

POLICY LESSONS FROM HISTORY AND NATURAL RESOURCE PROJECTS IN  
RURAL HAITI

By  
T. Anderson White

Working Paper No. 17, 58 Pages, November 1994

For more information, contact

T. Anderson White  
Department of Forest Resources  
115 Green Hall  
University of Minnesota  
1530 North Cleveland Avenue  
St. Paul, MN USA 55108

Tel: (612) 624-1224  
Fax: (612) 625-5212

For copies of this publication, contact

Ellen A. Maurer  
Communications Director  
EPAT/MUCIA Research & Training  
University of Wisconsin-Madison  
1003 WARF Office Building  
610 Walnut Street  
Madison, WI USA 53705-2397

Tel: (608) 263-4781  
Fax: (608) 265-2993  
Email: [eamaurer@facstaff.wisc.edu](mailto:eamaurer@facstaff.wisc.edu)

Edited by Ellen Maurer  
Layout by Sharon Graham and Lesa Langan

\* Some figures and/or tables included in the printed version of this publication could not be included in this electronic version. If you need copies of these figures or tables, please contact the author.

PROJECT INFORMATION

A USAID-funded global program, the Environmental and Natural Resources Policy

and Training Project (EPAT), is implemented, in part, by 15 universities and development organizations through the Midwest Universities Consortium for International Activities, Inc. (MUCIA).

EPAT/MUCIA has research, training, and communication components that offer the latest information about:

- \* Energy, Industry & the Urban Environment
- \* Forestry & Watershed Management
- \* Macroeconomic Policy
- \* Population & the Environment
- \* Institutions & Policy Implementation
- \* Environmental Policy Training
- \* Environmental Policy Communications

EPAT/MUCIA publications include:

- \* Policy Briefs - short overviews of environmental policy concerns
- \* Case Studies - outlining specific in-country policy challenges
- \* Manuals - how-to-do-it environmental policy handbooks for easy reference
- \* Working Papers - of environmental policy research in progress
- \* Monographs - detailing the state of knowledge in particular subject matter areas.

EPAT/MUCIA environmental policy partners apply their research to real problems, and they are eager to collaborate with researchers throughout the world.

USAID Missions, national and international agencies, and host country governments can collaborate with the EPAT/MUCIA project by contacting:

Chief of Party  
Tel: (703) 841-0026  
Fax: (703) 841-0699

EPAT/MUCIA-Research and Training partners include University of Arizona; Cornell University; University of Illinois; Indiana University; University of Iowa; University of Michigan; Michigan State University; University of Minnesota; The Ohio State University; Purdue University; University of Wisconsin; Abt Associates; Development Alternatives, Inc.; Development Associates, Inc.; and World Resources Institute.

ISSN # 1072-9496

## FOREWORD

Haiti is in a crucial period in its life as a nation. Hard

choices lie ahead as it attempts to reconstruct its government and economy. Success will depend heavily on the government's commitment to policy reform and its ability to effectively, efficiently, and fairly implement those reforms. Success will also depend upon the effective use of external aid to support both governmental and nongovernmental sectors of Haiti. This paper deals with both requirements for success. It outlines the lessons learned from past Haitian rural land use activity and explores the external aid programs that have influenced and supported it.

The EPAT/MUCIA project, funded by USAID, carries out research and training related to environmental and natural resources policy. For more than two years, studies of rural land use policy issues and their implications for the development of rural Haiti have been part of the project. T. Anderson White has been the main contributor to this work. White has worked on Haitian development issues for 10 years. He has been a member of NGO projects, a consultant to the World Bank, and a policy researcher with the EPAT/MUCIA Forestry, Water, and Watershed Management Team at the University of Minnesota.

White has participated in some of the most in-depth and recent analyses of indigenous land use innovations, local collective action, and impacts of soil conservation and forestry projects in Haiti. He has developed many insights on past and potential roles of external assistance such as multilateral, bilateral, and nongovernmental. This summary now puts in context all pieces of White's work. We hope that it will be useful to Haitian policymakers and their supporting national and expatriate technical advisors. A companion Policy Brief summarizes the policy lessons (White and Gregersen, 1994). In this paper, White examines the following questions.

1. What are the key issues underlying declines in rural welfare and productivity?
2. What are the main lessons learned from the numerous forestry and soil conservation policies and projects?
3. What are the implications of these assessments for future policies, projects, and external aid?

White concludes that neither past policies nor projects have substantially, and positively, changed the principal and growing land use problem in rural Haiti, namely, declining rural productivity and welfare. If policies and projects are to aid rural development in Haiti, they must first address political repression, pervasive insecurity, and inadequate access to education, capital, and local organizations. These are the causes of the problems. Deforestation and low levels of farm technology are only symptoms.

The EPAT/MUCIA Forest, Water, and Watershed Management Team stands ready to provide support to help make the Haitian reconstruction effort sustainable, efficient, and equitable.

Hans Gregersen, Leader  
Forest, Water, and Watershed Management Team  
EPAT/MUCIA

#### ABSTRACT

The rural population of Haiti is sinking ever deeper into poverty and misery in parallel with the rapid degradation of its agricultural and forest lands. With essentially no remaining agricultural frontier, no significant value-added products and markets, and very few off-farm employment opportunities, many view emigration as their only hope.

This downward spiral of welfare results mostly from taxes on rural production coupled with lack of government investments in rural infrastructure and measures. Traditional rural institutions that could contribute to development have been seen as a political threat and have been repressed.

It is evident from the history of Haiti that even good projects have not made up for bad sectoral policies and repressive politics. Large amounts of aid dollars and rapid adoption of specific techniques have not been able to buy development. Though there are many examples of successful local action, alone it is not enough for rural revival. Before spending additional resources productively in rural areas, the government needs three basic reforms.

1. Reform the legal framework and administration that govern rural Haiti.
2. Reform the Ministry of Agriculture, Natural Resources, and Rural Development to serve peasants, encourage rural enterprises, and cooperate with nongovernmental organizations (NGOs).
3. Initiate and support alternative nongovernment organizational structures (such as NGO umbrella organizations and networks) to implement policies and development programs.

Once the macropolicy and institutional reforms are in place, the government needs policy and program action to:

- \* improve basic and essential social and physical infrastructure in rural areas,
- \* strengthen local indigenous groups to manage rural development activities,
- \* support the development of rural microenterprises to provide opportunities for off-farm employment, and
- \* increase peasant social and economic security through legal

means and productivity enhancement.

#### ACKNOWLEDGEMENT

I am especially indebted to the Haitian peasants, from whom I have learned of the politics and pain of poverty and land degradation, and to the Save the Children staff in Maissade. I would also like to thank Jon L. Jickling who co-authored the studies on which much of this report is based. Some of these studies were prepared in collaboration with Jickling under the auspices and leadership of Ernst Lutz, of the Environment Department of the World Bank. I thank the EPAT/MUCIA Environmental and Natural Resources Policy and Training Project, the United Nations Environment Program, and the University of Minnesota for financial support. In addition, I thank Hans Gregersen, Al Lundgren, Scott Josiah, and Karlyn Eckman of the Department of Forest Resources, University of Minnesota, as well as EPAT/MUCIA reviewers, for their helpful suggestions. Finally, thanks to Clara Schreiber for her help in editing the numerous drafts of this paper.

#### ACRONYMS AND ABBREVIATIONS

AID  
Association Internationale de Developpement

AFII  
Agroforestry II (USAID)

AOP  
Agroforestry Outreach Project (USAID)

CARE  
Cooperative for American Relief Everywhere

EPAT  
Environmental and Natural Resources Policy and Training Project

FAC  
Fonds d'Aide et de Cooperation

FRS  
Forestry Resource Service (MARNDR)

MARNDR  
Ministry for Agriculture, Natural Resources, and Rural Development

MCC  
Mennonite Central Committee

MPP  
"Mouvman Paysan Papay"

MUCIA  
Midwest Universities Consortium for International Activities

NGO  
Nongovernmental Organization

NPV  
Net Present Value

OAS  
Organization of American States

ODBFA  
"Organisme de Developpement du Bassin du Fleuve Artibonite"

PADF  
Pan American Development Foundation

SCF  
Save the Children Federation

STABV  
Technical Secretariat for Watershed Management (MARNDR)

TWAMP  
Targeted Watershed Management Project (USAID)

USAID  
United States Agency for International Development

## CONTENTS

## INTRODUCTION

### BACKGROUND: CAUSES OF DECLINING RURAL PRODUCTIVITY AND WELFARE

The Political Economy of Rural Haiti

Peasant Livelihoods

The Role of Trees in Rural Haiti

Indigenous Agroforestry

Description of Systems

Home Tree Gardens

Border Systems

Living Fences

Dispersed Intercropping

Trees in Blocks, Fallow, and Pastures

Economics of Indigenous Agroforestry  
Indigenous Soil Conservation  
Indigenous Collective Action for Land Management  
Interpretation and Synthesis: Key Issues for Policy Design

#### THE EXPERIENCE AND IMPACT OF NATURAL RESOURCES PROJECTS

Natural Resource Project Approaches and Organizational Structures

Methods for Improving Land Use

The Landscape Infrastructure Approach

The Agricultural Parcel Approach

Current Extension Modes

A Commandante Mode

A Technique by Task Mode

An Integrated and Participatory Promotion Mode

Description of Organizations Active in Natural Resource Projects

The Ministry of Agriculture, Natural Resources, and Rural Development (MARNDR)

The Multilaterals

The Bilaterals

The NGOs

Organizational Arrangements Used to Implement Projects

International NGO-led Rural Development

Local NGO-led Rural Development

International Agency Support for Local NGOs

NGO Umbrella Organizations

Semi-autonomous Government Agencies

Donor-Funded Government Agencies

The Experience and Impact of Forestry Projects

The Sustainability Dimension: What Have Peasants Adopted?

The Distribution Dimension: Who Has Benefitted and How Much?

Distribution of Benefits

Level of Benefit

The Efficiency Dimension: Are Projects Economically Efficient?

The Experience and Impact of Soil Conservation Projects

The Sustainability Dimension: What have Peasants Adopted?

The Distribution Dimension: Who Has Benefitted and How Much?

The Efficiency Dimension: Are Projects Economically Efficient?

Key Lessons From Project Experience

#### POLICY DIRECTIONS AND ORGANIZATIONAL ROLES

Introduction

Prerequisites for Action: Policy and Institutional Reform

Reform the Legal Framework and Macropolicies that Govern Rural Haiti

Reform MARNDR to Serve Peasants, Encourage Rural Enterprises, and Cooperate with NGOs

Initiate Alternative Organizational Structures (such as NGO Umbrella Organizations and Networks) to Implement Policies and Development Programs

Programs For Improving Rural Productivity and Welfare

Improve Basic and Essential Social and Physical Infrastructure

Strengthen Local Indigenous Groups to Manage Rural  
Development Activities  
Support Development of Rural Microenterprises to Provide  
Opportunities for Off-farm Employment  
Increase Peasant Social and Economic Security through Legal  
Means and Productivity Enhancement  
Reforming Land Tenure Policies  
Improving Farm Productivity

ENDNOTES

REFERENCES

INTRODUCTION

Haiti is well known as a small country with immense problems. Haiti is also well known in the development community as a country that has long received much external aid for development activities. Most of this aid supported urban development projects. But by the 1980s, official external aid for natural resource and agriculture projects alone ranged from US\$31 to 50 million a year. More than 130 separate projects were in operation (AID 1990).[note 1] Despite great levels of aid funding, and both passionate criticism and praise for the many policies and projects, no one has recently conducted a thorough evaluation of natural resource projects, policies, and external aid.

This paper aims to provide a thorough, yet succinct, assessment of these issues:

- \* the causes of declining rural productivity and welfare,
- \* the general experience and impact of natural resources policies and projects in addressing those causes, and
- \* the key implications of these experiences for future development efforts.

Though the paper reviews selected project experience, it is not a comprehensive evaluation of all land use policies and projects in Haiti.

The paper assesses the general trends in land use and associated technology over recent years and evaluates the impact of official forestry and soil conservation projects. A lack of information and the difficulty of assessing impacts means that we have taken a narrow perspective on impact assessment, focusing on the sustainability, distribution, and economic efficiency of the project. This assessment does not assume any easy answers to the problems of poverty and land use in Haiti nor a single "blueprint" for the future.



Haiti is an instructive case study of natural resource policies and projects for two reasons. The extent of rural poverty, land degradation, and political division is extreme and represents the possible future of many regions in the developing world. The country also has a rich history of government policies and external assistance in rural development and natural resource projects.

#### BACKGROUND: CAUSES OF DECLINING RURAL PRODUCTIVITY AND WELFARE

This section examines the causes of rural poverty and declining productivity. It reviews the political economy of rural Haiti, the livelihoods of peasants, their indigenous land use innovations, and the role of trees, and summarizes key insights.

##### The Political Economy of Rural Haiti

Haiti has historically been politically, economically, and culturally divided between the poor peasant majority, the small middle class, and the merchant elite who comprise about 5% of the population (see box 1). The elite and middle classes have controlled the political, economic, and military systems and denied peasant participation in the political process (Trouillot 1990). The Haitian state has extracted taxes from the poor and provided few services in return. Despite this repression, both fiscal and political, there is a long history of peasant resistance and revolt (Moral 1978). The wealthy, on the other hand, have been able to evade taxes and benefit from government protection of monopolies and privilege (Fass 1990). In addition, the wealthy have usually avoided investment in innovations that raise the productivity of the poor (de Young 1958).

##### Box 1 Basic Statistics of Rural Haiti

The latest study on agricultural holdings (1971) found that 59% of all household land holdings totaled less than 1 hectare. About 91% of all holdings totaled less than three hectares, and these lands supported 88% of the rural population. Although 32% of all lands are arable by conventional standards, about 60% are actively cultivated. The GNP per capita was an estimated \$370 in 1990. Yet this masks the great income disparity between the wealthy and the poor and urban and rural incomes. It is estimated that 1% of the population owns 44% of the total national wealth. Cereal production has been declining at about 2% per capita annually and overall production dropped 30% between 1965 and 1983. Population growth is about 1.6% per year. Infant mortality is 120 per 1000 live births. Approximately 77% of the adult population is literate. Fewer than 40% of school-ages

children complete two years of schooling. Though there is little data since the "coup d'etat" in 1991, by all accounts, the degree of deprivation has increased dramatically in both rural and urban areas.

Source: USAID 1985, World Bank 1990

The Duvalier family dictatorship between 1957 and 1986 enhanced this division by repressing opposition, reinforcing monopolies, and infusing fear and distrust throughout society. The persecution of individuals with leadership and organizational skills destroyed the social fabric needed for security, access to resources, innovation, and development.

The many military governments since 1986 have continued the repression of popular organizations such as cooperatives (Maguire 1991). This repeated oppression is a prime cause of the low numbers of self-organized and self-governing rural organizations and their low levels of organizational skills. Rural data shows a sharp drop in traditional labor exchange arrangements during the Duvalier dictatorship. Many groups spontaneously formed (or reformed) with his fall in 1986 (White 1992a). This revival shows that given neutral (or positive) political climates, rural groups will organize, making direct external assistance unnecessary.

The internal economic and political affairs of rural Haiti have always tightly intertwined with externally-dominated economic and political systems. This began with the landing of Columbus in 1492, the quick annihilation of the indigenous population, and the importation of more than a million African slaves to Saint-Domingue. Since then, externally-dominated markets and strategic political interests have strongly influenced internal affairs (Dupuy 1989, Farmer 1992). This influence extends to rural areas via price fluctuations of export crops and, more recently, by bans on Haitian immigration.

Other countries diplomatically isolated Haiti in the years after independence. And France continued to threaten invasion until Haiti paid a wartime indemnity of 150 million francs (Farmer 1992). This debt drained government accounts (not fully repaid until 1936) and led the return to an export-focused economy.

The United States invaded Haiti in 1915 to protect American financial and strategic interests (Schmidt 1971). Historians now credit this occupation, which ended in 1934, with establishing the modern Haitian army, centralizing state control, and ending peasant access to power. They also say it inflamed racial tensions that led to the "noirist" (nationalistic black power) movement and the subsequent Duvalier dictatorship (Mintz 1974, Trouillot 1990).

Taxes on rural production (via taxes on public market exchanges and exports) have always been a main source of government revenues. However, Haitian governments have never invested significant funds in rural and agricultural sectors. Urban areas

have received most public investment (Fass 1990, USAID 1985). This has prevented peasants from accumulating savings and limited their ability to reinvest in productive activities.

The lack of rural infrastructure, agricultural extension, and research has stunted agricultural innovation, access to markets, and the development of rural enterprises. The government and donors have adhered to an urban, manufacturing-led model of national development. More than 80% of international funding during the 1970s and 1980s subsidized public infrastructure projects in Port-au-Prince and other secondary cities (Fass 1990, UNDP 1976-90). The government has maintained this approach. This is despite the global experience that agrarian nations cannot shift directly to manufacturing and service economies without severe short-term costs to rural areas and long-term costs to the nation as a whole (Hayami and Ruttan 1985).

