate another 2,400 hectares in six valleys. Surveying and soil testing in eight additional valleys is under way prior to engineering design for the 1994 construction program. Project involvement is strictly demand driven, beginning with a request from the villagers themselves and accompanied by a solid village commitment to contribute labor during the construction phase, and a strong village organization to manage water control structures, provide dike maintenance, and manage user-fee collection and purchases.

An agronomy program is closely allied with the construction of water management structures to demonstrate improved rice production using a technology package selected and

proven by the Senegalese Agriculture Research Institute. The combined program of land rehabilitation and improved technology has increased rice yields fourfold, from between 0.5 and 0.8 tons per hectare to between 2.3 and 2.6 tons per hectare.

Training activities run concurrently with other project components to ensure the transfer of technical knowledge and skills, which will allow the people of Casamance to assume responsibility for operating water management systems. Through a direct grant mechanism, two nongovernmental organizations with personnel experienced in rural engineering, topography, agriculture, extension work, and management oversee and coordinate the work of small NGOs or associations working in each of the target valleys. These smaller valley units collaborate with and train village water management committees, encourage farmers to use improved technologies as demonstrated in the pilot parcels, and help guide the construction of contour berms. After effectively transferring their skills and management ability to the village committees, these small NGO units shift to other villages.

Senegalese government staff employed by the project and in the regional inspectorates of the Ministry of Rural Engineering and Hydraulics and Agriculture receive on-the-job training and participate in short- and long-term training courses (in-country and overseas) that address project goals. Currently, four Senegalese government engineers have been selected to enter master's degree programs in rural engineering and agronomy at Louisiana State University; the programs are being specifically tailored to the requirements of each post. Private sector contractors also receive training in dike construction, programming, management, and technical and financial aspects of business so that they may constitute a local construction resource much needed for future development and maintenance.

Guinea watershed management. The three-year (FY 1991-93), \$12 million *Guinea Natural Resources Management* (GNRM) project is designed to improve the overall management and use of natural resources in the Fouta Djallon Highlands watershed in Guinea. The region contains the headwaters of three major West African rivers—the Gambia, the Niger and the Senegal—that support millions of farmers and fishermen.

GNRM, an integral but freestanding component of the second phase of the multidonor Fouta Djallon Highlands Integrated Rural Development (FDHIRD) project, aims to stabilize the targeted watershed through the introduction of sustainable and profitable agricultural practices. The main components of the project are as follows:

- *Natural resource management.* Improvement of agroforestry, soil, watershed management and conservation, and cropping systems.
- *Applied research.* Dissemination of existing technology and research results that may have immediate benefits for the watershed areas; assistance to Guinean research institutions in developing and testing other appropriate technologies.
- *Enterprise development.* Identification of alternative economic and production opportunities to diversify the watersheds' economy and increase incomes; development of enterprise management and financial skills consistent with sustainable resource management practices.
- *Training.* On-the-job training, in-country seminars, workshops, study tours, and formal U.S. graduate-level training to improve natural resource management practices and increase enterprise activities.
- *Impact monitoring.* Development of key indicators and methodology to measure project impacts on soil productivity, soil erosion, agricultural productivity, and household incomes.
- *Policy analysis.* Examination of political and administrative constraints on improved natural resource management and provision of relevant findings to decision makers; emphasis on issues related to gender, market access, and sustainability of agricultural production.

Guinea's Ministry of Agriculture and Animal Resources provides overall project management and implementation. Specific activities in the watershed areas are the responsibility of Watershed Management Units (WMUs), each of which includes a Guinean water and soil engineer, an agroforester, a gender specialist, and a sociologist. Two Peace Corps Volunteers specializing in agroforestry will also be posted in the watershed sites in the fall of 1993 to help implement project goals.

Since its start-up in September 1992, the project has established housing and office facilities; hired a full staff; launched and analyzed diagnostic surveys in surrounding villages in each of the target areas; held seminars and training sessions for WMU staff in bookkeeping, credit management, and extension techniques to integrate women in development activities; established a demonstration beekeeping project and provided technical training in improved beehive design; established six private tree nurseries to supply seedlings for fence and fruit trees; and set up a loan guarantee fund for watershed farmers.

