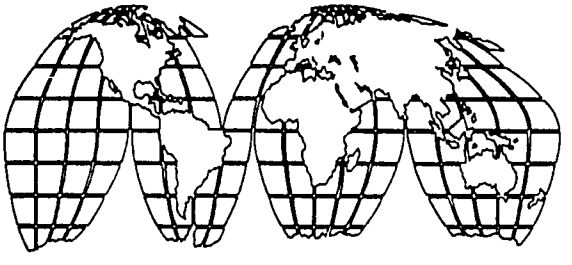
USAID Working Paper No. 187

Center for Development Information and Evaluation



Protecting Biological Diversity: *Thailand Case Study*

March 1994

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

PN-ABT-450

USAID Working Paper No. 187

Protecting Biological Diversity: *Thailand Case Study*

---

by

Phil Church, Team Leader
Program Economist
Office of Evaluation
Center for Development Information and Evaluation
Policy Directorate

Benjamat Teeramatvanit
Researcher
Population and Community Development Association
Bangkok, Thailand

Alberto de la Paz
Planning Officer
Population and Community Development Association
Bangkok, Thailand

Nora Berwick
Natural Resources Specialist
Office of Policy Analysis and Resources
Policy Directorate

U.S. Agency for International Development
Center for Developmenmt Information and Evaluation

March 1994

This Working Paper is one of a number of case studies prepared for CDIE's assessment of USAID Protecting Biological Diversity programs. As an interim report, it provides the data from which the assessment synthesis is drawn. Working Papers are not formally published and distributed, but interested readers can obtain a copy from the DISC.

TABLE OF CONTENTS

PREFACE

During the October 1993 field work for this evaluation in Thailand, the World Bank held public hearings on its first proposed Global Environmental Facility (GEF) project for Thailand. The focus of the proposed $ 93 million GEF activity will be protection of Thailand's tropical forests and the biological diversity they contain. The GEF would fund the management of four large "ecological conservation units" in what its designers argue will be a last-ditch effort to save Thailand's remaining natural forest habitats.

The GEF project reflects the degree of international recognition given to the value -- and to the precariousness -- of Thailand's tropical forest habitats and the biological diversity they contain. National awareness of the problem, by both government and private sectors, is building as well. The English and Thai language press hardly go a day without reporting about an environmental event or pending ecological crisis at the hands of Thailand's "economic growth at all costs" development strategy.

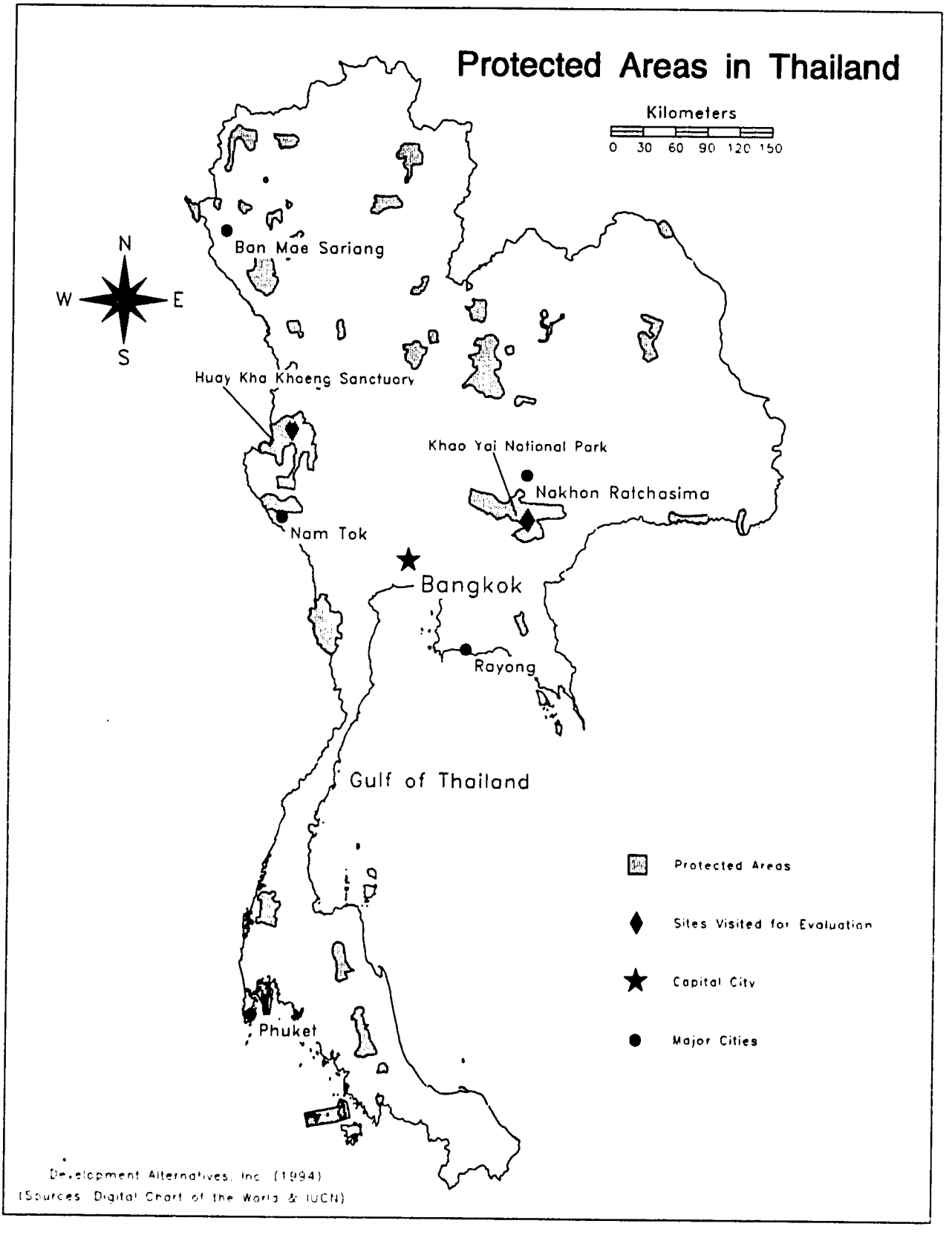
The evaluators find this public attention and debate healthy even though, in Thailand, words and awareness often appear to translate slowly into actions and accomplishments. The pioneering efforts of Thai environmental groups to address forest habitat protection through buffer zone community development are a welcome exception. Still, as this evaluation points out, this strategy raises a number of issues with regard to its effectiveness, sustainability and spread which have yet to be addressed in Thailand and elsewhere.

The authors hope that this evaluation of forest habitat protection in Thailand will generate further interest in examining ways to quickly mobilize energies -- economic, social and political -- to strike an acceptable balance between economic growth and resource conservation in countries like Thailand which have drifted towards courses of unsustainable development.

Phillip E. Church

GLOSSARY

ADB	Asian Development Bank
USAID	U.S. Agency for International Development
ASEAN	Association of South East Asian Nations
EPS	Environment Protection Societies, TEAM Project
GEF	Global Environmental Facility, World Bank
IUCN	International Union for the Conservation of Nature
MANRES	Management of Natural Resources Project, A.I.D.
MOAC	Ministry of Agriculture and Cooperatives
NGO	Non-Governmental (private voluntary) Organization
NPD	National Parks Division, RFD
PDA	Population and Community Development Association
rai	A local unit of agricultural land area = 0.16 hectare
RFD	Royal Forestry Department, MOAC
RTG	Royal Thai Government
TAT	Tourism Authority of Thailand
TEAM	Training and Environmental Awareness Project
UNDP	United Nations Development Program
WCD	Wildlife Conservation Division, RFD
WFT	Wildlife Fund of Thailand
WWF	World Wildlife Fund


Protected Areas in Thailand
Kilometers
0 30 60 90 120 150
N
W
E
S
Ban Mae Sariang
Huay Kha Khaeng Sanctuary
Khao Yai National Park
Nakhon Ratchasima
Nam Tok
Bangkok
Rayong
Gulf of Thailand
Phuket
Protected Areas
Sites Visited for Evaluation
Capital City
Major Cities
Development Alternatives, Inc. (1994)
(Sources: Digital Chart of the World & IUCN)

1. INTRODUCTION

This report examines an approach to forest habitat protection which is being advocated in environmental circles as a particularly suitable, if not essential, strategy for developing countries. The approach focuses on the development needs of households and communities in and around officially recognized forest parks and wildlife sanctuaries. The objective is to introduce new forms of economic livelihood as alternatives to forest habitat encroachment for tree harvesting and wildlife hunting and at the same time raise awareness about the value of conserving natural forests.

This approach represents a major departure from the traditional ways of protecting forests with wardens and rangers responsible for controlling illegal use. The conversion of forests into fortresses to be protected by armed guards hasn't stopped encroachment by loggers and poachers in developing countries where human and financial resources for the task simply aren't available.

Since the early 1980's government agencies and non-government organizations (NGOs) in a number of developing countries have begun to experiment with community conservation and development programs as an additional approach to curbing illegal encroachment by villagers around the edges of protected forest habitats. The U. S. Agency for International Development (USAID) has supported a number of these efforts.

This case study of buffer zone community development in Thailand is part of a global examination of those programs supported by USAID to assess their impact and identify lessons learned in their implementation. Other country case studies in the global evaluation include Sri Lanka and Nepal, along with Thailand, in Asia, Madagascar and Uganda in Africa, and Costa Rica and Jamaica in Latin America.

Section 2 of this report discusses the problems threatening forest habitats in Thailand and the USAID development assistance approach taken for their solution. The section also describes the procedures followed in this case study for examining the performance of USAID assistance. Section 3 of the report summarizes the evaluation findings on the impact, effectiveness, sustainability and spread of the approaches USAID supported for forest habitat protection in Thailand. Section 4 describes the major lessons learned from the Thailand experience and Section 5 summarizes outstanding issues that merit further examination.

2. FOREST HABITATS IN THAILAND

The Problem

Like many developing countries, Thailand has witnessed the gradual loss of its forest lands to logging, agriculture and other uses. In 1961, when Thailand initiated a program to protect forest habitats and wildlife, forested areas covered about 50 percent of the land area. By 1990 an estimated 25 percent of Thailand's land area remained in forests, all of it as parks, wildlife sanctuaries or forest reserves (See Appendix A: "Forest Habitat Protection in Thailand").

Forestry and wildlife specialists argue that there is no longer scope for converting forests for agricultural and other uses. "Open land" for agricultural settlement is gone. However, population and economic growth pressures continue to exert themselves on every piece of land in the country. Forests habitats are not exempted; as remaining frontiers, forest habitats are even more vulnerable to loss today.

In Thailand, forest habitats have been constantly threatened by villagers residing in "buffer zone" areas bordering national parks (Wells 1992). Because of their remoteness, buffer zone villagers often have been marginalized from Thailand's impressive growth-oriented economic development. Their relative poverty has compelled them to turn to forests as sources of land for cultivation, wood for fuel and construction, and wildlife for consumption and sale. Since the mid-1970's expanding populations and increased settlement in villages border on national parks have further aggravated the problem (Arbhabhirama 1987, Thomas 1993).

Early steps at protecting forest habitats have generally involved legalistic solutions (Thomas 1993). A logging ban has been in effect for nearly five years but enforcement is uneven, largely because of money and staff limitations. Forest areas have been demarcated as sites of natural beauty, all commercial activity has been banned and a system of park wardens and rangers has been set up to enforce prohibitions against unauthorized human settlement and activities.

However, conflicts between villages and enforcement officers have arisen and the more strict the enforcement the more intense the conflicts have become. Understaffed and overwhelmed by the number and extent of forest habitats for which they are responsible, Thailand park service personnel have found themselves in a losing battle against encroachment and destruction. Several park officials have lost their lives in the process.

Villagers have felt exploited and abused in return. Often resettled from newly demarcated park lands on which their families had lived for generations, they viewed national parks as land taken from them to be used as "playgrounds for the rich". Their sense of resentment hardly was conducive to their cooperation with local authorities for the protection of forest habitats they felt were taken unjustly from them.

Strategies other that the use of force are now proposed to reduce encroachment by villagers bordering the park areas (FPD 1993, Thomas 1993). Instead of control alone, Thai government agencies and environmental groups are exploring ways to involve communities located around the edges of critical forest habitats to raise awareness of the value of protecting forest habitats. Instead of enforcing prohibitions by government agencies, local NGO's are exploring how to promote new income earning activities as alternatives to illegal farming, hunting and tree harvesting within the parks boundaries. These community conservation and development activities among buffer zone villagers are emerging as a promising approaches for forest habitat protection.

Community conservation and development activities face a number of implementation questions. Of major concern is are the respective roles of government and non-governmental organizations in their promotion. NGOs appear to be more responsive to needs of local communities but have limited capacity to expand activities beyond more than a small share of those needed to be reached to have a solid impact. Government agencies, on the other hand are often paralyzed by confusing and overlapping jurisdictions. Closely related is how to raise community management skills to levels capable of carrying on once NGO support has ended.

The USAID Assistance Approach

In Thailand USAID has assisted in the pioneering the buffer zone community conservation and development approaches to forest habitat protection through a local environmental NGO, the Wildlife Federation of Thailand (WFT) working with villagers around the edges of Khao Yai National Park. Khao Yai is one of Thailand's oldest and largest national parks located within three hours driving time of central Bangkok and a popular attraction for both Thai and foreign tourists (See Map #2). Established in 1962 and covering nearly 2,160 square kilometers, Khac Yai Park is an island of mountains rising abruptly from sea level to over 3,000 feet in what is now a fertile farming area of central Thailand. (See Appendix B: "Profile of Khao Yai National Park").

In addition to being a habitat for wildlife, including several species endemic to Thailand, the park serves as a watershed for several rivers that supply the rural agricultural provinces of Prachinburi, Saraburi, Nakornratchjasima and Nakornnayok. The Park also hosts a military contingent which operates and controls a strategic radar and electronic guidance facility overlooking the valley and Bangkok municipal area beyond.

Despite its official protected area status and high profile within Thailand, Khao Yai National Park has not been exempt from the gradual destruction of the forest habitats along its borders with neighboring rural communities. Like protected forest habitats in many parts of the developing world, deforestation and agricultural settlement have left the park an island surrounded by farms and rural villages. Encroachment into the park has been a regular occurrence against which the Thai National Parks Division (NPD) and Wildlife Conservation Division (WCD) of the Royal Forest Department (RFD) have had only limited and sporadic effectiveness.

Halting park encroachment was also the objective of the USAID grant. The USAID strategy, however, supported the establishment of village "Environment Protection Societies (EPSs) to increase forest conservation knowledge and to introduce alternative livelihood activities to villagers bordering Khao Yai National Park who were logging, farming and hunting within the park's boundaries.

The grantee, the Wildlife Federation of Thailand (WFT), was responsible for setting up and conducting The Environmental Awareness and Mobilization (TEAM) project in Khao Yai National Park buffer zone communities. To be eligible for WFT support under the grant participants must be EPS members, demonstrate awareness of park regulations and conduct environmentally sound agricultural practices.

The TEAM project goals were to:

- Raise environmental knowledge and awareness of members in the 47 villages border Khao Yai National Park in Pak Chong and Pak Thongchai districts of Nakornratchasima Province and Nadee and Prachantakam districts of Prachinburi Province;

- Enhance income in ten of these villages selected for introduction of new economic livelihood enterprises as alternatives to exploiting the forest and wildlife resources of Khao Yai National Park.

The WFT is a Thai NGO affiliated worldwide with other national organizations concerned about protecting wildlife and their habitats worldwide. The WFT's international affiliate, the World Wildlife Federation (WWF) is based in Washington, D.C. and has also

supported WFT's buffer zone development activities in Thailand, continuing after USAID grant funding terminated.

A major WFT objective has been the protection of Thailand's remaining forest habitats from further degradation and eventual destruction. To protect Thailand's remaining forest habitats meant halting a forty year trend of deforestation that has reduced the country's forest cover from about 60 percent of the land area in the 1950's to about 25 percent of total land area in 1990. (See Appendix B: "Protected Forest Habitats in Thailand").

Forest degradation and loss is a dynamic process that only recently has been recognized and understood in Thailand and has yet to be halted. Loss of forests to logging and farming has been accepted as a cost of doing business in Thailand's growth-at-any-cost economy. What remains are islands of forest habitat for the dwindling plant and animal life, many species of which are endemic to the country.

Much of the country's remaining forest habitats are threatened by a pattern of poverty and degradation that starts with encroachment for illegal logging, farming and hunting by villagers from neighboring communities. Once degraded from slash and burn agriculture and from the removal of high value tree species, the forests then become targets for commercial logging and tree farming operations. The resulting mono-culture forestry systems that result are far inferior to the natural forests they replace.

Early baseline surveys of village households confirmed a cycle of poverty and indebtedness that appeared to directly responsible for forcing villagers to turn to park encroachment for survival. Most households farmed land on which they depended for basic food needs and a small marketable surplus. Many farm households went into debt at time of planting in order to buy crop inputs and other necessities to get by till harvest. At harvest, however, farmers reported that they had to pay off their debts by selling to the same merchants at whatever price they could get. The result farmers reported was little left to get by till the next season and the need to turn to the forests to cut trees or hunt animals for consumption or sale.

WFT project implementers determined that they must break this poverty-debt-encroachment pattern if they were to reduce further destruction of the Khao Yai park forest habitat. The solution proposed was an alternative livelihood loan fund from which villagers could borrow as an alternative to going into debt with local merchant money lenders. At the same time, loan eligibility could be conditioned on demonstrated commitment to discontinuing further park encroachment. The vehicle for borrowing from the loan fund was membership in the local village Environment Protection Society (EPS).

To break the poverty-indebtedness-encroachment cycle, the USAID grant helped the WFT fund four program activities in project villages:

- The establishment of two WFT activity centers to conduct awareness education about the importance of conserving forest habitats and their wildlife;
- The creation of ten village Environmental Conservation Societies to provide members with conservation information as well as financial and technical support for individual and community action activities;
- The provision of technical assistance and support for improved farming methods as well as in new household livelihood activities (e.g., rattan furniture, fruit tree orchards, livestock raising, community forestry;
- The establishment of a supervised loan fund for EPS members to finance these new activities and to provide a new source of borrowing as an alternative to traditional money lenders.

The Evaluation Procedures

This CDIE evaluation case study tests the hypothesis that poverty alleviating community development activities in buffer zone areas around forest habitats will lead to a reduction in the park encroachment practices of target villagers. This will in turn lead to less destruction of forest habitat and loss of wildlife from encroachment in the park areas bordered by participating program villages. (See Appendix A.)

The evaluation benefits from well-documented baseline (PDA 1988) and monitoring surveys prepared on the TEAM project (PDA 1989, PDA 1990). These PDA surveys included interviews with all program participants at the outset and at two points during implementation. Household heads as well as local group leaders were interviewed to collect information on changes in their living standards and in their attitudes and practices with respect to encroachment into the neighboring forest area. The surveys sought to determine relationships between program participation, living standards and park encroachment practices.

This case study also draws on an additional evaluation survey of the TEAM project villages conducted in early 1992 by the Chulalongkorn University Social Research Institute (Chulalongkorn, 1992). That evaluation sought to further identify villagers perceptions about the TEAM project and its objectives.

To validate and up-date these evaluation surveys, CDIE arranged for a further 1993 survey of participating and non-participating villages and households to examine the impact of the program three years after USAID funding had ended. CDIE also felt a follow-on survey was warranted because at the time of USAID grant termination, many TEAM project activities -- e.g., tree orchards, community forests -- had not yet come to fruition.

To collect further data CDIE contracted the PDA to survey 200 households in the project area during November 1993 (See the Evaluation Survey Questionnaire in Appendix A). Asking many similar questions about TEAM project purposes, changes in socio-economic well-being, and park encroachment practices, the 1993 survey was targeted at both participating and non-participating households grouped as follows:

- 50 participating TEAM project households that claimed to have totally discontinued their park encroachment activities;
- 50 participating TEAM project households that claimed they continued some but much less park encroachment;
- 50 participating TEAM project households that claimed they continued their park encroachment practices;
- 50 households in villages and areas bordering the park but outside the TEAM project area.

In addition to these baseline, monitoring and impact surveys, CDIE evaluation team members made site visits to the TEAM training centers and selected project villages to conduct group interviews and assess the strength of local environmental groups and the production loan program activities. The evaluation also draws on data and information available in Thailand from wildlife experts who had been tracking the conditions of forest plant and animal populations within Khao Yai National Park generally and specifically, those areas bordering TEAM project villages.

Finally, the evaluation benefits immeasurably from the existing base of field studies and reports that have been prepared over the course of the last decade by a range of institutions and individuals who have helped focus official and public attention on the alarming rates at which forest habitats are being lost in Thailand.

