

**Using Local Environmental Knowledge: a case-study of mangrove resource
management practices in Peam Krasaop Wildlife Sanctuary, Cambodia**

by

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Abstract

This research focused on local ecological knowledge held in four mangrove coastal communities in Peam Krasaop Wildlife Sanctuary (PKWS), Cambodia. This thesis examines the different environmental beliefs and management practices held by villagers, chiefs and elders pertaining to mangrove resources and critiques the tools and methods used in the field. That is, the scope of this thesis was to learn how Participatory Rural Appraisal (PRA) methodology works in one specific isolated region of Cambodia; and, through this process, to look at resource management practices within PKWS.

Accessing local environmental knowledge in PKWS was difficult because so few community members returned to the area after the Khmer Rouge (KR). Those elders that returned to PKWS held different knowledge bases: some with an ecological perspective and others with an economic perspective. PKWS is not a permanent base for all villagers, and this helps to explain the varied levels of interest in environmental protection measures. Further complicating the issue is that these villages are isolated and poor: daily struggles can take precedence over long term planning for PKWS. Only a few villagers, including the local police and local authorities, actually earn good money from resource extraction activities.

Given the time constraints and the hierarchy that one must adhere to when conducting research within Cambodia, it is questionable if the research could have been more participatory in nature. Still, this research process created a platform, albeit limited, for those villagers involved in the research process to dialogue and to discuss issues. The excitement that community members showed while participating in this research and in sharing knowledge offers hope that communities can begin working towards sustainable resource usage in PKWS.

Never before have so many people lived in PKWS or have resources become so depleted. Within PKWS over 500 ha of mangrove forests have been cut for shrimp aquaculture, new charcoal villages have been established and existing villages are increasing in size. If this protected area is to remain a unique ecosystem, sustainable livelihood alternatives must be found. There are a few elders and chiefs who hold valuable insights into potential sustainable mangrove resource management practices.

List of Acronyms

ADB	Asian Development Bank
DFFH	Department of Fishing, Forestry and Hunting
IDRC	International Research Development Center
KR	Khmer Rouge
MoE	Ministry of Environment (national)
NGO	Non Governmental Organization
PKWS	Peam Krasaop Wildlife Sanctuary
PRA	Participatory Rural Appraisal
TEK	Traditional Ecological Knowledge
UN	United Nations
UNTAC	United Nations Transitional Authority in Cambodia
WI	Wetlands International

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I. INTRODUCTION

This research focused on local ecological knowledge held in four mangrove coastal communities in Peam Krasaop Wildlife Sanctuary (PKWS), Cambodia. The net influx of people into PKWS coupled with Thai market pressures for mangrove resources (i.e. charcoal and logs) threaten livelihood sustainability within these coastal communities. Little micro-level information pertaining to village life or the mangrove environment, even in a general sense, was found for this isolated region of Cambodia. However, communities are the users and, ultimately, the managers of resources. Therefore, it was thought that perhaps some system of resource management might exist (or have existed) in PKWS.

I.1 THE CONTEXT: CAMBODIA

Cambodia has recently emerged from a period of international isolation and turbulence; indeed, this nation is only beginning to recover from the effects of the genocidal Khmer Rouge (KR) era, 1975-1979 (Chandler, 1998). The KR regime has left behind a legacy of destitution and displaced people, and the vast majority of the rural population lives in abject poverty (Legerwood, 1998; mangroves Cambodia, 1997). Access to basic health care needs and education is rare and expensive: villagers make their living from farming or fishing and supplement their subsistence lifestyles through diversified means including the selling of natural resources. Indeed, it is resource extraction activities that offer short-term economic benefits to rural villagers.

Ironically, Cambodia's forced international isolation during the KR and the Vietnamese occupation protected forest and coastal resources. Cambodia, until recently, held many pristine, unique ecosystems. Only in the late 1980's did the Cambodian government begin selling some of its natural resources; since then some government officials have reaped copious amounts of money from excessive, unsustainable resource extraction activities (Global Witness, 1998).

Rural Khmer are the laborers for such extraction regimes; however, villagers see little profit from such activities. Illegal resource practices do not offer sustainable livelihoods: soon there will be few resources left to exploit or to extract.