The project is training farmers in the care of traction animals and the utilization of animal and green manure, essential for increasing and maintaining soil fertility in the acidic soils of the watersheds. Other activities include increasing reforestation around springs, developing indicators for monitoring and evaluating project interventions, conducting market surveys to identify seasonal and regional markets for community enterprise activities, establishing fire breaks and alley farming, and training watershed producers in small-enterprise management skills.

Watershed development in Cape Verde. The islands of Cape Verde, located 400 miles off the coast of Senegal, have been seriously degraded because of recurrent droughts and expanding populations trying to farm and raise goats in the semiarid environment. The nine-year (FY 1984-92), \$7.6 million *Cape Verde Watershed Development* project has supported extensive tree planting and soil and water conservation activities on one of the largest islands, boosting agricultural productivity and restoration of the barren landscape.

On the island of Santiago, 13 watersheds covering 18,000 hectares have been rehabilitated using soil and water conservation structures, water-harvesting techniques, and reforestation. A series of small dams and rock walls were built, and grass, trees, and shrubs were contour-planted on the hillsides to stabilize the slopes, controlling both water runoff and soil erosion during the rainy season. Small reservoirs capture rainfall for use in crop production throughout the long and hot dry season. Through an agroforestry component, trees and crops were combined on the hills to protect the soil, regulate water flow, and

provide water for livestock, firewood for cooking, and poles for building, while increasing crop and fruit yields. More than 500 people participated in a variety of training and extension programs. The project organized community work groups as well as the first outreach program in Cape Verde specifically addressing the needs of rural women.

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Appendix A

Environment Program Project List

Key*Title, Years, LOP:*

PA	Project assistance
NPA	Non project assistance
C	Continuing project renewed on a yearly basis
LOP	Planned obligations for the total Life-of-Project

Focus Areas:

FOR	Tropical Forest & Biological Diversity Conservation
ENY	Environmentally Sound Energy
ESA	Environmentally Sustainable Agriculture
WAT	Water Resources, Coastal Zones and Wetlands
URB	Urban and Industrial Pollution Prevention and Control
POL	Environmental Policy
TOT	Total Percentage which supports Environment Strategy (no overlap)

Appendix A: Environment Program Project List (FY 1992-93)

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A-1

Project Number	Title ^a	Mission/Office	Years of Obligation ^b	Planned LOP ^c	Percent of Obligation ^d						ENV STRA
					FOR	ENY	ESA	WAT	URB	POL	
Africa											
625-0970	Sahel Policy Project	Africa Regional	1985 - 92	7883			10				10
625-0973	Sahel Water Data and Management III	Africa Regional	1987 - 97	20194						30	30
625-0975	Sahel Regional Institutions	Africa Regional	1987 - 97	26250	10					41	43
698-0467	* Natural Resources Mgmt. Support	Africa Regional	1987 - 92	21953	72					62	92
698-0478	* Policy Analysis Research & Tech. Support	Africa Regional	1992 - 98	73800	12	2	24	4	3	11	54
698-0492	Emergency Water Supply	Africa Regional	1992 - 92	3340				100			100
698-0517	* African Emergency/Locust Grasshopper	Africa Regional	1987 - 94	32974			48				48
633-0250	Program Development and Support	Botswana	1988 - C	1896						25	25
686-0270	Agriculture Research & Training Support	Burkina	1989 - 94	6776			25			50	75
686-0276	Pilot Village Natural Resources Mgmt.	Burkina	1989 - 90	1500	25		25	25	3	25	100
695-0124	Burundi Enterprise Support and Training	Burundi	1990 - 96	21000			5				5
695-0125	Burundi Enterprise Promotion Prog. - NPA	Burundi	1990 - 96	70000			8				8
695-0510	Program Development and Support	Burundi	1988 - C	2494			5				5
631-0052	National Cereals Research & Extension II	Cameroon	1985 - 93	32436	9		100				100
631-0058	* Tropical Roots and Tubers Research	Cameroon	1986 - 92	5195			35				35
631-0066	Agriculture Education II	Cameroon	1991 - 92	4623	23		58				58
655-0015	Program Development and Support	Cape Verde	1988 - C	1075			10				10
655-0017	* Watershed and Applied Research Dev.	Cape Verde	1991 - 96	3800	20		20	20			60
679-0008	Conservation of Northern Forests	Congo	1991 - 93	1900	100					50	100
661-0002	Eritrean Technical Assistance - PA	Eritrea	1993 - 93	5650		10					10