3. EVALUATION FINDINGS: PROGRAM IMPLEMENTATION

This evaluation examines the importance of the following strategies as determinants of the performance of forest habitat protection programs receiving USAID support:

- **Institution building** -- the creation and strengthening of village and national non-governmental organizations and local and national public agencies to carry out programs aimed at forest habitat protection;
- **Education and awareness** -- increase the local knowledge and understanding of the value of forest habitats;
- **Technological change** -- introduce new skills and techniques compatible with forest habitat protection;
- **Policy reform** -- change public investment measures, market incentives and land ownership for forest habitat protection.

This evaluation assesses the ways USAID programs have (or have not) used these strategies to foster conditions for better forest habitat protection. This section examines how these four strategies were implemented and the conditions they created. The examination is based on USAID and WFT project records, survey reports and site visits and in-depth interviews with current WFT staff and program participants.

The project began in August 1987 with a $ 209,000 grant from USAID to the Wildlife Fund Thailand for community conservation and development activities in 47 villages bordering Khao Yai National Park (USAID 1987). WFT committed an additional $ 93,100 to the project activities. USAID funding supported WFT project activities for three years, ending in August 1990. At the time of this evaluation WFT continues project activities at all village locations with support from WFT and from local Thai contributions.

The WFT was responsible for setting up and conducting "The Environmental Awareness and Mobilization" (TEAM) Project in Khao Yai National Park buffer zone communities. The TEAM project goals were to:

- Raise environmental knowledge and awareness of members in the 47 villages border Khao Yai National Park in Pak Chong and Pak Thongchai districts of Nakornratchasima Province and Nadee and Prachantakam districts of Prachinburi Province;

- Enhance income in ten of these villages selected for introduction of new economic livelihood enterprises as alternatives to exploiting the forest and wildlife resources of Khao Yai National Park.

To achieve the first goal WFT staff organized conservation interest groups, called "Environment Protection Societies" (EPS). At the outset WFT staff recruited EPS membership through community organization meetings, environmental "fairs", contests, posters and other local events with a focus on the environment. While the novelty of EPS activities was enough to attract some membership, particularly in villages that had little previous exposure to community action and organization, WFT staff recognized the need to make EPS activities relevant to everyday livelihood concerns.

Early baseline surveys of village households revealed a cycle of poverty and indebtedness that appeared to be directly responsible for forcing villagers to turn to park encroachment for survival. Most households farmed land on which they depended for basic food needs and a small marketable surplus.

However, many farm households went into debt at planting time in order to buy crop inputs and other necessities to get by till harvest. Farmers reported that at harvest they had to pay off their debts by selling to the same merchants at whatever price they could get. The result farmers reported was little left to get by till the next season and the need to turn to the forests to cut trees or hunt animals for consumption or sale.

WFT project implementers determined that they must break this debt-poverty-encroachment pattern if they were to reduce further destruction of the Khao Yai park forest habitat. As a solution WFT proposed a loan fund from which villagers could borrow as an alternative to going into debt with local merchants or money lenders. In addition to need and some form of collateral WFT conditioned loan eligibility on demonstrated commitment to discontinuing further park encroachment. The vehicle for borrowing from the loan fund was membership in the local village Environment Protection Society (EPS) set up and initially managed by WFT staff.

To help achieve program objectives, the USAID grant funded four WFT activities in project villages:

- The establishment of two WFT activity centers to conduct awareness education about the importance of conserving forest habitats and their wildlife;

- The creation of ten village Environmental Protection Societies to provide members with conservation information as well as financial and technical support for individual and community action activities;

- The provision of technical assistance and support for improved farming methods as well as in new household livelihood activities (e.g., rattan furniture, fruit tree orchards, livestock raising, community forestry;

- The establishment of a supervised loan fund for EPS members to finance these new activities and to provide a new source of borrowing as an alternative to traditional money lenders.

The TEAM project was implemented by five WFT staff working intensively in ten villages, with community development and conservation awareness programs, and extensively in 37 villages, with conservation awareness programs alone, bordering Khao Yai National Park. About 130 members were trained to conduct development activities aimed at providing alternatives to park encroachment. WFT continues to fund a project officer and five project staff in the field. In addition one U.S. Peace Corps volunteer has been assisting WFT field operation during most of 1993.

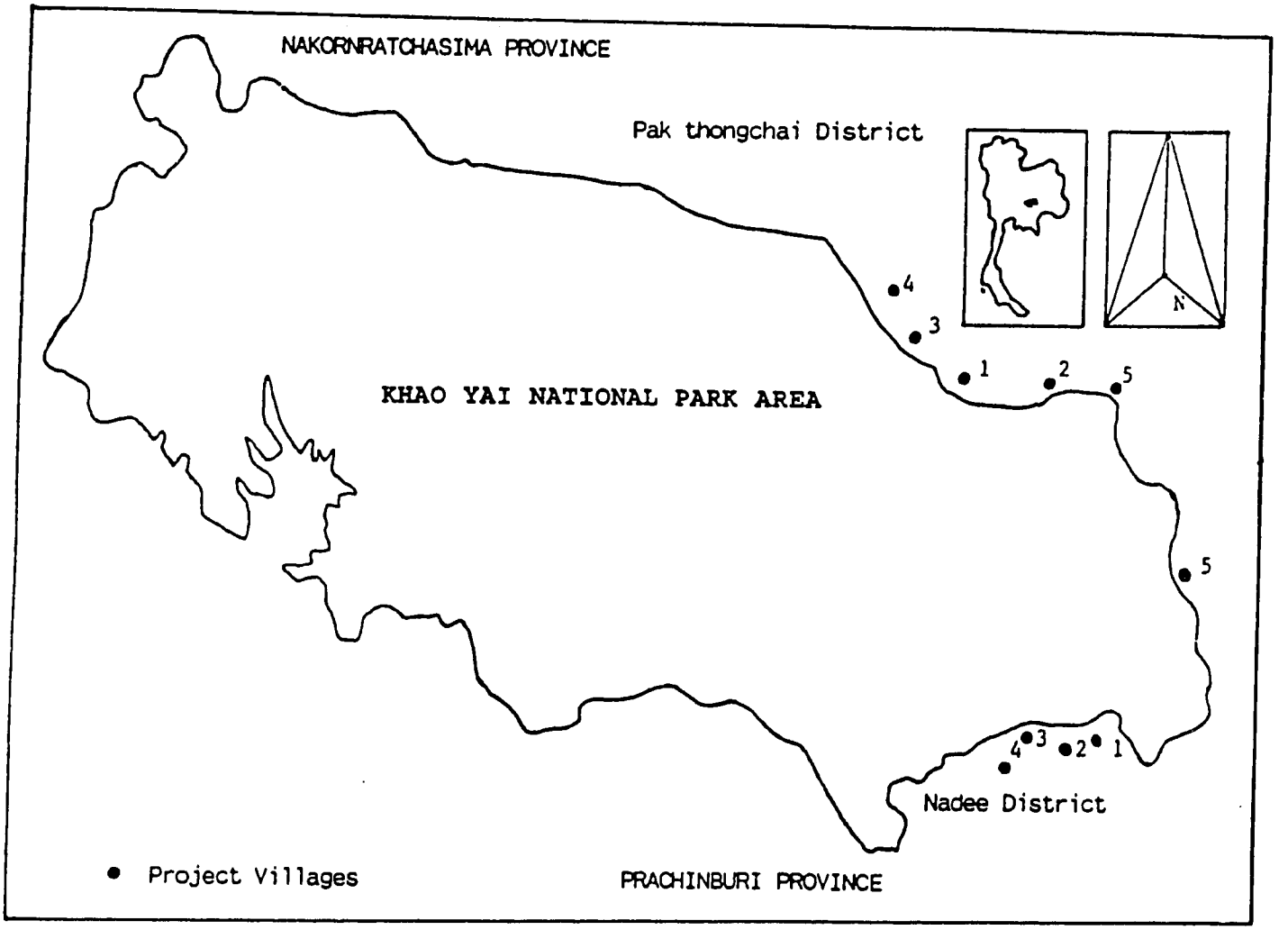
For conducting its intensive village conservation and development activities, WFT selected ten villages, (Figure 1), five each from two districts along the eastern borders of Khao Yai National Park (See Appendix D: "Profile of Project Villages"):

In Pakthongchai District: Khao Paeng Ma, Bu Chao Khun, Khlong Satorn, Khlong Sai, and Taa Wang Sai villages.

In Nadee District: Bu Phram Nai, Nong Ta Baek, Waan Luang, Bu Khunchai, and San Dan villages.

The combined populations of the ten selected villages totaled about 5,000 at the time the project began in 1987 (PDA 1988). Villages were selected because of the known record of Park encroachment by their members. Another characteristic of many households in the TEAM villages was resentment towards outside government representatives, a residual feeling left over from many families being displaced from the lands that now make up the park and being forced to settle and farm lands permanently rather than cultivate and hunt extensively in the park as they had before. Due to this latent hostility as well as to the remoteness of some of the villagers from roads and communications, the TEAM villages received relatively little public services -- health, education, agricultural credit and extension -- from official government agencies. The TEAM project sought to restore confidence in

FIGURE 1: LOCATION OF PROJECT VILLAGES AROUND KHAO YAI PARK



TEAM Project Villages by Name and District

Pakthongchai District

1 Khlong Satorn
2 Khlong Sai *
3 Bu Chao Khun
4 Taa Wang Sai
5 Khao Paeng Ma **

Nadee District

1 Waan Luang
2 San Dan **
3 Bu Khun Chai *
4 Nong Ta Baek
5 Bu Phram Nai

* District EPS center location
** District training hall location

outsiders by providing -- or arranging for government agencies to provide -- basic health, education and agriculture extension services.

To support and coordinate field activities, one TEAM activity center was set up in Klong Sai village in Pakthongchai District and one TEAM center was set up in Bu Khunchai village in Nadee district. These facilities included a meeting hall, office space, dormitories for field staff and a nursery for tree seedling production (USAID 1987).

WFT staff managed the centers, coordinated and helped conduct conservation awareness and training activities, operated tree nurseries and coached the management and activities of the village EPSs. WFT selected its field staff from recent college graduates from the surrounding areas and trained them with in organizational skills and community development techniques. WFT field staff selected local village leaders from among the participating EPS members and, in turn, gave them WFT leadership training.

To be eligible for WFT support under the grant, villagers had to be members of a local village EPS, demonstrate awareness of park regulations and conduct environmentally sound agricultural practices.

Institution building

The evaluation examined the outcome of USAID funding for strengthening institutional capacity at two levels: local buffer zone community organizations and national public and private institutions.

> **Three years after USAID funding ended, moderately sized village groups continue to operate but only with on-going support and direction of the local Thai environmental NGO.**

The TEAM project set up and supported the early operation of Environmental Protection Societies in each of the ten project villages. The EPSs became the nuclei for both the conservation awareness programs and alternative economic livelihood activities. In addition they were to provide a voice for local villagers in the planning and management of community development programs as well as conservation campaigns. Finally, WFT planned eventually for the EPSs to carry on the management of TEAM activities when project staff left to assist the establishment of EPS groups in other communities, but they had not left at the time of the evaluation.

The most recent complete figures on rates of village household participation are from the 1992 TEAM project survey (Chulalongkorn 1992). Table 1 shows a significant variation in rates of EPS participation by households among the ten TEAM project villages.

Table 1: Participating households in project villages - 1992

Village		Households	
		Number	Percent
Taa Wang Sai	Pakthongchai	71	44.9
Khlong Sai	Pakthongchai	38	46.3
Khlong Satorn	Pakthongchai	63	22.2
Bu Chao Khun	Pakthongchai	40	27.6
Khao Paeng Ma	Pakthongchai	27	31.4
Total	Pakthongchai	239	31.4
Waan Luang	Nadee	47	40.2
Nong Ta Baek	Nadee	33	37.9
San Dan	Nadee	26	81.2
Bu Khun Chai	Nadee	9	45.0
Bu Phram Nai	Nadee	71	61.7
Total	Nadee	186	50.1

Source: Chulalongkorn 1992.

Survey responses indicate a range of reasons why participation rates have varied among villages. The most popular reason was the opportunity to obtain credits from crop production. Villages where indebtedness was greatest were those with the highest rates of household participation. Other factors were the types of activities promoted in each community and the extent to which community leaders had a role in deciding those activities. Evaluation surveys revealed that some villages felt they had little say at first in what the EPS activities would be (Chulalongkorn 1992). Some EPS leaders complained that they often did little more than approve what they were asked to by WFT TEAM project staff.

As a result, WFT staff abandoned some activities that they initiated at the outset of the project. One of those was a wholesale-retail buying cooperative which project staff proposed to improve EPS members' purchasing power. When no EPS member showed interest in managing the cooperative store, the TEAM project was forced to discontinue the activity.

The evaluation found the viability of village EPSs to be mixed, in seven of the ten villages, EPS activities continued at a relatively high level with membership -- nominal and active -- at or above one-third of village households. While EPS leaders are elected by village members, their functions in many cases have been more ceremonial than active (Chulalongkorn 1992). The CDIE evaluation verified that many of the EPS leaders were also local village leaders.

The community conservation and development program has helped Thai environmental NGOs strengthen their own capacity and heighten their own awareness about viable strategies for forest habitat protection.

Interviews with NGO staff suggest that the experiences gained through the TEAM project have helped sharpen the rigor and heightened the resolve with which community conservation and development activities are conducted. Achievements at reducing forest encroachment among participating villages have been sufficient to convince NGO leaders that buffer zone strategies can work. The difficulties that field programs encountered have also increased awareness that external support must be sustained over at least a period of five, and often up to eight or ten, years and must eventually obtain the help and participation of a range of government and non-government agencies to achieve sufficient momentum for sustainability and spread.

The most visible manifestation of WFT's own increased capacity has been its ability to carry on activities after the USAID funding ended. The WFT was formally registered with the Thai government in 1985, under the royal patronage of Her Majesty Queen Sirikit, the "Green Queen" as she is popularly called for her concerns about the environment. According to USAID project records the WFT in two years was able to raise about 7 million Baht, considered good for a new local NGO. The USAID grant constitutes WFT's early movement into implementing projects with combined development and environmental components, as compared to traditional awareness and education campaigns that similar organizations had conducted in the past.

With some outside support from the WWF, the ten TEAM project villages are continuing to benefit from WFT help. While working with a smaller staff, WFT has managed to increase performance -- in terms of the number of villagers reached and numbers of livelihood activities launched by each WFT staff member. Shortly before this evaluation began, WFT added two more villages, one in each of the two project districts, and was planning to use its centers as training locations for expanding into more of the nearly 150 villages that currently ring the park.

Further evidence of WFT capacity are similar community conservation and development programs it has launched in other locations in the country. At one location, Thong Yai Naresuan and Huai Kha Khaeng wildlife sanctuaries in western Thailand near the Burmese border, WFT has begun to work with several tribal groups living within the sanctuaries to establish sustainable forest habitat use systems.

The TEAM project has helped bridge gaps between government agencies and the people they are intended to serve and direct.

The TEAM project activity received no direct support from government agencies involved in the protection of the forest habitats of Khao Yai National Park. In fact one of the major constraints the project faced was the limited Royal Thai Government (RTG) public agency presence in villages bordering the park. This was the result largely of the "unofficial status" of villagers, who in many cases were squatters on public lands. To discourage further squatting, the Thai government did not want expand public services such as schooling, health clinic, farm production credit and agricultural extension.

The Thai government Royal Forest Department (RFD), on the other hand, was responsible for forest lands up to the border of the park and had no authority or incentive to work with buffer zone communities. Because WFT had no such bureaucratic or legal restraints it was free to work with villagers in buffer zone area. One result of WFT awareness activities was the creation of better villager understanding of the roles played by park rangers in enforcing habitat and wildlife protection. Several villagers indicated that they had begun to help RFD rangers by reporting park violations and forest fires. Independent CDIE interviews of park ranger staff confirmed that they felt relations with villagers had improved, making their work safer and more effective.

The TEAM project was also successful in drawing some government agencies and private businesses into project villages. WFT helped arrange visits to project villages by provincial agricultural and health officers. WFT environmental conservation materials also became part of local school classroom materials. The Siam Commercial Bank, a private bank which took over management of loan funds, also became a more active player in the area as a result of WFT's own recognition of its limited capacity to provide lending services to village EPS members.

Awareness and Education

The TEAM project achieved rapid and noticeable increases in knowledge and understanding about forest conservation, even among villagers with low levels of income and literacy.

Before 1987, conservation education has played a minor role in protecting the parks (Kasetsart 1987). The TEAM project as originally proposed, placed considerable emphasis on increasing the understanding of damage to forest habitats and wildlife caused by encroachment for illegal farming, logging and hunting. Project activities very quickly shifted largely to promoting alternative livelihood activities. The evaluation found that the reason for this shift was the rapid pace at which local villages appeared to gain understanding and knowledge about forest habitat protection.

During the 3-year period of USAID grant funding, TEAM project staff set up and carried out mobile education programs in nearly fifty villages around Khao Yai National park. Education activities included special education programs for school children, environmental fairs, speeches by government park officials and talks by project staff. WFT also drew on local teachers and monks to deliver its environmental messages. Monks, revered for their respect of nature, were particularly well-received messengers among villagers. Their participation as environmental educators has since been promoted in WFT environmental awareness activities elsewhere in the country.

Another product of WFT TEAM activity is the inventory of training materials -- films, posters, videos, information bulletins. WFT records show extensive evidence of these being drawn upon by other environmental NGO's as well as journalists from the news media both inside and outside the country. There is less evidence that much of this information has made its way into official Thai circles, for example, school books and school curricula, agricultural extension bulletins, etc. In discussions with evaluators, environmental representatives from the Thai Ministry of Education, indicated awareness of these NGO sources of conservation information and applauded their efforts at getting out public messages. The same education ministry representatives were cautious about how much of these messages could be absorbed into what was already viewed as a very crowded primary and secondary school curricula, particularly for rural youth, most of whom will only receive six years of formal education.

Evaluation survey findings registered clearly distinguishable increases in environmental awareness from the responses of project participants (PDA 1990, Chulalongkorn 1992). Awareness was also apparent among non-members of village EPS's who attended the lectures, video presentations and observed other TEAM messages on posters or handouts (PDA 1990).

The positive outcome of community level communications has led to some changes within public agencies. Recently the Khao Yai National Park headquarters began to conduct its own program to educate rural people about the importance of protected area conservation, and the RFD's Wildlife Conservation Department (WCD) has established Nature Education Centers. Khao Yai National Park also now invites local village leaders to participate in seminars in which park objectives are explained and dialogue concerning villager/park interactions is encouraged.

Technological change

The project introduced new farming practices and rural enterprises as alternative sources of livelihood.

Activities aimed at introducing new practices and techniques for earning a livelihood gradually became central project components during the period of USAID grant implementation. Their gain in prominence reflected both the demands and interests of participating villagers as well as the time and energies required of project staff to support them. During the three year period of grant project implementation in the ten target villages, TEAM staff helped introduce new techniques and practices for the following alternative livelihood activities:

- **Livestock raising.** EPS members who undertook cattle fattening were assisted by the project in financing, purchasing and transporting animals and arranging regular veterinary visits. In Nadee District alone, over 375 head of cattle, 3,300 chickens and 110 swine were being raised during the second year of project implementation according to project records.

- **Fruit tree cultivation.** The project helped farmers obtain over 30,000 tree seedlings during the three years of USAID grant funding. TEAM project tree nurseries continue to turn out seedlings for sale to members at cost or for free distribution in cases where promotions are conducted such as community reforestation. Fruit tree varieties distributed include mango, tamarind, jackfruit, santol and gooseberry. Other commercial trees include neem, cashew and bamboo. Several forest indigenous forest species were distributed including colocacia gigantia, peltophorum pterocarpum and pseudocarpus macropcarpus.

- **Rice seed Bank.** The project set up a rice seed bank from which seed was loaned for hill-side rice farming; borrowers paid back 150 percent of their seed loan at harvest that went in the "seed bank" for re-lending.

- **Sericulture.** A provincial agricultural officer, invited to work with TEAM staff, helped with the introduction of mulberry trees for silkworm propagation and silk production. In Klong Sai two villagers invested in screen houses for silkworm propagation.

- **Aquaculture.** The project introduced fish farming for income in Taa Wang Sai, Khlong Satorn, Bu Phram Nai, Waan Luang, San Dan and Nong Ta Baek villages around the park borders. Staff supervised pond preparation and arranged purchase of tilapia, silver barb and common carp fingerlings and training for artificial spawning.