In response to the growing concern for protecting Cambodia's unique environment, the Kingdom of Cambodia created the Ministry of Environment (MoE) in 1993. This Ministry has the broad mandate of environmental protection: one MoE initiative has been the identification and development of 23 protected areas. Protected areas management has been mandated under Royal Decree, "Creation and Designation of Protected Areas", November 1, 1993, and includes 23 unique ecosystems. For example, significant portions of Cambodia's remaining mangrove forests are protected in Peam Krasaop Wildlife Sanctuary (DNCP/MoE, 1995).

I.2 PKWS: THE STUDY SITE

PKWS, located in southeastern Cambodia's Koh Kong province, is 23 000 ha (mangroves Cambodia, 1997). This Wildlife Sanctuary is intended to protect one diverse mangrove ecosystem: within PKWS are some of the last remaining areas of pristine mangroves to be found in southeast Asia. Mangrove forests are flourishing systems that attract various fish and wildlife species; hence, such forests offer coastal communities food sources, shelter, medicine, building materials and other resources (Mastaller, 1997).

It is worth noting that Koh Kong province is known for the abundance of illegal cross-border trade with Thailand. This border trade includes the smuggling of illegal drugs and guns, child prostitution and illegal resource exportation. Illegal resource extraction activities such as charcoal and logging exportation and explosive fishing threaten the existence of the mangrove forest (Mam, 1996). Mangrove stands have also been razed to make way for unsuccessful shrimp farms.

The open access regime of most mangrove fish and forestry resources leads to over-exploitation and environmental degradation (mangroves Cambodia, 1997). There are nine villages located within PKWS and coastal villages have

faced a net in-migration since the KR regime. Cambodians are attracted to the coastal area because of the relative abundance of resources; therefore, threats upon the mangrove ecosystem are ever increasing. Mangrove resource extraction activities offer livelihoods for villagers in the form of fishing, charcoal production or shrimp farm labor opportunities.

Coastal communities in PKWS are isolated from the rest of Cambodia, and while there is little written information available regarding PKWS, one can easily assume that these communities are dynamic and continuously changing. Designating this area as a protected area has increased the pressures upon local communities (O'Callahan, 1998). Illegal charcoal activities are sometimes stopped, which forces villagers to make charcoal further within the mangroves or to find alternative income-generating methods. Stopping illegal charcoal production activities without offering alternative livelihoods is not a viable solution. Alternative livelihoods are necessary both to protect this unique ecosystem and to ensure the long-term future of these communities.

I.3 THE 'MANGROVES CAMBODIA' PROJECT

There is one micro-level project working with coastal communities in PKWS. The 'mangroves Cambodia' project is a two-year integrated participatory management of mangrove resources project implemented in December 1997. In part, the project emerged in response to the need to develop the capacity of the MoE, provincial departments and local initiatives in undertaking research and development activities and to assist local communities in participating in the management of mangrove resources and in developing sustainable livelihood options. Therefore, understanding resource patterns within PKWS and how resource access differs among community members is essential as is integrating community participation within existing provincial and national initiatives working within PKWS.

The implementing agency for 'mangroves Cambodia' is Cambodia's MoE. The 'mangroves Cambodia' team consists of two national-level MoE members, four provincial-level members (2 from the Department of Environment, 1 from the

Department of Fisheries and 1 from the Department of Social Welfare) and one international Project Advisor who was pursuing a Master's degree during this research process. This research worked in conjunction with the 'mangroves Cambodia' project.

I.4 RESEARCH DESIGN

This research was designed to maximize the researcher's understanding of culture and language prior to beginning the field component of the research. Given that this research spanned a period of six months, there was time to take language lessons and to integrate research ideas with local initiatives. The research methodology was designed in connection with an existing project, 'mangroves Cambodia' and worked through the appropriate government channels before beginning community-level research. The idea was to facilitate learning amongst the 'mangroves Cambodia' team members, villagers and the researcher.

Participatory Rural Appraisal (PRA) methodology informed the entire process including research design and implementation. PRA, a family of approaches, provides tools that enable rural people to share, enhance, and analyze their knowledge of their landscape and life conditions and to subsequently plan and act (Chambers, 1994a). An advantage of working with the 'mangroves Cambodia' team was that plans and actions stemming from the village-driven research could be further expanded in conjunction with the 'mangroves Cambodia' project.

Two provincial team members assisted me with my field research in helping to facilitate discussions, organization and translation. Both national level team members helped immensely in facilitating this research both in the capital, Phnom Penh, and in Koh Kong. The 'mangroves Cambodia' team was preparing for an intensive field component that coincided with the time I would spend in PKWS.