The government has enacted hundreds of well-stated laws and regulations aimed at protecting the environment and rural productivity. However, rural government officials regularly used these laws as income sources and instruments of coercion (Alexis and Janvier 1991). Government policies only consist of regulations and taxes rather than providing resources and incentives for appropriate land use (see box 2). Policies aim to eliminate the symptoms of rural decline (such as deforestation, soil erosion, charcoal production) rather than reversing its causes.

For example, the Rural Code requires arrest for people who cut trees on mountains and along streams and clear lands for agricultural purposes. County sheriffs ("chef de section") and other government officials are to enforce these regulations. They receive at least one-half of the fine collected from an arrest (Pierre-Louis 1989). In 1972, the government established a special reforestation fund ("Fonds Special de Reboisement") to generate funds for reforestation. This money came from taxes on wood products and harvest fines, and official Ministry of Agriculture agents enforced the law in the rural areas. The government levies taxes on wood products all along the market chain (from harvesting, local surtax, transport tax, market tax, and vendor tax). Tax collectors arbitrarily levy fines adding risk and uncertainty to the market (McGowan 1986). The decree of 1987 prohibits tree cutting and wood product transport except by authorization of the official agents.

#### Box 2 Geography and Climate

Haiti is one of the largest Caribbean nations, having approximately 27,000 square kilometers of land area. It is mountainous with peaks up to 2,684 m and few arable plains. Approximately 63% of all lands slope more than 20% and more than 40% of all lands are 400 m above sea level. Rainfall ranges from 300 mm in the northwest peninsula to 3,000 mm in the mountains of

the southwest. Extreme events, such as hurricanes, droughts, and floods are frequent.

Source: USAID 1985

The threatened economic and social collapse of rural Haiti is a recent phenomenon. With the birth of the last generation, poor people have "passed directly from emergence to emergency" (Lowenthal 1989: 6). Haiti's population growth has outpaced its ability to innovate and manage in the face of government predation and changing environmental conditions.[note 2] In about seven generations, the basic production site has shifted from flat, fertile plains to small plots and steep slopes. Without an agricultural frontier, no significant value-added products and markets, and very few off-farm employment opportunities, rural production and livelihoods increasingly fail. Emigration is the only source of hope.

Economic development has stalled. Few off-farm employment opportunities exist for rural people, and urban wages have fallen markedly in the last 10 years. The average annual growth in gross domestic product (GDP) has been 0.2% between 1965 and 1990 (World Bank 1992). Historically, agriculture exports have dominated the GDP and the export market. Now agriculture only comprises about 30% of GDP and, mostly because of soil erosion, continues to decline (USAID 1985). About 70% of the workforce is either unemployed or underemployed. Internal and international migration from the rural areas has drastically increased in recent years for both political and economic reasons.

The urban-based manufacturing and assembly sector grew rapidly during the 1970s. But it stalled in the late 1980s from internal political turbulence, manufacturers' resistance to dealing with new unions, and the international recession (NLC 1993). Urban wages in the assembly sector have declined more than 39% in real terms between 1983 and 1991. They fell to US\$0.14 an hour in 1993 dollars, the lowest manufacturing wage in the hemisphere (NLC 1993). This same period saw a rapid rise in the assembly and export of apparel. Each urban manufacturing job supports about five to seven people.

#### Peasant Livelihoods

Seventy-two percent of the population are peasants. Their average annual "per capita" income and agricultural yields are among the hemisphere's lowest, and their population density is among the highest (World Bank 1992). Haitian peasants are managers of complex enterprises with two types of cultivation, agroforestry and annual row crops. Their use of basic inputs is infrequent. Tools are rudimentary and practices have not changed significantly since the 1800s (USAID 1985).

The overwhelming majority of peasants have access to one or more agricultural plots. Peasants are market-oriented producers, hampered by their access to labor and capital. They fear risks

and try to avoid them by diversifying the farm enterprise. Population growth, erosion losses, and inflation combine to cause increasingly small returns to land and labor investments (USAID 1985).

Rural women have primary responsibility for agricultural domains that assure family nutrition and security and appear to have growing responsibility for all domestic production. In addition to nurturing the family, women work in independent commercial activities and help sow, harvest, and market home produce. They also care for the home garden, fruit trees, special agricultural crops, and small livestock. A recent study of the role of women in the Maissade area found that women are often responsible for agricultural fields (the conventional male role) while males search for off-farm employment (White 1993). This study also found that women face extraordinary problems in gaining access to agricultural credit and labor.

Family networks and labor exchange groups are the primary social organizations in which peasants produce, market, debate, and formulate responses to the changing conditions of life. The extended family household ("lakou") is the primary production and consumption unit. These indigenous cooperative institutions provide cultural and social meaning to life. In addition, they control uncertainty, share risk, and assure member production and subsistence. The extended family also increases individual access to production factors (such as, land, labor, tools, and credit). It guards against individual member failure from loans and by sharing food and other necessities. Families operate according to the cultural ethics of the right to survive and the duty to reciprocate.

The social norm of bilateral, divisible land inheritance has led to the steady reduction of land-holding size until the last generation "crossed the threshold to an absolutely insufficient scale of operations" (Lowenthal 1989: 6). A remnant of French colonialism, this system assures that all offspring receive an equal portion of the family land when the parent-owner dies. Although recent data are not available, estimates are that average family farms are less than one hectare (see box 1). Small or even drastic increases in income will not result in an adequate standard of living for peasants, much less for their children.

Although the lack of formal land titles and contracts raises the potential insecurity of investments, strong community groups can overcome this insecurity. About 30% of all farmlands in Haiti are either rented, leased, or sharecropped. Tenure status is rarely officially recognized, and the frequent lack of notarized contracts or titles provide no basis for legal recourse. Land disputes are one of the greatest sources of conflict for peasants and income for rural government officials. Researchers have conventionally believed that the uncertainty associated with these informal tenure arrangements severely limits peasant interest in adopting conservation practices, including tree planting (AID 1990, USAID 1985, Zuvekas 1978).

Research in Maissade shows that:

- \* strong peasant organizations can counteract the uncertainties associated with informal tenure arrangements, and

- \* peasants are willing to adopt low-input, short-term yielding practices, even if they do not have formal title to the land.

This evidence shows that informal land tenure does not really constrain investment by itself (White 1992b).

Uncontrolled livestock grazing during the dry season is a great source of insecurity, and it also discourages the planting of perennials such as trees and hedgerows. In 1963, a new law abolished free range, but the government has never effectively enforced the law. Many peasants cite this problem as the main threat to their production. At the beginning and end of every season, roaming livestock eat and trample crops because peasants disagree when the free-roaming season starts. Such illegal foraging is also a major source of conflict between peasants, and arbitration is a regular source of income for rural police and justice systems.

#### The Role of Trees in Rural Haiti

The remarkable extent of deforestation and land degradation in Haiti began with colonial clearing for plantations and accelerated after independence with industrial logging of state lands to pay foreign debts (Pierre-Louis 1989). Developers cleared large tracts of forest for coffee and other agricultural plantations. Then industrial logging for export became an important economic activity throughout the colonial period. Early Haitian governments also encouraged logging to gain hard currency to pay off the wartime indemnity to France.[note 3]

History shows that the landscape change in Haiti is an example of industrial deforestation followed by smallholder agricultural expansion with government support or indifference (see box 3). Similar situations occurred throughout the Mediterranean since the Bronze Age, in Europe during the 15th century, and North America during the 18th and 19th centuries (Perlin 1991). Now it continues in Haiti into the 20th century. Population expansion of the million slaves brought to Haiti combined with the lack of public investment in rural human and land resources has led to today's degradation.

About 60% of all lands have been converted from forest to agricultural use, and most of the rest is degraded forest and agroforestry tree cropping systems (USAID 1985). Despite the conversion from forest to agriculture, almost all landscapes include trees. In contrast to the continued overexploitation of degraded forest areas by local users, peasants have domesticated many tree species into diverse agroforestry systems.

### Box 3 Politics, Control, and Forest Cover

Prior to the fall of the Duvalier regime in February 1986, people had to have permits (and illicit payments to government agents) to harvest trees. This policy limited tree harvesting but also gave control to the local police. With the fall of Duvalier, this system broke down and tree harvesting, charcoal production, and wood transport exploded overnight. Charcoal production spread into previously-protected forests all over the country, and peasants harvested previously-protected fruit trees for timber. This expansion into new forests and species flooded the market with products and temporarily kept real wood product prices flat with inflation. This example illustrates the mixed impacts of coercive protection policies. True, control did protect trees and some forests. But when the government did not match this with incentives to grow trees or manage forests and when this control corresponds to wider political corruption, positive impacts are fragile and easily overwhelmed when the political tides change.

Energy demand is probably the largest current cause of tree harvesting. Woodfuel accounts for approximately 84% of all energy consumed and 96% of all wood volume harvested (World Bank 1991). Experts predict a substantial and growing woodfuel deficit and that all wood supplies will be eliminated by the end of the century. Such studies frequently underestimate the contribution of degraded forests and the impact of fuel substitution. Certainly people are depleting the forest resources, and increasing scarcity will disproportionately impact the poor. It will especially affect both the rural poor who rely on charcoal production for their income and the urban poor who will spend a greater proportion of their income on fuel (World Bank 1991).

Trees and agroforestry systems are a cornerstone of Haitian peasant cultivation. Trees yield multiple and diverse wood products, forage, medicinals, shade, fuel, and food. Fruit trees are especially important as an annual source of free food, especially critical during periods of hunger. All farms heavily consume wood products. A recent survey of peasants in diverse areas of the country found that about 50% of households regularly purchase wood products (Starr 1989).[note 4] Trees sometimes also have critical spiritual significance. People believe them to be the residence of powerful family spirits and the guardian of family lands (de Young 1958).

Trees are essentially a diverse savings bank for the rural poor, providing food, forage, and energy security, and a source of cash for emergencies. Over the years, population and poverty have increased, international market prices fallen and fluctuated, and domestic food prices risen. For these reasons, peasants have steadily shifted away from producing export tree crops such as coffee. They prefer food crops, like beans, with stable markets.

Consequently, there has been extensive decline of tree cropping

systems while dispersed agroforestry systems and annual cultivation has expanded.

Trees are most intensively managed where land and tree tenure is secure and the collective management of forests is infrequent.[note 5]

Intensive indigenous tree cultivation (regular planting and maintenance) occurs where individuals have secure rights to the land and trees, usually in an agricultural context.

Conversely, people exploit trees in areas without agricultural production, with limited owner presence, and with insecure tenure. For this reason, reforestation and agroforestry are essentially two different domains. The conditions and incentives necessary to improve the Haitian forests are also different from those required to improve agroforestry. In addition, private trees and land are usually under the ultimate authority of a single individual.

Examples of collective forest management include the protection of water sources and town woodlots for community shade and recreation. Grazing and tree harvesting usually occurs on most state-owned forest lands. Sometimes authorities sanction this use and sometimes not. Also local users sometimes develop informal rules to decide who can use the lands and how. This use is neither the exploitation of an open access resource nor the collective management of a common property. In essence, we do not know if rules exist or not. However, it is clear that people are overusing the resources, implying that if rules are in place, they are ineffective. Further research on this topic is essential to develop policy for state forest lands.

Most of Haiti is naturally suitable for arboriculture, growing trees, rather than row agriculture. And trees play a critical role in providing for individual and national economic security and growth (de Young 1958). Arboriculture is more appropriate for the highly erosive lands of Haiti than row agriculture. And history has shown that tree crops (first coffee and most recently mangos) have often led exports and provided hard currency for the national treasury. These contributions exist despite disincentives for cultivation (taxes and no extension support). Trees are playing a critical role in Haiti as scarcity and insecurity dominate the country. Forests and trees have been absorbing the shocks of farm poverty, stalled economic growth, and political repression. For example, there has been an increase in charcoal production despite small and declining returns to producers (World Bank 1990). People are harvesting domesticated trees at early ages for less than optimum uses, such as fruit trees cut for planks and timber trees harvested for charcoal. And people are digging up tree stumps and burning them for charcoal (Jickling and White 1992).

Indigenous Agroforestry



Shortly after the revolution of 1804, about 500,000 slaves suddenly became landowning peasants. They had to devise productive land-use systems in a vast array of site conditions with little or no capital or support. This transition from slave to peasant meant they converted forest and coffee plantations to farmland and planted trees in diverse agroforestry systems (see box 4).

As land tenure and site conditions are very diverse in Haiti, so are the species and tree configurations of the indigenous agroforestry systems.[note 6] In areas converted to agriculture, trees grow in the nooks and crannies of agricultural parcels. Several systems predominate despite diverse conditions. They include home tree gardens, boundary systems, living fences, dispersed intercropping, and fallow and pastoral systems. Brief descriptions of these systems, and conclusions concerning the economics of indigenous agroforestry follow.

#### Box 4 - Peasants Do Plant and Cultivate Trees

The widespread deforestation and forest degradation in Haiti has led many observers to conclude that peasants do not cultivate trees and, indeed, have a pernicious vengeance against them. Given the widely-practiced agroforestry systems, this is clearly not the case. Peasants both plant trees (often fruit trees or timber trees of higher value) and manage natural generation (Balzano 1986, Conway 1986, Murray 1979, Smucker 1988).

In east central Haiti, near Las Cahobas, Campbell (1994) conducted an intensive study of 116 randomly chosen farms. Findings showed that peasants plant 32% of fruit trees (excluding coffee) and 17% of timber trees on farms, independent of any project. Similarly, Campbell found 39 fruit trees (48 per hectare) and 49 timber trees per farm (61 per hectare) of diverse age classes. Also, on the farms where peasants planted project agroforestry trees, they made up 30% of all timber trees. The most common endemic timber trees were catalpa, tropical ash, and mahogany. Peasants planted 38% of all mahogany, 29% of all catalpa, 25% of all royal palms, and only 5% of all ash. This intentional planting reflects a higher economic value of these species. Peasants left other species and individuals of less economic value grow after natural seeding. In southwestern Haiti, Erlich (1986) found that peasants had planted 39% of trees in farming systems while the rest were the product of natural regeneration.

#### Description of Systems

Haitian agroforestry systems are diverse, including the following types.

##### Home Tree Gardens

Also referred to as kitchen gardens, or "jaden lakou", "jaden devan kay" in Haitian creole, these tree groves encircle each

family compound. These gardens are remarkable for their species diversity and complexity and play a very large role in assuring family food security. One recent study in southern Haiti found that home owners regularly cultivated up to 43 species and that 66% of all their marketed goods came from the kitchen garden (Pierre-Jean 1991). Often studies point to the sustained economic and ecologic viability of the home tree garden and the potential for greater economic productivity.

#### Border Systems

Border systems, an agroforestry arrangement where peasants plant or maintain trees along a field or property boundary, are common throughout Haiti. These trees serve primarily as property boundaries but are also a source of fuel, forage, and occasionally timber products. In a study of 180 farms in different ecotypes representing 88% of Haiti's land area, Ashley (1986) found that 60% of farms surveyed had border systems.

#### Living Fences

Like border plantings, living fences are very common in Haiti. They mark property boundaries and provide diverse nonmarket products for home consumption such as forage and rope. They also protect fields from free-ranging livestock, a common and important problem during the dry season. In Ashley's study of traditional agroforestry systems, 42% of all gardens had live fencing, 55% had no fencing, and 88% of all fencing found was live (Ashley 1986).

#### Dispersed Intercropping

Besides in home tree gardens and border and fencing systems, trees grow throughout agricultural parcels. Starr (1989) found that 47% of survey respondents used this dispersed intercropping system. But Balzano's (1986) survey found that 93% of all gardens had trees within them. Ashley (1986) found that 36% of farm area planted to annual food crops had 30% tree cover or greater.

#### Trees in Blocks, Fallow, and Pastures

In the moist areas of the country, peasants have traditionally maintained a woodlot ("rak bwa"). They periodically harvest timber products and use the woodlot to shelter livestock (Balzano 1986, Smucker 1988). Though the practice is diminishing with increased population pressure, a recent Cooperative for American Relief Everywhere (CARE) study found that some two-thirds of respondents periodically continue to allow their land to lie fallow (Starr and others 1992). In arid areas, peasants also manage trees in woodlot pastures, providing both important forage and shade for livestock.

#### Economics of Indigenous Agroforestry

The economics of indigenous agroforestry and its contribution to rural households has not been fully examined. This is partly because researchers tend to investigate newly-introduced technology. There is also great diversity in systems, products, and prices, and it is difficult to estimate the value of labor

and trees. Jickling and White (1992) conducted the only study of indigenous agroforestry economics. They examined agroforestry systems in two areas of Haiti, Maissade and Maniche. They conducted field surveys of the locally predominant systems (agriculture mixed with trees in border, dispersed, and small block arrangements), the inputs, outputs, and tree utilization patterns. The results of this analysis are only directly appropriate for the areas considered. The study resulted in two key conclusions.

Indigenous agroforestry provides both stable and profitable returns and is clearly worth peasant investment. This finding holds even though the study examined only some economic benefits of agroforestry and not the economic value of trees as stored capital and security. The net present values (NPV) of farms managed as indigenous agroforestry systems were 13% greater (in Maissade) and 35% greater (in Maniche) than farms managed as pure agriculture systems (see box 11). The incremental benefit-cost ratio of managing agroforestry rather than pure agriculture was 3.5 and 3.9 in the two cases. Average annual net financial revenues were between 20 and 40% greater than in the pure agriculture case.