- **Mushroom cultivation.** TEAM staff demonstrated the culture of mushrooms using cow manure and rice straw and the provincial agricultural officer assisted with technical advice and distribution of inoculum.

The evaluation found that by 1993 several of these activities had been dropped as project activities while others were greatly expanded. This is to be expected as both local villagers and project staff learn which enterprises are the most profitable in terms of risk, operating costs and market prices. Moreover, the long list of enterprises began to prove too demanding for the limited project staff.

Another limitation was the lack of technical depth among TEAM staff. Trained and oriented more conservationists than agriculturalists WFT staff demonstrated a uniformly limited foundation in the agricultural sciences. Some had made commendable strides at learning local practices from the farmers they were there to help. Others brought with them basic farming skills from limited formal and informal training. But on the whole TEAM staff had little technical training in any field of agriculture sciences.

Some made up this deficiency by learning to draw on local government extension agents to the extent they were available. From some standpoints, this may well have been the best project implementation approach. By playing the role of agriculture service broker between villagers and government agents, TEAM project staff were building bridges of communication that had a chance of lasting after they moved on to other assignments.

Policy Reform

The project has increased public awareness of importance of buffer zone community conservation and development activities as components of forest habitat protection but this awareness has only begun to influence government policy and has yet to be institutionalized in public programs.

At present there is only a hint of interest within official Thai circles for pursuing community conservation and development activities in areas ringing many of Thailand's other 90 forest and marine parks and sanctuaries. The failure of government agencies to respond appears to be due to the lack of clarity regarding leadership and responsibility roles.

This problem may be rectified somewhat by a soon to be released national forestry master plan, the first of its kind in Thailand. The draft master plan, which was developed with extensive external support from the World Bank and several European donor countries, was under review by the Thai parliament at the time of this evaluation. Domestic impetus for the plan derived from disastrous flooding in the south of the country in 1988 that was traced to indiscriminate logging and deforestation. The plan targets called for a restoration of forests to cover 40 percent of national territory of which 25 percent would remain in natural growth and 15 percent would be used for commercial tree farming to meet national tree products demand.

Although the master plan contains controversial components related to commercial logging operations and plantation tree farming, it does address forest encroachment pressures on protected forest habitats. Specifically it outlines a strategy for the systematic development of communities around these areas using concepts like those funded under the USAID grant.

Thai government planners have recognized that resistance of local people will have to be overcome to reverse what is a worsening enforcement problem as rural populations increase around protected areas and farmland becomes less available (TDRI 1987). There is a need to further improve relations with local communities by increasing integration of protected area management with socio-economic development (Kasetsart 1987). Forestry authorities still tend to address the problem through public relations, education and greater enforcement effort.

The master plan stresses that the most serious forest habitat management problem is the management of people. For too long, local people have been left out of management planning, even though they are very much a part of the systems being managed. While not directly attributable to the TEAM project, Thai government policy-makers are exploring new measures enabling local villagers to participate directly in the management of protected forest habitats in or around which they live. Among these are stewardship certificates that would give local cultivators the rights to farm within forest lands on a sustainable basis. The extent to which TEAM project villagers demonstrate their capacity manage the forest areas under their control, may help determine this political support.

A further area where public attention appears needed is in land ownership and land use policy. Villagers indicated reluctance to adopt many alternative livelihood activities that require long-term investments -- e.g. fruit tree orchards, fish ponds -- because they were uncertain of their long-run rights to use of the land (Chulalongkorn 1992). Lack of land title also cut off many from commercial sources of credit and trapped them in the poverty and indebtedness cycle.

4. EVALUATION FINDINGS: PROGRAM IMPACT

TEAM project monitoring and evaluation surveys have documented a number of changes traceable to project activities (PDA 1988, PDA 1990). Other independent evaluations have validated these findings (Chulalongkorn 1992). This CDIE evaluation, in addition to drawing on these reports, conducted further field observations to verify and quantify some of these changes since project initiation and in relation to non-project villages in the area.

Impact on Practices

Forest encroachment for illegal logging, hunting and farming has declined around all villages where TEAM project activities have been carried out.

In discussions with CDIE evaluators, Park Officials report fewer instances of illegal logging and poaching in the park areas nearest to project villages as one positive sign that some encroachment has been stanched. All impact evaluation surveys registered evidence of less illegal activity within the park areas bordering the project villages. Official reports of encroachment around project village areas are infrequent and gunshots are rarely heard in the nearby forest.

While villagers speak positively about the environment and natural resources, they do not necessarily translate their words into constructive actions. Villagers in most areas support measures to ban or limit hunting and crop cultivation in national park areas but don't always observe them themselves. Villagers and officials both assert that some illegal activities continue. Both groups also point to improved relations between villagers and park personnel. Khao Yai Park officials and guards no longer fear to enter buffer zone villages to discuss problems with the villagers (TDRI 1987).

Loan incentives were particularly important for discouraging encroachment by many villagers. However, some of the most important target households -- the landless and wage earners -- were not eligible for loans because of the project's strict eligibility requirements for borrowing.

A critical TEAM project component was the provision of funds for new livelihood enterprises. The availability of loan funds was one of the main reasons given by TEAM project participants for joining the EPS's and for stopping their encroachment activities. Baseline surveys confirm the poverty and indebtedness cycle in which many project villagers found themselves.

The most serious short-coming of the loan fund appears to be the eligibility requirements that the TEAM project established for its use. To borrow from the fund, EPS members must have land on which to cultivate. While the land does not, apparently, need to be used as collateral, this requirement does exclude the poorer landless households in the project villages who have no assets.

To remedy this situation TEAM project staff attempted to encourage landless EPS members to form borrowing groups to which loans could be granted with a collective guarantee. The project even succeeded in acquiring about 5 hectares of land in 1989 for landless members to farm. On balance, however, the project did not fully resolve the problem of incentives for landless villagers, and as one evaluation report suggests may have antagonized some landless forest encroachers further by excluding them from participation in the loan program (Chulalongkorn 1992).

A further limitation of the use of loan incentives was their administrative burden on TEAM field staff. From the outset, the management of lending activities became a time-consuming activity for project staff charged with administering several hundred loans ranging in size from the equivalent of $US 80 to $US 200. With USAID consent, WFT turned administration of the funds over to a local Thai bank to keep track of borrowers' accounts. Evaluation survey respondents indicated larger and longer-term loans were more useful for their needs -- e.g., fruit tree orchard establishment -- which would also have eased the management load of the loans.

In retrospect, this was a sensible move that released TEAM staff for other community development activities while involving an outside institution, the commercial bank, in supporting local EPS members directly. Later evaluations found that some villagers were now going directly to commercial banks, avoiding moneylenders altogether, and doing so without any help or coaching from TEAM project staff (PDA 1990).

Still many target households expressed displeasure with the way that loan funds were handed out (Chulalongkorn 1992). Several accused project staff and EPS leaders with favoritism in granting loans. Others reported knowing of cases where loans were not used for their intended purposes of crop production or new enterprise formation but instead for home improvements, buying bicycles, consumption or.... worse .....drinking and gambling.

Burdensome administrative requirements, occasional favoritism in lending, and misuse of loan funds are inevitable limitations which any lending program in a poor rural setting is likely to encounter. With proper monitoring and oversight they can probably be kept at controllable levels. They are realities that program managers must work around.

The exclusion of an important part of the target population

through borrowing eligibility is likely to pose the most serious constraint on the effectiveness and impact of the program. Survey results showed that those least eligible for borrowing -- the landless and wage earners -- were the greatest abusers of the forest habitats. By failing to include them as borrowers, the project was missing one of the main objectives of its incentive system.

The sustained presence of project staff contributed to the rate of technology adoption by buffer zone villagers.

TEAM project staff have been able to gain the confidence of local village households by living and working in the villages. They are not "nine-to-five" development bureaucrats from the "big city" of Bangkok. Moreover the on-going presence of the TEAM project in participating villages has apparently given some villages enough confidence to invest in some of the more long-term agricultural practices -- such as tree orchard establishment. Because few villagers have secure tenure status on the land they farm, they had been reluctant to make such investment prior to project start-up. With the project staff serving as their informal representatives as well as technical advisors, villages are more prepared to make investments in crop systems that have a longer payback period.

This suggests that among the more positive features of community conservation and development programs are their high profile and their vocal advocacy of members' interests. This requires a commitment on the part of NGOs to continue their presence over an extended period of time. In the absence of the support from public agencies or of strong local advocacy groups among participating members, local NGOs are constrained in the number of villages and households that can be brought into their community conservation and development programs. With nearly 53,000 families in 150 villages around Khao Yai National Park alone, sustainability and spread become critical in planning for maximum program impact.

Bio-physical Impacts

Bio-physical impacts of the project are spotty and limited to a few areas where belts of community forests have been planted and illegal logging and hunting halted by active vigilance on the part of project villagers.

Only circumstantial evidence exists this early after the termination of USAID funding to demonstrate that forest habitats and wildlife populations are regenerating as a result of TEAM project activities. Neither Khao Yai National Park Officials or any other institution public or private conducts systematic monitoring of wildlife populations in Thailand, a short-coming that the new GEF biological diversity initiative proposes to address.

Evidence that some wildlife populations are recovering can be found in informal park ranger counts within the park. Another bit of evidence are increased reports of crop damage by park wildlife as their populations reach levels where some species venture out of the park into farmers' fields in search of new feeding grounds.

Socio-Economic Impacts

The project contributed directly and indirectly to increasing local community living standards and by introducing new livelihood enterprises, practices and techniques as alternatives to exploiting forest resources.

The most powerful incentive to take pressures off the park is to draw people away from the park for their income. As an incentive measure, supplanting loan-sharking activities with lower interest EPS loans has been effective in several of the project villages.

While the socio-economic status of the villages has improved and land ownership stabilized or increased, indicators such as increased migration rates and comments from villagers suggest that the income-generating activities of TEAM Project are only now beginning to have an impact (PDA 1990). Most socio-demographic characteristics of health and sanitation indicators have improved in the implementation areas as well (PDA 1990, Chulalongkorn 1992). TEAM project households had better water storage and sanitation facilities as well as more income from diversified crop production.

The establishment of Environmental Protection Society loan funds has definitely led to a reduction in the number of loans requested from higher-interest sources (PDA 1990). Some households were going individually to banks to borrow money without further need of TEAM project staff or coaching (PDA 1990) This suggests lower costs of production among EPS loan users and higher net incomes.

5. EVALUATION FINDINGS: PROGRAM PERFORMANCE

While the real and potential impact of USAID support for forest habitat protection in Thailand continues to be matter for some speculation, there is clearer evidence from the evaluation findings about how well the program was conducted.

Program Efficiency

A brief analysis of funding and impact suggests that USAID resources were used in a cost effective fashion. The $210,00 of USAID grant money plus about $90,000 of local NGO funding reached ten villages with TEAM program activities over a three year period. This amounts to about $30,000 per village for the life of the project and about $10,000 per village per year to cover the costs of a field staff of five, the construction of facilities at two sites, project vehicles and administrative overhead.

The $10,000 per village figure is roughly equivalent to the annual salary and support for a single RFD park ranger. Both park rangers and TEAM villages play roles in reducing illegal park encroachment. The difference is the need for ongoing park ranger presence whereas the project goal was to re-orient villagers away from park encroachment permanently.

Program Effectiveness

The selection of low-income villages around Khao Yai assured reaching households where the indebtedness and poverty cycle was most acute and caused the greatest park encroachment.

On a national scale, project designers selected low-income project villages around the edge of Khao Yai National Park so that the poorest Thai households would have an opportunity to participate. Baseline surveys of the ten TEAM project villages indicate a pattern of below standard conditions across all sets of social indicators -- health, education, assets, incomes and employment. (See Appendix D: "Profile of Project Villages").

The evaluation attempted to examine how effective USAID support was in reaching all social groups with potential to benefit from TEAM community conservation and development activities around Khao Yai National Park. The evidence suggests that the project was designed to reach all social strata but during implementation, managers failed to address the circumstances of some groups -- notably wage earners and landless tenant cultivators -- which led to less coverage and impact of the activity than possible.

The project can be given fairly high marks for drawing both

women and men into conservation and community development activities and providing both with new sources of employment and income. Women as heads of households as well as spouses were represented among EPS members in all project villages in proportions that ranged from 40 to 60 percent of total membership (PDA 1990). Several EPS activities -- weaving, animal fattening, tree nurseries -- were particularly popular among women villagers. Women interviewed also pointed to the project's water and sanitation activities as particularly helpful to the health of their families and the greater ease of their own domestic tasks.

During implementation the project inadvertently excluded from participation, by restrictive loan eligibility requirements, landless and wage laborers who are among the more prone to park encroachment.

TEAM project management introduced factors that led to the marginalization of some villagers. The most notable of these was criterion for borrowing from the team alternative livelihood funds. To be eligible as a borrower, villagers must first be EPS members and second must have land to work. The project justified this second requirement as a means of assuring that funds were used for alternative agricultural practices and not for consumption. Moreover, the bank managing loan funds was apparently reluctant to lend to what it viewed as itinerant cultivators who might not be located later for repayment.

The result, however, was to exclude the landless and wage laborers many of whom were the most serious abusers of the Khao Yai National Park forest habitat and its wildlife. This marginalization also discouraged those ineligible for loans from participating in other TEAM project activities such as community tree planting. The evaluation could not identify any other A.I.D> funded activities targeted at breaking the poverty-indebtedness-encroachment cycle of landless and wage laborers.

One example, from Sup Tai village shows that such opportunities do exist, however. Although Sup Tai village is one of the most beautiful areas bordering the park, it was rarely visited by guards or visitors. Some naturalists hired villagers to take them hiking into surrounding mountains, where outsiders had seldom visited. In time, more hikers came, paying local villagers for guide services at rates twice what they could earn at other work (TDRI 1987) and providing a new source of income as tour-guides lifting several village households out of their poverty and debt trap and elevating the value of the park's forest habitat as a source of livelihood.

Program Sustainability

The evaluation sought evidence of the long-run "socio-economic" viability of TEAM project village livelihood activities

and community organizations as well as the "bio-physical" viability of the forest habitat systems within Khao Yai National Park itself.

New livelihood activities have enhanced living conditions and given households more economic self-reliance.

Field surveys verify that a number of TEAM villagers are experiencing substantial improvements in well-being as a result of engaging in alternative livelihood activities introduced by the project. The evidence suggests they no longer have the need or the inclination to illegally enter the park for logging or poaching. These same families also register a higher degree of environmental awareness than at the outset of TEAM project activities.

At the same time, village populations continue to swell both from natural growth as well as from in-migration of other families in search of land and employment. At issue is whether or not new income earning activities can be generated fast enough to employ the growing labor force in the area or whether a new generation of forest encroachers is likely to emerge.

Village Environmental Protection Societies established and nurtured by the project have not yet acquired sufficient leadership and management skills or financial assets to continue without project assistance.

The TEAM project experience suggests that a long-term NGO or public agency commitment is needed to elevate villages to levels where they can conduct conservation and development activities on their own. After seven years of activity WFT has yet to achieve that sustainability in any of the ten TEAM project villages. How to phase out and leave viable local village organizations in place has yet to be attempted in the program. WFT has no phase-out dates set. The risk of dependency of WFT project staff appears critical.

One approach currently being considered by WFT is the development of some of the first ten TEAM villages into "model communities" and training centers for members and leaders of future groups in neighboring Khao Yai National Park villages to be formed in the future. The goal is to use the first TEAM villages as model communities and resource centers for farmer-to-farmer training and other demonstration purposes. Such a strategy might enhance both the spread of new program activities as well as the sustainability of original village programs.

One disquieting trend which the project has not yet addressed is the gradual growth of populations within the buffer zone villages themselves. The Thai government continues to build roads and string electric power lines into remaining rural villages till without these services. Buffer zone villages, once these services come, begin to grow both from in-migration and from more family members remaining in the community. Education has been the major

key to out-migration and the release of population pressures on buffer zone resources. Growth in the rest of the Thai economy has also help attract second generation buffer zone inhabitants away from the area and reduced the pressures to clear more forest land to farm. Should the pull of the Thai economy ever subside, pressures can be expected to build for forest encroachment again and the sustainability of program efforts at finding alternative livelihood activities will come under renewed strains.

As a forest habitat for many endemic wildlife species, the long-run viability of Khao Yai National Park remains in doubt.

Despite the relatively greater attention given to Khao Yai National Park by RFD wardens and guards as well as environmental NGO's with community conservation and development programs, there is no guarantee that encroachment for illegal hunting and logging can be kept indefinitely at low and sporadic levels that are offset by natural regeneration. New pressures from land speculation and development around the Park pose continual threats to the balance of the Park's plant and animal ecosystems.

Perhaps most alarming are plans for some developers to put in tourist resorts and golf courses up against the borders of the Park. Resorts and golf courses may outwardly appear to be ideal benign "smokeless" industries that generate new tourism jobs and foreign exchange. In fact, because they are voracious users of water and chemical herbicides and pesticides that contaminate park water systems and feeding and breeding grounds, they are not good neighbors for fragile forest habitats.

A further negative development flowing from the faddishness of eco-tourism around Khao Yai National Park is a new "flower market" fed by plant poaching. In an effort to establish instant gardens around their facilities and residences Thai resort and home developers are paying premium prices for rare forest foliage. This has spawned a new spate of encroachment into Khao Yai National Park by plant poachers in search of rare tropical flora species.

It is good news that project villagers have, reportedly not been caught up in this new threat to the Khao Yai forest habitat. In fact project villagers, themselves were the first, according to WFT representatives, to call attention to plant poaching. How long the temptation of this source of income can be resisted is a matter of conjecture. Measures appear warranted both to add plant life to endangered species lists as well as to increase enforcement of forest encroachment for plant removal as well as logging and hunting. Another approach would be the development of exotic plant nurseries around national parks to propagate, under RFD or WCD regulation, the most popular plants so that illegal markets would be taken away from poachers.

The evidence suggests that Khao Yai National Park will

continue to exist as a national park serving the recreational needs of the country. The sustainability (survival) of wildlife species within the Khao Yai habitat is less certain. Recreational activities particularly around small park habitats conflict with wildlife feeding and breeding activities.

The accidental damage to habitats from too much tourism pressures is another threat. During the period of this evaluation, Khao Yai National Park was the scene of a number of questionable activities in and around its borders. One week-end the park's main road system became the scene of a motorcyclist rally filling its valley's with noise and fumes. During the following week the park and its surrounding areas was the backdrop for a local motion picture company on location with camera crews and actors filming "chinese western"! A "Woodstock 69" rock concert was also staged near the park to raise funds and awareness for environmental conservation. While legitimate all these activities add to pressures on the park's plant and animal life and take their toll on the habitat. (See Box #1 for a discussion of "good" and "bad" park buffer zone uses.)

========== Box 1 ==========

Buffer Zones: Making The Best Use of a Good Thing

Many conservationists argue that buffer zones -- belts of land generally between two and ten kilometers in width between the border of a national park and the "outside world" -- are good, if not essential, parts of sustainable forest park habitats management. Buffer zones insulate wildlife populations from distractions of civilization that disrupt their feeding and breeding. Buffer zones also ameliorate the damage caused by wildlife that otherwise might stray into farmers' field or onto commercial highways.

Buffer zones represent a sizeable piece of real estate, however. A five kilometer wide buffer zone around the estimated 4,000 kilometer perimeter of Khao Yai National park, for example, represents an area of roughly 20,000 square kilometers. The evaluators sought to determine how buffer zone lands were currently being used in Thailand today and how conservationists believed buffer zones might better be managed in the future.

Some Good Uses of Buffer Zones

- **Community and farm forestry** -- Lots planted to trees provide a protective belt as well as a source of income and investment.
- **Water catchment and impounding** -- Reservoirs in addition to being natural barriers can provide a source of dry season water for park wildlife. It addition reservoirs can serve as sources of water for farm irrigation, which enhances the value and integrity of parks and buffer zones among neighboring farms.
- **Plant nurseries** -- Properly managed and regulated, plant nurseries provide and source of cash income and can supply the market for exotic plants that might otherwise be removed illegally from the forest park.
- **Research stations** -- Government controlled lands can be used to conduct agricultural research. The RTG, for example, operates one of South Asia's

few bamboo research stations in a section of the Khao Yai buffer zone area, cultivating and testing bamboo varieties from around the world.

- **Camping and low-impact recreation** -- Commercial and public campsites in still undeveloped buffer zone areas can serve to absorb campers and picnickers who might otherwise seek to camp within the park itself.

Some Not-So-Good Uses for Buffer Zones

- **Commercial farming and fruit tree orchards** -- While acceptable under some conditions, the practice of using pesticides for insect and disease controls creates a potential danger for neighboring forest park habitats.