* Projects described in this report

^a NPA = Nonproject Assistance
PA = Project Assistance

^b C = Continuing project

^c LOP = Life-of-project funding (\$000s)

^d Environmental Strategy totals eliminate overlapping obligations. See Appendix A.

Appendix A: Environment Program Project List (FY 1992-93)

FOR USAID INTERNAL USE ONLY

A-3

Project Number	Title ^a	Mission/Office	Years of Obligation ^b	Planned LOP ^c	FOR	Percent of Obligation ^d					ENV STRA
						ENY	ESA	WAT	URB	POL	
687-0113	* Knowledge/Eff. Appl./Pol. for Envir Mgt	Madagascar	1992 - 94	9000	90					90	90
687-0115	* Knowledge/Eff Appl/Pol for Env Mgt - NPA	Madagascar	1992 - 94	27000	100					100	100
612-0235	Agric. Sector Assistance Program - PA	Malawi	1991 - 96	15000	17		17			17	34
688-0218	Livestock Sector II	Mali	1982 - 91	23715	14		20			20	40
688-0232	Farming Systems Research and Development	Mali	1985 - 94	20793	10		44				44
688-0233	Development of Haute Vallee	Mali	1988 - 95	25230			25				25
688-0244	Animal Production for Export	Mali	1992 - 97	18200			12				12
688-0247	PVO Co-Financing	Mali	1989 - 95	30040	15	3					15
688-0250	Strengthening Agricultural Research	Mali	1992 - 97	19466	12		50				50
688-0267	Mali Environmental Support	Mali	1994 - 98	7000	35		9			25	55
688-0937	* Village Reforestation	Mali	1983 - 92	2766	100					25	100
656-0217	Mozambique - PVO Support Program	Mozambique	1990 - 94	84389			5				5
656-0223	Market Recovery and Development - NPA	Mozambique	1995 - 99	40000			4				4
683-0256	Applied Agricultural Research	Niger	1987 - 97	20000			10				10
683-0257	* Agric.Sector Development Grant II - NPA	Niger	1990 - 96	20000	29				25	25	54
683-0265	* Agric. Sector Development Grant II - PA	Niger	1990 - 95	7972	25		25			25	50
683-0271	Disaster Preparation & Mitigation - NPA	Niger	1992 - 96	10000			15				15
683-0278	Goure NRM Interventions	Niger	1992 - 96	5000			50	50			100
683-0279	Disaster Preparation/Mitigation Support	Niger	1992 - 96	8000			15				15
936-5556	* Forest Resources Management	Niger	1993 - C	400	50		50				100
624-0434	African Development Bank II	REDSO - West Africa	1985 - 94	19999						45	45
624-PART	Policy, Analysis, Res. & Tech Support	REDSO - West Africa	1992 - C	1099						28	28

* Projects described in this report

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^d Environmental Strategy totals eliminate overlapping obligations. See Appendix A.

Appendix A: Environment Program Project List (FY 1992-93)