Considering the average household landholdings in the two areas, these returns translate to an additional \$64 in Maniche and \$123 in Maissade.[note 7] Returns to peasant labor invested in agroforestry were 10 and 26% greater than that invested in pure agriculture.

These results show that farm investment of both land and labor in the agroforestry systems studied are profitable. More specifically, peasants maintain these systems for several reasons:

- \* Agroforestry products more than compensate peasants for the lost agricultural production.
- \* Households have readily available labor.
- \* Fruit trees provide food to the household during the annual hunger periods.

Investment in agroforestry is more profitable than in pure agriculture. However, considering current price trends (food prices are rising faster than wood prices, and the value of labor is declining), there is no incentive for peasants to expand indigenous agroforestry production. Sensitivity analysis indicated that NPVs were sensitive to changes in agricultural yields and not to changes in wood product yields, number of trees per farm, or annual tree product price increases. This is understandable as agricultural products make up about 65% of total farm income.

Logically, people who are poor and getting poorer will increasingly opt for agricultural production because of the food value and the short-term return on investments. The number of trees per farm more than doubled in one case. But this increase

resulted in a less than 20% increase in farm NPV. This occurred because an increase in tree densities reduced agricultural production while providing relatively modest additional returns from tree products which have low relative values. The research shows that agroforestry is profitable up to, or just beyond, the level of land and labor investment required for indigenous agroforestry. Investments in agricultural productivity yield greater returns beyond that point.

### Indigenous Soil Conservation

Severe soil erosion has been a problem in Haiti since the colonial period. At that time, people cleared mountain forests for coffee production. They also clean-cultivated (scraping weeds between plants and pretill field burning) plantation crops such as cotton, indigo, and tobacco (Paskett and Philocete 1990).

The widespread annual cropping of hill slopes is fairly recent. It was not until the mid-twentieth century that many peasants faced the problem of cultivating sloping land. Some people have adjusted the farming techniques developed on the plains. These adjustments conserve soil moisture, require limited amounts of labor and nonfinancial input, and use common tools such as hoes and machetes. Peasants mostly use these techniques in areas of high soil moisture, such as ravines, and with higher valued crops like rice, bananas, and taro. Peasants do not use these methods in extensively-managed gardens planted to low-value cereal crops.

Indigenous methods which conserve soil and water include the following (White 1992a):

- \* soil and stubble scraped up into a mound to retain water for rice cultivation ("zare"),
- \* weeds hoed into contour ridges at one-pace intervals ("sakle en woulo"),
- \* crop stubble gathered along the contour and supported with stakes ("ramp pay"),
- \* assorted plant and soil material placed in ravines to retain soil and water for banana, taro, rice, or yam cultivation ("dig ravin"), and
- \* soil heaped into mounds for sweet potato cultivation ("bit").

When peasants practice these traditional techniques, they must reconstruct them every year. Frequently, peasants construct the techniques haphazardly, and they are inefficient in controlling soil erosion.

The "tram," a peasant innovation, is the combination of the mounds ("bit") and a contour seed bed promoted by a Haitian

agronomist.

Since the 1950s when this innovation took place, it has become standard practice in the vegetable-producing areas close to the capital. In analyzing the evolution of the "tram," the anthropologist G. Murray concluded that peasants did not care about saving their soil alone but also in saving the fertilizer sown for vegetable production. In essence, "Erosion control has occurred as the secondary result of an innovation whose primary function, from the peasants viewpoint, is the immediate enhancement of their cash profits" (Murray 1979: 10). This is consistent with the finding that peasants use the indigenous "dig," "woulo," "ramp pay," and "zare" to retain moisture for enhanced crop productivity, not to retain soil alone.

No available studies have examined the financial returns to indigenous soil conservation. One study did examine the economics of several indigenous techniques that project technicians helped improve, such as "ramp pay" and "kleonaj." Box 5 describes these techniques and box 13 shows the financial returns.

#### Indigenous Collective Action for Land Management

Peasant decision about land use, technique adoption, and willingness to risk is strongly influenced by access to labor and the relative rates of return of each option to that labor.[note 8] In addition, it is often within a labor exchange group that peasants discuss and test new ideas. In rural Haiti, most peasants have access to land and only few have access to capital. This enhances the role of labor, and labor is often the medium of exchange between peasants (White 1992a).

In many areas of the country, labor exchange groups have spontaneously transformed to implement project-promoted soil conservation techniques. Though these groups changed without project knowledge, most projects have since embraced and promoted them. For example, in the late 1980s, the Pan American Development Foundation (PADF) noticed that a group of peasants had organized to improve a small watershed in Las Cahobas. Labor exchange groups ("esquad") are also known to install hedgerows on member lands in areas of southwest Haiti. The Foundation subsequently began to promote this type of cooperative activity throughout the country (PADF 1991).

#### Box 5 - The Improved "Ramp Pay" and "Kleonaj" Techniques: Combinations of Peasant and Scientist Knowledge

The "ramp pay" and "kleonaj" are two indigenous/project techniques which have rapidly diffused both with and without project assistance. The "ramp pay" is an indigenous trash barrier, built with crop stubble along the contour of steep agricultural parcels. Similarly, the "kleonaj" is a trash

barrier built in small ravines. Both structures usually dam up sediment for a moisture-demanding and usually higher-valued crop such as taro or bananas.

In the mid-1980s, several projects began encouraging peasants to improve these techniques and extend their use. Peasants were to suspend the traditional practice of annual field burning and install the "ramp pay" along the contour of their fields using an A-frame level. They were also to support the "ramp" with live stakes, grasses such as "Pennisetum," or seeded hedgerows such as "Leucaena." To improve the traditional "kleonaj," peasants were to plant live stakes or grasses downslope of the structure and equidistant in ravines. These improved techniques yield increased agricultural production (via moisture retention), forage, and fuel and are now widely promoted in Haiti.

Source: White 1992a

In Papay, in 1988, a number of peasants associated with the "Mouvman Paysan Papay" (MPP) organization initiated new groups ("brigad") to install soil conservation techniques on member lands. MPP has since actively promoted the practice and more than 500 "brigad" existed in 1989 (Gerner 1989). Similarly, in Maissade, numerous labor exchange groups ("asosye") associated with the Save the Children Foundation (SCF) project have added soil conservation tasks to their agenda. They now install contour structures on member lands (White 1992a). The government repressed many, if not most, of these types of groups after the overthrow of President Aristide in September 1991. In particular, it violently oppressed the MPP groups.

#### Interpretation and Synthesis: Key Issues for Policy Design

This brief overview of rural Haiti and land use innovations illustrates a number of points.

Given current products, prices, and technology, most farms are too small to provide adequate household livelihoods. Rural livelihoods are thus increasingly marginal and insecure. Population growth and decreasing land base per household, political oppression, and a lack of off-farm employment opportunities has led to diminishing productivity from land and labor investments. It has also resulted in a rise in rural emigration. Though indigenous soil conservation and agroforestry investments raise household income and security, the financial impact is not substantial. Alone, they do not significantly alter the worsening difficulty of rural life. The gains of indigenous conservation innovations, though positive, are not substantial when compared to the overall requirements of subsistence.

Multipurpose trees, and integrated farming systems, have played and continue to play a vital role in Haiti. They aid national

economic development, produce products, and increase savings and security for the poor. As peasants depend on their tree reserves in emergency situations, trees are becoming more important because of their multiple uses, low labor requirements, and the flexibility in harvesting. This finding is widely reported in developing countries (Chambers and others 1989). Tree planting and management is profitable for peasants and sometimes more beneficial than agriculture over the long-run. However, they can only productively manage a portion of land in trees and still meet food requirements and financial needs. People are relying more and more upon fruit trees for food. And they are using fast-growing timber species for generating quick income.

Tree domestication (via agroforestry for multiple products) is a longstanding rural response to decreasing land holdings. Peasants have steadily eliminated coffee trees from their gardens because of low and uncertain returns and the increasing and stable value of food crops. With economic stability, decreased pressure on the land from off-farm employment, and increased tree product prices, trees could become a greater source of sustained income.

Indigenous social organizations can increase access to the factors of production, protect member subsistence, and generate technical and institutional land use innovations. Peasants have created technical and institutional innovations that could contribute to sustainable and productive rural livelihoods. Land degradation then is not due (at least primarily) to a deficit of land use technology or to a lack of local organizations. The breakdown of indigenous organizations and land use rules have facilitated degradation. And policymakers have mostly ignored these institutions. These findings are consistent with a growing amount of research on developing countries (Blaikie 1985, Bromley 1992a, Galbraith 1979, Jodha 1992, Ostrom 1990).

Pervasive insecurity, augmented by political repression has discouraged investments in conservation practices, the creation of innovations, community development, and collective action on land use problems. This lack of security over political trends, future agricultural prices, and social expectations, is perhaps the greatest problem in rural Haiti. It creates an environment where peasants avoid risk and think twice about collective action that could further their welfare. This conclusion is also consistent with those of other authors who have identified insecurity as perhaps the most fundamental constraint to innovation, institutional formation, and economic development (Runge 1986, Sen 1967).

In sum, the causes of land degradation and declining productivity are many, major, and complex. Evidence indicates that it is not a deficit in land use technology that causes degradation and poverty. Instead, it is pervasive insecurity, a deficit in production resources (land and capital), and the limited opportunity for off-farm employment. These deficits partly occur because of the taxing of rural surpluses and the absence of reciprocal investments in rural human capital. The government has viewed rural institutions that can pool knowledge and capital

and generate innovations as a political threat and oppressed them for decades.

Because arable land is insufficient and agricultural prices already high (compared to the international market), new opportunities for higher returns to off-farm labor could offset rural decline. This would relieve pressure on the land and thereby possibly increase returns to farm investments. It would also increase the possibility of adopting conservation practices to support more sustainable and productive agriculture.

## THE EXPERIENCE AND IMPACT OF NATURAL RESOURCES PROJECTS

### Natural Resource Project Approaches and Organizational Structures

Projects, funded largely by external donors and implemented either independently or with the government, have been the primary means of addressing rural poverty and land degradation problems. Throughout the 1970s and 1980s natural resource projects comprised between 5 and 15% of all multi- and bilateral projects and total aid funds (UNDP 1976, 1977, 1978, 1980, 1981, 1984, 1987, 1990). Most total funds during this period targeted transportation and urban infrastructure. During the 1980s, total multi- and bilateral aid for natural resources and agriculture alone ranged from US\$31 to 50 million a year. And more than 132 separate projects were in operation (AID 1990). This section reviews the overall approaches, extension strategies, and organizational arrangements used by projects.

### Methods for Improving Land Use

The approaches used to change rural land use fit in two categories: the landscape infrastructure ("équipement du territoire") and the agricultural parcel approaches.

#### The Landscape Infrastructure Approach

Most major development projects have utilized the "équipement du territoire" approach. This is characterized by large-scale prescriptions for reforestation, watershed treatment, and the use of monetary and commodity incentives to attract peasant adoption (Lilin and Koohafkan 1987). Technology transfer is the basic orientation (see box 6). Watershed management projects have often targeted highly degraded and steep lands upstream of important water development projects. Reforestation projects often concentrated on abandoned government and absentee landholder land. This approach focuses on deforestation and soil erosion as a local problem solved by planting trees and installing project conservation structures.



## Box 6 - Local Versus "Expert" Technology: The Common Predilection for Technology Transfer

External aid agents have frequently identified local knowledge or technology as a primary causal factor for poverty and land degradation. Apparently assuming that local knowledge was insufficient, the focus of most projects has been to transfer some sort of technology to local peasants. Several examples illustrate this common theme in external aid to Haiti.

1. According to Schmidt (1971: 181), a 1929 evaluation of U.S.-led cotton promotion projects by the chief agricultural officer found that "Haitian peasants were growing cotton more successfully than American plantations which employed the latest scientific methods."

Also U. S. projects "had failed because promoters had been unwilling to study the techniques employed by local people who had, through generations of practical experience, developed locally viable methods."

2. The Marbial/FAO project, initiated in 1950, first promoted bench terraces and stone gully treatments. After later experience, the project began promoting modifications of local soil conservation techniques (Pasto 1954).

3. The USAID-sponsored Pan American Development Foundation (PADF) agroforestry project was the largest tree planting project in the history of Haiti. It almost exclusively supplied exotic tree species (such as "Leucaena" sp., "Eucalyptus" sp.) during the early years of the project (1980s). But based on local demand, by 1990, local species comprised about one-half of all seedlings supplied (PADF 1991).

Since the late 1970s, many development workers have criticized this conventional approach and these techniques. They conclude that the vast majority of conventional forestry and watershed management projects have not improved productivity and have not achieved sustained adoption (AID 1990, BREDA 1988, Bureau 1986).

Basic shortcomings include a primary orientation to tree planting rather than tree management and mechanical rather than biological structures. They also include disregard for individual landowner preferences, indigenous knowledge and propagation techniques, and socio-cultural institutions and land tenure complexities (Murray 1979, Lilin 1986) (see box 7).

In addition to these weaknesses, some agents and peasants have criticized the provision of commodity and monetary incentives as demeaning. They conclude that it reduces self-reliance, depresses local crop prices, and causes peasants in adjacent areas to stop voluntarily adopting techniques.

Conventional projects have usually promoted several preselected, expertly-designed techniques. They have taken the perspective that extension is a process of persuading peasants to adopt these techniques (cf. Agarwal 1983). Projects have assumed that the

promoted forestry species and planting arrangements were inherently good and appropriate for all targeted peasants. Thus, rather than investigating peasants' ability to manage their trees, conventional projects have concentrated on persuading peasants to plant project trees or install soil conservation structures (White and Jickling 1992).

#### Box 7 - Lessons from Marbial: The First Externally-Funded Natural Resource Activities in Haiti

The United Nations started the first rural development project in Haiti in the Marbial Valley in 1950. In the final report to FAO, T. A. Pasto (1954) summarized the experiences of the forestry and soil conservation activities. He recommended extension strategies that worked with local, indigenous groups ("kombit") in developing and adopting land-use techniques. The project also conducted educational sessions in which groups examined local land-use problems. Pasto noted the existence of indigenous soil conservation structures ("ramp pay" and "kleonaj") and that farmers did not always build them on the contour. Project technicians encouraged further construction of these techniques, provided contour levels, and various grasses for hedgerows. The project began with a centralized tree nursery and then shifted to household nurseries, providing mostly fruit and trees to shade coffee. Project technicians recommended:

- \* working through local groups to identify problems and to transfer techniques,
- \* building on local techniques,
- \* shifting from central to household nurseries, and
- \* planting fruit trees.

These recommendations are almost identical to those of conventional projects conducted during the 1970's and 1980's. They represent an approach project evaluators recommend today, some 40 years and many projects later.

#### The Agricultural Parcel Approach

The experience and critique of conventional projects generated several important shifts in project approach during the 1980s (STABV 1990).

- \* Agroforestry and low-input biological soil conservation structures gained preference over conventional reforestation and mechanical soil conservation techniques.
- \* Project administrators rejected the categorical application of the conventional "equipment du territoire" approach to reforestation and soil conservation in favor of farm-level interventions.
- \* Planners realized that external incentives (in the form of food

and currency) were not necessary to achieve tree planting and soil conservation adoption.

These shifts corresponded to the recognition that sustained peasant adoption of conservation practices depended on their capacity to raise agricultural production. This shift amounts to the application of farming systems approaches to achieve conservation goals. Since the early 1980s, most agricultural development, integrated rural development, and agroforestry NGO projects have integrated these lessons into their design.

In addition, findings by anthropologists in the late 1970s led to other substantial shifts in forestry aid approaches in Haiti. These anthropologists learned that, in order for forestry projects to be successful, peasants must have full rights over the trees planted. Projects should also promote trees as cash crops, rather than as means to reforest Haiti and save soil (Murray 1979). In essence, anthropologists found that in order for forestry aid to work in Haiti, interventions must fall within (and support) the historical trend of tree domestication (i.e., agroforestry) rather than attempting to reforest Haiti. The USAID-financed Agroforestry Outreach Project (1981 to 1989) and its follow-on, Agroforestry II (suspended in 1991 due to political turbulence) concentrated on these new notions of agroforestry as tree domestication.

The agricultural parcel approach is successful for erosion and productivity concerns on private lands. But it does not deal with "public" erosion problems, such as erosion that crosses boundaries. Several organizations have recently begun small "bottom-up" watershed management approaches with positive results. These programs aim to increase overall productivity by getting watershed landholders to coordinate land use activities in the watershed. These landholders cooperate to install checkdams in the ravines that cross property boundaries. The hope is that this collective activity will spontaneously diffuse to nearby watersheds.

Research on the dynamics and impacts of the small-watershed program in Maissade shows that the cooperative treatment can be effective and sustained after direct project influence (see box 8). Two years after the program started in 1988, peasants had voluntarily installed more than 590 checkdams<sup>[note 9]</sup> in the main ravines in 22 small watersheds. More than one-half of the groups remained active in 1992, four years after they started and two years after project assistance terminated. Even though the peasants did not always form watershed-specific management groups, complete ravine treatment is still possible.