- **Golf courses and resorts** -- Golf courses are major users of chemical pesticides and herbicides that can make their way into animal feed chains; resorts are waste producers; both are heavy consumers of water which may be in short supply around some park habitats.

- **Industry and urban settlement** -- These pose the same dangerous (air and water) pollution problems.

- **Roads and electricity** -- These attract commerce, business and increased population converting buffer zone into land development and land speculation schemes.

- **Military installations** -- The same pollution problems prevail along with the threats to plant and wildlife posed by military maneuvers.

========== End Box ==========

Perhaps one of the greatest threats to the future of Thailand's forest habitats is their fragmentation into islands surrounded by agricultural, industrial and urban development. (See Box #2). Particularly endangered are wild elephants, grazing and predatory mammals and some migratory birds that require large areas over which to move in search of food and breeding grounds.

========== Box 2 ==========

Forest Fragmentation and Bio-Diversity Protection

There are three dimensions to biological diversity:

- Diversity of habitats -- tropical and temperate forests, savanna grasslands, wetlands, marine ecosystems, etc. -- across the spectrum of climatic and geographic settings;

- Diversity of animal and plant species within each habitat; and

- Diversity of the genetic make-up of within each species.

The first two of these are the most easily understood and the most widely supported aspects of biological diversity. "Save our tropical forests and endangered wildlife!" is a popular rallying cry among environmentalist groups in almost all Asian countries today. Efforts have focused on adding to the inventory of the number and total area of land set aside as protected habitats.

Thailand, with nearly 20 percent of its area demarcated as protected areas compared to 10 percent internationally and about 5 percent among the world's developing countries, has a good record of setting aside areas for wildlife conservation. Still, development has brought with it a disintegration of forests into a collection of fragmented "island" habitats (See Appendix Table B-3). Moreover, many of these forest habitats are perched in the upper mountains where animals are faced with seasonal shortages of water and feeding grounds.

As a result animal and plant populations in many of Thailand's habitats have fallen far below what wildlife biologists estimate are necessary to assure the genetic diversity required for species viability. The size and quality of Thailand's habitats are as critical to the ability of some species to survive.

For example, wildlife biologists estimate that Thailand's wild elephant population must average above 1000 animals to retain the genetic diversity for species survivability (TDRI 1990). At the same time elephants require by some estimates about 10 square kilometers of land per animal for feeding and breeding (IUCN, 1989). This implies a habitat size of about 10,000 square kilometers for long-run species survival -- more if habitat quality is inferior due to seasonal food or water shortages.

Among the 90 protected areas demarcated in Thailand (See Appendix B) only six are more than 2,000 sq. km. in size and none are over 10,000 sq. km. The evaluation does not believe the Asian wild elephant can survive within the remaining forest habitats as they are currently managed. The evaluation also fears that many other animal species, among them predatory cats, migratory ruminants and some bird species are also threatened with extinction from forest habitat fragmentation.

========== End Box ==========

External pressures from land development pose a serious threat to the sustainability of programs aimed at halting encroachment by buffer zone households.

Ironically, the accomplishments of the TEAM project could also contain the seeds of its undoing. The WFT and other environmental NGOs have been so effective with the "green messages" about the value of the country's national parks and forests that, around Khao Yai National Park at least, land developers have begun to move in and buy up -- or seize by political and legal maneuvers -- rights to use lands bordering the parks for resorts, golf courses, vacation cottages etc.

The result of land speculation and development around Khao Yai National Park has been the destabilization of some of the buffer zone communities as villagers begin to sell their lands, often for inflated prices that are too tempting to reject. As a result, some villagers who sell their land and fail to use the proceeds wisely are facing new economic hardships that potentially can force them back into forest encroachment for survival. Other households are reluctant to invest in land and income improving activities for fear of losing land to speculators and developers.

Program Replicability

Closely related to sustainability, the evaluation also sought evidence of the likelihood that the TEAM community conservation and development model might spread to other areas around Khao Yai National Park and beyond.

The TEAM project has identified low-cost ways of conducting conservation and development programs.

The TEAM project has a relatively small number of villages and villagers around only one of nearly one hundred parks and protected areas in the country. These represent only a fraction of the villages around Khao Yai National Park itself. Nationally, there are several thousand villages in which the pressures for illegal logging, hunting and farming in protected forest habitats exist.

The WFT is sufficiently convinced of the effectiveness of its community conservation and development approach to stanching park encroachment that it has already begun to expand into new villages around Khao Yai National Park as well as around other protected forest habitat areas in Thailand. A few other NGO's appear to have similar faith in the system to support it elsewhere as well.

The TEAM project identified several ways that NGO's could better leverage their talents and resources in the future. Conservation awareness and education messages were relatively easy to communicate; the best messages developed by the TEAM project can be used now in other locations benefiting from earlier production investments. Local teachers and monks can be recruited to volunteer as communicators with NGO staff. Involvement of government agencies, particularly at the provincial level where there are some resources available, is another means of spreading program activities. More energy and resources can be focused on promoting livelihood activities which are the main vehicles for breaking the poverty-indebtedness-encroachment cycle.

The community conservation and development strategy implemented by the TEAM project has not yet received any endorsement in official Thai government circles where support for its sustainability and spread could be greatest.

Slower to convince -- and to act -- is the Royal Thai Government which has the resources to promote the spread of such activities more broadly. Interviews with RTG officials indicate they are aware of WFT community conservation and development activities around Khao Yai National Park and are pleased with the involvement of private voluntary groups.

However, limited public leadership results from the lack of clear delineation of which government agency would have the responsibility for directing such programs. The major constraint

to spread and replicability appears to be a lack in organizational and political leadership not the lack of resources or know-how.

More substantive government action may come about soon as a result of recent new international initiative in Thailand. The most significant of these initiatives is a large biological diversity program proposed for funding by the Global Environmental Facility (GEF). International recognition may be one of the most powerful forces for promoting buffer zone community conservation and development activities as a forest habitat protection strategy. The GEF-sponsored project would expand the strategy of buffer zone development to other forest habitat areas in Thailand while supporting their continuation around the Khao Yai National Park border areas (See Box #3).

========== Box 3 ==========

THE GEF COMES TO THAILAND

The Global Environmental Facility (GEF) addresses environmental problems -- greenhouse gas emissions, loss of biological diversity, degradation of coastal resources, toxic chemical disposal -- that have global or regional dimensions.

The first GEF activity planned for Thailand is a $93 million project to protect the country's remaining forest habitats and biological resources. The largest and most complex environmental project yet for Thailand, the GEF activity very simply is designed to save what remains of the country's rapidly dwindling biological diversity.

The GEF strategy is to set up and administer four Ecological Conservation Units connecting the Thailand's remaining natural forest habitats. During its first five years of implementation the program will Khao Yai Park and its neighboring Ton Nga Chang wildlife sanctuary, as well as four other locations: the Hua Kha Khaeng-Thong Yai Naresuan sanctuary area; Phu Khieo-Nam Nao in Chaiyapham; Khao Soi Dao and adjoining protected areas in Chanthaburi; and Khaeng Krachan-Nam Pachi in Petchaburi.

The GEF project, called the Conservation Forest Area Protection, Management and Development Project, has five major objectives:

- develop a coherent national policy for forest habitat and biological diversity conservation;
- map and demarcate protected area boundaries;
- conduct protection and management programs in each area;
- implement buffer zone development programs around each area;
- establish working relationships with relevant environmental NGOs.

The GEF project would draw on the participation of 46 organizations including three ministries -- agriculture, interior and Science, Technology and the Environment -- and their various agencies, four universities and local environmental NGOs. Funding for the Thailand program breaks down into a $ 20 million GEF grant, an estimated $ 48 million loan from the World Bank, $12 million from the Royal Thai Government and the balance in co-financing and contingency funding from bilateral donors.

---------- End Box ----------

6. LESSONS LEARNED

Evaluation findings have highlighted some useful lessons from USAID's support for forest habitat protection through community conservation and development initiatives such as those conducted by the WFT in Thailand. Particularly noteworthy for their potential broader application are the following:

Environmental awareness messages are effective at increasing knowledge and changing attitudes even in rural areas with low literacy and income levels.

In Thailand environmental messages clearly have gotten through. After six years of project activities all villages surveyed demonstrated a greater knowledge and understanding of the value of forest habitats and wildlife. This awareness was independent of the level of income or functional literacy in project villages. "Environmental awareness" indicators where so high -- 95 to 98 percent range -- even after the second year of project activities that subsequent surveys found statistically no additional improvement from continued awareness campaigns.

Awareness of forest habitat protection and conservation converts best to action when accompanied by the introduction of alternative livelihood activities to generate incomes lost from forest encroachment.

Declines in forest encroachment and increases in conservation practices tracked closely with increases in the adoption of and benefits received from new livelihood activities. Those villagers who turned from money lenders to project loans to meet their borrowing needs voiced particular satisfaction with the project for helping them engage new forms of livelihood. Among those who admitted to continuing forest encroachment were many of the landless and wage laborers that had not benefitted from the adoption of new forms of economic activity fostered by the project.

Incentive systems such as credit programs must be designed and implemented with care to assure that target participants, particularly the landless and wage earners, are not excluded.

The TEAM project experience demonstrates the importance of knowing the target group and responding with incentives that will bring about desired changes in practices. There is a trade-off between controls to avoid abuse of project resources and efforts to include as many of the target population as possible. These trade-offs must be identified and addressed in the management of project activities.

Community conservation and development programs around protected forest habitat areas are most easily spread and sustained when local public agencies as well as community organizations themselves are actively involved.

The management intensive nature of community conservation and development activities requires mobilization of community organizations and local public agencies if they are to continue without outside NGO support. Local participation and support is critical if efforts are to be made to involve communities in other areas where forest habitat encroachment is a problem.

Environmental NGO's appear effective at addressing short-term problems without government involvement. Longer-term issues and those problems that derive from price and market distortions seldom can be addressed by NGO and local community action programs. Rather, they require environmental NGO's to take up the banner and lobby for policy changes to address such distortions on a national rather than local scale.

There are two types of conservation messages that environmental NGOs must articulate and disseminate. One type of message is to local communities and villagers engaged in the day-to-day business of earning a living from lands in and around protected areas. The messages for them relate to more environmentally sound ways of conducting their living. For the other audience of decision makers trying to craft national policies to reinforce and encourage sound environmental behavior, the conservation message is more one of reporting the impact of good and bad policy on local practices and on the status of the bio-physical environment.

7. OUTSTANDING ISSUES

USAID support for forest habitat protection in Thailand raises three issues that merit further examination both within the Thai context and in other countries

How strong is the linkage between incentive systems (e.g., loan programs) and conservation measures?

The TEAM project depended heavily at the outset on its loan fund activity both to break the poverty-indebtedness cycle within local villages as well as to induce more responsible conservation practices toward Khao Yai National Park. The amount of time and energy that went into administering the loan fund program may have limited the capacity of project field staff to engage communities in other activities -- community reforestation, new crop technologies.

It is unclear from the impact surveys whether or not the loan program was critical to making village households change their forest encroachment practices. The linkage between incentive systems such as loan funds and changes in practices needs to be more clearly established. Could TEAM project staff have been more effective at using a smaller share of these funds to help participating villagers get credit from already established sources or at teaching them how to fill out loan applications, using funds to guarantee banks against default by members -- particularly landless members?

A related issue is the role that land tenure -- land ownership and land access -- play conditioning responses to incentive programs. The willingness of villagers to invest in activities with long-term pay-off -- fruit tree orchards, community forestry -- was clearly related to the security they felt they had over the land the were using. WFT staff report frequent occasions were they were consulted by villagers about land ownership issues and land speculation developments. Knowledge of land markets and land titling procedures is complex in most rural settings and open to interpretation and influence. Whether environmental NGOs have the capacity to take on the problems of assuring secure land access for buffer zone villagers is another concern.

Does subsidized resettlement contribute to the same forest habitat encroachment it seeks to stop?

There is no doubt that some forest encroachment occurs out of necessity and the need for survival. Sensitive to the need of the poor who have often come to depend on the forests for their

livelihood, both government and non-government organizations have proposed resettlement programs that would provide encroachers with land, agricultural inputs and a "grub stake" to start a new life elsewhere.

However, such programs very often foster the problems they hope to alleviate as people move into forest lands to cultivate in anticipation of the subsidized "grub stakes" that governments or NGOs promise to provide.

What measures are needed to assure that the accomplishments of community conservation and development programs do not also produce conditions that weaken their long-run sustainability?

The effectiveness with which WFT has spread news about the value and uniqueness of the country's natural forest habitats has spawned new threats. Public disinterest in natural forests has been displaced by an almost faddish return to nature particularly on the part of Thailand's growing urban populations seeking escape from city ills of traffic and pollution.

Pleasure seeking tourists from abroad have added to the hoards of "green recruits" heading for the forested hills of the country's national parks and wildlife sanctuaries. A recent cultural event "to save the parks" drew an estimated 30,000 concert-goers to what the press characterized as a Woodstock '69 event in Thailand. However, concert-goers left tons of garbage in their wake after the event was over.

Alert investors have found national park buffer zones to be good candidates for land development and speculation. The result is displacement of local populations, their separation from the land and increased pressures to revert to park encroachment. In addition some investments such as resorts and golf courses are not good neighbors for parks whose wildlife are sensitive to the contamination of their feeding and breeding grounds such enterprises introduce. Developers seeking to cash in on the public's "green" interests have created a new market for plant poaching to satisfy a growing urban demand for instant exotic gardens around the homes and resorts.

APPENDIX A

EVALUATION PROCEDURES

CDIE assessments of environmental programs are aimed at answering two central questions: "Has USAID made a difference?" and, if so "How well did it do it?" The central hypothesis of the environmental assessments is that USAID, through the right mix of program strategies, can impact on local conditions and practices to produce favorable long-lasting changes in the bio-physical environment and on the socio-economic welfare of cooperating countries. This Appendix describes the process used to test this hypothesis in USAID programs aimed at protecting biological diversity.

Impact - How much?

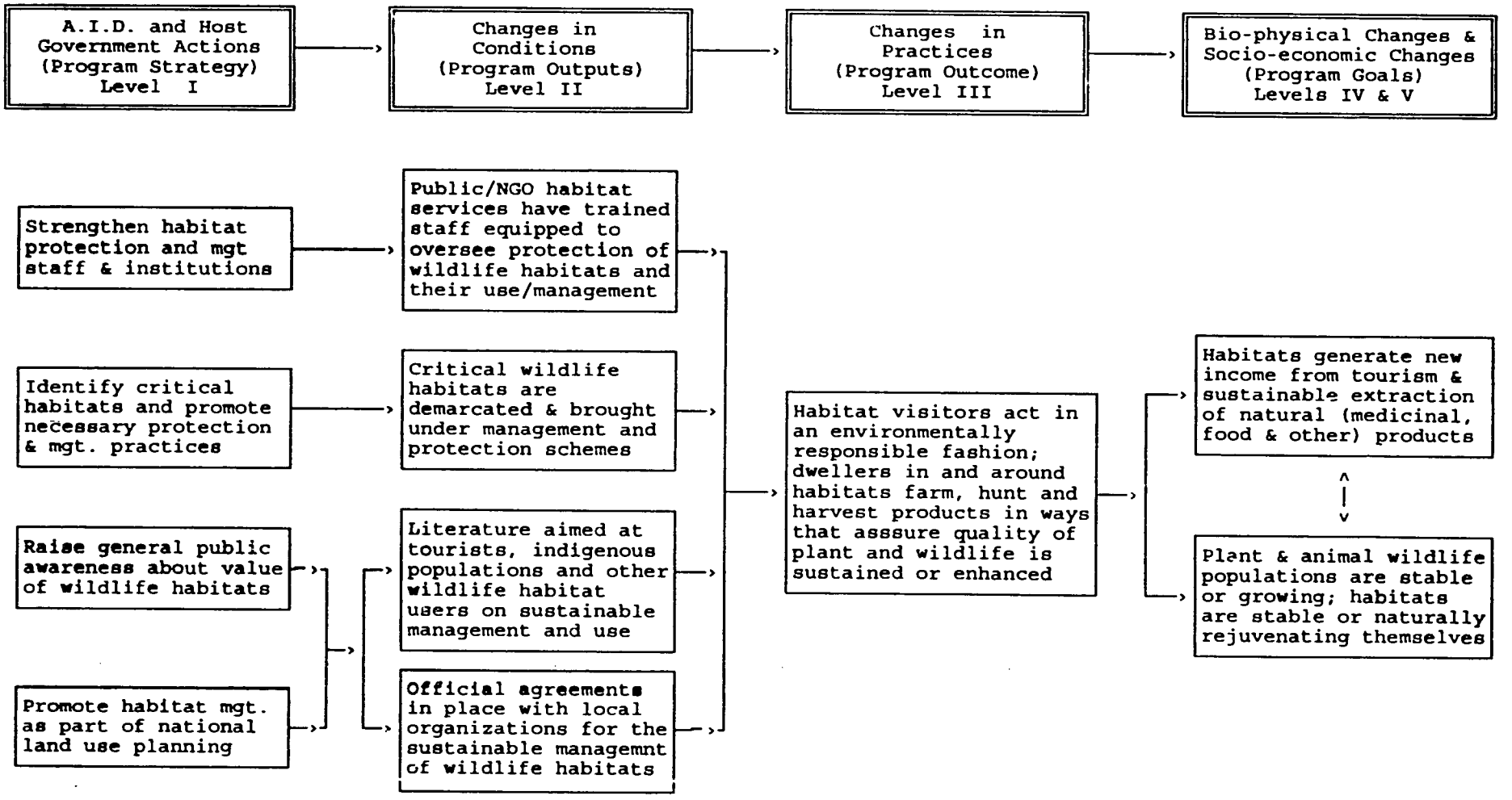
The assessment seeks to establish plausible associations between USAID program strategies or activities and the benefits to the human population which result from improved environmental quality and better natural resource management. In answering the first question, "Did USAID make a difference?", the assessment has attempted to document what happened or can be expected to happen from USAID assistance. The evaluation examines the relationships between environmental impact and USAID program investments using a five-level analytical framework (See Figure A-1.)

In the assessment framework, **Level I** describes the **"program strategies"** that USAID and the host government employed to conserve biological diversity through forest and marine habitat protection programs. These strategies include: strengthen habitat protection and management staff and institutions, identify critical habitats and promote necessary protection and management practices, raise general public awareness about value of wildlife habitats, and promote habitat management as part of a national land use planning.

The information is collected and organized in terms of four, cross-cutting strategies employed by USAID: 1) strengthening institutional capacity; 2) introducing technological change 3) fostering environmental education and awareness; and 4) adopting environmentally sound economic, regulatory, and tenure policies. The operating hypothesis is that by successfully carrying out development programs that create enabling conditions in these areas or by successfully recognizing and building on pre-existing conditions, meaningful progress toward the conservation of biological diversity will be made.

Figure A-1: Framework for Assessing USAID Bio-Diverisity Protection Programs

(Focus of Forest and Marine Wildlife Habitats)



At **Level II, "program outputs"** are the conditions that have resulted from implementing these strategies. Examples include: public agencies or NGOs services have trained staff equipped to oversee protection of wildlife habitats and their use/management,critical wildlife habitats are demarcated and brought under management and protection schemes, literature is published and disseminated to tourists, indigenous populations and other wildlife habitat users on sustainable management, or official agreements are in place with local organizations for the sustainable management of wildlife habitats.

The **Level III "program outcomes"** resulting from changes in Level II conditions are the adoption of practices and technologies by target groups. Such changes in practice include: habitat visitors conduct themselves in an environmentally responsible fashion, dwellers in and around habitats farm, hunt, and harvest products in ways that assure quality of plant and wildlife is sustained or enhanced.

Level IV and V "program goals" constitute the biophysical and socio-economic changes expected to result from the adoption of Level III program outcomes or practices. Level IV and Level V goals can be viewed as mutually supportive; each contributes to the sustainability of the other (and in many respects each flowing from the other.)

For the purposes of the evaluation, **Level IV "bio-physical goals"** are the specific environmental objectives of the program being assessed. Level IV indicators measure environmental conditions and biophysical changes that contribute to producing the strategic objective. Such changes would include: plant and animal wildlife populations are stable or growing, or habitats are stable or naturally rejuvenating themselves.

Level V "socio-economic goals" represent the development goals and are generally associated with sustainable increases in income, profits, remunerative employment, overall well-being, or production. While access to income data is difficult, the continued involvement of beneficiaries in the program can be used as a "vote with their feet" proxy indicators of improved farm incomes and profits, at least at the time of the evaluation.

Performance Scales: How well?