I.5 RESEARCH QUESTIONS

This research investigated local environmental knowledge (also referred to as traditional ecological knowledge (TEK)) pertaining to mangrove resource management. Elders might hold wisdom that would provide insight for future management in PKWS; and, if any management plan is to be successful, villagers must be involved in this process. Given the changes found in PKWS, another research goal was to access any contemporary resource management systems and environmental beliefs held by villagers, chiefs and elders.

Another important aspect of this research was critiquing the tools and methods used in the field. Although the researcher held some understanding of the theory behind using a participatory research approach, she had never undertaken this type of research before. Perhaps something could be learned from using this approach in rural Cambodia.

The research questions were:

- 1. What, if any, local environmental knowledge exists within PKWS?**
 - ✓ **Has this local environmental knowledge changed over time?**
 - ✓ **How has the net in-migration into PKWS affected local environmental knowledge?**
- 2. How appropriate and effective is it for a Canadian Masters student to use a PRA research approach in rural Khmer communities?**

The scope of this thesis is mangrove resource utilization and management.

Although villagers might also be involved in fisheries management initiatives, I have chosen to concentrate on mangrove resources and management systems.

I.6 THESIS ORGANIZATION

This thesis draws upon relevant literature and the research findings to present a snapshot of localized knowledge regarding mangrove management systems. Equally important, the entire research process is critiqued and the PRA methodological approach is problematized.

Chapter 1 briefly introduces the issues surrounding the study site and the research itself. Chapter 2 contextualizes the ecological, historical and

methodological issues through a literature review. Included within this section is a brief synopsis of the recent political regimes in Cambodia along with some implications for Khmer society. Chapter 3 focuses on the research methodology: the tools used in the research process. Chapter 4 further discusses resource management practices in the study area, PKWS. This section provides an overall picture of PKWS whereas Chapter 5 paints a specific snapshot picture of four villages and four chiefs within PKWS. In Chapter 6, the research findings pertaining to resource management are analyzed and contextualized. Then, Chapter 7 examines the strengths and weaknesses found when taking a PRA research approach in rural Cambodia. Finally, Chapter 8 contributes conclusions.

II. LIT REVIEW: ECOLOGICAL, HISTORICAL, METHODOLOGICAL

If the reader is to understand the significance and scope of this research, it is important to know something about mangrove ecosystems, local environmental knowledge, the Cambodian context and the methodological approach chosen for this research. What follows is an attempt to synthesize concepts succinctly in a relevant manner to the research.

II.1 ECOLOGICAL CONTEXT

II.1.1 MANGROVE DISTRIBUTION IN SOUTH-EAST ASIA

Mangrove forests are fertile, diverse saltwater ecosystems found in the coastal zone that ensure inhabitants with food and shelter (Akornkhae, 1987). These productive natural environments provide breeding habitat for a variety of birds, reptiles, mammals and insects. Similarly, mangroves also provide habitat to a variety of fish species, crustaceans and shellfish (Ruitenbeek, 1992; Walters, 1996). New plant tissue is constantly being broken down within these forests, thereby contributing to the life support system for vast numbers of animal consumers including humans (Masteller, 1997). Human dwellers further find a primary source of income, fuel, medicine and other basic necessities for their livelihood within mangrove forests.

The mangrove ecosystem is in a continuous state of change. Many forces impact the coastline including wind, tidal action and monsoon conditions. The mangrove environment is exceptionally dynamic: a general mangrove prototype cannot exist. In other words, each mangrove forest type is the result of the adaptations within plant communities to actual physical and biological influences in that particular environment (Masteller, 1997). Precisely because mangrove forests are highly adapted, they protect and provide a barrier for coastal communities from wind storms and sea storms. Also, mangroves insulate coastlines and maintain the estuarine ecological balance that is integral within coastal zones (Ahmed, 1997; Akornkhae, 1989).

Aksornkhae (1989) notes that mangrove forests in southeast Asia have recently gained in economic significance with direct resource utilization for market products and aquaculture. Mangroves, being highly productive ecosystems, support both local and commercial fisheries (Bann, 1997). With an increased economic incentive for mangrove products, these seawater forests are declining.