In sum, different levels of net gain and watershed and landholder heterogeneity will result in different institutional formations. Although this approach shows promise, with the limited amount of experience, it is too early to assess fully the problems and potential of this approach in Haiti.

Current Extension Modes

During the 1980s and early 1990s, projects used the following extension methods to promote adoption of agroforestry and soil conservation techniques in Haiti (adapted from Murray 1990).

#### A Commandante Mode

Adoption occurs because of project authority or project disbursed wages. This mode usually accompanies joint government/international donor projects that use the "équipement du territoire" approach. This peasant persuasion method can result in rapid and extensive tree planting but can also jeopardize long-term development objectives. The Fonds Agricole/European Economic Community agroforestry project in Ka-Philippe is an example of this approach. Providing food for work at US\$50/kilometer of hedgerow established, this project established 4,400 kilometers between 1984 and 1988 (Francisse 1989).

#### Box 8 - Key Findings from Research on Small Watershed Management in Maissade

In 1988, Save the Children Federation launched a pilot participatory watershed management project in 22 small watersheds in Maissade, Haiti. This program encouraged peasants to voluntarily form groups to install soil conservation measures in their watershed areas. Some of the key research findings follow.

1. Participation correlated most highly with prior membership in peasant cooperatives ("groupman"), prior adoption of soil conservation structures, and land position in the watershed, respectively. Participation did not correlate with land ownership in the watershed or the actual construction of checkdams on participants' land.
2. A majority of watershed landholders participated, and participants regularly and voluntarily treated nonparticipant land. Twenty-eight percent of all checkdams were constructed on nonparticipant land.
3. The degree of cooperation and treatment did not correlate with watershed size or the socioeconomic diversity of landholders. The fact that individuals, rich or poor, have scattered plots apparently encourages interest in watershed management.
4. More than one-half of participants did not benefit from the construction of checkdams on their land within the two years of study. As most participants were members of peasant cooperatives and labor exchange groups, it is hypothesized that the activity actually functioned as a mechanism for labor reciprocity.
5. Peasants constructed checkdams on land regardless of tenure status. People participated regardless of the status of their landholding in the watershed.
6. The poorest class of landholders made leading and substantial labor contributions to the activity. In this case, the poor were

not too poor to contribute labor to a conservation activity. Evidently, the poor will make substantial contributions if the effort is within a framework of assured labor reciprocity.

This research shows the strong demand for labor, the strong role of labor exchange groups, and the ability of peasants to voluntarily manage landscapes given a positive policy environment.

Source: White and Runge 1992

#### A Technique by Task Mode

Agricultural extension-type agents promote project-selected techniques and receive pay based on the number of extension tasks completed. The Pan American Development Foundation (PADF) agroforestry project (part of the AOP/AFII) is an example of this approach. Since 1988, PADF has paid extension agents ("animateurs") separately for registering, training, and evaluating each participating peasant. This approach uses project-peasant communication and is administratively efficient. It has resulted in the planting of more than 45 million seedlings by more than 200,000 peasants between 1982 and 1990 (PADF 1991).

#### An Integrated and Participatory Promotion Mode

Projects develop and extend agroforestry and soil conservation techniques along with other community development interventions. Techniques use indigenous practices and local peasants help refine and promote them. Projects using this mode usually focus on select communities and encourage peasant organization. The Helvetas, Mennonite Central Committee (MCC), and Save the Children Federation (SCF) projects are examples of this approach.

#### Description of Organizations Active in Natural Resource Projects

The groups below work specifically with natural resource projects.

The Ministry of Agriculture, Natural Resources, and Rural Development (MARNDR)[note 10]

In fiscal year 1985, the MARNDR functional operations budget was less than 3% of the national budget (Pierre-Louis 1985). Approximately 75% of total MARNDR funds went for salaries (Cassagnol 1990). MARNDR has mostly allowed international donors to define the program.

Donor funds, the largest part of program budgets, are erratic and project related. They cannot cover the long-term program costs of continuing investments such as research and extension. MARNDR has very limited capability to devise, manage, or implement projects. Their extension service is largely inactive, lacking training, direction, and resources. Historically, the major thrust of Haitian government programs and policies has been to increase agricultural production through the greater use of irrigation, capital goods, and high yielding varieties (USAID

1985).

#### The Multilaterals

The World Food Program, the European Economic Community, United Nations Development Program, United Nations Food and Agriculture Organization, Inter-American Development Bank, and the World Bank have all been involved in forestry and soil conservation projects in Haiti. These agencies are mandated to work directly with the government. They have attempted to develop government institutions by training staff and purchasing materials and vehicles.

In the rural areas, multilateral projects have provided substantial employment and food in the direct impact areas. These projects undeniably have benefitted the targeted areas. But by most reports, they have been ineffective in achieving significant and sustained land use and welfare changes (AID 1990, Bureau 1986, Murray 1979, STABV 1990).

#### The Bilaterals

The major bilateral organizations include the Canadian International Development Agency (CIDA), France's Fonds d'Aide et de Cooperation (FAC), Germany's Deutsche Gesellschaft Fur Technische Zusammenarbeit (GTZ), and U.S. Agency for International Development (USAID). Until the early 1980s and the discovery of extensive government corruption, ministries used bilateral aid. Since that time, most have contracted NGOs for project implementation; essentially they have become substitutes for government agencies.

In this way, bilaterals can improve project accountability. But the approach is problematic as projects first struggle for peasant trust and then engender long-term dependency on their services. This substitution is acceptable as long as the government allows it, and the political climate permits long-term, comprehensive implementation. Unfortunately, the political climate has historically been unstable except during periods of dictatorships.

Bilaterals do not have to work with the government and can make a substantive, long-term contribution by supporting emerging local institutions of all types. All bilaterals respond to political pressures in the relationship between their countries and Haiti, some more drastically than others. This dynamic relationship means changes in funding levels, funding orientation, and implementation strategy. Thus, it frequently threatens the long-term provision of public services. Bilaterals have a limited ability to follow through on the periodically-generated long-term plans. This means short-term commitment to specific development themes, individual NGOs, projects, and specific geographic areas.

#### The NGOs

Since the 1950s, NGOs have (partially) filled the void left by the government in rural areas by providing basic development services (education, health, agricultural extension). More than 300 NGOs now operate in Haiti.

A 1989 survey found that more than 100 separate projects promoted tree planting (AID 1990). Many have the experience, understanding, and trust of peasants and are in a good position to provide services. Some NGOs explicitly work toward the empowerment and organization of the poor. However, many provide basic services, such as health and education, and avoid direct efforts at popular organization.

Though NGOs are very diverse, there are two basic types:

- \* Those whose operation is wholly dependent upon external international donor funds. These are usually large, international organizations with limited and tenuous commitment because of the political nature of multi- and bilateral funds.

- \* Those who maintain their own private core sources of funding. These include a diverse array of international and local NGOs including both expatriate and local missionary groups and local peasant-led cooperatives.

#### Organizational Arrangements Used to Implement Projects

The government and donors have used a variety of organizational arrangements to implement natural resource projects.

#### International NGO-led Rural Development

This is a longstanding approach in which an international development NGO focuses on one place and directly addresses a variety of basic needs. Organizations of this type include Mennonite Central Committee (MCC), Cooperative for American Relief Everywhere (CARE), and Save the Children Federation (SCF).

These organizations usually either work toward forming or strengthening existing community groups. This type of organization has been popular in Haiti, and NGOs have historically operated independently of the government.

There are examples of locally impressive impacts, especially when the NGO has been successful in building strong local organizations. However, this approach has not generated impacts on regional or national levels. Often these projects and their positive impacts do not spread beyond the zone of intensive investment. This is not necessarily because of project design but from a lack of skilled NGOs, funds, and government support for expanding impacts and networking with other community groups.

Groups that implement distinct projects, usually those of international stature, often experience the same problem of unsustained project benefits and activities as government and major donor organizations. The NGOs that operate with a core of private funds usually have a long-term commitment to a specific area and to a specific population. NGOs, especially the locally-based organizations, frequently lack regular and adequate levels of financing. They also have weak administrative systems and have limited access to qualified technical assistance.

For these reasons, many NGOs have a limited capacity to manage large funds and responsibilities. The reality of short-term and

uncertain funding and short-term project targets often conflicts and frustrates long-term development goals. It is also challenging for NGOs to avoid developing local dependencies. This is a frequent product of long-term commitments that contradicts the very object of their assistance. Because of past problems, many NGOs have developed a phobia of cooperation with the government or MARNDR.

#### Local NGO-led Rural Development

There is a large number and a wide variety of locally-led rural development organizations in Haiti. These separate into two groups:

- \* missionary organizations (often with international personnel and/or funding), and
- \* local nonsectarian rural organizations.

These groups engage in natural resource activities to complement evangelical goals. Local people have focused and organized these groups to implement rural development programs. Though there are relatively few of them in rural Haiti, one in particular deserves special comment, the "Mouvman Paysan Papay" (MPP) located in Papaye. This organization focused on building a network of local peasant groups and cooperatives. It also provided for a number of basic rural concerns such as credit, technology, and education.

Both these types of groups receive funding from a variety of international organizations. Because of their focus on organization, and low profile in the international community, these organizations have frequently been the target of government repression. They often have the strongest direct connection to local groups and leaders, and many have developed expertise in group formation and training.

#### International Agency Support for Local NGOs

Several international agencies (both bilateral government agencies and private NGOs) provide funding and technical assistance to local NGOs rather than directly implementing projects. Organizations using this approach include Helvetas, Fonds d'Aide et de Cooperation (FAC) (France), Catholic Relief Services (CRS), Canadian International Development Agency (CIDA), and the Inter-American Foundation (IAF). These organizations focus on strengthening the local institutions by using technical assistance. They typically develop long-term relationships with specific local groups and for this reason have limited impact beyond those select groups.

#### NGO Umbrella Organizations

This type of organizational structure, in which a single organization acts as an intermediary between donor(s) and multiple NGOs to manage a project, is relatively new to Haiti. Only three examples stand out, the Pan American Foundation (PADF) tree planting project "Proje Pyebwa", the Haitian Association of Voluntary Organizations (HAVA), and the Targeted Watershed Management Project (TWAMP).



The PADF project, the largest tree-planting project in the history of Haiti, subcontracted tree production and extension services to almost 100 local NGOs. The group provided technology that was in demand and easily adopted, straightforward administrative systems, and extension messages that were few and simple. This method resulted in many project outputs (trees planted and soil conservation structures installed). The Foundation focused on technology transfer and did not explicitly work to strengthen the subcontracting NGOs.

The purpose of HAVA, on the other hand, was to strengthen smaller, local organizations. It provided credit funds, technical assistance upon local demand, opportunities for networking, and access to information concerning other NGOs.

The USAID-funded TWAMP project resembled the PADF model but worked with far fewer, yet larger, more sophisticated local NGOs.

TWAMP did not have the authority to manage subgrant budgets. It also could not design either the techniques promoted or the programs executed by the NGOs. Local NGOs came to resent the imposition of a weighty (and expensive) administrative layer between themselves and USAID. USAID ultimately canceled the project in 1991 because of the organizational arrangements and low outputs.

#### Semi-autonomous Government Agencies

The poor performance of donor-funded and MARNDR-implemented projects during the 1980s brought about several semi-independent organizations. Multilateral organizations funded these groups and implemented them with MARNDR. These groups include the Organisme de Developpement du Nord (OD), Organisme de Developpement du Nord-Ouest (ODNO), and the Organisme de Developpement du Bassin du Fleuve Artibonite (ODBFA). Both OD and ODNO were regional development organizations that addressed a wide variety of rural development concerns.

ODBFA differed in that it had a mandate to plan and coordinate all development and conservation activities in the entire Artibonite watershed (Louis-Jeune 1991). This organizational structure was advantageous in increased political independence and more efficient lines of authority.

However, by the early 1990s, all of these organizations had either closed or were operating with severely diminished funds. These groups could not escape the more generalized weaknesses of Haitian government bureaucracies and were unable to address constraining national policies. They were largely cut off from government funding, were unable to raise a steady supply of donor funds, and produced low output.

#### Donor-Funded Government Agencies

Funding for a specific government agency, for program implementation and institution building, was the most common form of multi- and bilateral aid until the early 1980s. This approach was advantageous to directly strengthen government institutions.

Agencies within the government are usually in a better position to change national and administrative policy than those outside. Disadvantages include the increased difficulty of action from cumbersome and politically-charged administrative systems.

A worthwhile, recent exception to this general rule has been the Secretariat Technique d'Amenagement des Bassins Versants (STABV).

STABV began in 1986 as part of the USAID Targeted Watershed Management Project (TWAMP). It functioned as an umbrella organization whose aim was to strengthen MARNDR's ability to plan, monitor, and evaluate watershed management projects. STABV was a startling departure from traditional MARNDR agencies because it:

- \* publicly recognized the positive contribution of NGOs in development efforts and sought to work with them, and
- \* understood that MARNDR's greatest contribution was in planning, coordinating, and monitoring development activities.

STABV began the difficult process of surveying and cataloging the many NGOs and projects in the country and distilling out key technical and strategic lessons. STABV worked within the Ministry to focus on key issues and improved government relations with NGOs throughout the country (Pierce 1988).

#### The Experience and Impact of Forestry Projects

The goal of most official forestry projects has been to produce quantifiable outputs such as planted seedlings. However, some projects (and organizations) have promoted activities that are much more difficult to assess such as training or cooperative formation. Few projects of any type have been critically evaluated in terms of their impact on the welfare of people and the status of natural resources. This section presents a series of findings from studies conducted by White and Jickling (1992) and Jickling and White (1992) of projects that directly intervened to change land use. These studies assessed projects in terms of:

- \* sustainability: what techniques have been adopted?
- \* distribution: who has benefitted and how much?
- \* efficiency: are the projects an efficient use of public funds?

#### The Sustainability Dimension: What Have Peasants Adopted?

Adoption has occurred when peasants actually use project innovations in their farming systems. Simple survival of the trees planted as part of the project does not show adoption. A recent review of the sustainable forestry and agroforestry projects (Jickling and White 1992) shows these conclusions.

Except in a few areas, there is little evidence that the conventional, "équipement du territoire," reforestation projects have had a lasting impact. Early reforestation projects mostly promoted native timber species produced in large centralized plastic bag nurseries. Peasants planted the trees along contours within gardens, abandoned fields, public degraded forests, or in community woodlots (Murray 1979). Apparently, most trees planted have either died from neglect, livestock predation, or peasants cut them down and did not replant. Multilateral aid projects have generally continued this conventional reforestation approach despite its widely-recognized poor performance (Bureau 1986, Lilin and Koochafkan 1987). In the areas where people still cultivate conventional project trees, the trees are either fruit trees like "Citrus" species, (such as the ODBFA project in Peligre) or easily cultivated, highly-valued, and thin-crowned timber trees such as "Simaruba" species and teak (such as the FAO project in Maniche).

Recent agroforestry projects have been very effective in delivering large numbers of trees and achieving high survival rates. In the 1980s, bilateral and NGO projects usually adopted an agro-forestry approach targeting individually-owned agricultural parcels. Most projects promoted fast-growing, exotic species best suited for fuel use. Peasants planted most trees in traditional mixed arrangements but mainly along garden borders (Ashley 1986).

In the late 1980s, after peasant requests, projects began to deliver more local species that were slower-growing but higher-valued. They also began supporting limited peasant production of fruit trees despite strong peasant demand. This occurred partly because of technical and nursery constraints and partly from project efforts to encourage local production. Seedling survival has steadily risen in major agroforestry projects. PADF's average, one-year survival went from about 30% in the early eighties to greater than 50% in 1990 (PADF 1991).

Agroforestry project trees are in high demand and anecdotal evidence suggests that, in some areas, agroforestry project trees continue to grow in nurseries. People have cultivated natural regeneration ("Azadiracta," "Cassia") after agroforestry project closure. Most agroforestry projects report that peasant demand for project trees greatly overwhelms their potential to supply. In the CARE project of the AOP, for example, more than 90% of tree planters wanted to receive project trees again (Starr and others 1992).

The AOP/AFII project began to consider the problems of sustainability in the last two years of project operation and began to encourage tree production at the local level. This involved encouraging community and household nurseries (see box 9). By 1991, more than 170,000 peasants associated with the PADF project were producing their own trees from more than 800 home and community nurseries (USAID 1993). Unfortunately to date, no one has conducted an extensive systematic survey of post-project, project tree cultivation or utilization.

## Box 9 - Father Bloque and "Kapab": An Example of Spontaneous and Inexpensive Diffusion

During the mid-1960s Father Bloque, a Roman Catholic priest, introduced "kapab" ("*Colubrina arborescens*") seed to the Las Cahobas area of central Haiti and planted seedlings around his circuit churches. "Kapab" is a fast-growing tree with superior form for agroforestry systems (straight and self-pruning). Parishioners collected seed, and now "kapab" trees frequently grow in the household gardens and fields of both parishioners and non-Catholics alike throughout the area. Though Pere Bloque left Las Cahobas in the mid-1970s, peasants still collect and give the seed to others. The PADF project began activities in Las Cahobas in the mid-1980s and delivered an inferior variety of "kapab" to local peasants from another area of the country. Within several years, the project began delivering seedlings of the local superior variety.