FOR USAID INTERNAL USE ONLY

A-2

Project Number	Title ^a	Mission/Office	Years of Obligation ^b	Planned LOP ^c	Percent of Obligation ^d						ENV STRA
					FOR	ENY	ESA	WAT	URB	POL	
663-0005	Development of Competitive Markets - PA	Ethiopia	1992 - 96	7000			12			15	15
635-0219	Agricultural Research & Diversification	Gambia	1985 - 91	16090	5					5	10
635-0235	* Agriculture and Natural Resources - NPA	Gambia	1992 - 97	10000			100			100	100
635-0236	Agriculture and Natural Resources - PA	Gambia	1992 - 96	12050						100	100
635-HRDA	Human Resource Development Assistance	Gambia	1988 - C	400			23			45	45
936-5556	* Forest Resources Management	Gambia	1993 - C	100			100			100	100
641-0110	Program Development and Support	Ghana	1989 - C	5102	15						15
641-0122	* Nat. Res. Conserv./Historic Preservation	Ghana	1991 - 95	8622	60					60	60
641-0125	* Trade and Investment Program - NPA	Ghana	1992 - 96	60000						10	10
641-0126	* Trade and Investment Program - PA	Ghana	1992 - 96	20000						10	10
675-0219	* Natural Resource Management	Guinea	1991 - 93	11800	25		25	38		25	100
675-0510	Program Development and Support	Guinea	1988 - C	3272					2	10	10
657-0015	Program Development and Support	Guinea-Bissau	1991 - C	2460			16				16
657-0021	T and I Promotion Support - PA	Guinea-Bissau	1992 - 99	19997			12				12
657-HRDA	Human Resources Development Assistance	Guinea-Bissau	1988 - C	800			6				6
615-0229	National Agriculture Research	Kenya	1986 - 96	30000			30				30
615-0247	Conserv. of Biodiverse Resource Areas	Kenya	1992 - 96	7000	45					55	100
632-0228	* Community Natural Resources Management	Lesotho	1991 - 99	14086			60				60
632-0231	Small Scale Intensive Agric. Production	Lesotho	1992 - 95	1500			67				67
687-0103	Amber Mountain Conservation & Dev.	Madagascar	1989 - 91	912	60			30		20	80
687-0110	* Sustainable Approaches via Envir. Mgt.	Madagascar	1990 - 95	40000	40			10		60	100
687-0112	Debt for Nature Swap	Madagascar	1989 - 92	2500	44			25		25	75

* Projects described in this report

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Appendix A: Environment Program Project List (FY 1992-93)

FOR USAID INTERNAL USE ONLY

A-4

Project Number	Title ^a	Mission/Office	Years of Obligation ^b	Planned LOP ^c	FOR	Percent of Obligation ^d					ENV STRA
						ENY	ESA	WAT	URB	POL	
696-0129	Natural Resource Management - PVO	Rwanda	1989 - 91	12245	33		50	24		8	100
696-0148	Assistance to Displaced	Rwanda	1993 - 93	2700			25				25
658-0002	Agricultural Training	Sao Tome/Principe	1986 - 91	200				3			3
685-0283	Senegal Reforestation	Senegal	1986 - 92	14000	100					25	100
685-0284	PVO/NGO Support	Senegal	1990 - 94	21000						20	20
685-0285	Natural Resource-Based Agric. Research	Senegal	1991 - 97	19750			15			15	30
685-0294	Program Development and Support	Senegal	1988 - C	3462			40				40
685-0305	Community-Based Natural Resources Mgmt.	Senegal	1993 - 99	25000	90		14			70	100
685-ATLS	African Trng. for Leadership and Skills	Senegal	1993 - C	1000						15	15
685-HRDA	Human Resource Development Assistance	Senegal	1988 - C	2000						15	15
690-0224	* Regional Sorghum/Millet Research	Southern Africa Reg.	1983 - 94	25310			20				20
690-0251	* Natural Resource Management	Southern Africa Reg.	1989 - 95	38458	100					100	100
690-0268	S. African Root Crops Research Network	Southern Africa Reg.	1993 - 95	7000			50				50
621-0171	Wildlife Management	Tanzania	1990 - 91	2500	100					100	100
621-0521	Program Development and Support	Tanzania	1989 - C	4045						4	4
617-0123	Action Program for the Environment - NPA	Uganda	1991 - 95	10000	57		15			65	95
617-0124	Action Program for the Environment - PA	Uganda	1991 - 95	17115	79	15	15			65	95
617-0125	Ag Marketing & Institution Strengthening	Uganda	1994 - 99	25000			33				33
617-0129	West Nile Community Self-Reliance II	Uganda	1991 - 91	3000	24						24
611-0230	Zambia - Privatization	Zambia	1992 - 95	18000					4	7	7

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