In answering the second question, "How well?", CDIE's primary concern is the **efficiency, effectiveness, sustainability** and **replicability** of the program.

Where data exist, the evaluation measures program **efficiency** by using monetary estimates of the flow of benefits to calculate an economic rate of return for those USAID and host government program

investments to which benefits can reasonably be attributed. Because benefits occur into the extended future, their value must be annualized and adjusted to net out all costs and expressed as a discounted net present value to compare with project investment.

To assess program **effectiveness**, the evaluation examines how well USAID sponsored techniques or services are reaching intended target groups and whether there is equity or bias in access and participation by these groups. Examples of effectiveness indicators include the make-up of participating groups according to resource endowments and social status (e.g., farm size, gender)

The examination of **sustainability** is important at all program levels (See Figure A-1). Evidence of sustainability includes the continuation of activities, regulations, or institutions beyond the termination of USAID technical and financial assistance either on their own "internal" momentum or with host government or other donor assistance. At the conditions level II indicators include how long NGO's have continued to operate independently of outside support or how successful local NGOs have been in obtaining outside funding support for their operations. At the practices Level II indicators include the economic viability of new enterprises introduced to dwellers around the perimeters of protected areas and the financial soundness of park management and protection programs. At the bio-physical Level IV indicators include evidence that native plant and animal populations are stable and growing, invader species of exotics are under control and that feeding and breeding grounds are remaining in or returning to their natural state.

To determine the **replicability** the evaluation examines whether conditions and practices, promoted by the program, have spontaneously spread beyond the target areas. This spread may occur among participants by "word of mouth" or other means without further outside support, or "induced" by public, private or donor agencies which have picked up on a USAID supported concept. Replicability indicators include the number of similar activities supported by local or international agencies outside the program target area and population; number of participants outside the target area that have adopted in sum or in part USAID sponsored practices.

Data collection procedures

CDIE employs a variety of primary and secondary sources of data to: construct the chain of events linking program activities and to impacts; examine major evaluation issues; and identify lessons learned.

In preparation for the field work CDIE collected and analyzed relevant secondary data and information that are available in Washington or in host countries from a range of sources including

project documents, technical reports, and special studies (available with the Agency's Development Information System).

CDIE's fieldwork methods combine an examination of changed and changing conditions at the national policy, planning and institutional levels with a more in-depth evaluation of one case where a site-specific protected area program has been operating with USAID support. Data collection methods included key informant, focus group and informal interviews, direct observation and analysis of secondary sources

Evaluation data collected in the field will form the basis for a country case study synthesizing lessons learned from USAID programs in fostering conservation of biological diversity through protection and management of protected forest and marine habitats. The case study experience will in turn contribute a global assessment of USAID biological diversity.

In addition to a review of program and project documentation (see bibliography of all documents cited in this assessment), data collection includes field visits to document implementation efforts. These include non-statistical evaluation of the biophysical state of habitats under improved management practices and a comparison of conditions in areas that have not experienced USAID supported interventions.

Following each field site visit, participating team members gather to discuss their findings. A structured checklist is applied to these discussions to ensure team consensus on key points related to program performance. In addition, the team develops a roster of key technical, institutional, social and economic indicators for evaluating program impact at each site. The team members use this roster to strengthen their consensus on the assessment of field site. The consensus building checklist and the key indicators lists are attached in the following pages.

Biodiversity Conservation Site Assessment Checklist

A. Institution building

1. Evidence of an increased ability by government personnel to implement biodiversity conservation.

2. Evidence of an ability by user groups to implement biodiversity conservation.

3. NGO's - Evidence of an increased ability by NGO's to assist in the implementation of biodiversity conservation.

B. Awareness, Education and Advocacy

1. Evidence of educational/awareness programs being carried out in the project areas.

2. Evidence of an increased level of awareness of biodiversity conservation by villagers.

3. Evidence of villager advocacy for extension of biodiversity conservation.

C. Impact on Practices - A description of biodiversity conservation practices.

1. User group organization.

2. Methods of protection.

3. Methods of harvest and product distribution.

4. Description of sanctions.

D. Socio-economic impacts

1. Evidence of increased benefits to the community.

2. Evidence of increased benefits to individual user group members.

3. Evidence of development activity funded through the sale of community forest products.

E. Program effectiveness

1. Evidence of equitability (cast, tribal, proximity) in the management of the habitat.

2. Evidence of the addressing of gender concerns in habitat management.

E. Program Sustainability

1. Description of the external inputs provided in establishing and managing the habitat.

2. Description of the external inputs that are perceived to be necessary to future biodiversity conservation management.

3. Team's assessment of the sustainability of the biodiversity conservation efforts.

4. Continuation of government inputs.

5. Continuation of NGO inputs.

6. Sustainability of the Users group (economic and institutional).

7. Sustainability of the resource under management.

G. Replicability

1. Evidence of program replication beyond project input sponsored areas.

2. Evidence of increased participation of villages within project sponsored areas.

Appendix D

Questionnaire No. .....

Questionnaire

The Environmental Awareness and Mobilization Project at villages near Khao Yai National Park

Interviewee's name.....
Relationship to household head.....
House No. ..... Village No. ..... Village Name.....
Sub-District..... District.....
Province.....

Interviewer's Name..... Date .....
Editor's Name..... Date .....

Research and Evaluation Division
The Population and Community Development Association (PDA)

Part I
Socio-Economic and Primary Health Care Data

1. Sex [ ] Male [ ] Female
2. Age ..... Years old
3. Number of members currently staying in this household (.....) persons
   Male..... persons Female ..... persons
4. Have any members in your household migrated to other places in 1993?
   [ ] No
   [ ] Yes How many.....

No.	Sex	Age	Reason for Moving
1			
2			
3			

5. What was(were) your main source(s) of income between 1993? (November 1992-November 1993)? What was your income and expenditure* for the year?

TYPE OF ACTIVITY	PRIMARY	SECONDARY	INCOME (Baht)	EXPENSES (Baht)
AGRICULTURAL CROPS Cassava Corn production Soybean production Vegetable production Fruit trees Seedling production _____ ANIMAL HUSBANDRY Cattle (beef) Poultry (ducks,chicken) Swine (pigs) _____ _____				
NON-AGRICULTURAL Trading/vending (selling) Government employee Landlord Sell forest products Laborer (in Bangkok, etc.) Tree farming Bamboo shoots				
NATURAL RESOURCE DEPENDENT ACTIVITY Fuel wood/charcoal prodn. Trekking guide _____ _____				
OTHERS				

*Include all expenditure occurred for each occupation such as seeds, fertilizer, labor and others etc.

6. What is the total area of your land holding?
[ ] Total area..... Rais [ ] None

[ ] for residential purposes
[ ] for agricultural purposes

7. Over the past 5 years have you either purchased or sold land? [ ] Yes [ ] No
To whom did you purchase land from? [ ] Villager
To whom did you sell land to? [ ] Villager [ ] Outsider

8. Did you or any member of your household engage in crop cultivation in the year 1993?
[ ] Yes [ ] No (skip to no. 13)

9. What is your total area for crop cultivation in 1993?
Total area..... Rais

10 How much land do you own and how much land did you rent from total area for crop cultivation in 1993?
Land owned..... Rais
Land Rented..... Rais

11. How do you usually sell your agricultural products and animals?
(more than one answer)
[ ] Sold to merchants who travelled to the village
[ ] Sold at district market
[ ] Sold at the village market
[ ] Sold product to promotional companies
[ ] Other (specify).....

12. Did you and/or your family have any free time from agricultural activities?
[ ] No [ ] Yes length of time..... month

J	F	M	A	M	J	J	A	S	O	N	D

13. Have you or any household member need to borrow in cash or kind between November 1992 and September 1993?
[ ] Did not borrow (skip to No.15)
[ ] Borrowed (Specify sources of loan and amount of cash?

Sources of Loan	Amount of cash	Interest Rate
Bank for Agricultural and Agricultural Cooperatives	.....	
Other Commercial Bank	.....	
Merchant or Middleman	.....	
Neighbors/Relatives	.....	
Cooperative stores	.....	
Project loan fund	.....	
Others (specify).....	.....	
	.....	

14. Main reasons for borrowing money from the above source(s) (more than one answer)

For Agricultural Purposes	[ ]
For Household Consumption (use)	[ ]
For Medical Expenses	[ ]
For House Construction and/or Repairing	[ ]
For Household Convenience (appliances/equipment)	[ ]
For Rituals/Social Functions (eg.,wedding)	[ ]
For Child Education	[ ]
Others (specify)	[ ]

15. What was your average monthly household expenditure between November 1992-November 1993? (eg. food, clothes, medicine, transportation, recreation etc.)
(Specify)..... Baht

16. In 1993, did your family own or purchase any of the following appliances/equipment?

	ITEMS	TOTAL	ESTIMATED COST
	ELECTRIC APPLIANCES	_____	_____
1.	Television	_____	_____
2.	Radio-tape cassette player	_____	_____
3.	Video cassette player	_____	_____
4.	Refrigerator	_____	_____
5.	Electric iron	_____	_____
6.	Electric fan	_____	_____
7.	Rice cooker	_____	_____
	VEHICLES	_____	_____
1.	Bicycle	_____	_____
2.	Motorcycle	_____	_____
3.	E-Tan truck	_____	_____
4.	Pick-up truck	_____	_____
5.	6-wheeler truck	_____	_____
	OTHERS	_____	_____
	Water pump		

17. Type of household construction

17.1 Roofing	1990	1993[1]
-Fiber-Cement board	[ ]	[ ]
-Galvanized Iron	[ ]	[ ]
-Grass/Leave/Nipa	[ ]	[ ]
-Other (specify).....	[ ]	[ ]

[1]This will be used as an indirect indicator for socio-economic status and does not have to be asked if the interview is being done at the farmer's residence. Only the type of construction material used for their house in 1990 needs to be asked.

17.2 Wall

-Bamboo Mat	[ ]	[ ]
-Wood	[ ]	[ ]
-Fiber-Cement Board	[ ]	[ ]
-Others (specify).....	[ ]	[ ]

18. Are you or any member of your household a member of any village group(s)? (more than one answer possible)

[ ] No

[ ] Yes

	Since
[ ] Village Loan Fund	.....
[ ] Demonstration Market, Store	.....
[ ] Rice Bank	.....
[ ] Public Health Loan Funds	.....
[ ] Medicine Loan Funds	.....
[ ] Saving Club	.....
[ ] Others (specify).....	.....

19. What types of water containers are there in your household?[2] (more than one answer)

[ ] Water Tank use for ..... years

[ ] Giant Water jar use for ..... years

[ ] Small Water jar use for ..... years

[ ] Metal Water jar use for ..... years

[ ] Others(specify) use for ..... years

20. What are your sources of water for domestic consumption and use?

	Drinking Water		Domestic Water	
	1990	1993	1990	1993
Rain	[ ]	[ ]	[ ]	[ ]
Self dug well	[ ]	[ ]	[ ]	[ ]
Pond,Canal,Swamp	[ ]	[ ]	[ ]	[ ]
Others (specify).....	[ ]	[ ]	[ ]	[ ]

21. Is there latrine at your place of residence?[2]

[ ] No

[ ] Yes. What type of latrine

[ ] a latrine with septic tank

[ ] a digging latrine

[ ] others(specify).....

22. How do you manage all waste disposal ?

[ ] pile it on the ground

[ ] burn it

[ ] bury it

[ ] use for compost fertilizer

[ ] carry it outside the house

[ ] other (specify).....

---

[2]The interviewer will not ask this question if the interviews are to be conducted at the respondents residence since this question can be observed without asking.

Part II

Knowledge, Attitudes and Participation in Environmental Conservation and the TEAM project

1. Do you know the location of the National Park boundary?
[ ] No [ ] Yes

2. Do you engage in crop cultivation or animal husbandry within the National Park boundary?
[ ] No [ ] Yes, how many Rais? _____

3. Have you or any family member ever entered the National Park between November,1992-November,1993?
[ ] No (skip to 5) [ ] Yes

4. Specify the reasons for entering the National Park.
(More than one answer)
[ ] Cut wood for fuel [ ] Cut wood for house building and repairing
[ ] Cut wood for sale [ ] Hired to cut wood
[ ] Hunt animals for sale [ ] Hunt animal for control crop pest
[ ] Obtain the forest product for use of the family [ ] Obtain the forest product for sale
[ ] Crop cultivation [ ] Animal husbandry
[ ] Others(specify).....

5. Have any of your neighbors or fellow villagers entered the National Park between November 1992-November 1993?
[ ] No (skip to 7) [ ] Yes

6. Indicate what you believe or know to be the reason(s) for their entering the National Park
(More than one answer)
[ ] Collect wood for fuel [ ] Cut wood for house building and repairing
[ ] Collect wood for sale [ ] Hired to cut wood
[ ] Hunt animals for sale [ ] Hunt animal for control crop pest
[ ] Obtain the forest product for use of the family [ ] Obtain the forest product for sale
[ ] Crop cultivation [ ] Animal husbandry
[ ] Others(specify).....

7. Do you now about other people (outsiders) who go into the forest to cut trees for lumber? [ ] No [ ] Yes. If yes, what do you feel about outsiders who cut trees inside the forest near your village? (This question will be left as an open-ended questions to get the real feelings of villagers.)

8. What is your opinion if the park authorities allow the villager to hunt animals inside the boundary of the National Park?
[ ] Should not be allowed
[ ] Should be allowed if hunting is limited to certain species only
[ ] Hunting of a limited number of all species should be allowed
[ ] Hunting of an unlimited number of all species should be allowed
[ ] No opinion

9. What is your opinion with regard crop cultivation within the National Park boundaries?
[ ] It should not be allowed
[ ] It should be allowable with limitation
[ ] It should be allowable without limitation
[ ] No opinion

10. What is your opinion with regard using National Park land as pasture land for dairy cattle and other animals?
[ ] It should not be allowable
[ ] It should be allowable with limitation
[ ] It should be allowable without limitation
[ ] No opinion

11. Have wild animals damaged your crop in the past year? [ ] No [ ] Yes

11.1 What types of animals have damaged your crops?

11.2 What will you do if wild animals intrude and destroy crops on your farm outside the National Park
[ ] Shoot or trap them
[ ] Chase them away without hurting them
[ ] Inform the government officer
[ ] Do nothing
[ ] Others (specify).....

12. Have there been fires in the National Park near your village in the past year?
[ ] No [ ] Yes

12.1 What would you do if there is a fire in the National Park?
[ ] Inform the government officer
[ ] Call neighbors to help put out the fire
[ ] Do nothing
[ ] Others (specify).....

13. Who do you think should be responsible for environmental conservation?
(more than one answer)
[ ] Government Officers who looking after the National Park
[ ] Villagers
[ ] Village headman/teacher
[ ] Children
[ ] Everyone
[ ] Others (specify).....

14. Are you or anyone in your family an active participant of the TEAM project?
[ ] No, because.....(skip to 18)
[ ] Yes

SKIP THIS SECTION IF THE RESPONDENT IS NOT AN ACTIVE PROJECT PARTICIPANT

15. As a member of EPS, what kind of activities did you receive or had participated in the past year?
1..... 2.....
3..... 4.....
5..... 6.....
7..... 8.....
9..... 10.....

16. What activities would you like to do in addition to EPS activities?
[ ] None
[ ] Yes (specify).....

17. Are you satisfied with the EPS activities in which you are currently involved with?
[ ] Very much
[ ] Fair
[ ] Not at all
[ ] No opinion

18. Have you been able to engage in any form of livelihood as a direct or indirect effect of the project?

Direct	Indirect
[ ] No	[ ] No
[ ] Yes (specify)	[ ] Yes (specify)
1.....	1.....
2.....	2.....
3.....	3.....

19. Do you have any complaints or suggestions with regards to the EPS concept or management?
[ ] None
[ ] Yes (specify the problems).....
[ ] Suggestions (specify).....

APPENDIX II
Focus Group Guild-line
The Follow-up Study on the Environmental Awareness and Mobilization Project

==========

Target Group : Any Environmental Protection Society member in 4 project implementation villages and 2 non-project villages. (8 persons per group)

PART I. (GENERAL INFORMATION)

Focus Group Guild-line

1. General information on Focus Group participants

2. Perception of the villagers in target area about TEAM project
   - 2.1 What is the major issue which the villagers perceived about the TEAM project? Are there any change during the last 3 years?
     If yes, what are these and how did this affect you?
   - 2.2 Are they in agreement or in disagreement with the project? Explain reason for agreement or disagreement. Did the villagers show any interest in the project? If yes, how was this demonstrated? Are there any changes in attitude towards the project during the last three years?

PART II. (QUESTIONS 2 TO 6 FOR EPS MEMBERS ONLY)

3. The role and function of EPS Clubs
   - 3.1 What are the roles of EPS clubs and EPS committees? What are their roles and involvement relating to the success of the TEAM project?
   - 3.2 From your experience of working with EPS clubs, Has there been any change in the role or function of EPS clubs during the past 3 years? If yes, please describe what these are?
   - 3.3 Did the EPS Committees effectively and consistently perform their role or not? What management techniques were used? Were there too little or too many EPS committees members? Do you think you have received any benefit working on the EPS Committee?
   - 3.4 Were there any obstacles and problems with regard to the operation of the EPS Committees and working from the position of the committee members?
   - 3.5 What can you suggest to improve the performance of the EPS clubs and the EPS Committees

4. EPS Committee's opinions on members or villagers in the areas affected by the project during the past 3 years
   - 4.1 The impression of villagers with regard whether environmental conservation activities and consciousness had improved/remained the same or worsened.
   - 4.2 Did the villagers and members have the attitude of acceptance in the environmental conservation policies. Was there a decrease in wildlife poaching and forest destruction?
   - 4.3 How many members do you have in your EPS clubs who are still committed as a members?
   - 4.4 Do you believe that the TEAM project will achieve the following objective:-
     - Increasing the knowledge and creating a positive attitude amongst the villagers towards conservation of natural resources? If not, why?
     - Increasing the average income of the villagers without having to exploit the forests and hunt wildlife? If not, why?

5. Will the community be able to sustain project activities once WFT transfers its activities to the village? What will the villagers (people's organization need in order to sustain the benefits derived from this project?

PART III. (FOR ALL RESPONDENTS)

6. Alternative livelihood opportunities
   - 6.1 What livelihood opportunities has the project been able to offer you and other villagers?
   - 6.2 Do villagers who have adopted these livelihood activities earn enough money?
   - 6.3 How much are they earning do they supplement their income through other livelihood activities? What are these other livelihood activities?

7. Rural finance and indebtedness
   - 7.1 Where do most farmers go to for loans and what is their main reason for going to these sources?
   - 7.2 If the interest rate from merchants is high, do farmers still go to these people for loans and what is their reason for still going to these sources of loans?
   - 7.3 What usually happens when a farmer cannot pay the loan on time? If the farmer cannot pay the loan at all?
   - 7.4 Have there been many farmers who have been forced to sell their land? How many farmers do you know who have been forced to sell part of their land or all of their land to settle an old debt.

8. Land sale
   - 8.1 Have there been rich people from outside of your village who have come to offer to buy land? Where are they from?
   - 8.2 Have there been people who have sold their land to these "OUTSIDERS"? How many have sold their land?
   - 8.3 What was the cost of one rai (1,600 m^2) of land three year ago? Today, how much does one rai of land cost?

9. Rural energy
   - 9.1 What activities use the most energy in your village?
   - 9.2 Are there activities that use a lot of wood or charcoal (bakeries, brick making, charcoal production, cooking, cremation, etc.)
   - 9.3 What is the most common source of energy for cooking?
   - 9.4 Where does the WOOD of CHARCOAL used for these activities mostly come from?
   - 9.5 Are there people engaged in the production of charcoal? No [ ] Yes [ ] How many [ ]
   - 9.6 Are there people engaged in the collection of fuel wood for sale? No [ ] Yes [ ] How many [ ]
   - 9.7 Has there been a shortage of wood for fuel or charcoal?
   - 9.8 Is there electricity in the village?
   - 9.9 Is the supply of electricity reliable? Yes [ ] No [ ]. How many hour(s)/day(s) does a black out last [ ] hours
   - 9.10 Is the supply of Liquid Petroleum Gas (LPG) reliable? Yes [ ] No [ ]

10. Land cultivation and soil fertility
    - 10.1 How is land usually plowed in this area?
      - Tractor
      - Animal
      - Others
    - 10.2 Is the land becoming more fertile or more infertile?
    - 10.3 What is the reason for the land becoming more fertile or infertile?