Source: Campbell 1993

### The Distribution Dimension: Who Has Benefitted and How Much?

No one list of forestry projects, numbers of trees planted, or number of peasants impacted exists in Haiti. It is difficult to even estimate the dimensions of government-led conventional reforestation impacts. Most records are poor and difficult to retrieve and decipher. The NGO-implemented projects have a much better record on monitoring. This section presents a synopsis of the known information. With limited data available, the findings are tentative.

#### Distribution of Benefits

By project closure in 1991, the AOP/AFII, by far the largest agroforestry project in the history of Haiti, reached approximately 90,000 peasants a year, and was responsible for planting about 9 million trees a year (USAID 1993). Many other projects, of course, also promote tree planting, but most project trees planted in Haiti between 1980 and 1992 came from AOP/AFII. AOP project documents show that middle-class peasants have disproportionately benefitted from project agro-forestry. They have sufficient land and time to invest in tree planting (Conway 1986, Smucker 1988).

A recent gender analysis of tree use in Maissade showed that women overwhelmingly viewed project tree seedlings as "men's trees." This occurred because men controlled their harvest and financial returns (White 1993). These were the same timber tree species planted nationally by PADF and CARE in the AOP. Women also clearly stated that they controlled and directly benefitted from fruit trees, not timber trees. Though women undoubtedly profit somewhat from timber tree planting, these findings show that perhaps men have benefitted more from most agroforestry projects.

#### Level of Benefit

The actual return to peasants from participating in agroforestry projects is difficult to determine. There also have been few financial or economic analyses conducted in Haiti.[note 11] Several economic analyses have examined the profitability of fuelwood production from project trees from the peasant perspective. We should view the results of these analyses as relative indicators rather than precise measures of value. Following are results of these analyses (Jickling and White 1992).

Studies show that fuelwood plantations cannot be profitable at the farm-level and cannot compete favorably with food crops unless retail prices increase drastically (Earl 1976, Barkley 1983). Earl (1976) found that farm-level fuel production costs were 28 times the farmgate price. They remained 3.4 times the farmgate price even when labor was given a value of zero. These findings supported the need for the integrated management of both trees and crops.

Plantations for poles on large holdings can be profitable when near to urban areas. Josiah (1987) examined the profitability of "Casuarina" plantations on large landholdings near Port-au-Prince where peasants used stems for poles and excess material for charcoal. Because of high site quality and market proximity, this venture was highly profitable (benefit-cost ratio 6:1) and compared favorably to alternative agricultural investments.

Project agroforestry is modestly profitable to peasants in financial terms (see box 10). In the recent study conducted by Jickling and White (1992) in Maissade and Maniche, the addition of project trees to the prevailing indigenous agroforestry systems increased farm-level net present values by less than 3% in one case and 2% in the other (see box 11). This increase compares poorly with the addition of indigenous agroforestry, which increases NPVs 13 to 25%. All land uses (pure agriculture, indigenous agroforestry, indigenous plus project agroforestry) yielded about the same benefit-cost ratio of 2:1. However, agroforestry systems yielded higher net returns than pure agriculture.

Returns to labor increased 8% and 10% per person day invested (see box 12). Annual financial net revenues increased 7% per hectare in one case and 14% in the other with the addition of project trees. These additional annual incomes would translate to \$11 (Maniche) and \$47 (Maissade) if peasants converted a full hectare to indigenous plus project agroforestry. These studies did not include the nonfinancial benefits of trees such as increased security via savings. Other studies, though varying tremendously in assumptions, have found results in the same range (Grosnick 1986a, Eysinga 1989, Bellerive 1991).

In total farm income and household subsistence, the agricultural portion of the agroforestry system is currently more important than tree management. It will limit major investments in trees. Agriculture is by far the main contributor to farm income. Thus 50% increases in agricultural yields raised farm net present values by an average of 78%. However, 50% increases in wood

product yields only raised farm net present values an average of 13% (at 20% discount rates). Given the subsistence value of agricultural production, peasants would be hesitant to substantially increase investments in tree management despite the slightly higher return of trees and the other security benefits that they provide.

#### Box 10 - Indications of Peasant Benefits from the PADF Project

Researchers conducted a survey of 47 peasants from all regions of Haiti who marketed harvested PADF trees in 1991. They found that the average gross return from product sales was \$34.2 (assuming a 10.0 Gourde to 1 US\$ exchange rate). The average age of the trees harvested was 5 years and peasants harvested an average of 71 trees. This means that the average project tree had a market value of \$.48 after 5 years. Though small, this amount is a positive contribution to household income. Major resulting products were poles and beams (42%) followed by poles and charcoal (30%) and charcoal (28%). Trees used for poles and beams averaged 6 years old and had the highest per tree value. This data should be interpreted with caution. A sample size of 47 from a population of thousands is very small. Many anecdotal accounts show that people regularly have used project trees for home, shed, church, and school construction.

Source: Internal PADF data provided by Scott Josiah, former assistant director, PADF-Haiti 1992

These results may seem to contradict widespread peasant enthusiasm for planting project trees. They do not. In short, we can interpret the findings like this. Peasants are poor. The project trees are free. The number of seedlings delivered require little land or labor investments, and they can yield some cash. For a poor peasant, almost any cost-free investment that yields a positive return is a good one, until it threatens basic household security.

Enthusiasm for project trees depends on the amount of land peasants can plant to trees and still assure family subsistence. For most peasants, who own little land, the option to substantially increase tree plantings is not a very real one. Current trends show that food prices are rising faster than wood product prices. This means that despite the profitability of project tree management, peasants will increasingly manage their land for food. They will sacrifice long-term tree profits for short-term food needs.

#### The Efficiency Dimension: Are Projects Economically Efficient?

To my knowledge, there has been no economic analysis to date on a conventional reforestation project in Haiti. Because these projects were often vehicles for rural labor creation and food distribution (such as food for work), it is difficult to assess their actual impact. Though these projects did not usually

result in greater numbers of trees, they did (and do) subsidize rural households. No one has determined the effect of these projects in higher numbers of trees, numbers of households, and economic value of benefits. Given the spotty nature of government records, it would be very difficult to get this information.

Economic analyses of the USAID/AOP have found it to be efficient with internal rates of return (IRR) between 9.1 and 33%. Grosnick (1986b) conducted a post-project analysis and found an IRR of 9.1%. Eysinga (1989) conducted a post-project analysis on the same project in 1989 and found an IRR of 33%. Fleming and Karch (1991) conducted a post-project analysis of the proposed follow-on to the AOP project (USAID/AFII) and found an IRR of more than 50%. The IRR is notably greater in this analysis because of the introduction of soil conservation and agricultural components in the project program. Others have criticized these analyses for overestimating the decline in agricultural production without the project, the performance of project-trees, and value of project-tree products. None of these analyses used empirical tree valuation or pricing data.

Box 11 - Financial Returns to Agroforestry in Maniche and Maissade: Peasant Perspective.

Land Use	Maissade/SCF	
	Net Present	Average Annual
	Value@ 20%	Net Revenue
Agriculture	\$847.5	\$281.5
Indigenous Agroforestry	\$957.6	\$340.2
Indigenous + Project Agroforestry	\$976.0	\$387.1

Land Use	Maniche/PADF	
	Net Present	Average Annual
	Value@ 20%	Net Revenue
Agriculture	\$231.0	\$107.2
Indigenous Agroforestry	\$312.4	\$149.8
Indigenous + Project Agroforestry	\$320.7	\$160.5

Notes:

1. All values are in US\$/ha (@ 10.0 Gourdes/US\$).
2. Average Annual Net Revenue = non-amortized net returns, labor inputs valued 0.

Source: Jickling and White 1992

The addition of indigenous agroforestry systems to pure agricultural systems increase average yearly net revenues per hectare 20 and 40% in Maissade and Maniche. NPVs increase

between 13 and 35% with the addition of indigenous agroforestry. The addition of project trees increases net revenues an additional 7-14% and NPVs only 2-3%. If labor inputs were valued at market rates, then the average annual net revenues would decline to about 50% of the above figures.

Recent post-project analyses, based on actual utilization studies, found IRRs of 12.6% for the SCF project and 4.3% for a PADF subproject (Jickling and White 1992). Both projects were complex and it was difficult to determine economic prices over the life of the project. Therefore, the authors calculated project IRR by including average project seedling costs in the farm-level analyses. They subtracted project activities unrelated to agroforestry (soil conservation, animal husbandry, rural infrastructure) from budgets to determine the average seedling costs. The PADF subproject studied represents only one of many PADF subprojects investments. We should not interpret it to necessarily represent the efficiency of the total PADF project.

Box 12 - Return to Labor (US\$/person-day) from Different Land Use Systems in Maniche and Maissade

Land Use Systems	Maniche	Maissade
Pure Agriculture	\$0.95	\$1.66
Indigenous Agroforestry	\$1.19	\$1.83
Indigenous + Project Agroforestry	\$1.29	\$2.08

Source: Jickling and White 1992

Note:

1. Exchange rate 1 US\$ = 10.0 Gourdes

Haitian peasants usually value the labor they invest in their own production at less than market rates. Therefore, the financial returns from labor often provides a more accurate measure of benefit to farm household from changing land uses than net present value or benefit-cost measures. In Maniche, adopting indigenous agroforestry increases the return to labor 25% compared to 10% in Maissade. This difference relates to the lower productivity of Maniche agriculture and a greater incremental return to tree crops than in Maissade.

Project investments which increase agricultural production are much more efficient than investment in timber production. White and Quinn (1992) examined the economic efficiency of the soil conservation and agroforestry programs of the SCF project. They found that the project's soil conservation program was much more efficient than agroforestry investments. Benefit-cost ratios for the total project was 1.5 for the soil conservation component and 3.5 and 0.2 for the agroforestry component. This project is representative of the small, integrated, and participatory rural development projects in Haiti.



## The Experience and Impact of Soil Conservation Projects

### The Sustainability Dimension: What have Peasants Adopted?

A 1986 Ministry of Agriculture survey estimated that peasants have adopted soil conservation measures on about 18,000 hectares of land. Another more recent survey found that soil conservation techniques were adopted on an additional 1% of cultivated land per year (AID 1990). Though these figures are estimates, peasants increased the pace of use in the late 1980s as projects began promoting contour "Leucaena" hedgerows. Between 1987 and 1990, PADF alone was responsible for installing more than 625 kilometers of contour soil conservation treatments (PADF 1991). And just in the spring of 1991, about 1,500 peasants planted 215 kilometers of hedgerows and constructed 2,200 checkdams (USAID 1993). The study reviewed project outputs by the number of soil conservation treatments installed and perhaps the number of adopters. These are easily measurable indicators and show a level of effort but not whether benefits are sustainable or diffusible. Experience and anecdotal evidence (White and Jickling 1992) indicates the following points.

Peasants have not adopted or maintained mechanical measures, including bench terraces, contour rock walls, and canals, without external incentives. These techniques require substantial labor investments. They result in little economic benefit and are culturally alien to peasants. The only areas where peasants have adopted and maintained these techniques are where they intensively cultivate highly-valued vegetables.

Peasants have widely adopted and maintained vegetative techniques, including hedgerows, wattling (crop stubble barriers) and gully plugs without external incentives. These vegetative techniques provide multiple benefits such as, forage, wood, and increased agricultural production, and they require limited labor. Peasants have not adopted lemongrass and vetiver ("Vetiveria zizanioides") apparently because these grasses do not provide forage or any other benefit in addition to soil conservation.

Soil conservation techniques that peasants have widely adopted without external incentives have the following characteristics.

- \* They combine preexisting techniques familiar to peasants ("ramp pay," bit, hedgerows) and are compatible with other agricultural and social activities.

- \* They are simple, use locally available resources, and require low and nonfinancial installment costs.

- \* They provide relatively short-term economic returns the same or next agricultural season.

- \* They are adaptable to specific farm site conditions, management

goals, and preferences. This factor helps peasants feel ownership and authorship of the technique.

\* They are easy for peasants to adopt in steps depending on their levels of knowledge, resources, and incentive.

To conclude, peasants have adopted erosion control when it increases their income not because it saves soil. The techniques which peasants have spontaneously diffused outside the project boundaries, "tran," "ramp pay," "kleonaj," are indigenous but improved by project technicians. Labor availability also appears important to peasants. They have not adopted any technique that requires high labor.

#### The Distribution Dimension: Who Has Benefitted and How Much?

No soil conservation project that I know of in Haiti has examined the socioeconomic or gender status of its beneficiaries. There have been few economic analyses of soil conservation efforts in Haiti, either "ex ante" or "ex post," at either the peasant or project level. Accurate project level budget information is difficult to obtain and decipher. It does not contain enough detailed or reliable information for the government-sponsored projects. The several project "ex ante" analyses located were based on national averages and estimations of erosion and yield rates and conducted by multilateral development bank agencies (such as World Bank 1991).

A recent "ex post" study conducted by White and Jickling (1992) on soil conservation treatments promoted by SCF in Maissade yielded the following results.

The NPVs of all soil conservation treatments (hedgerows, "ramp pay," rock walls, and gully plugs) almost double those of the no-treatment scenario at discount rates below 25%. But the benefit-cost ratios of the treatment and no-treatment cases were similar.

These differences diminish with increasing discount rates. But the NPVs of all treatments remain much greater than the no-treatment (standard agriculture) NPV at the 30% level (see box 13). All land use options have similar benefit-cost ratios. This implies that land or labor constraints might discourage adoption. The low level of input costs and high benefit-cost ratio of the "ramp pay" helps explain why peasants have adopted this technique quicker than others.

All treatments are profitable at all erosion rates tested. The authors used a Universal Soil Loss Equation (USLE)-based model to predict changes in crop yields at different hypothetical erosion rates, with and without soil conservation. They calibrated this model with real, on-site soil erosion and crop production data. A 50% rise in erosion rate decreased treatment NPVs decline by 15 to 25%. Similarly, a 50% decrease in the estimated erosion rate caused all treatment NPVs to decline by about 10% except in the hedgerow where the NPV increased slightly. This results from decreasing difference between yields on treated land and

untreated land as erosion rates decline. The smaller this difference, the more difficult it is to justify investment in soil conservation. This 50% decrease in erosion rate puts the estimate in the range of erosion reported in other parts of Haiti (less than 100 T/ha/yr onfarm). This suggests that, for areas with erosion rates less than those in Maissade, conservation treatments would have a less favorable NPV and benefit-cost ratio. Also only low input techniques would be economically justifiable.

Only low input techniques, such as "ramp pay," remain profitable with very high (or very low) erosion rates and high discount rates. Extreme increases and decreases in erosion rate estimates cause a decrease in the value of all techniques. This occurs because of the decreasing difference in yields between treated and nontreated lands. An increase in personal discount rate (the minimum rate of return required by individuals before investing) similarly decreased the value of all conservation investments. These findings show that for many peasants' conditions of high erosion and high discount rates, only low input techniques are profitable.

The Efficiency Dimension: Are Projects Economically Efficient? Several authors have examined the costs of conventional watershed management treatments but have not conducted an economic efficiency analysis. In one typical multilateral project, costs for food aid alone (incentives to laborers for the construction of soil conservation treatments) ranged from US\$200 to US\$900 per treated hectare. It required 140 to 1000 person-days to treat a hectare (Amat 1977). Another project, that provides food aid for contour "Leucaena" hedgerow construction, pays about US\$50 of food aid per kilometer of hedgerow constructed (Francisse 1989). Soil conservation measures implemented through NGOs do not usually provide such incentives and can be cheaper. To my knowledge, the SCF Maissade project is the only one that has been assessed in terms of economic efficiency. Thus, it is difficult to compare project approaches or determine whether projects have been efficient or not.

#### Box 13 - Financial Returns to Investment in Different Soil Conservation Techniques-Maissade

Land-use Option	NPV(US\$)	Benefit/Cost Ratio	Return To Labor
No-treatment	\$565.6	2.46	\$0.61
Rock wall	\$1,028.9	3.02	\$1.56
Hedgerow	\$1,260.7	3.07	\$2.23
"Ramp pay"	\$1,118.5	3.37	\$1.69

#### Notes:

1. Return to Labor is a nondiscounted measure of return per person-day invested as calculated over a 50-year period.
2. Exchange rate: 1 US\$ = 10.0 Gourdes.
3. NPV is calculated at a 20% discount rate.

By adopting soil conservation measures that reduce erosion, peasants in Maissade can increase NPV per hectare from 75-115%. Hedgerows provide the highest returns. Return to rock wall investments were profitable. But these labor-intensive structures provided lower returns compared to the other measures.

Source: White and Jickling 1992

The "ex post" economic analysis of the SCF project by White and Jickling (1992) yielded the following results.

The Maissade Watershed Management Project had an IRR of 23%, a NPV of US\$42,490, and a benefit-cost ratio of 1.32 at a 20% discount rate. However, the authors did not quantify some project benefits. These included off-site benefits such as reduced sedimentation and improved water quality downstream. They also included secondary benefits associated with increased agricultural production such as employment generation and population stabilization. If the authors had included these benefits in the analysis, the return would probably have been significantly higher. A previous economic analysis of the same project found a project level IRR of 19% (White and Quinn 1992).