Meanwhile, many coastal communities remain dependent on mangrove resources for food, firewood and construction materials (Bann, 1997; Masteller, 1997). Ironically, most forms of direct mangrove exploitation offer low economic returns and involve long work hours in muddy, wet conditions (Walters, 1996). While mangrove forests do offer livelihood incentives, local people generally do not reap the benefits of unsustainable mangrove resource extraction practices (Ruitenbeck, 1992). Therefore, the preservation of mangrove resources is essential not only for coastal protection and diversity but also for the cultural and socio-economic well being of coastal communities.

Coastal dwellers have lived within mangrove forests for centuries. Unfortunately, little is written about traditional mangrove resource systems beyond a descriptive account of resources used from the mangroves (Walters, 1996). Even so, limited data reveal that, traditionally, mangrove resources have provided community members with fuel wood and production materials; plant products for food, fodder, alcohol, medicine, tannins and dyes; hunting opportunities for birds and other wildlife; fishing and shellfish grounds; siting for mollusk culture and fish pond aquaculture; and siting for settlements and refuse dumps (Aksornkhae, 1987; Masteller, 1997; Ruitenbeck, 1992; Walters, 1996). Almost nothing is known about traditional uses or mangrove management resource practices undertaken by coastal communities in Cambodia. Local capacity for mangrove management must be fostered and built upon if mangrove resources are to be protected (Giesen, 1997).

coastline (ADB, 1996). Koh Kong province holds the most abundant mangrove resources at an estimated 63 700 ha; the remaining forests are found in Sihanoukville (13 500 ha) and Kampot and Kep City Resort (7 900 ha) (ADB, 1996). Of course, statistics vary according to the source; however, considering the increase in illegal charcoal production and business pressures for shrimp aquaculture, it can be assumed that mangrove resources are rapidly disappearing (Baird, 1993).

KOH KONG PROVINCE

Koh Kong province, one of Cambodia's three coastal provinces, is situated in southeastern Cambodia and covers an area of 11 160 km² (Smith, 1996). Koh Kong's coastline holds 260 km of Cambodia's 460 km total coastline; along Koh Kong's edge lies the vast majority of Cambodia's mangrove forests (ADB, 1996; Bann, 1997). Koh Kong province is an isolated and remote province still subject to KR guerilla activities. There is no functional road connecting this province with other parts of Cambodia (Sophat, 1996) and airplane access is temporarily unavailable into the provincial town, Koh Kong town, because of landmines consistently found on the runway. Security issues have improved since 1997; even so, it can be difficult to access isolated mangrove coastal villages.

Indeed, Koh Kong province has some of the most pristine mangrove forests in the Gulf of Thailand (Kosal, 1996; DNCP/MoE, 1995). This unique mangrove environment is the only site in Southeast Asia being considered for the establishment of a coastal biosphere reserve; moreover, most of the mangroves found in Koh Kong are located within PKWS and are therefore protected on paper. Enforcement of illegal mangrove extraction activities is a difficult issue considering the limited resources that the MoE is working with.

Tragically, the destruction of Cambodia's mangrove forests is proceeding quickly because of the immense business pressures placed on extracting Cambodia's mangrove resources for charcoal production and aquaculture activities (DNCP/MoE, 1995; mangroves Cambodia, 1997). Illegal logs and charcoal are exported to neighboring Thailand; little money stays within Cambodia and these activities are of little benefit to local communities.

Furthermore, as more people migrate into PKWS more mangrove resources are extracted.

II.1.3 LOCAL ENVIRONMENTAL KNOWLEDGE

Local environmental knowledge (also referred to as TEK, indigenous knowledge or local knowledge) is developed when time is spent living and interacting within a specific landscape (Berkes, 1994; Johannes, 1993). This knowledge system is unique, traditional and local, developing around the specific conditions of men and women living within an area (Grenier, 1998). Local environmental knowledge includes classification systems, empirical observations regarding the local environment and systems of self-management for resource use. Knowledge is both cumulative and dynamic; past experiences can be built upon and socio-economic changes can be incorporated (Johnson, 1992; Lickers, 1998). Local knowledge systems are central within indigenous cultures and often in rural, isolated areas where people have developed a close relationship with their environment.