APPENDIX B

PROTECTED AREAS IN THAILAND

Trends in Protected Areas Development

The dramatic changes occurring in deforestation and land use in Thailand are well documented (Thomas 1993, Arbhabhirama et. al 1987). Efforts to protect remaining natural forest areas are come at a time when the forces behind these changes have built to unprecedented levels with the exhaustion of the country's agricultural frontiers (Thomas 1993).

By some measures Thailand ranks high among developed and well as developing countries of the world in the extent of areas set aside for the protection of habitats and wildlife. Expressed as a share of total national territory, protected areas account for nearly one in every ten hectares of land in Thailand. Figure A-1 compares the share of protected areas to total land area for Thailand as well as several other developed and developing countries, including those in the CDIE evaluation of protected forest habitats.

Thailand's progress in bringing remaining forest habitats under protection is a rather recent development. No program of parks or protected areas existed in the country prior to 1960, less than 35 years ago. Figure A-2 shows that since that time, Thailand has brought considerable land areas under formal protection. By 1990, these efforts appear to have nearly arrested the trend of displacing remaining forest areas with food crop production.

Figure A-3 and Table 1 summarize IUCN data on all protected areas -- parks and sanctuaries established in Thailand through 1987. Since that time six additional park areas have been created. While these numbers are impressive, the national park service appears to have way to few park rangers and park wardens to control human activity within the national park system (Arbhabhiriama, et al. 1987).

Moreover, many of these protected areas are considered to be too small in area to assure long-run survival of many of the plant and animal species within them particularly the larger mammals -- notably elephants -- that require extensive areas over which to migrate and feed. Figure A-4 presents a graphic tabulation of Thailand's protected areas by size. Only a few areass, Khao Yai National Park among them, are over 2,000 square km in size, the minimum area considered necessary by some wildlife specialists for survival of many of the species -- particularly wild elephants, predatory cats, deer and some bird species -- endemic to Thailand.

Development and Protected Areas

(Data from World Resources 1992–3)

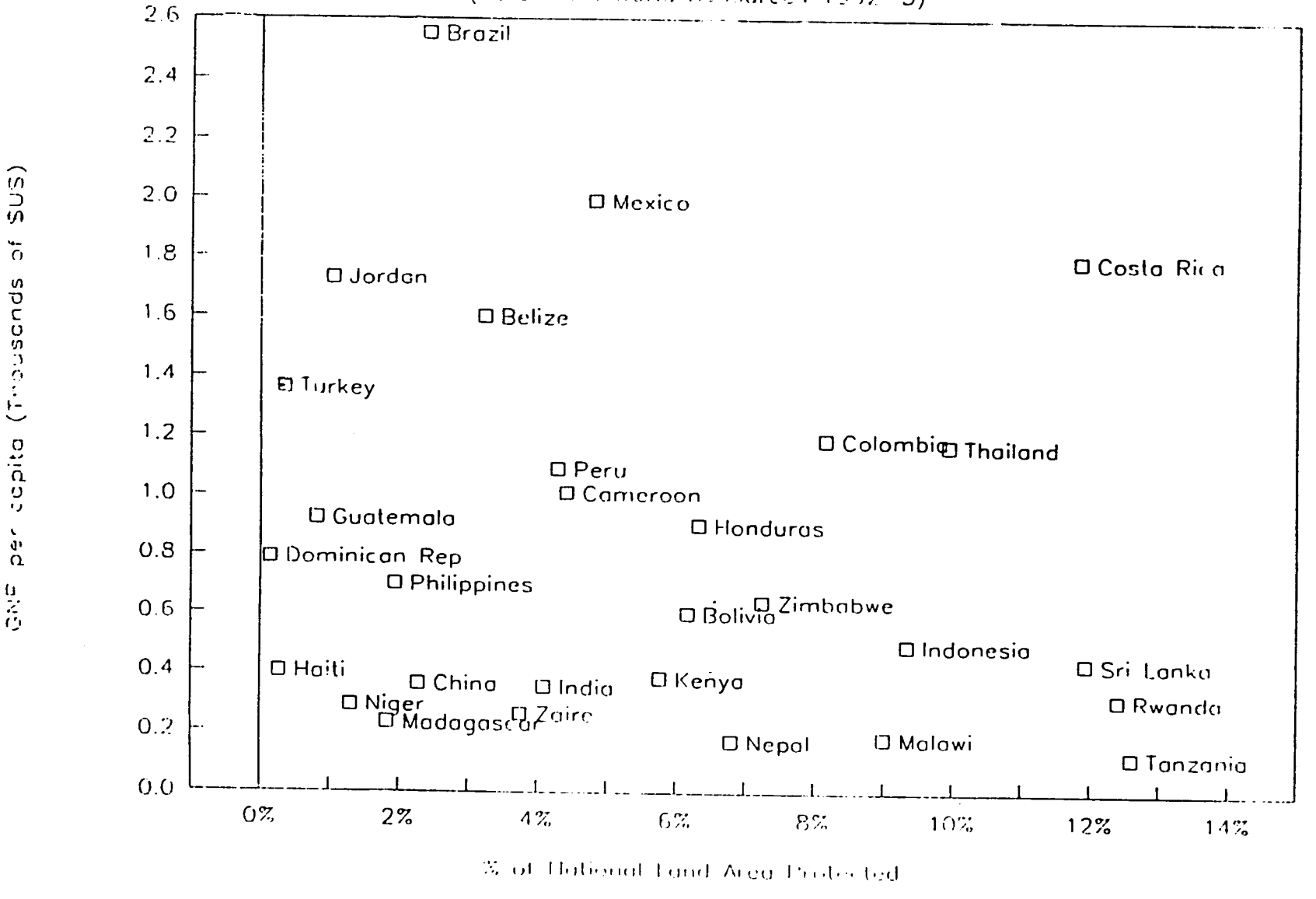
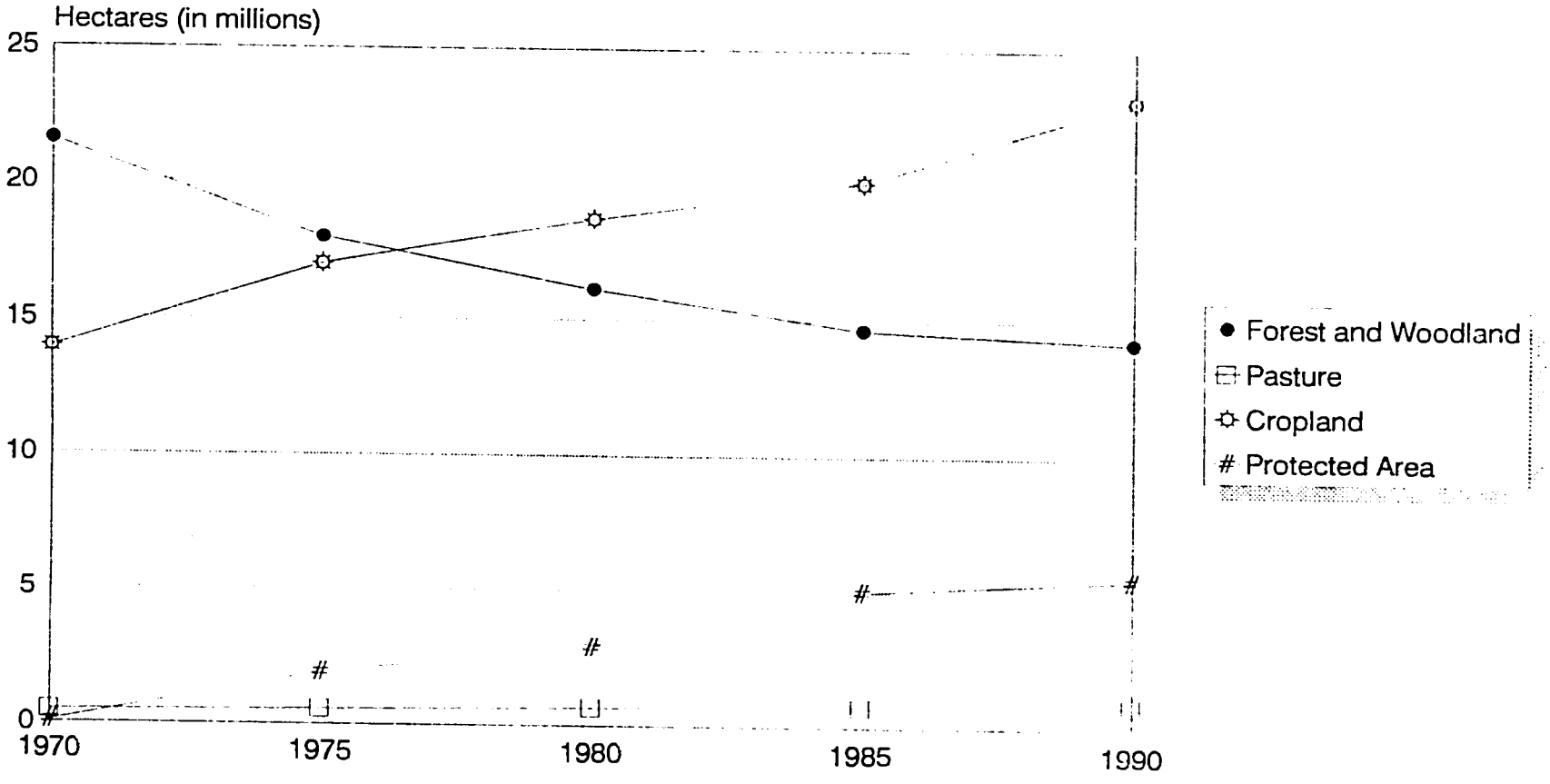
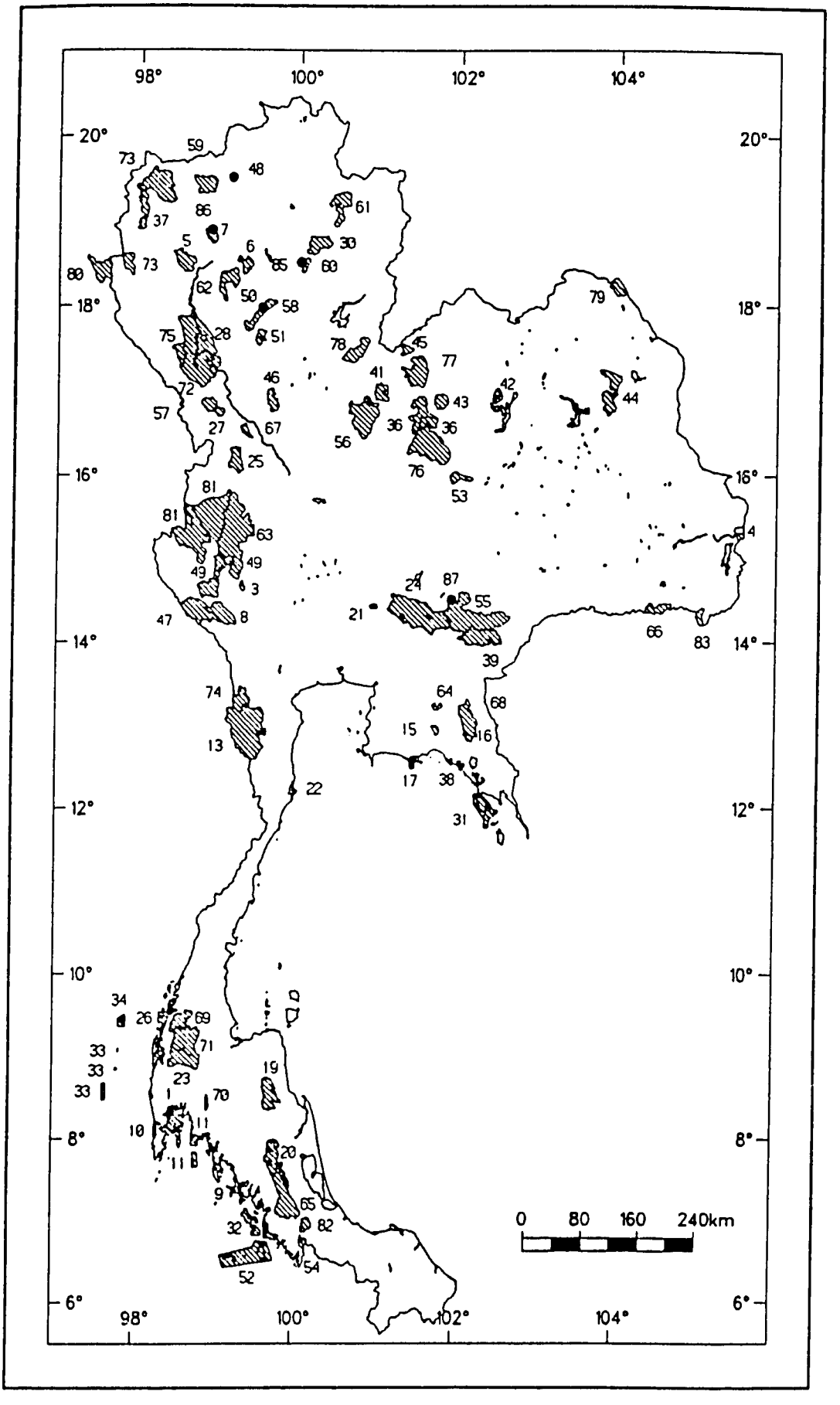


Figure A-2 Thailand: Land Use (1970 - 1990)



Source: FAO 1987; IUCN 1990b; WRI 1992b
Note: Forest and Woodland, Pasture, and Cropland data are from 1971, 1976, 1981, 1986, and 1989.
Protected Area data are from 1970, 1975, 1980, 1985, and 1990.



Protected Areas of Thailand

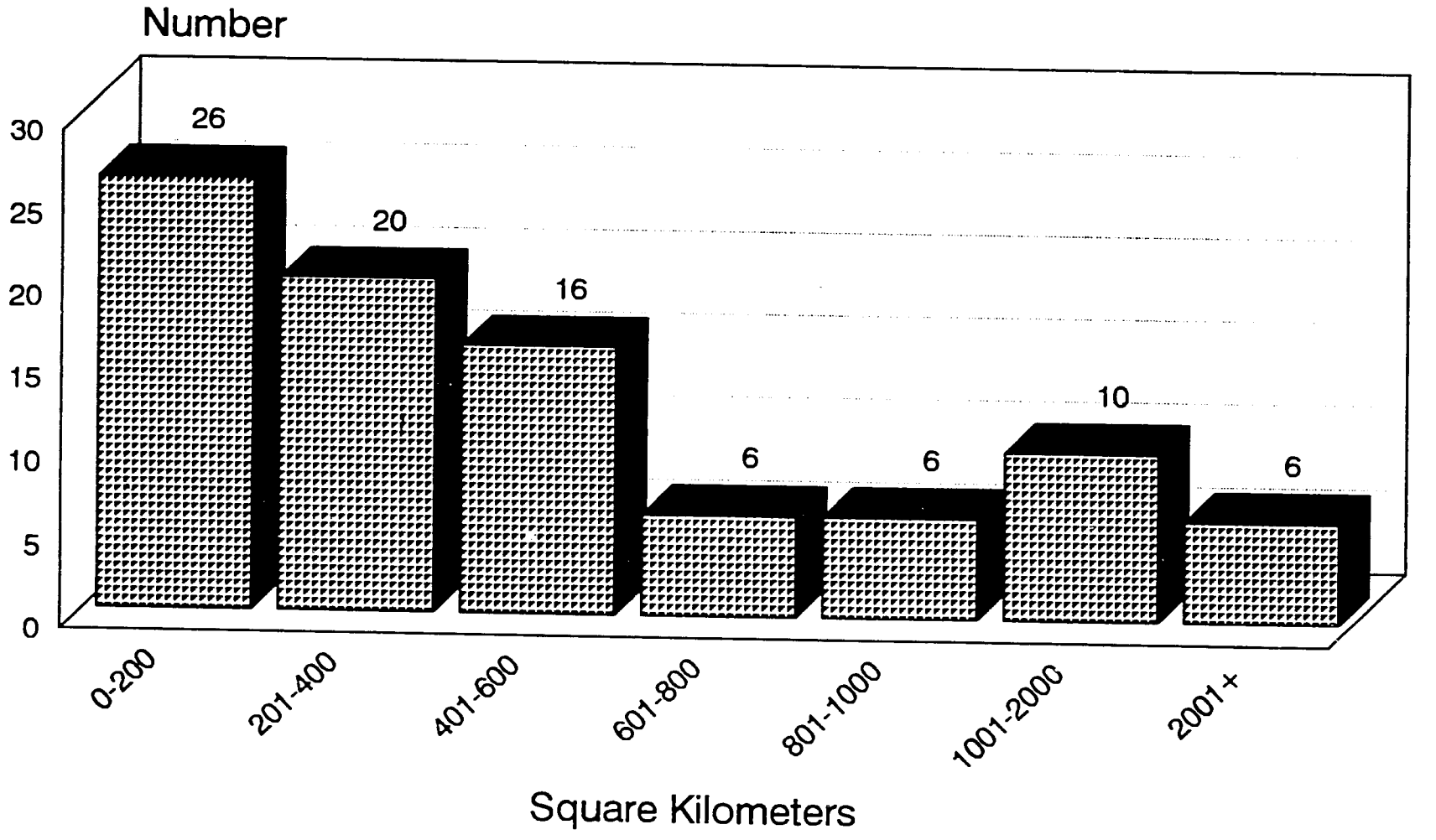
SUMMARY OF PROTECTED AREAS

Map† ref.	*National/international designation* Name of area	IUCN management category	Area (ha)	Year notified
	National Parks			
1	Ao Phangnga	II	40,000	1981
2	Chae Son	II	59,200	1988
3	Chaloem Rattanakosin (Tham Than Lot)	II	5,900	1980
4	Chat Trakan	II	54,300	1987
5	Doi Inthanon	II	48,240	1972
6	Doi Khuntan	V	25,529	1975
7	Doi Suthep-Pui	II	26,106	1981
8	Erawan	II	55,000	1975
9	Hat Chao Mai	II	23,088	1981
10	Hat Nai Yang (+ Ko Phuket reefs)	II	9,000	1981
11	Hat Nopharat Thara - Mu Ko Phi Phi	II	38,996	1983
12	Huai Huat	II	82,856	1988
13	Kaeng Krachan	IV	291,000	1981
14	Kaeng Tana	II	8,000	1981
15	Khao Chamao-Khao Wong	II	8,368	1975
16	Khao Khitchakut	II	5,870	1977
17	Khao Laem Ya - Mu Ko Samet	V	13,100	1981
18	Khao Lam Pi - Hat Thai Muang	II	7,200	1986
19	Khao Luang	II	57,000	1974
20	Khao Pu - Khao Ya	II	69,400	1982
21	Khao Sam Lan	V	4,457	1981
22	Khao Sam Roi Yot	II	9,808	1966
23	Khao Sok	II	64,552	1980
24	Khao Yai	II	216,863	1962
25	Khlong Lan	II	30,000	1982
26	Laem Son	II	31,500	1983
27	Lansang	II	10,400	1979
28	Mae Ping	II	100,300	1981
29	Mae Wong	II	89,400	1987
30	Mae Yom	II	45,475	1986
31	Mu Ko Chang	II	65,000	1982
32	Mu Ko Phetra	II	49,438	1984
33	Mu Ko Similan	II	12,800	1982
34	Mu Ko Surin	II	13,500	1981
35	Mukdahan	II	4,550	1988
36	Nam Nao	II	96,600	1972
37	Namtok Mae Surin	II	39,660	1981
38	Namtok Phlui (Khao Sabup)	II	13,450	1975
39	Pang Sida	II	84,400	1982
40	Phu Chong - Na Yoi	II	68,600	1987
41	Phu Hin Rong Kla	II	30,700	1984
42	Phu Kao - Phu Phan Kham	II	32,200	1985
43	Phu Kradung	II	34,812	1962
44	Phu Phan	II	66,470	1972
45	Phu Rua	II	12,084	1979
46	Ramkamhaeng	II	34,100	1980
47	Sai Yok	II	50,000	1980
48	Si Laana	II	140,600	1989
49	Si Nakarin	II	153,200	1981
50	Si Phangnga	II	24,608	1988
51	Si Satchanalai	II	21,320	1981
52	Tarutao	II	149,000	1974
53	Tat Ton	II	21,718	1980
54	Thaleban	II	10,168	1980

Map† ref.	*National/international designation* Name of area	IUCN management category	Area (ha)	Year notified
55	Thap Lan	II	224,000	1981
56	Thung Salaeng Luang	II	126,240	1972
57	Ton Krabak Yai	II	14,900	1981
58	Wiang Kosai	II	41,000	1981
	Wildlife Sanctuaries			
59	Doi Chiang Dao	IV	52,100	1978
60	Doi Luang	IV	9,705	1984
61	Doi Pha Chang	IV	57,108	1980
62	Doi Pha Muang	IV	58,311	1980
63	Huai Kha Khaeng	IV	257,464	1972
64	Huai-Sa-la	IV	38,000	1990
65	Khao Ang Ru Nai	IV	10,810	1977
66	Khao Banthat	IV	126,695	1977
67	Khao Phanom Dong Rak	IV	31,600	1978
68	Khao Pra Bang Kram	IV	18,640	1987
69	Khao Sanam Phriang	II	10,001	1985
70	Khao Soi Dao	IV	74,502	1972
71	Khlong Nakha	IV	48,000	1972
72	Khlong Phraya	IV	9,500	1980
73	Khlong Saeng	IV	115,530	1974
74	Mae Tuen	IV	117,300	1978
75	Mae Yuam Fang Khwa	IV	29,200	1986
76	Maenam Phachi	IV	48,931	1978
77	Omgoy	IV	122,400	1983
78	Phu Khieo	IV	156,000	1972
79	Phu Luang	IV	84,799	1974
80	Phu Miang-Phu Thong	IV	54,500	1977
81	Phu Wua	IV	18,650	1975
82	Phu-si-tan	IV	25,000	1990
83	Prince Chumphon Park	IV	45,400	1988
84	Salawin	IV	87,500	1978
85	Sub-langka	IV	15,500	1986
86	Thung Yai Naresuan	IV	320,000	1974
87	Ton Nga Chang	IV	18,195	1978
88	Umphang	IV	251,564	1989
89	Wang-pong	IV	14,800	1987
90	Yod Dom	IV	20,255	1977
	Non-Hunting Area			
91	Mu Ko Libong	VIII	44,749	1979
	Biosphere Reserves			
	Hauy Tak Teak Reserve	IX	4,700	1977
	Mae Sa-Kog Ma Reserve	IX	14,200	1977
	Sakaerat Environmental Research Station	IX	7,200	1976

†Locations of most protected areas are shown on the accompanying map.