The project is profitable at all erosion rates tested (93 T/ha/yr to 279 T/ha/yr). If local erosion rates were actually in the 100 T/ha/yr range (as reported in other areas of Haiti) rather than the 200 T/ha/yr range found in the field survey, then the NPV would increase by about 60%. This finding implies that similar projects conducted in less erosion-prone areas would be much more profitable. A 50% increase in the erosion rate estimate results in an NPV decrease of about 60% at the project level. This latter finding implies that similar projects would be much less profitable in areas where the erosion rate is extremely high.

>From the project perspective, the hillside treatment program is profitable at discount rates below about 27% and at all erosion rates tested. But the ravine treatment program is not economically efficient at any erosion or discount rate tested. The hillside treatment program promoted "ramp pay" and "Leucaena" hedgerows. Both showed important economic improvements, and peasants widely adopted them. A 1988 SCF decision to concentrate extension effort in 22 small watersheds restricted personnel from promoting ravine treatments throughout the project area. As a result, peasants did not install enough checkdams to generate enough benefits to justify large program costs.

#### Key Lessons From Project Experience

Recent assessments of forestry and soil conservation projects draw the following general conclusions (White and Jickling 1992, Jickling and White 1992).

Except in a few areas, there is little evidence that techniques,

promoted by conventional, "équipement du territoire" natural resources projects, have had a lasting impact. Multi- and bilateral donor-sponsored projects have poor records except in the limited cases of long-term funding commitment to NGOs and training centers. Large donors have tried to transfer a few expertly-designed technologies rather than addressing the basic causes of poor land use. Donors have not encouraged authentic collective action or used methods that encourage new innovations.

Multilateral-sponsored project shortcomings come from their multiple goals and inadequate concern for sustainable benefits. Projects usually avoid site condition adjustments and participatory methods as they complicate and thus frustrate monitoring and efficiency. Multilaterals seek to address macro-economic problems and respond to multiple government development goals. Their forestry and watershed management projects have often doubled as rural labor projects. The intent of such projects is to absorb rural labor and inject capital into farm households. In these cases, conservation is the means, not the end, and a lack of survival or sustained management is of secondary importance.

Though they are not a panacea, NGOs have carried out the most effective, efficient, and innovative soil conservation and forestry projects. Groups that have successfully promoted agroforestry and soil conservation have an in-depth knowledge of local practices, institutions, and economies. They also have an agricultural production orientation to soil conservation. They either built on existing technologies using indigenous groups as vehicles for extension or by encouraging extensionist-peasant communication. These projects often strengthened collective action and the potential for future innovations.

Few soil conservation projects have directly targeted training. Those that have were models for the design and extension of national soil conservation techniques. The most successful soil conservation projects have also used groups of peasants rather than individuals to help spread information.

The soil conservation techniques that peasants have widely adopted are low-input and yield large short-term benefits. They also combine preexisting techniques familiar to peasants. The traditional "ramp pay" and "kleonaj" practices, which peasants have widely adopted, are showing signs of spontaneous diffusion. These are indigenous techniques that joint peasant-technician knowledge has improved. The hedgerow, now the most widely-promoted structure, did not come from indigenous practices. It required substantial peasant training to gain acceptance.

All soil conservation techniques adopted yield large benefits to peasants within several years of construction. Investments in soil conservation outperform investments in forestry and agroforestry. Usually the techniques that have been voluntarily adopted are vegetative techniques. However, peasants usually have not adopted or maintained mechanical measures without external incentives.

Institutional innovations to implement conservation have also spontaneously formed in various areas of the country. These came from indigenous peasant groups and new knowledge concerning soil erosion and soil conservation delivered by extension agents. This shows that there is a positive role for aid to invest in technician knowledge sharing and technology development with peasants.

The new agroforestry techniques and approaches have been successful because they complement indigenous practices and the historical trend of tree domestication. They also yield significant, though modest, financial benefits to peasants. There are key differences in new agroforestry projects.

- \* They complement indigenous practices of integrating multipurpose trees into a complex farming system.

- \* They assure peasants complete tenure and harvest rights over planted seedlings.

By delivering free seedlings and promoting their planting along farm boundaries, projects subsidized expansion of traditional agroforestry. They increased incentive to plant and manage seedlings by sufficiently convincing peasants that they had full rights over the planted seedling projects. Project trees were in great demand for the same reason that peasants appreciate traditional agroforestry. Trees are a low-input, multi-use, capital that increase household security. Most of the trees grew rapidly and could provide some financial returns within 10 years.

This was an additional benefit but probably not the most important one.

Efforts to reforest Haiti have had limited and unsustained effects. Declining rural productivity, and not deforestation, is the primary cause of poverty and land degradation. Agroforestry and not forestry is a critically important component of peasant production. Agroforestry cannot masquerade as reforestation. In 1938, Nicolas, Lespes, and Lee identified deforestation as a national problem. Since then, people have blamed peasants for the ecologic degradation, saying they did not understand the value of trees or soil and made poor land use choices (Pierre Louis 1989).

Projects tried to solve the problem by subsidizing single-purpose tree planting rather than managing existing tree resources or encouraging low-input propagation techniques. This logic is similar to other social forestry projects of the same period throughout Africa (Arnold 1992, Gregersen and others 1989, Dewees 1989). Focusing on the symptoms of underdevelopment (such as deforestation) rather than the causes is also a common trait in development projects (Bromley 1992b).

Increasing the number of trees planted and the supply of fuelwood through agroforestry does not necessarily slow deforestation. Researchers recognize that tree planting is an inefficient way to solve fuelwood scarcities (Dewees 1989). Even the successful

agroforestry projects of the 1980s affected the relatively fertile agricultural plots and not the most abused and severely degraded forest lands.

The finding, that peasants will voluntarily treat small multi-owner watersheds, contradicts current thinking that peasants are inherently uncooperative. Expatriate technical advisors have frequently characterized Haitian peasants as fiercely independent, uncooperative people and have designed projects and policies accordingly. The first USAID-financed study of rural sociology concluded that the Haitian peasant "except under extreme duress, is incapable of group action to defend its interests" (Schaedel 1962: iii).

Recent findings have important implications. Various arrangements of volunteer peasants can achieve watershed management. Peasant participation correlates most strongly with previous cooperative experience. And they will voluntarily treat nonparticipants' lands. These findings show that cooperation to treat common environmental problems is possible but conditioned upon local support of indigenous institutions and a positive political climate. The widely-reported peasant resistance to cooperation is apparently a product of insecurities from political turbulence and repression, rather than an innate cultural trait.

The only gender analysis (to my knowledge) of tree use in Haiti shows that perhaps men benefit more than women from project agroforestry tree planting. Agroforestry projects overwhelmingly plant timber (rather than fruit) trees. And men (not women) control the planting, harvest, and financial benefits of timber trees. Women control the harvest and financial benefits from fruit trees. Though women undoubtedly benefit from timber trees, they would probably benefit more from fruit tree planting. In addition, although fruit trees take a long time to mature, they yield food. For this reason, they may be a more efficient investment than timber trees. Financial analyses show that timber trees yield positive but small returns.

Indigenous land use technologies have been insufficient. Peasants have not adopted conventional project technologies. And new farm technologies yield significant though relatively small returns. Future development requires substantial investments in human capital and physical infrastructure. Although project focus on transferring technology has some benefits, they are not enough to reverse the trends of rural decline. Several situations have resulted in a Malthusian situation where the poor are getting poorer. These include population growth and political repression of rural groups. In addition, the government taxes peasant income but does not invest in rural areas.

Future efforts must address:

- \* peasant insecurity over access to labor, land, and capital,
- \* a lack of peasant organizations, allowing them to pool risk,

exchange labor, and achieve economies of scale in purchasing inputs and marketing products,

- \* a lack of off-farm employment opportunities, and
- \* inadequate basic social and physical infrastructure to improve rural standards of living.

Projects, even good ones, cannot replace fiscal policies biased against the rural sector and repressive politics. Reliance on projects alone is not enough. Since the 1980s, some projects have improved, resulting in some economic benefit for participants. But overall, project investments have not reversed environmental or economic trends. They are also insufficient to significantly alter rural poverty and degradation on either the local or national level. It is unrealistic to assume that donors can muster the financial resources for projects to reach all degraded areas of the country. Per hectare treatment can cost between \$140 to \$1000 (Amat 1977, Pierce 1988). Both a positive policy framework and strong grassroots action are necessary for sustained rural development (Lewis 1988). Poverty and land degradation are largely a product of political decisions and an unresponsive state (Blaikie 1985, Sen 1981). In Haiti, large amounts of aid dollars have not been able to buy state-building or rapid adoption of specific techniques.

## POLICY DIRECTIONS AND ORGANIZATIONAL ROLES

### Introduction

This section suggests general policies and organizational roles to address these fundamental problems:

- \* peasant social and economic insecurity,
- \* weak peasant and community organizations,
- \* lack of off-farm employment opportunities, and
- \* inadequate social and physical infrastructure.

The following set of policy directions come from the preceding assessment of land use history. They are not intended as a blueprint for action. We can use them as a point of departure for future, in-depth, policy analysis and design. It is beyond our expertise and the scope of this paper to make specific recommendations for all necessary actions to bring about substantive change in rural Haiti. The suggested policies do not cover the breadth of land use policy and administrative reform issues faced by Haiti today.



For example, we do not cover the issue of public land management.

We also recognize that specific political circumstances will naturally dictate the roles and abilities of each organization. First, we review the macropolicy reforms and organizational restructuring that are necessary to achieve sustained rural development in Haiti. Second, we look at specific programs needed to improve rural productivity and welfare.

#### Prerequisites for Action: Policy and Institutional Reform

As indicated earlier, past projects have had mixed results in local areas. But they have not significantly slowed Haiti's downward spiral of land degradation and poverty. Before the government can productively spend additional resources in improving rural land use, it needs three basic policy and institutional reforms:

- \* reform of the legal framework and macropolicies that govern rural Haiti,
- \* reform of the MARNDR to serve peasants, encourage rural enterprises, and cooperate with NGOs, and
- \* alternative organizational structures to channel international aid and implement policies and programs.

#### Reform the Legal Framework and Macropolicies that Govern Rural Haiti

Sustained development in rural Haiti will be the product of:

- \* a positive legal framework,
- \* regulations and tax codes that encourage rural production and environmental protection, and
- \* subsidies for rural infrastructure, promising technologies, and enterprises.

A reformed legal framework would be the first and most important step towards rural revival. A positive legal framework would be one that:

- \* guarantees freedom for people to organize,
- \* guarantees due process of law,
- \* enables collective action to address public problems, and
- \* facilitates self-determined technical and institutional innovation (Ostrom and others 1993).

Substantial reforms in rural administrative systems are necessary for these changes to be effective. These reforms include restructuring rural administration to reduce the opportunity for graft or coercion.

The government needs to review and revise both the rural code (set of regulations pertaining to rural areas) and the tax codes to encourage appropriate and promising land use practices and formation and strengthening of local groups and enterprises. Most of Haiti is better suited for agroforestry than for row agriculture and is much more likely to be able to sustainably produce tree products. Tax and regulatory reforms to improve farm productivity include:

- \* rescinding regulations requiring government approval of tree harvest and creating new legislation assuring full harvest rights over private trees,
- \* eliminating taxes on tree harvest and transport in rural areas to reduce graft and tax bias against tree production,
- \* reducing or eliminating market taxes for agricultural products, and
- \* providing tax credits to peasants who adopt conservation practices.

A World Bank-sponsored forestry project started land use policy assessment and reform, but the work halted because of the political turbulence in 1991. The government should reassess and continue the project.

In terms of subsidies, the government should first consider those to enhance rural social and economic security and strengthen rural collective action. To operate efficiently, the government should see its role as residual, there to provide a framework for action. Then it should strategically subsidize activities for public problems beyond the ability of local groups. Priority areas for subsidy include:

- \* rural infrastructure,
- \* rural training centers to improve farm productivity and local organizational and entrepreneurial skills, and
- \* rural credit programs.

We do not promote the strengthening of rural collective action for ideological reasons. Rather, collective action is important because it is the institutional basis for pooling risk, leveraging resources, and developing community leadership.

Multilateral donors (such as the IDB and World Bank), rather than bilaterals (such as USAID and CIDA), are best to help carry out these policies. Multilateral donors must insist that natural resource projects have a broad policy framework. They must provide necessary incentives for appropriate land use and support

for local collective action. Major funding must depend on adoption of the above key policy reforms or include funding and technical assistance to devise the policy reforms. Multilaterals have access to greater funds and do not have political agendas. Therefore, they are the most appropriate donor institutions to finance basic government services with long-term returns (such as research and extension).

In these areas, program direction and funding continuity are much more important than project magnitude. Important gains can be made with low-level, consistent financing and by establishing better systems of accountability. Because of their political might, multilaterals can also encourage MARNDR to work with and through experienced and proven NGOs. In addition, multilaterals can help develop innovative MARNDR/NGO institutions.

#### Reform MARNDR to Serve Peasants, Encourage Rural Enterprises, and Cooperate with NGOs

A new government must reform MARNDR and the FRS to fit the real dilemmas of rural Haiti and the real capabilities of different development organizations involved. Reforms should include the following initiatives.

MARNDR focus should shift from promoting capital intensive row-crops and commercial timber forestry to low-input, integrated farming systems and rural enterprise development. The government needs to evaluate and reform the agricultural extension service to meet the challenges and clientele of farm agroforestry. The Forestry Resources Service needs to develop strategies to manage its forest lands jointly in cooperation with local user groups. MARNDR currently lacks the range of skills required to conduct research and perform in these new arenas. Its linkages with the other institutions are weak, and it has limited capabilities to work as partners with local people.

The government needs a permanent presence in all rural communes to manage public subsidized programs and represent local needs to national planners. A special government committee of experts convened in 1991 to assess MARNDR and recommend a new structure more responsive to peasants' agricultural needs. Haiti accepted and initiated these recommendations in August 1991, just before the overthrow of the government. The recommendations included the assignment of a MARNDR agronomist to each commune to serve as a coordinator of agricultural and forestry activities and to link with local NGOs.

MARNDR should consider following the lead of several Latin American countries (Chile, Mexico, and Bolivia) in disbanding the agricultural extension system (Kaimowitz 1993). An ineffective drain on government dollars, the current extension system cannot perform the on-site, technology-development assistance now required to promote farm production and enterprise development. MARNDR needs to establish a guaranteed internal source of core funding to pay recurrent costs. Some people have suggested a surtax on hydroelectric power (ODBFA 1987).

The government and MARNDR must establish positive relationships with NGOs and work toward planning, evaluating, and coordinating development activities. MARNDR has not been an effective project implementor. And the NGOs do not have the mandate or expertise to coordinate, monitor, and evaluate projects on a national scale. Regional MARNDR coordination of development activities could best serve the interests of the country. This would take advantage of the network and experience of NGOs, reduce duplication, and increase the technical supervision of activities.

The proposed MARNDR/World Bank/IDA Forestry and Environmental Protection Project (postponed since 1991 due to political turbulence) is an example of such a new approach. In this proposed project, implementation would be contracted to NGOs through MARNDR. In this case, MARNDR would coordinate to provide technical back up to NGOs implementing the agroforestry and rural development activities (World Bank 1991).

Initiate Alternative Organizational Structures (such as NGO Umbrella Organizations and Networks) to Implement Policies and Development Programs

The government and donors have adopted a project mentality and, regardless of many failures, have not looked beyond this approach. The project approach is inherently fragile in cases of weak institutions, short-term funding, and limited chance for follow-up. NGOs are near their absorptive capacity in terms of organizational capability with current levels of financial and technical support by government, multi-, and bilaterals. However, both local and international NGOs could make a greater contribution to rural development if given additional support.

Umbrella organizations appear to be effective in strengthening local NGOs when organizational layers are few, lines of authority are clear, and technologies are few and simple. The experience of both HAVA and PADF show that international NGOs can successfully support local groups and transfer resources. The experience of TWAMP shows that to be successful, umbrella organizations must offer key services demanded by the client NGOs. They must also have clear authority to manage programs and budgets. Organizations can help developing and carry out new policies in the following ways.

The role of local NGOs is to be responsive to and strengthen community groups. And NGOs enhance groups access to training, credit, and technical assistance opportunities. Local NGOs can serve as links between the government, donors, and local groups. Local groups can network with other NGOs to help spread information and focus donors on key issues.

International NGOs should strengthen the ability of local NGOs to better serve local people and implement activities. International organization interventions are relatively expensive. They are most efficient if they act indirectly, an arm's distance from direct implementation. International NGOs

should also complement other organizations, providing services that others are not capable of or naturally disposed to do.

For these reasons, the key contributions of international NGOs would be to:

- \* enhance the organizational capabilities of local NGOs and
- \* help local NGOs with projects by providing technical assistance, credit, and other resources such as seeds.

International groups could carry out these roles by acting as umbrella organizations (such as PADF). They could also fund local NGOs to act as umbrellas (such as HAVA) or finance networks of local NGOs that address specific issues (such as soil conservation technologies). International NGOs should shift from direct implementation. They should also avoid implementing public works projects. These would corrupt capacity to strengthen groups and would bring about dependency.