Community members, because of their different skills and activities, hold varying relationships with their environment, thereby holding different knowledge bases. This means that the quantity and quality of environmental knowledge within a community varies depending upon ones' resource-based experiences, age, sex, social status and profession (Berkes, 1993; Berkes, 1989; Johnson, 1992). Local environmental knowledge is stored in peoples' memories and activities and is expressed in the form of stories, songs, dances, myths, cultural values, beliefs, rituals, community laws and local language. This knowledge is shared and communicated orally, by specific example and through culture. Indigenous forms of communication and organization are vital to local-level decision making processes and to the preservation, development, and spread of TEK (Grenier, 1998). Unfortunately, between outside influences and increasing levels of exploitation, traditional management practices and principles have often been rendered inadequate (Ferrer, 1992).

LOCAL ENVIRONMENTAL KNOWLEDGE AND MANGROVE RESOURCES

Included within TEK are systems for environmental management and common-property management practices (Grenier, 1998). Prior to modern resource management, often individual cultures managed their local environment in a sustainable, appropriate manner (Johannes, 1981). Consider mangrove resources: coastal dwellers and native people held good practical knowledge of mangrove resources prior to colonization after which local knowledge systems were often rendered inadequate (ISME, 1994). For example, mangrove products in PKWS were supposedly utilized for tannins, dyes and honey and traditional medicines (a limited number) were made from mangrove resources (DNCP/MoE, 1995). However, much traditional wisdom has been lost with economic exploitation of mangrove resources, commercialization and population growth in coastal communities.

In Cambodia, mangrove dependent communities have faced rapid, turbulent change; moreover, few villagers returned to their coastal communities after the genocidal KR regime. Koh Kong province was once an abundant, resource rich province filled with wildlife and other species (Menglim, 1996). Considering the net in-migration into PKWS, the subsequent population increase, and the commercialization of mangrove resources it is important to tap into any local wisdom that exists regarding mangrove resource management.

II.2 HISTORICAL CONTEXT

Given the unique shape of Cambodia's history one must have a vague comprehension of the context and role that specific events have played in shaping the lives of rural Cambodians today (see Bit, 1991; Chandler, 1991; 1992; Osborne, 1993; Thion, 1993). This is especially relevant if one, the outsider, is to be able to somewhat grasp life in the isolated mangrove communities of PWKS and to understand the influences that helped to form these communities.

II.2.1 PRE-INDEPENDENCE

Between 1853-1953 Cambodia was under French colonial rule. If the French had not imposed their protectorate on Cambodia, it is likely that Thailand and Vietnam would have continued to fight to annex more and more Khmer territory (Osborne, 1993; SarDesai, 1989). During French colonialism, French officials ran the internal affairs within Cambodia and placed many Vietnamese in high government positions. The French supported, and perhaps even enhanced, the role of the monarchy (Chandler, 1991). By taking a paternal view of Cambodia and assuming that the Khmer 'were children in need of protection', French colonialism did little to encourage leadership and self-development within Cambodia (Chandler, 1998).

Of course, there are social consequences from having long term paternal colonial rule imposed upon a population. In the Cambodian context, the legacy of having once been a strong 'great' culture has perhaps encouraged the superiority that many Khmer feel towards other races, especially the Vietnamese, whilst depending upon foreign donors for aid money and development ideas (Chandler, 1991; 1998). For a hundred years, the,

Cambodian's were informed that their ancestors had built Angkor and that at one time Cambodia had dominated a large part of mainland Southeast Asia. In the same breath they were told that because of Cambodia's subsequent decline, they were incapable of governing themselves (Chandler, 1998: 37).

As a result of such occupation, rural Khmer have all been affected by leadership decisions from Phnom Penh: centrally-planned policies often meant that government officials would be sent into rural areas to implement such policies. This did little to build local leadership capacities.

II.2.2 SIHANOUK 1953-1970

Prince Norodom Sihanouk ruled Cambodia's 1953 independence from France; indeed, Cambodia slowly prospered and developed under Sihanouk's highly centralized leadership (Osborne, 1993). By the late 1960s Cambodia had become a net exporter of rice, almost self-sufficient in basic food-stuffs. Educational facilities were expanded during Sihanouk's rule with more than two

million children enrolled in primary and secondary schools, meaning that education was accessible even in rural areas (Chandler, 1991). This was the first independent period in Cambodia's modern history and was relatively stable. The Sihanouk time frame is fondly recalled in both urban and rural communities.