Figure A-4. Distribution of Protected Areas by Size (Thailand)



Source: IUCN, Caring for the Earth: A Strategy for Sustainable Living, 1992.

Thailand's Biological Diversity

More than 10 percent of the world's known animal species, 4,253 out of a total of 41,600 species, are found in Thailand (UNCED 1992). About 143 of the total number of animal species found in Thailand are endemic (UNCED 1992). Mammals number about 265 species, of which about 92 species are bats -- including agriculturally important insect predators and pollinators of some species of fruit trees -- 70 are rodents, 36 are carnivores, 18 are ungulates and 13 are primates. Somewhat less well known are the estimated 600 freshwater species and 850 marine species of fishes, 300 species of reptiles, and 100 species of amphibians (TDRI 1987).

In addition to the Asian wild elephant, Thailand is home to many large and spectacular species, including the tiger, clouded leopard, gaur, bateng, Malayan tapir, Asian wild dog, sambar deer, painted stork, open-billed stork, helmeted hornbill, great hornbill, argus pheasant and green peafowl. Primates include three species of gibbons, including the pileated gibbon found only in Southeast Thailand and Western Kampuchea, four species of leaf monkeys and five species of macaques (TDRI 1987). The country's smaller animals, including most invertebrates, are poorly known. Of the approximately 900 species of birds in Thailand, 578 are forest species. Some 10,000 species of beetles, 1,200 species of butterflies, and 200 species of hawk moths have been recorded in Thailand (UNCED 1992).

Between 20,000 and 25,000 species of vascular plants native to the country; flowering plants are believed to number 10,000 to 15,000 species in 260 families. This includes more than 500 species of trees and over 1,000 species of orchids. Botanists have described only an estimated 60 to 70 percent of Thailand's vascular plants (TDRI 1987). There are at least 2,000 species of mushrooms (UNCED 1992). Plants are major contributors to Thailand's economic diversity. Hundreds of species are useful to man. Over 150 plants are either edible or poisonous and find commercial use in insecticides and medicines (TDRI 1987).

About 11 animal and plant species are endangered or threatened with extinction (UNCED 1992). These include the Backwater fish Xenocheilichthys gudgen, Oriental darter *Anhinga melanogaster*, and Hog deer *Cervus porcinus*. The wild elephant population, once abundant, has been reduced to about 1,500. Many of these species have become endangered and others are so rare that no recent records exist from the wild, or are now confined to small local populations. A few have already become extinct (TDRI 1987). The rare endemic palm *Kerriodoxa elegans* is listed by the IUCN as one the world's 12 most endangered plants (UNCED 1992). Other endangered endemic species are the Princess Sirindhorn bird *Pseudochelidon siritare*, the marshall crown bat Rhinolophus marshalli and the Phra Rahu palm *Maxburretia furtadoana*.

The most seriously threatened species are large water birds of swamps and marshes and lowland rain forest species. Lowland forests are in acute need of protection, along with freshwater swamp habitats, and high altitude mountain or hill evergreen forest, which harbors species of birds not found elsewhere. Only small remnants of such habitats now remain (TDRI 1987). Kouprey and Javan rhino are no longer found in Thailand, the number of elephants has been drastically reduced (UNCED 1992).

Although wildlife protection laws and nature conservation areas have been established since 1960, the country's biological wealth continues to shrink. Natural forests are perhaps the country's most important source of biological diversity, and most forest-dependent species will soon remain only within the protected areas of national parks and wildlife sanctuaries. About 28 percent of the country, or approximately 14 million hectares, is under natural forest cover, compared to 28 million hectares thirty years ago (UNCED 1992).

Threats to Forest Habitats in Thailand

Threats to the long-term preservation of Thailand's natural forest habitats are myriad: logging and land clearing for agricultural cultivation continue despite newly legislated restrictions; regulations against illegal trading in wild species are also still unevenly enforced. Deforestation, both of rain forests and mangrove forests, by construction of water reservoirs and hydropower dams, urbanization, tourism, and pollution are the newest economic growth threats to many forest habitats and the wildlife species that depend on them for survival (UNCED 1992).

A great deal more must be learned about exactly what species do not fall within Thailand's current system of protected forest habitats in order to either establish protected areas around them or, where possible, relocate these animals into protected zones. Unregulated hunting of protected animals outside of the protected area system has pushed most large species to the brink of extinction, except in a few remote regions. Detrimental subsistence hunting and trapping continues in many rural areas, inside and outside of protected areas. Even within the park system some species are endangered or already extinct, including the large hornbill species and gibbons. Elephants avoid parts of parks near villages and tourism centers. Schomburgk's deer is extinct; other species have not been seen in years (TDRI 1987).

The local wildlife trade is extensive and existing laws ineffectual. It is virtually impossible to prevent animals from being bought and sold, even in the large markets, as almost any animal can be concealed, or be claimed by an owner to be a personal pet. The illicit trade is conducted by hundreds of small vendors, pet stores, private zoos, large international dealers, game meat

restaurants, and jewelry stores which sell endangered cat skins, teeth and claws.

Either loopholes in the law are found or the laws are simply ignored. For example, present regulations allowing persons to own one pair of any protected species has created a convenient loophole for dealers and does nothing to aid captive propagation. Experienced wildlife traders get animals past checkpoints and out of the country. Authorities have little government support or manpower (TDRI 1987).

Reports from protected area officials and from scientists with extensive field experience strongly indicate that encroachment and poaching pressures have been markedly increasing since the protected areas system was established in 1962. These pressures have been fueled by a rapidly expanding human population and by chronic economic problems in rural areas.

Abuse of protected areas has traditionally been met with law enforcement. Although these efforts have minimized on the short-term habitat destruction at parks and sanctuaries in comparison to other types of protected/regulated areas, deterioration of park continues (Kasetsart 1987).

Shifting agriculture is also destructive to many of Thailand's forest habitats. The destruction of lowland forest due to agricultural expansion and the construction of reservoirs has caused the endemic Damrongia purpureolineata, a rare herbaceous plant related to some local ornamental plants, to become extinct (UNCED 1992).

The local tribal groups and subsistence cultivators are reluctant to relocate and difficult to resettle when willing to do so. There is some experimentation with letting the tribes remain while continuing their traditional lifestyle (TDRI 1987).

People who benefit from illegal use of protected areas represent the entire social spectrum and include wealthy businessmen, politicians and government officials as well as hill tribes, landless Thais and local villagers. Illegal activities are often a collaborative effort among rich and poor, such as a business executive paying a villager to collect orchids or timber.

But poor villagers who live in the vicinity of protected areas, landless Thais and hill tribes may be responsible for a large (perhaps the largest) proportion of illegal activities because of economic necessity and lack of alternative income sources (Kasetsart 1987). Park guards are out-manned and out-gunned. The problem of protecting forest habitats, however, is not an enforcement problem but one of rural development.

Approaches to Protecting Biological Diversity

The demarcation of forest and other lands as protected areas may help but by no means guarantees that habitats and their wildlife will remain undisturbed. Management and monitoring are required to assure that protected areas are more than just "paper parks" with no more than posted signs and presidential decrees on which to depend.

The Law for Wild Elephant Conservation of 1921 was the first legislation governing the protection of a wild species. The law was enacted after it was realized that the wild elephant population was decreasing at an alarming rate.

The National Park Act, enacted in 1961, was to protect natural habitats. The first National Park, the Khao Yai National Park, was established the following year (UNCED 1992). The Wild Animals Reservation and Protection Act (WARPA) was passed in 1960 regulated and restrict the hunting, trading, and ownership of specified endangered animals. The WARPA was revised and strengthened in 1972 (UNCED 1992).

Beginning in 1961, administration of WARPA and the National Park Act and of the new protected areas was under two 'sections' of RFD's Silviculture Division; in 1965 the National Parks Section was upgraded to 'sub-division' status. As their conservation responsibilities rapidly expanded and the number of protected areas increased, RFD with Cabinet consent upgraded these agencies to the National Parks Division, in 1972, and the Wildlife Conservation Division in 1975. Four sub-divisions were established in the National Parks Division (NPD): administration, technical, national park management and forest park management. Five sub-divisions were established in WCD: administration, technical, extension, law enforcement, and wildlife sanctuary (Kasetsart 1987). The annual budget for park management is about 3.5 million baht ($120,000) (Wells and Brandon 1992).

To prevent further encroachment into natural forests, a nation-wide logging ban was imposed in late 1988. Programs to protect and to increase forest areas, emphasizing local participation, have also been initiated. Although lost forests can be regrown, biodiversity, once eliminated, is gone forever in practical terms (UNCED 1992).

The Wildlife Conservation Act of 1991 superseded the WARPA, which was unable to keep up with the changing pattern of wildlife exploitation and did not fully reflect other international legislation. The continued destruction of wild species prompted an alarmed public and the government to pass the Wildlife Conservation Act of 1991. Besides updating WARPA, the new act incorporated the provisions of the "Convention on International Trade in Endangered Species of Wild Flora and Fauna" by prohibiting the import, export,

and ownership of endangered species of foreign origin. The 1991 Act also promoted captive breeding of selected species of birds and mammals to help increase the populations, conserve the species, and to reduce the pressure on wild species (UNCED 1992).

The Seventh National Plan (1992 -1996) calls for the extension of the target area for conservation forest from the previous 15 percent of the country's area to 25 percent. In order to achieve the target, the Royal Forestry Department must increase the size of national parks and wildlife sanctuaries to include more of the remaining natural forest in watershed zones (UNCED 1992).

The value and functions of protected areas vary, and ideally the functions of each should be defined in a management plan. In 1984 the World Wildlife Fund sponsored a project for Khao Yai National Park, which included preparation of a detailed management plan by a team of NPD officials and outside local experts. This is the first detailed management plan for a conservation area in Thailand (TDRI 1987).

The Khao Yai Management plan was innovative in that it specifically addressed the well-being of local communities bordering the park. A pilot project to initiate appropriate tourism with the aim of benefiting local villagers was funded in the WWF project. Both the NPD and WCD have recently established planning sections with the intention of preparing management plans for other protected areas (TDRI 1987).

The Wildlife Fund Thailand (WFT), founded in 1983 and now a WWF-International affiliate, while relatively small, has brought to public attention some of the country's most important environmental issues (Wells and Brandon 1992). Dozens of other environmental NGOs have emerged on the scene since 1988 when flood disasters in Southern Thailand awakened public attention to the country's vulnerability from further destroying forest cover.

Most popular parks in Thailand's protected forest habitats system provide a certain level of visitor facilities, some that are fully adequate to meet demand and some that are inadequate. Most parks however do not yet possess visitor facilities and services of sufficient quality. Certain parks encourage the public to assist in offering visitor services, but these are generally very small operations run by local people (Kasetsart 1987).

National park visitor volumes increased nearly 400 percent between 1976 and 1985, and 62 percent from 1981 to 1985. In 1985 the number of visits topped 4 million. This trend toward dramatically increasing tourism is expected to continue due to higher per capita incomes, more urbanization, improved communication routes and possibly increased promotional activities. Most park visitors will, as in the past, come from Bangkok and other large population centers, but the proportion of visitors who

come from rural areas will likely remain high. The number of foreign visitors, which now does not exceed 5 percent of total park visitors, should increase if TAT follows through on its intention to improve promotion of national parks as tourist destinations (Kasetsart 1987).

WCD has requested international assistance to establish a research and training center at Huai Kha Khaeng Wildlife Sanctuary and Khao Yai National Park have requested government permission to place a research officer at the park to coordinate research projects (Kasetsart 1987). Research management at nearly all parks is either absent or primitive. This is primarily because: (i) research performed in the park is not analyzed for its potential use in helping to manage the park; (ii) the parks lack officers to liaison with research institutions; and (iii) most parks do not have adequate facilities for visiting researchers (Kasetsart 1987).

APPENDIX C

PROFILE OF KHAO YAI NATIONAL PARK

Introduction

Khao Yai National Park is a forest habitat in transition. Ecologically, the park is slowly restoring itself to a natural state after decades of human settlement within its borders. Even today human settlement continues with installations for park employees and their families and tourists. A military contingent that operates radar facilities on mountains inside the park is also stationed within Khao Yai.

It remains to be seen if Khao Yai is on a stable course of restoration or if it will instead deteriorate further under the pressures of commercial development for tourism and illegal encroachment for fuelwood and hunting by villagers along is borders. AID assistance to local NGO's has helped unleash economic forces favorable to the long-run sustainability of the forest habitat within Khao Yai National Park. The potential impact of AID assistance on survival of Khao Yai Park forest habitat must be understood in the context of the physical setting and history of the park's evolution.

Physical Features of the Park

Khao Yai National Park is located about 200 kilometers northeast of Bangkok on paved highway about 3 hours driving time from the center of the capital city. The Park covers 2,186 square kilometers of hilly and mountainous terrain in the Dongrek mountain range which forms a natural wall fencing of the northeast plateau from the central plains of Southeastern Thailand.

There are five basic vegetation types in the park: moist evergreen forest, dry evergreen forest, hill evergreen forest, dry mixed deciduous forest, and grassland and secondary growth. The moist evergreen forest is dominant, covering nearly 70 percent of the park, with its core area lying between an elevation 400 to 1,000 meters above sea level.

Khao Yai National Park is regarded as one of the world's leading National Parks. It includes some of the largest remaining areas of tropic moist forest in mainland Asia and has exceptionally diverse plants and animals. Khao Yai Park alone is estimated to contain perhaps 2,500 species of flowering plants. It is one of the last remaining viable habitats in Thailand for many rare species.

The park is best known for its elephants, gibbons, and other mammals, and 318 bird species (35 percent of all those occurring in the country). It contains 67 species of mammals, including 16 bat species), which represents a third of the country's mammals. The park's 200 Asiatic elephants, while not a large population, is more than found in other protected areas in Thailand (UNCED 1992). The park is also part of the hydrological cycle of northeast Thailand, containing the headwater of four major rivers and supplying two large reservoirs (Wells and Brandon 1992).

Khao Yai also shelters four major watersheds. The total run-off discharge of the park is about 1,900 million cubic meters per year, which sustains both the park's biological diversity as well as agriculture and industry outside the area.

Historical Evolution of Khao Yai Naticnal Park

The evolution of Khao Yai National Park as a protected forest habitat can be broken down into three phases:

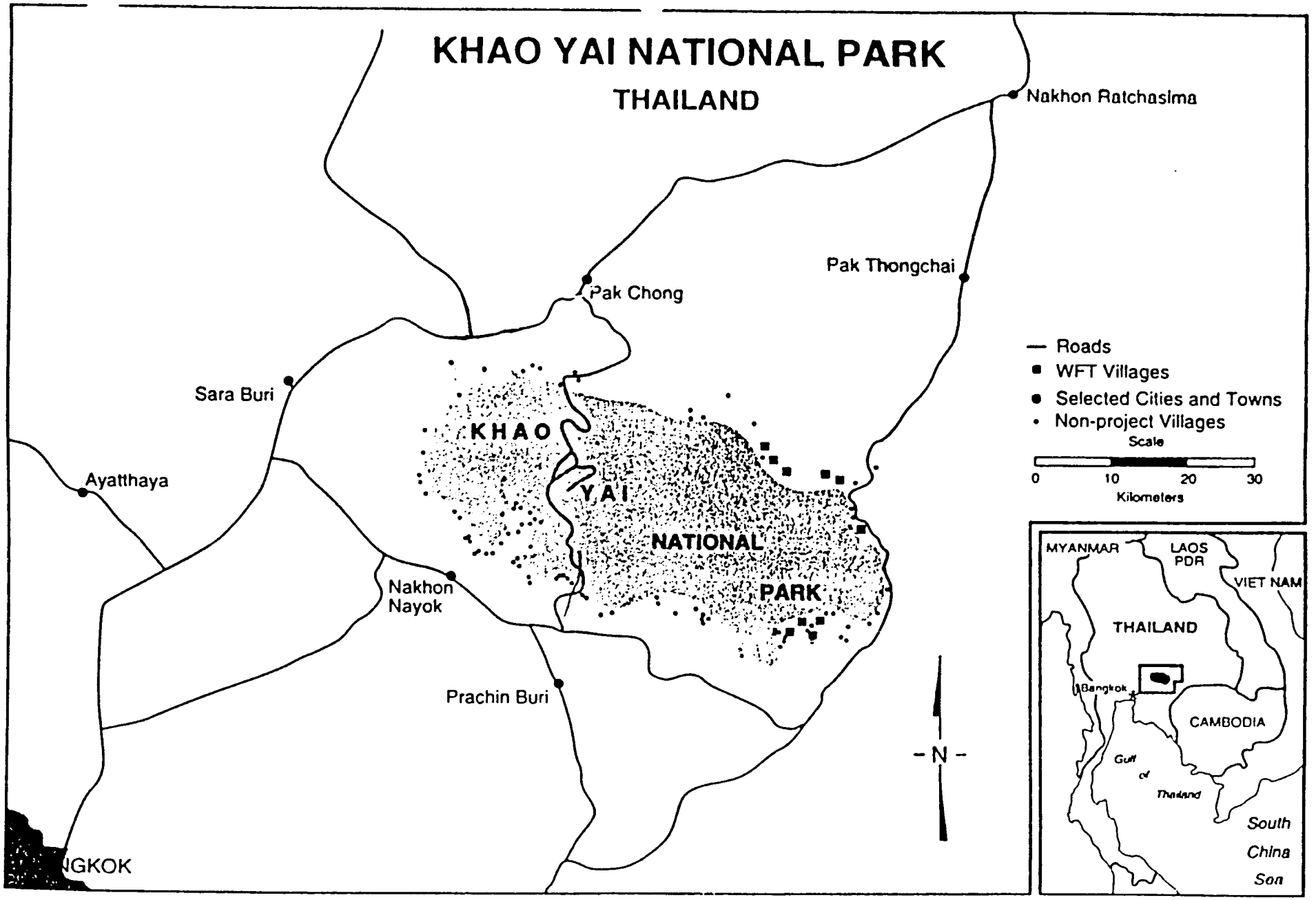
- Pre-park period of natural development and human settlement
- Early park system development and operation
- Current and anticipated park conditions

These three periods are distinguished by the types of demographic economic and political pressures that have been placed on the forest habitat resources of the park

The Pre-Park Period

Prior to the establishment of a national park system in Thailand in the early 1960's, the forest habitats that made up the areas of Khao Yai National Park were essentially open unclaimed forests at the disposal of any who chose to use them. Before establishment of a constitutional monarchy and the consolidation of political control over the country, Khao Yai hosted bands of highwaymen who would attack road commerce between Bangkok and the north and then flee to the refuge of the Park's impenetrable forests for refuge. The abundance of wildlife and land for extensive cultivation of subsistence crops easily supported the small populations that lived within the park boundaries through the first half of the century.