Bilaterals should focus on supporting both international and local NGO efforts. They should avoid direct implementation and joint government projects. Bilateral funds are frequently politically motivated and unreliable over time. The uncertainty of funding makes them unsuitable for projects, such as research, which require long-term planning and commitments. Bilateral agencies can contribute best by choosing certain types of intervention, such as agriculture or health, and providing long-term focused assistance indirectly through international and local NGOs.

#### Programs For Improving Rural Productivity and Welfare

Once the macropolicy and institutional reforms are in place, or at least well underway, the government needs to begin four areas of policy and program action. These are important for sustainable increases in rural incomes, reduced rural unemployment, and increased health and security in rural Haiti. These include:

- \* improving basic and essential social and physical infrastructure,
- \* strengthening local indigenous groups to manage rural development activities,
- \* supporting development of rural micro-enterprises to provide opportunities for off-farm employment, and
- \* increasing peasants' social and economic security through legal means and improved productivity.

Meeting all four needs is essential to increase overall economic productivity of Haitian agriculture and improve rural welfare.

Thus, improved infrastructure can help lower effective costs for getting products to markets and inputs back to the farm. Improved social infrastructure, such as schools, extension, and training facilities, can result in better knowledge and technology transfer. This, in turn, can improve productivity.

Better local management and organization (such as in cooperatives) can bring higher prices for outputs. This solves some of the problems associated with lags and losses in production and introduces new, more productive technologies. As mentioned earlier, consolidation of farms resulting from movement out of farming to off-farm employment can bring improved overall productivity. A good example is the lengthening of fallows and changing crop rotations to reflect agroecological conditions.

Finally, with an increase in farm security through land tenure, peasants are more likely to invest in longer term productivity-enhancing technologies. The following section discusses each of the four areas of need and the main policy interventions that the government could consider to increase productivity and welfare in rural Haiti. Table 1 also details policy actions.

#### Improve Basic and Essential Social and Physical Infrastructure

Rural Haiti lacks the basic social and physical infrastructure needed for sustainable development. Many of the suggestions below depend on the creation of such infrastructure in the areas of transportation, marketing, education, training, and health.

Since there is an urgent need to both rebuild rural physical infrastructure and address rural unemployment and underemployment, projects should be labor intensive. Projects should include road and trail improvement, maintenance and ravine treatment, and improvement of local market facilities. There are other urgent needs in agriculture and natural resources development. These include developing public transportation and communication systems, providing basic school and training facilities, and designing a research and extension system. The government can address public environmental problems by:

- \* encouraging local collective action to voluntarily address common problems, such as treating ravines that cross private lands, and then
- \* subsidizing the treatment of large public problems, such as ravines, if peasants have previously and voluntarily participated in installing upstream treatments.

Regional MARNDR representatives with local NGOs could coordinate programs that would provide rural employment and strengthen local organizations.

Since these programs will involve substantial investment of public resources, there needs to be firm government commitment behind them. The government, MARNDR, and multilateral donors should design and implement programs and local NGOs could help

carry them out.

Table 1. Programs for Progress in Rural Haiti

Requirements for Sustainable Rural Development

Policies and Actions Needed to Overcome Knowledge Constraints

Improve basic and essential social and physical infrastructure.

Establish a schooling and training network that is realistic in terms of mobility of rural inhabitants.

Establish an information system that can identify priorities for rural infrastructure, recognizing that all needs cannot be met.

Policies and Actions Needed to Overcome Resource Constraints

Encourage local action in infrastructure development where feasible, particularly where private benefits can be defined.

Subsidize infrastructure projects where such are public goods or where local communities do not have the resources.

Define the roles of multi- and bilateral external aid in funding infrastructure projects.

Provide resources through local NGOs in coordination with local government officials.

Policies and Actions Needed to Overcome Incentive Constraints

Where effective, encourage labor-intensive infrastructure projects that can employ local people and provide a feeling of "ownership" of the results.

Provide initial subsidies for essential infrastructure where local motivation is not sufficient to result in investment.

Develop clear rules about use of infrastructure and encourage local ownership of projects so people will maintain them after initial investment and construction.

Strengthen local, indigenous groups to manage rural development activities.

#### Policies and Actions Needed to Overcome Knowledge Constraints

Provide local extension and training on technical information, management skills, legal rights, investment, and other organizational skills.

Through training and other means, simplify and clarify the regulations about local organizations and their status.

Encourage formation of information networks. Establish regional information clearinghouses for donor and government support, such as funds and technical information.

#### Policies and actions Needed to Overcome Resource Constraints

Establish credit programs for local organizations.

Establish special (sometimes subsidized) credit programs for targeted stakeholders, such as women's groups.

#### Policies and actions Needed to Overcome Incentive Constraints

Establish explicit government declarations that rural popular organizations are positive and fundamental actors in national development.

Establish rights and make them known and enforceable.

Support the development of rural microenterprises to provide opportunities for off-farm employment

#### Policies and Actions Needed to Overcome Knowledge Constraints

Provide technical support to prospective entrepreneurs.

Provide marketing information for sale of outputs and purchase of inputs.

Conduct research on promising products, markets, and transformation technologies to support microenterprise development.



Provide managerial training.

#### Policies and Actions Needed to Overcome Resource Constraints

Provide credit for startup and working capital.

Provide training to secure competent labor supplies.

Provide access to secure sources of purchased inputs.

#### Policies and Actions Needed to Overcome Incentive Constraints

Provide subsidized credit (small amounts) if needed. Make sure that payback periods are long enough to provide incentive for start-up.

Provide insurance or develop other means to help share risk of start-up enterprises. Loss to the individuals could be disastrous and thus counteract any positive motivation to start businesses.

Establish clear legal basis for microenterprises.

Reduce peasant social and economic insecurity.

#### Policies and Actions Needed to Overcome Knowledge Constraints

Provide clear information on the rights of rural people under the policy reforms discussed earlier.

Provide training so peasants understand land laws and their rights under them.

Provide training in dispute resolution so that rural groups can mediate conflicts.

Where needed, develop cadastral surveys to establish land tenure so that peasants have a clear knowledge of their property boundaries.

Establish standard contract forms that explicitly state land agreements.

#### Policies and Actions Needed to Overcome Resource Constraints

Provide government-paid arbitration of disputes over land

titles and other legal matters.

Provide subsidies to cover costs of productivity-enhancing investments and investments that increase the sustainability of agricultural practices.

Subsidize crop storage facilities, the establishment of live fencing (especially around home gardens), and the dissemination of important seeds.

#### Policies and Actions Needed to Overcome Incentive Constraints

Subsidize fencing of properties after establishing clear tenure rights to avoid the problems of stray animals and other encroachment.

Provide clear information on local inhabitant rights under the policy reforms and existing laws.

Provide clear indication of fiscal responsibilities of individuals, such as taxation and availability of subsidies.

#### Strengthen Local Indigenous Groups to Manage Rural Development Activities

Community groups are the foundation for rural development activities. Sustained democracy and development in Haiti depend on the ability of these groups to form and address public problems and to articulate concerns and demand state responsibility. For these reasons, strengthening local groups should be a primary policy objective of government and external aid. In addition, the government should place special emphasis on encouraging the formation of women-only groups as they are the keys to home security and family nutrition. These groups can be very productive when given access to training and capital.

Policy options include the following:

- \* clarifying and simplifying regulations concerning the acquisition of formally-recognized status;

- \* providing nationwide technical assistance to community groups on official policies affecting rural areas, the legal rights of peasants and groups, assistance in accounting, investment decisionmaking, organizational mechanics, and problem and project analysis;

- \* establishing regionally-managed credit funds for groups at

subsidized rates;

- \* facilitating group access to information by encouraging associations and networks;

- \* increasing local group access to donor sources by establishing regional clearing houses of information concerning government and donor programs; and

- \* establishing credit programs to which only women's groups would have access to funds and training for entrepreneurial activities.

Large, local and international NGOs should implement these programs and multilateral or bilateral agencies could fund them.

#### Support Development of Rural Microenterprises to Provide Opportunities for Off-farm Employment

Ultimately, rural development requires significant amounts of productive off-farm employment. It will decrease pressure on the land and increase the funds available for reinvestment in infrastructure and public works. As labor shifts from agricultural to manufacturing sectors, farms will probably consolidate. This is necessary to increase agricultural productivity in much of Haiti. Since there are good conditions for arboriculture, attempts to spur microenterprise might also include a major focus on tree-based enterprises, such as fruit or fuel production, processing, and marketing.

The government can encourage such rural enterprise development by:

- \* increasing access to information on markets, prices, and technology;

- \* assuring competition;

- \* reducing barriers to firm initiation for example, by making credit available;

- \* sharing the risk of promising new ventures;

- \* allowing long-term horizons for investments; and

- \* conducting basic, generic research on promising technologies.

Policies to achieve these goals should include:

- \* launching a national program to encourage the formation of rural microenterprises,

- \* conducting basic research on products that people can produce and process in rural areas and the markets of those products,

- \* making credit available to start rural microenterprises, and

- \* establishing national extension facilities to provide

information on technologies, input markets, project management, product pricing, loan rates, and requirements for government programs.

Multi- and bilaterally-funded local NGOs in cooperation with the government should implement these programs. Since the government has very limited experience in this domain, it should call on the experience of existing credit programs such as the Haitian Development Foundation.

#### Increase Peasant Social and Economic Security through Legal Means and Productivity Enhancement

There is a critical need to enhance the social, economic, and food security of rural people. The government can work on three fronts by:

- \* diminishing the overall climate of fear and extortion by government officials and strengthening local organizations,
- \* reforming land tenure policies, and
- \* improving farm productivity.

Macro-level policy reforms discussed earlier could address the first point. Actions shown below can address the second and third points.

#### Reforming Land Tenure Policies

Some experts have proposed land reform (land redistribution). We rejected that option here since there is not enough arable land to distribute to make a significant impact on land pressure. Large private landowners or the state owns much of the land. For this reason, it is better to address the problem of security of the existing land distribution rather than redistributing land.

Policy reforms about land security should result in regulations that establish:

- \* standard, legally-recognized definitions and specifications for different tenure modes,
- \* tax policies regarding land that encourages owners to clarify tenure rights,
- \* standard contract forms for land leases,
- \* rules for judicial arbitration and enforcement of contract agreements, and
- \* mechanisms to enforce the rural code banning free range to decrease dry season predation.

Public subsidies to address this issue should include training local organizations in land and contract regulations and dispute resolution techniques. Public subsidies should also fund programs that encourage and subsidize fencing. Top priority

should be home gardens using live fencing technology.

#### Improving Farm Productivity

Peasants faced with unique management objectives and microsite conditions cannot take advantage of the generic, capital-intensive crops and practices that MARNDR has prescribed. New approaches should:

- \* make intensive use of peasant knowledge and take advantage of the underemployed resources such as labor and land;
- \* use extension methods that permit dialogue with peasants (rather than prescriptions) and the adaptation of techniques to their specific management objectives and microsite conditions;
- \* build on and increase the efficiency of the existing, integrated production systems including small livestock, annual crops, and multipurpose trees (Kaimowitz 1993); and
- \* encourage adoption of low input conservation practices and diversification into new and more profitable products.

New emphasis should first assure food security. This should happen through the adoption of proven conservation practices and fencing and later on the adoption of income-increasing products. The focus of land use extension should be on soil management rather than tree planting. The government should promote low-input soil conservation, cover crops, contour plowing, and organic fertilizers.

Also important are low-input tree propagation methods, direct seeding, transplanting of natural regeneration (wildlings), and the management of natural regeneration. New focus should also be on crop storage and fencing. The crop storage component would address the heavy annual losses from pests and permit peasants to take advantage of price fluctuations. Fencing, foremost for home gardens, is important to increase farm security. It also provides an incentive to invest in perennials and livestock.

Public subsidies to implement these policies should include:

- \* research into the identification, production, processing, and marketing of higher-valued tree crops;
- \* the diffusion of basic conservation practices and fencing; and
- \* the diffusion of basic animal husbandry assistance.

MARNDR has some technical competence yet lacks contacts with peasants, while NGOs often lack technical expertise yet have contacts with peasants and their organizations. Joint research should have MARNDR supply technical assistance and lands and NGOs conduct technology diagnosis and design and on-farm trials. International NGOs should carry out the technology extension programs through umbrella arrangements.

Although these programs and policies will help stem rural decline

and move Haiti toward democracy and development, they cannot achieve these goals alone. Peasants must have a sustained voice in policy and public governance. The government must respond to this voice, and international groups must remain ready to strengthen this process.

#### ENDNOTES

1. In this text, the term external aid refers generally to multi- and bilateral (government to government) development assistance. The term multilateral refers to aid between international organizations such as the United Nations and the World Bank and the government of Haiti. The term bilateral refers to aid between two nations such as USAID assistance to Haiti. Either government agencies or international nongovernmental organizations implemented this aid.

2. As anthropologist Ira Lowenthal (1989: 6) states:

"It is all too easy -- and in some circles, all too common -- to allow the contemporary crises in the peasant sector to obscure the fundamental character of the Haitian rural masses as successful and highly innovative agriculturalists."

3. For example, in one representative contract (dated 1904), a contractor was given the right to cut as many trees of all sizes and species as wanted over a 9-year period in the north, west, and central departments of the country. Another company was given the unlimited rights to harvest logwood and mahogany on the island of La Gonave. The forests of these areas were reportedly decimated in the 1955 forestry sector review by Burns (Pierre-Louis 1989).

4. The Starr (1989) study found that 51% of households paid between 20 and 5000 Gourdes for wood products in 1988. Construction materials were the most common product purchased (35.7%) followed by a combination of products (25.6%), charcoal (14.6%), planks (9.5%), poles (9.5%), and firewood (5.1%). If combined, all construction materials make up 54.7% and energy products 19.7%.

5. Land and tree security does not relate directly to the land tenure arrangement under which the parcel is managed. Various land tenure arrangements exist in Haiti such as share-cropping, renting, undivided inheritance land, and titled ownership. Benefits peasants receive depend on their social relationship with the landowner and not the exact tenure type.

6. In this report, the term indigenous agroforestry system describes a longstanding farming system in which peasants intentionally cultivate trees in close association with crops or animals. This definition covers only a portion of the trees of

Haiti as many trees exist in the degraded dryland scrub-forests and in the residual pine and broadleaved closed-canopy forests.

7. Throughout the text we assume an exchange rate of 10 Gourdes to one U.S. dollar.

8. As anthropologist G. Murray (1977) noted:

"[In Haiti,...]the peasant's success in life entails not only the acquisition of land, but the systematic mobilization of the energies of other individuals as well....Much of his behavior will not be understood however, unless his radical dependence on the labor of others is clearly perceived...."

9. Some of the watersheds involved had installed checkdams in 1960 as part of a U.S.-funded watershed management project which paid peasants to install structures on private lands. Remnants of several of the checkdams remain.

10. MARNDR has five program departments: administration, animal production, agricultural production, rural development, and natural resources. The Department of Natural Resources houses the following services: forest resources, environmental protection, watershed management, water resources, aquaculture, maritime fishing, and irrigation and rural engineering.

11. See Jickling and White (1992) for a review of economic analysis and forestry project impacts.

## REFERENCES

Agarwal, B. 1983. "Diffusion of Rural Innovations: Some Analytical Issues and the Case of Wood-burning Stoves." *WORLD DEVELOPMENT* 11(4): 359-76.

Association Internationale de Developpement (AID). 1990. "Gestion des ressources naturelles en vue d'un developpement durable en Haiti: Rapport interimaire." BDPA/SCET/AGRI/Ministere de l'Economie et des Finances, Port-au-Prince, Haiti.

Alexis, J. E., and J. C. Janvier. 1991. "Etude preliminaire de la politique Haitienne en matiere d'environnement." *Cahier du GERPE* no. 91-04. Universite Laval, Quebec, Canada.

Ama, M. J. 1977. "Reboisement et Lutte Contre L'Erosion (Brouillon)." *Rapport Final du Projet HAI/72/012*, Food and Agricultural Organization (FAO), Port-au-Prince, Haiti.

Arnold, J. E. M. 1992. *COMMUNITY FORESTRY: TEN YEARS IN REVIEW*. Community Forestry Note No. 7. Rome, Italy: Food and Agriculture Organization of the United Nations.

Ashley, M. D. 1986. "A Study of Traditional Agroforestry Systems in Haiti and the Implications for the U.S. Agency for International Development/Haiti Agroforestry Outreach Project." University of Maine Agroforestry Research Component Final report, Vol. 1, U.S. Agency for International Development, Port-au-Prince, Haiti.

Balzano, A. 1986. "Socioeconomic Aspects of Agroforestry in Rural Haiti. University of Maine Agroforestry Research Component." U.S. Agency for International Development, Port-au-Prince, Haiti.

Barkley, M. S. 1983. "The Economic Viability of Wood Crops in Haiti: A Survey of the Literature and the Port-au-Prince Market. Agroforestry Outreach Project." U.S. Agency for International Development, Port-au-Prince, Haiti.