This economic growth did not last, however, given the politics of the Vietnam war and Cambodia's internal struggles. Sihanouk ruled in an authoritarian manner and manipulated the political scene to eliminate any enemies; this led to the underground movement that resulted in the emergence of the KR (Bit, 1991; Osborne, 1993). Also, Cambodia became ensnared in the Vietnam war when, in the late 1960s, the Americans 'blanket bombed' eastern Cambodia. It was through these provinces that the Viet Cong had been transporting arms (Boyden & Gibbs, 1996; Shawcross, 1982). Therefore, as Cambodia's struggles increased, key services including access to education and health care broke down.

II.2.3 LON NOL 1970-1975

In 1970, Sihanouk was ousted from government by General Lon Nol with the backing of the United States government. Turbulent years followed as the KR tried, and eventually succeeded, in overthrowing Lon Nol. Although some basic institutions remained unchanged, they were headed by newly appointed officials who had little training or preparation in carrying out activities or instigating necessary social reforms (Bit, 1991). Between 1969 and 1973 the United States dropped an estimated 550 000 tons of bombs on Cambodia (Boyden & Gibbs, 1997). These bombings, together with the guerrilla activities of the period, left hundreds of thousands of people dead and similar numbers uprooted and internally displaced, many fleeing from the countryside to refugee camps around the cities. By the time KR took power in 1975, more than a million displaced people had taken refuge in shelters around Phnom Penh (Boyden & Gibbs, 1997; Thion, 1993).

II.2.4 KHMER ROUGE 1975-1979

The catastrophic regime that swept through Cambodia between 1975 and 1979 under the leadership of Pol Pot was one of the most horrific and fierce found anywhere in this century. Under the leadership of Pol Pot and the Khmer Rouge, over a million Cambodians, or one in eight, died from warfare, starvation, overwork, misdiagnosed diseases, and executions (Chandler, 1991). According to Chandler,

The [KR] abolished money, evacuated cities and towns, prohibited religious practices, suspended formal education, newspapers, and postal services, collectivized eating after 1977, and made everyone wear peasant costumes... The regime proposed to wage a class war and to turn the economy around by abolishing class distinctions, destroying pre-Revolutionary institutions, and transforming the population into unpaid agricultural workers (1991: 1).

Central within this horrific experience was the total and complete fear of

Photo 1: Khmer Rouge Skulls

KR skulls at The Killing Fields: KR skulls and bones are found in all parts of Cambodia.

Photo: Melissa Marschke, October, 1998



anyone and everyone. The KR operated in extreme secrecy in order to keep the population "hostage under the belief that danger was everywhere, nameless, faceless and ever present (Bit, 1991:82)". People were told "that Angka has the eyes of a pineapple", a Khmer metaphor meaning that the regime, like a pineapple, has eyes everywhere (Boyden &

Gibbs, 1997). Thus, should anyone break the rules or resist authority they would be caught and punished accordingly. In establishing such mechanisms, the KR regime attempted to breakdown the usual bonds of alliance and trust which bind a community together (Taylor, 1994).

Most deaths were not planned by the KR: such a drastic, draconian regime was never envisioned by Pol Pot. Distressingly, millions of Khmer fell victim to the KR's utopian program of social engineering and economic transformation (Boyden & Gibbs, 1997; Chandler, 1991). The recent legacy of the KR regime continues to haunt Cambodians.

II.2.5 COMMUNIST PERIOD

In 1979 the Cambodian people were liberated from the KR when their arch-enemy, the Vietnamese, overthrew the KR; thus, the People's Republic of Kampuchea was established with the backing of Vietnamese troops. Remaining KR members fled into hiding in the northeastern provinces along the Thai border. Khmer Rouge guerilla activity continued especially along border areas.

Emergency aid was carried out between 1979-1982, although assistance from the West did not last. Most of the aid only reached the capital, Phnom Penh, or the Thai border (Mysliwicc, 1988; Shawcross, 1982). With support thereafter limited to the socialist bloc and considering Cambodia's serious physical and human resource deficiencies, recovery was slow. Nevertheless, services were gradually re-established throughout Cambodia. In the mid-1980's, a process of market-oriented restructuring was introduced, although this was weakened by poor implementation, lack of technical and financial support from overseas and the allocation of a large proportion of available resources for military purposes (Boyden & Gibbs, 1997). It can be said that economic disparities were more equal during this period; that is, people were all equally poor.

From 1989 - 1991 Vietnamese troops withdrew from Cambodia, Buddhism was reinstated and the importance of the market economy emerged. This social and economic liberalization period, facilitated the Paris Peace Accords of 1991, led to a transitional period and the United Nations supervised election of 1993 (Boyden & Gibbs, 1997).