During the 1950's, military forces from the young republic moved into Khao Yai to secure it against further use as a redoubt for thieves and dissidents. Since the 1950's the park has been the home of a military encampment which operates communications facilities from atop its highest mountain peaks.



Early Park Development

Passage of the forest and wildlife acts in the early 1960's paved the way for official creation of Thailand's first national park, Khao Yai National Park, on 18 September 1962. Park lands officially became properties of the Royal Thai Government and administered by the National Parks Division of the Royal Forestry Department, Ministry of Agriculture and Cooperatives.

A road system built by the military to bisect the park was upgraded for private vehicular traffic and a park headquarters with nature interpretation center, staff quarters, restaurants and camping and observation facilities were added to carry out the Park's new role as a recreational and education facility as well as it function as a preserve for animal and plant wildlife.

During early park development the Tourism Authority of Thailand (TAT) invested in a lodge, golf course and dining facility near the park headquarters. Objections to the impact of the TAT facility on animal life led an earlier Thai administration to discontinue TAT operations in the park. At the time of the evaluation the TAT facilities remained inactive and abandoned the golf course a popular grazing pasture for sambar deer. However, as the daily Thai press and local NGO's reveal, the TAT continues to maneuver for support to reestablish park-based tourism in the country.

The Contemporary Park Setting

Khao Yai attracts 250,000-450,000 Thai and foreign visitors annually who spend the equivalent of $5 million US on admission, lodging fees, transportation, food, and other services in the park (IUCN 1990). About half of those surveyed were Bangkok residents; young and unmarried, with equal numbers of males and females. Most tend to be students, civil servants or engaged in business; the level of schooling is higher than the national average (Kasetsart 1987).

Land surrounding the park has been almost entirely deforested in the last three decades. The park is under pressure from illegal hunting and logging and from large-scale development projects--including some tourist facilities. About 53,000 people live in 150 villages around the park. Many illegally occupy land classified as reserved forest as do more than 7 million Thai villagers throughout the country. Many were formerly dwellers on park lands who now found themselves displaced to lands bordering the park and forced to adopt cultivation practices for which they were ill prepared. Their continued encroachment into the park for hunting, logging and farming can be traced to their inability to obtain a livelihood outside the park's boundaries.

Limited and sporadic park enforcement measures have generated hostility and armed clashes between local villagers and personnel of the National Parks Division of the Royal Forestry Department; people on both sides have been killed. However, illegal poaching and logging activities in the park have continued (Wells and Brandon 1992).

Enforcement measures following the establishment of the national park met with hostility and resulted in armed clashes between Royal Forestry Department personnel and villagers, with killings on both sides. espite aggressive protection measures, illegal activities in many areas of the park have continued, mainly poaching and the removal of timber and other forest products. Excessive logging, both legal and illegal, have already wiped out large parts of forests (UNCED 1992). In the first four months of 1986, 2258 poachers were arrested in the park. By the mid-1980's, at least 5 percent of the park's forests had been lost of encroachment and perhaps another 5 to 10 percent degraded (Wells and Brandon 1992).

Poaching remains a threat although its seriousness is hard to measure. Poachers' camps are found along every stream in remote areas and poachers, mostly teams of persons collecting fragrant wood ("mai hom") from the tree Aquilaria crassna, as well as animal hunters, are frequently encountered.

Approaches to Protecting the Park

Environmental Awareness and Mobilization (TEAM) Project. In 1987 Wildlife Fund Thailand initiated the AID-funded Environmental Awareness and Development Mobilization (TEAM) project (1988-1990). The purpose was to promote environmental conservation and economic development through community participation among villagers living adjacent to Khao Yai National park. Forty-seven villages in Pakchong, Paktongchai, and Nadee District were given conservation information as well as developmental assistance in the form of income generation activities that promoted conservation of wildlife and forests.

In many of the villages surrounding the park, the people are poorer than average and heavily in debt. Health and sanitation levels are low. There are few formal village institutions, literacy is rare, and perhaps a third of the villagers--mainly recent immigrants--have no legal land titles. Loan sharks control village economies, providing credit to farmers at a usurious 5 percent a month and then taking over the lands of those unable to repay. The heavy indebtedness of villagers, who have no access to alternative credit sources, appears to be the major constraint to change. Consequently, many villagers illegally hunt and log in the park.

The TEAM project offered alternatives by providing loans from a revolving loan fund. Interest rates on the loans were set at commercial bank levels. This is a considerable incentive for joining because loans from the local middleman and merchants cost 5 percent per month. To withdraw low-interest loans from the fund, villagers must join a "Environment Protection Society" and pledge not to hunt in the park and to abide by park regulations.

The TEAM project has an important historical context in that it was able to rely on the invaluable experience of an important earlier program near the park. In 1985 two Thai nongovernmental organizations--the Population and Community Development Association and Wildlife Fund Thailand--began working together in Sup Tai village just outside the park boundary. The Sup Tai Rural Development for Conservation Project sought to find ways to conserve the park's natural resources while promoting improved income-generating opportunities.

The project is built around a new village-level institution, the Environmental Protection Society, which would later distributed loans from the TEAM Project. An elected village committee administers the society with supervision from a full-time project manager. The environmental protection society was originally established as a vehicle for enabling villagers to make decision and, eventually, to become financially and organizationally self-sufficient and independent from the project.

From 1985 to 1989, 436 loans totally about $775,000 were made to Sup Tai residents. The experience at Sup Tai demonstrates that the loans have been repaid in full and on time, almost without exception. Early in 1990, the Bank of Agriculture and Agricultural Cooperatives agreed to provide credit directly to Sup Tai farmers on an experimental basis. In 1987 Wildlife Fund Thailand withdrew from the project to initiate the AID-funded TEAM project.

A.I.D. Management of Natural Resources and Environment (MANRES) Project. A.I.D. developed the $44,000,000 MANRES Project (1988-1995) to promote the economic and social development of Thailand through improved management of natural resources and the environment. It focused on developing the capacities of Thai governmental and nongovernmental institutions to define, analyze, and respond effectively to current and emerging natural resource and environmental management problems, and thereby to build consensus and capacity for advahcing policy options that will lead to sustainable development.

Among the seven MANRES sub-projects is a biological resources management sub-project to strengthen the management and public education capacities of the Royal Forest Department's National Parks and Wildlife Conservation Divisions. Targets are to train over 400 personnel, develop management plans for 40 parks/sanctuaries and implement the plans in 4-5 pilot areas and

within 2-3 regional development plans. This sub-project will promote scientific understanding of wildlife species/habitats through a National Biological Survey, fund action research, and improve public-private cooperation in biological resource conservation.

A MANRES environmental awareness sub-project will develop formal and informal environment and natural resources management curricula/materials and train teachers and community leaders in their use; develop Regional Resource Centers for Environmental Education at teachers' colleges; prepare a national strategy for environmental education; and conduct a mass media environmental awareness campaign. The MANRES biological resources management will also strengthen the management and public education capacities of the Royal Forest Department's National Parks and Wildlife Conservation Divisions. Targets are to train over 400 personnel, develop management plans for 40 parks/sanctuaries and implement the plans in 4-5 pilot areas and within 2-3 regional development plans. The sub-project will promote scientific understanding of wildlife species/habitats through a National Biological Survey, fund action research, and improve public-private cooperation in biological resource conservation. A human resources sub-project will fund environmental training of 30 Ph.D.'s, 50 M.S. degrees, and 350 short-term participants.

Conservation education also plays a role in protection of Thailand's parks and sanctuaries, particularly when directed at nearby villagers. Khao Yai National Park has established an outreach program to educate rural people about the importance of protected area conservation, and WCD has established Nature Education Centers (TDRI 1987).

The Thai-U.S. development partnership initiative recently launched by A.I.D. is sponsoring a two-year public-private venture to plant 9,000 hectares of trees around the borders of Khao Yai National Park as a means of formally establishing a buffer zone of community forests from which local communities could eventually live without the need for encroachment into the park to harvest trees for fuelwood and construction. The A.I.D funded tree planting activity is part of a larger national effort to restore commercial tree plantations on 15 percent of the lands in the country.

APPENDIX D

PROFILE OF PROJECT VILLAGES

As a pilot activity, the WFT TEAM project included a research component designed to monitor impact during implementation. An independent Thai NGO, the Population and Community Development Association (PDA) was contracted to conduct before and after surveys including a baseline study (PDA 1988), a mid-term study (PDA 1989) and a final impact evaluation (PDA 1990).

The research design focused on changes in four areas: social and economic status, health conditions, community development participation and attitudes towards natural resource conservation. The 1988 baseline household survey was gathered data on 582 households and the 1990 impact survey gathered data from 703 households enumerated in the 10 project villages (Figure C-1). In addition community profiles were compiled through interviews with key informants in each village.

For conducting its intensive village conservation and development activities, WFT selected ten villages -- five each from two districts along the eastern borders of Khao Yai National Park:

In Pakthongchai District: Khao Paeng Ma, Bu Chao Khun, Khlong Satorn, Khlong Sai, and Taa Wang Sai villages.

In Nadee District: Bu Phram Nai, Nong Ta Baek, Waan Luang, Bu Khunchai, and San Dan villages.

The combined populations of the ten selected villages totaled about 5,000 at the time the project began in 1987 (PDA 1988). Villages were selected because of the known record of Park encroachment by their members and because they received relatively little public services -- health, education, agricultural credit and extension -- from official government agencies.

Villages in both districts are relatively new with their earliest members going back little more than 50 years. The villages themselve only recently were given official recognition and political entities and have benefited for less than a generation from any schooling, health care or other social services. Villages in Nadee district stood out from those in Pakthongchai district by their lower land ownership and income levels and more dependency on dryland rice cultivation.

This appendix highlights major findings from the TEAM project baseline survey (PDA 1988) and impact evaluation (PDA 1990). Findings from these surveys are supplemented by additional

observations from a 1992 survey of the project villages (Chulalongkorn 1992) and a 1993 survey conducted for CDIE (PDA 1993) that compares both project and non-project villages 6 years after USAID funding began.

Socio-Economic Characteristics

Demographics. Villages in both survey districts demonstrated demographic patterns (age pyramids) similar to the nation as a whole. Dependency ratios -- the population under age 15 and over age 65 was 71.5 % in Nadee district and 76.1 in Pakthongchai district. Demographics features of the project villages changed little over the three year period. Educational levels increased over the three years of project activity with 62.3 percent in 1990 as compared to 58.2 percent in 1988 achieving the minimum compulsory level of 6 years of primary schooling. Migratory rates remained the same over the survey period though a larger share os emigrants indicated in 1990 they would return than in 1988.

Economic activity. Some occupational changes occurred over the survey period with rice farming increasing from 37.8 percent i 1988 to 58.2 percent in 1990 as the primary occupation in Nadee district. In Pakthongchai district where farmers are primarily corn producers crop farming increased from 60.0 percent to 82.5 percent for the period. In both districts these increases were accompanied by reductions in the level of unemployment and wage labor. Other increases in economic activity were registered in animal husbandry and commerce.

Land holdings. In Nadee district 25 percent of the households owned land in 1990, down slightly from 29.6 percent in 1988. In Pakthongchai district land ownership was up from 72.3 percent in 1988 to 83.1 percent in 1990. In both districts the rates of land ownership among EPS members were twice those of non-members in 1990.

Gross income. The median household income nearly doubled over the survey period in both districts increasing from 10,828 Bhat to 19,250 Bhat in Nadee district and from 14,000 Bhat to 30,015 Bhat in Pakthongchai between 1988 and 1990. As compared with non-members, median income of EPS members was about 3,000 Bhat higher in Nadee district and 9,000 Bhat higher in Pakthongchai district in 1990.

Loan activity. Majority (75.2 percent) of EPS members in Nadee district and nearly all (98.1 percent) EPS members in Pakthongchai district had borrowed money in the previous year for crop production, animal raising, household expenditures or health care. Sources of cash loans were different for EPS members, who took advantage of project borrowing, and non-members, who continued to depend of merchants, relatives or friends. During the three

year period EPS members because less dependent on these sources of borrowing

Health and sanitation. The usage of water jars for rainwater storage and latrines for human waste increased in project villages in both districts over the survey period. Almost all villagers (96.7 percent in Pakthongchai and 92.5 percent in Nadee district used water jars for rainwater storage in 1990, a significant increase over 1988 levels.

Environmental awareness and practices

Environmental conservation knowledge. Knowledge of the location of Khao Yai National Park boundaries in 1990 was high in both districts (93.9 percent in Nadee district and 95.8 percent in Pakthongchai district). Attitudes toward hunting changed dramatically over the period with the number of respondents claiming that all hunting within the park should stop increasing from 56 percent to 86 percent in Nadee district and from 59.4 percent to 88.9 percent in Pakthongchai district. Those arguing for selective hunting were in the most cases farmers that had experienced some crop damage from wildlife that intruded into their fields in search of food. EPS members were more likely to report park intrusions to forest rangers and to seek help of neighbors to fight forest fires than were non-members in both districts.

Project awareness. Almost all villagers in both districts were familiar with the TEAM project in 1990. Interestingly, many EPS members in 1990 had forgotten the original purposes of the project even though they had discontinued park encroachment. Many EPS members in 1990 perceived of the project as a community action work and not as a conservation program. Among non-members knowledge about EPS activities was lower in 1990 than in 1988 probably due to less mobile environmental awareness and organizing work by TEAM project staff. TEAM staff members still seemed to be the major source of information about EPS clubs. Few respondents indicated learning about EPS activities from members, a fact that may be explained by the lack of social cohesiveness still in many villages.

Protected Areas Encroachment Practices. Park encroachment dropped nearly 50 percent from 63.9 percent to 33.3 percent in Nadee district) with rates much lower for EPS members than non-EPS members. Reasons for park encroachment changed over the period with greater share of encroachment reported for hunting and wood gathering and less for agricultural cultivation.

APPENDIX E

PERSONS CONTACTED

USAID Regional Support Office for East Asia

Eugene Morris, Deputy Director
Denny Robertson, Director, Project Development & Evaluation
Lawrence Hardy, Project Officer, O/PDE
Susan Palmer, PVO Project Manager, O/PDE
Kamol Chantanumate, Project Officer, O/PDE

Wildlife Federation of Thailand (WFT)

Pisit na Patalung, Secretary General
Surapon Duangkhae, Conservation Programs Director
Nikom Putta, WFT TEAM Project Field Director
Seri Thonmak, Thun Yai Sanctuary Field Director
Charlie Interat, WFT Field Officer, Nadee District
Rob Steinmetz, U.S. Peace Corps Volunteer, Khlong Sai Center
Patrick Corrigan, U.S. Peace Corps Volunteer, Thung Yai
Varamit Peunchompoo, Field staff, Thung Yai Sanctuary

Population and Community Development Association, (PDA)

Tharainee Sriruethehong, Director, Research and Evaluation
Wilas Techo, Director, Water, Environment and Conservation

Royal Thai Government

Suthep Thaunggsuban, Dep. Minister, Agriculture and Cooperatives
Chumphonn Sukasaem, Protected Area Plannning, WCD/RFD
Yongyut Trisurat, Research Division, RFD
Thanali Sukpathee, Special Projects (Env. Awareness, Ministry of Education
Vallobh Sukont, Chief, Khoa Yai National Park

Other contacts

Choeng Hoy Chung, Senior Economist, World Bank
Khun Somsuee, Park Ranger Khao Yai
Khlong Sai village household heads (4)
Taa Wang Sai village farmers and headman
Nadee District household heads (5)
Thong Yai Wildlife Sancturay Karen tribal household heads

APPEND-E.THA::05/DEC/93

BIBLIOGRAPHY

A.I.D. 1988. "Project grant agreement between the Kingdom of Thailand and the United States of America for the Management of Natural Resources and Environment Project". Bangkok: U.S. Agency for International Development.

Arbhabhirama, Anat, Dhira Phantumvanit, John Elkington, Phaitoon Ingkasuwan, (editors). 1987. **Thailand Natural Resources Profile.** Bangkok: National Environment Board, DTEC, Royal Thai Government.

Brockelman, W. Y., and P. Dearden. 1990. "The role of nature trekking in conservation: a case-study in Thailand". in **Environmental Conservation**. 17 (2): 141-148 (39 ref., BLDSC) Bangkok: Center for Conservation Biology, Mahidol University.

Chettamart, S. 1985. "Preparing A Management Plan for Khao Yai Park: The Process Involved and the Lessons Learned." 162-165. in: Thorsell, J.W. (ed.) **Conserving Asia's Natural Heritage: The Planning and Management of Protected Areas in the Indomalayan Realm**. Switzerland: IUCN GLAND.

Chulalongkorn University. 1992. **Socio-economic impact of TEAM project villages**. Vols I and II. Bangkok: Social Research Institute, Chulalongkorn University.

Dobias, R. J. 1987. "A demonstration project for integrating park conservation with rural development at Khao Yai National Park". Project Coordinator, 53/12 Soi 15, Lad Prao Road, Bangkok 10900, Thailand. in **Parks**, 12 (1): 17-18 (OP)

Foster, David. 1991. "Tourism in Thailand: A study of the impact of environmental degradation", Bangkok: USAID. March.

Hanson, Arthur. 1989. **Safeguarding the Future: Restoration and Sustainable Development in Southern Thailand.** Bangkok: U.S.A.I.D. and the Economic and Social Development Board, RTG.

International Union for Conservation of Nature and Natural Resources (IUCN). 1985. **The Corbett Action Plan for Protected Areas of the Indomalayan Realm**. in Thorsell, J.W. (ed.) **Conserving Asia's Natural Heritage: The Planning and Management of Protected Areas in the Indomalayan Realm**. Switzerland: IUCN.

IUCN. 1991. **Protected Areas of the World - The Indomalayan Realm.** Volume 1. Gland, Switzerland: IUCN

Lovelace, G.W.; Subhadhira, S.; Simaraks, S. (editors). 19?? "A park road and its environmental effects: Khao Yai National Park". in **Rapid Rural Appraisal in Northeast Thailand. Case Studies**, Bangkok, Thailand.

Mahidol University. 1989. "Birds of Khao Yai National Park". Bangkok: Conservation Data Center, Mahidol University.

Poonswad, P. 1990. "Khao Yai National Park". in Bernard, H. U. & Brooke, M. (editors). **South East Asia Wildlife**. London: APA Publications Ltd. 1990.

Population and Community Development Association (PDA). 1988. **Baseline survey report: The Environmental Awareness and Mobilization (TEAM) Project**. Bangkok: PDA. June.

PDA. 1989. "Mid-interval survey report: The Environmental Awareness and Mobilization (TEAM) Project". Bangkok: PDA. November.

PDA. 1990. **Impact evaluation of The Environmental Awareness and Mobilization (TEAM) Project**. Bangkok: PDA. November.

PDA. 1992. **Rural development for conservation: Ban Sup Tai**. Bangkok: PDA.

RTG. 1992. **The Seventh National Economic and Social Development Plan (1992-1996)**. Bangkok: National Economic and Social Development Board. Office of the Prime Minister.

Santiapillai, Charles and Peter Jackson. 1990. **The Asian Elephant - An Action Plan For Its Conservation**. Gland, Switzerland: IUCN.

Suchevaku, Vinai. 1992. "Socio-economic survey and recommendations of a community based forestry management program -- Ban Phram Nai Village, Prachinburi Province, Thailand." Bangkok: Kasetsart University Regional Community Forestry Training Center. December.

Suvankorn, P.; Dobias, R.J. 1985. "Using Economic Incentives to Improve Park Protection: A Case Study from Thailand". 177-182. in Thorsell, J.W. (ed.) **Conserving Asia's Natural Heritage: The Planning and Management of Protected Areas in the Indomalayan Realm**. Gland, Switzerland: IUCN.

Swanson, T.M.; E. B. Barbier; J. Barnes; J. Burgess; D. Pearce, (editors). 1992. **Economics For the Wilds: Wildlife, Wildlands, Diversity and Development**. London: Earthscan Publications Ltd.

Thomas, David E. 1993. "Transforming the Thai landscape: An Emerging role for social forestry in Rural Development Programs", in **Regional Development Dialogue**, Vol. 14, No. 1. Bangkok, Spring.

Van Orsdol, Karl G. 1987. **Buffer Zone Agroforestry in Tropical Forest Regions.** Washington, D.C.: Forestry Support Program, U.S. A.I.D., September.

Wells, Michael and Katrina Brandon. 1992. **People and Parks**, Washington, D.C.: World Wildlife Fund.

Zola, Anthony M. 1993. "Buffer Zone Management, Forest Protection and Conservation", Bangkok: Faculty of Economics, Kasetsart University, June.

BIBLIOGR.THA::10/APR/94::pec