Bellerive, P. 1991. "A Financial Analysis of Selected Hedgerow Operations in Haiti's Southern and Northwestern Regions." Southeast Consortium for International Development (SECID)/Auburn Agroforestry Report No. 27. Port-au-Prince, Haiti.

Blaikie, P. 1985. THE POLITICAL ECONOMY OF SOIL EROSION IN DEVELOPING COUNTRIES. Longman Development Studies. Essex, United Kingdom: Longman Scientific and Technical.

BREDA. 1988. "Etude Comparative de 22 Projets d'Amenagement de Bassins Versants et de Reboisement." Secretariat Technique a L'Amenagement des Bassins Versants (STABV)/Ministry for Agriculture, Natural Resources, and Rural Development (MARNDR), Port-au-Prince, Haiti.

Bramble, D. W. a (gen. ed.). MAKING THE COMMONS WORK: THEORY, PRACTICE, AND POLICY. San Francisco, California: Institute for Contemporary Studies Press.

Bramble, D. W. b. "The Commons, Common Property and Environmental Policy." ENVIRONMENTAL AND RESOURCE ECONOMICS 2: 1-17.

Bureau, J. C. 1986. "Note de Synthese sur les Actions de Conservation des Sols en Haiti. Mission de Cooperation Francaise." Ministry for Agriculture, Natural Resources, and Rural Development (MARNDR), Port-au-Prince, Haiti.

Campbell, P. 1994. "Do Farmers in Deforested Environments Need Help Growing Trees? A Case Study of Las Cahobas, Haiti." Master's thesis, Department of Forestry, University of Florida, Gainesville, Florida.

Cassagnol, R. 1990. "Assessment of the Department of Natural Resources of the Ministry of Agriculture of Haiti." Mission Report to the World Bank. Ministry for Agriculture, Natural Resources, and Rural Development (MARNDR), Port-au-Prince, Haiti.

Chambers, R., N. C. Saxena, and T. Shah. 1989. TO THE HANDS OF THE POOR: WATER AND TREES. London, United Kingdom: Intermediate



Technology Publications.

Conway, F. J. 1986. "Synthesis of Socioeconomic Findings about Participants in the U.S. Agency for International Development/Haiti Agroforestry Outreach Project." University of Maine Agroforestry Outreach Research Project, U.S. Agency for International Development, Port-au-Prince, Haiti.

Deweese, P. 1989. "The Woodfuel Crisis Reconsidered: Observations on the Dynamics of Abundance and Scarcity." WORLD DEVELOPMENT 17(8): 1159-72.

de Young, M. 1958. MAN AND THE LAND IN THE HAITIAN ECONOMY. Gainesville, Florida: University of Florida Press.

Dupuy, A. 1989. HAITI IN THE WORLD ECONOMY: CLASS, RACE AND UNDERDEVELOPMENT SINCE 1700. Boulder, Colorado: Westview Press.

Earl, D. E. 1976. "Reforestation and the Fight Against Erosion." United Nations Development Program, Rome, Italy.

Erlich, M. 1986. "Etude du potentiel agroforestier et son developpement dans le Projet de Developpement Integre de la Region de Jeremie." Projet de Developpement Integre de la Region de Jeremie/Grande Anse, Haiti. Hendrikson Associierte Consultants GmbH. Food and Agricultural Organization (FAO), Port-au-Prince, Haiti.

Eysinga, F. V. 1989. "Economic and Financial Analyses of the National Program for Agroforestry." Development Alternatives Inc. (DAI), U.S. Agency for International Development, Port-au-Prince, Haiti.

Farmer, P. 1992. AIDS AND ACCUSATION: HAITI AND THE GEOGRAPHY OF BLAME. Berkeley, California: University of California Press.

Fass, S. M. 1988. POLITICAL ECONOMY IN HAITI: THE DRAMA OF SURVIVAL. New Brunswick, New Jersey: Transaction Publishers.

Fleming, K. D., and G. E. Karch. 1991. "Economic Indicators of Agroforestry II Strategy Implementation: Farm Income Analysis to Agricultural Project Analysis." Southeast Consortium for International Development (SECID)/Auburn University Haiti Agroforestry Outreach Project, U.S. Agency for International Development, Port-au-Prince, Haiti.

Francisse, J. F. 1989. "Bilan d'une methode d'approche en agroforesterie et en defense et restauration des sols des zones de Ka-Philippe et de Petite Riviere de Henne." Secretariat Technique a L'Amenagement des Bassins Versants (STABV)/Ministry for Agriculture, Natural Resources, and Rural Development (MARNDR), Port-au-Prince, Haiti.

Galbraith, J. K. 1979. THE NATURE OF MASS POVERTY. Cambridge, Massachusetts: Harvard University Press.

Gerner, K. 1989. Caritas d'Haiti. Technical Assistant to the

"Moveman Paysan Papaye" Project. Personal communication. Port-au-Prince, Haiti.

Gregersen, H., S. Draper, and D. Elz. 1989. PEOPLE AND TREES: THE ROLE OF SOCIAL FORESTRY IN SUSTAINABLE DEVELOPMENT. Economic Development Institute. Washington, D.C.: World Bank.

Grosnick, G. 1986a. "An Economic Analysis of Agroforestry Systems in Haiti. University of Maine Research Component." Final Report, Vol. 3. U.S. Agency for International Development Agroforestry Outreach Project, Port-au-Prince, Haiti.

Grosnick, G. 1986b. "An Economic Evaluation of the Agroforestry Outreach Project." Working Paper No. 6. University of Maine Research Component Final report, Vol. 3. U.S. Agency for International Development Agroforestry Outreach Project, Port-au-Prince, Haiti:

Hayami, Y., and V. Ruttan. 1985. AGRICULTURAL DEVELOPMENT: AN INTERNATIONAL PERSPECTIVE. Baltimore: The Johns Hopkins University Press.

Jickling, J. L., and T. A. White. 1992. "An Economic and Institutional Analysis of Agroforestry in Haiti." Draft. Policy and Research Division, Environment Department, The World Bank, Washington, D.C.

Jodha, N. S. 1993. COMMON PROPERTY RESOURCES: A MISSING DIMENSION OF DEVELOPMENT STRATEGIES. World Bank Discussion Paper No. 169. Washington, D.C.: The World Bank.

Josiah, S. 1987. "A Proposal for Forest Plantations." Operation Double Harvest, Port-au-Prince, Haiti.

Kaimowitz, D. 1993. "The Role of Nongovernmental Organizations in Agricultural Research and Technology Transfer in Latin America." WORLD DEVELOPMENT 21(7): 1139-50.

Lewis, J. P., ed. 1988. STRENGTHENING THE POOR: WHAT HAVE WE LEARNED? Overseas Development Council. New Brunswick, Canada: Transaction Books.

Lilin, C. 1986. "Evolution des pratiques de conservation des sols dans les pays en developpement." In DOCUMENTS SYSTEMES AGRAIRES; No. 6 Tome II; Actes de IIIeme Seminaire, Montpellier, 16 - 19 decembre, 1986. Montpellier, France: CIRAD.

Lilin, C., and A. P. Koohafkan. 1987. TECHNIQUES BIOLOGIQUES DE CONSERVATION DES SOLS EN HAITI. Projet: Centre de Formation en Amenagement Integre des Mornes, Organization des Nations Unis Pour L'Alimentation de L'Agriculture and Ministere de L'Agriculture de Ressources Naturelles et du Developpement Rural.

Port-au-Prince, Haiti: Ministry for Agriculture, Natural Resources, and Rural Development (MARNDP).

Lowenthal, I. P. 1989. "Social Soundness Analysis of the

National Program for Agroforestry." Development Alternatives Inc. (DIA), U.S. Agency for International Development, Port-au-Prince, Haiti.

Louis-Jeune, H. 1991. "Rapport de fin d'activities, Organisme de Developpement du Bassin du Fleuve Artibonite (ODBFA)". U.S. Agency for International Development, Port-au-Prince, Haiti.

Maguire, R. E. 1991. "The Peasantry and Political Change in Haiti." CARIBBEAN AFFAIRS 4(2): 1-18.

McGowan, L. A. 1986. "Potential Marketability of Wood Products, Rural Charcoal Production, Peasant Risk Aversion Strategies, and the Harvest of Agroforestry Outreach Project (AOP) Trees." University of Maine Research Component Final report, Vol. 3. U.S. Agency for International Development Agroforestry Outreach Project, Port-au-Prince, Haiti.

Mintz, S. 1974. CARIBBEAN TRANSFORMATIONS. Chicago, Illinois: Abline Publishing Company.

Moral, P. 1978. LE PAYSAN HAITIEN: ETUDE SUR LA VIE RURALE EN HAITI [1961]. Port-au-Prince, Haiti: Les Editions Fardin.

Murray, G. F. 1977. "The Evolution of Haitian Peasant Land Tenure: A Case Study in the Agrarian Adaptation to Population Growth." Vols. 1 and 2. Ph.D. diss., Department of Anthropology, Columbia University, New York.

Murray, G. F. 1979. "Terraces, Trees, and the Haitian Peasant: Twenty-five Years of Erosion Control in Rural Haiti." Report for U.S. Agency for International Development, Port-au-Prince, Haiti.

Murray, G. F. 1990. "Land Tenure and Trees on the Plateau Central: Anthropological Guidelines for Project Design in Haiti."

Report to the Organization of American States (OAS), Port-au-Prince, Haiti.

National Labor Committee (NLC). 1993. HAITI AFTER THE COUP: SWEATSHOP OR REAL DEVELOPMENT? A special delegation report of the National Labor Committee Education Fund in Support of Worker and Human Rights in Central America. New York.

Organisme de Developpement du Bassin du Fleuve d'Artibonite (ODBFA). 1987. "Rapport Electricite d'Haiti par le Directeur General de l'ODBFA au Ministere du MARNDR." Ministry for Agriculture, Natural Resources, and Rural Development (MARNDR), Port-au-Prince, Haiti.

Ostrom, E. 1990. GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION. Cambridge, Massachusetts: Cambridge University Press.

Ostrom, V., D. Feeny, and H. Picht. 1993. RETHINKING INSTITUTIONAL ANALYSIS AND DEVELOPMENT: ISSUES, ALTERNATIVES AND CHOICES. San Francisco, California: Institute for Contemporary

Studies Press.

Pan American Development Foundation (PADF). 1991. "Pwoje Pyebwa 1990 Annual Report." PADF, Agroforestry II Project, Port-au-Prince, Haiti.

Paskett, C. J., and C. E. Philocete. 1990. "Soil Conservation in Haiti." JOURNAL OF SOIL AND WATER CONSERVATION July-August: 457-59.

Pasto, T. A. 1954. "L'Education de base et la vulgarisation en matiere d'utilisation des terres et de conservation des sols dans la cadre de l'experience temoin de la Vallee de Marbial." Rapport au Gouvernement Haitien, Rapport No. 281. Food and Agriculture Organization of the United Nations, Rome, Italy.

Perlin, J. 1989. A FOREST JOURNEY: THE ROLE OF WOOD IN THE DEVELOPMENT OF CIVILIZATION. Cambridge, Massachusetts: Harvard University Press.

Pierce, T. 1988. "Watershed Management in Haiti: The STAB Experience." Development Alternatives Inc. (DAI), Washington, D.C.

Pierre-Jean, L. 1991. Director of Programming, Ministere de l'Agriculture de Ressources Naturelles et du Developpement Rural. Personal communication, August 21, 1991.

Pierre-Louis, R. 1985. "Soil Degradation and Declining Agricultural Productivity." Ministry for Agriculture, Natural Resources, and Rural Development (MARNDR), Port-au-Prince, Haiti.

Pierre-Louis, R. 1989. "Forest Policy and Deforestation in Haiti: The Case of the Foret des Pins (1915-1985)." Master's thesis. Planning Department, Cornell University, Ithaca, New York.

Runge, C. F. 1986. "Common Property and Collective Action in Economic Development." WORLD DEVELOPMENT 14(5): 623-35.

Schaedel, R. P. 1962. "Human Resources of Haiti: An Essay." U.S. Agency for International Development, Port-au-Prince, Haiti.

Schmidt, H. 1971. THE UNITED STATES OCCUPATION OF HAITI: 1915 1934. New Brunswick, New Jersey: Rutgers University Press.

Sen, A. K. 1967. "Isolation, Assurance and the Social Rate of Discount." QUARTERLY JOURNAL OF ECONOMICS 81: 112-24.

Sen, A. K. 1981. POVERTY AND FAMINES: AN ESSAY ON ENTITLEMENT AND DEPRIVATION. Oxford, United Kingdom: Clarendon Press.

Smucker, G. R. 1988. "Decisions and Motivations in Peasant Tree Farming: Morne Franck and the PADF Cycle of Village Studies." Proje Pyebwa, Haiti Agroforestry Outreach Project, Pan American Development Foundation (PADF), Port-au-Prince, Haiti.

Secretariat Technique a L'Amenagement des Bassins Versants (STABV). 1990. "Document d'approche theorique: La problematique de la valorisation et l'extension des systemes agroforestiers-lakou dans la cadre des systemes de production actuels de mornes." STABV/Ministry for Agriculture, Natural Resources, and Rural Development (MARNDR), Port-au-Prince, Haiti.

Starr, P. D. 1989. "Socio-cultural Factors in Haitian Agroforestry: Research Results from Four Regions." Haiti Agroforestry Research Project/U.S. Agency for International Development/Southeast Consortium for International Development (SECID)/Auburn University, U.S. Agency for International Development, Port-au-Prince, Haiti.

Starr, P. D., S. d'Aquin, and K. M. Rorison. 1992. "Agroforestry Knowledge, Attitudes and Practices in Northwest Haiti." Southeast Consortium for International Development (SECID)/Auburn Agroforestry Report no. 29. Haiti Agroforestry Research Project/U.S. Agency for International Development/SECID/Auburn University. U.S. Agency for International Development, Port-au-Prince, Haiti.

Trouillot, M. R. 1990. HAITI: STATE AGAINST THE NATION; THE ORIGINS AND LEGACY OF DUVALIERISM. New York: Monthly Review Press.

United Nations Development Program (UNDP). 1976, 1977, 1978, 1980, 1981, 1984, 1987, 1989, 1990. "Rapport sur l'assistance externe en Haiti." Port-au-Prince, Haiti.

U. S. Agency for International Development. 1985. HAITI COUNTRY ENVIRONMENTAL PROFILE: A FIELD STUDY. Port-au-Prince, Haiti.

U. S. Agency for International Development. 1993. INFO-PLUS. Vol. 1, No. 1. Port-au-Prince, Haiti.

White, T. A. 1992a. PEASANT INITIATIVES FOR SOIL CONSERVATION: CASE STUDIES OF RECENT TECHNICAL AND SOCIAL INNOVATIONS FROM MAISSADE, HAITI. U.S. Agency for International Development, Environmental and Natural Resources Policy and Training Project/Midwest Universities Consortium for International Activities (EPAT/MUCIA) Working Paper 3. Arlington, Virginia.

White, T. A. 1992b. PEASANT COOPERATION FOR WATERSHED MANAGEMENT IN MAISSADE, HAITI: FACTORS ASSOCIATED WITH PARTICIPATION. U.S. Agency for International Development, Environmental and Natural Resources Policy and Training Project/Midwest Universities Consortium for International Activities (EPAT/MUCIA) Working Paper 4. Arlington, Virginia.

White, T. A. 1993. "Study on the Role of Women in Agriculture, the Socioeconomic Status of Women, and the Status of SCF-supported 'Groupement' and Women's Clubs in Maissade, Haiti." Final report. Save the Children Federation (SCF), Port-au-Prince, Haiti.

White, T. A., and J. L. Jickling. 1992. "An Economic and

Institutional Analysis of Soil Conservation in Haiti."  
Environment Department Divisional Working Paper No. 1992-33.  
Policy and Research Division, Environment Department, The World  
Bank, Washington, D.C.

White, T. A., and R. M. Quinn. 1992. AN ECONOMIC ANALYSIS OF  
THE MAISSADE, HAITI, INTEGRATED WATERSHED MANAGEMENT PROJECT.  
U.S. Agency for International Development, Environmental and  
Natural Resources Policy and Training Project/Midwest  
Universities Consortium for International Activities (EPAT/MUCIA)  
Working Paper 2. Arlington, Virginia.

White, T. A., and C. F. Runge. 1992. "Common Property and  
Collective Action: Cooperative Watershed Management in Haiti."  
Working Paper P92-3. International Food and Agricultural Policy  
Center, University of Minnesota, St. Paul, Minnesota.

World Bank. 1990. POVERTY: WORLD DEVELOPMENT REPORT 1990.  
Washington, D.C.: Oxford University Press.

World Bank. 1991. "Forestry and Environmental Protection  
Project, Haiti." Project proposal prepared by LA3AG. The World  
Bank, Washington D.C.

World Bank. 1992. WORLD DEVELOPMENT REPORT 1992: DEVELOPMENT  
AND THE ENVIRONMENT. Washington, D.C.: Oxford University Press.

Zuvekas, C. 1978. "Land Tenure, Income, and Employment in Rural  
Haiti: A Survey." Working Document Series: Haiti General Working  
Document No. 2. U.S. Agency for International Development,  
Washington, D.C.

.