II.2.6 UNTAC UNTIL THE 1998 ELECTIONS

This transition and the election were overseen by the United Nations Transitional Authority in Cambodia (UNTAC), together with Cambodia's Supreme National Council. Lasting 21 months and costing more than 2 billion dollars, the purpose of this UN operation was to oversee the peace process and promote post-conflict reconstruction and rehabilitation (Boyden & Gibbs, 1997). While the international community largely declared UNTAC a success, UNTAC also caused problems. For example, although many Khmer refugees were repatriated, the number of internally displaced persons increased. The aid budget, focusing on short-term humanitarian relief, did little in terms of long term capacity building at a national or the local level. Also, the KR gained more control over national territory, including the eastern border provinces. Hence, UNTAC was not completely benign and did leave behind a stark legacy. One report states that since UNTAC,

There has been an increase in lawlessness, banditry, corruption, xenophobic tensions and violence; a sharp growth in prostitution and the incidence of HIV/AIDS infection; a rise in the number of street children; and a further deterioration in the situation of vulnerable groups, which now includes segments of the returnee population (UNSRID, 1993 cited in Boyden and Gibbs, 1997: 36).

Of course, aid money has poured into Cambodia since UNTAC. Cambodia is reliant on the inflow of money to run national programs, to build infrastructure and to carry out any development programs. In Phnom Penh more people have access to health care, education and various basic needs (Legerwood, 1998). There is a growing middle class in Phnom Penh but it is questionable how much development money is actually reaching the rural poor.

This tense political climate continues to affect peoples' daily lives. In KR areas there have been random attacks upon civilians. In Phnom Penh hundreds of innocent bystanders were killed in the 1997 July Coup d'Etat (O'Callahan, 1998). Political alliances provide a form of protection only so long as a political party holds power. Even after the 1998 elections, Khmer expressed concern over the ruling party and whether anything was really going to change. In early 1999 the UN Human Rights Commission was still investigating over 200 election

related deaths. Cambodian communities continue to exist in a constant state of conflict.

II.3 VULNERABILITY

Boyden and Gibbs (1997) state that Cambodia, at best, is a country that is experiencing low-intensity conflict rather than being a post-conflict or transitional society. Most Cambodians who are aged 35 or over today have witnessed the deaths of family and friends by 'execution, torture, starvation, disease or exhaustion', and have also experienced forced migration and dissolution of family and religion (Oveson *et al*, 1996). Such experiences are incomprehensible for any outsider to Cambodia and it is difficult to understand how these traumas are shaping and influencing individuals and communities today.

As one researcher states:

...Cambodia's vulnerability to outside pressure had been exacerbated by its leaders who were influenced in turn by other perceptions of the past and the crushing weight of Cambodian power relations. They were influenced, in other words, by the way they expected and were expected to behave (Chandler, 96: 313).

Cambodia is emerging from over two decades of conflict and isolation, remaining one of the poorest countries in the world. Lack of access to productive resources, credit, technology and information and decision-making processes exacerbates poverty and powerlessness, which are in turn associated with widespread exploitation, civil strife and outbreaks of violence (Boyden and Gibbs, 1997). Indeed,

There is evidence to suggest that large sectors of the population are more vulnerable today than at any time since the Pol Pot era, while the capacity of the Cambodian state to regulate the process of rehabilitation and reconstruction has been considerably weakened (UNRISD, 1993 cited in Boyden and Gibbs, 1997).

II.4 AUTHORITARIAN CONSTRUCTS

It has been suggested that Cambodian social relations take place within an authoritarian, hierarchical construct (Larsson, 1996; Legerwood, 1998; Ehibara, 1968). For the rural Cambodian, fate at the hands of others is an accepted concept (Chandler, 1991; Bit, 1991). Considering the uncontrollable

horror imposed by the KR this is hardly surprising. Moreover, Chandler (1991) notes that traditionally many farmers and their families did not think social change was possible and took their low status for granted. According to popular Buddhist belief, merit accumulated in previous lives went a long way toward explaining a person's social position. Those in power, it was widely thought, belonged in power; those at other levels of society had been born to take orders (Boyden & Gibbs, 1997).

A leader is perceived as strong and deserving if they take care of their immediate followers (Bit, 1991). The poor have, therefore, constructed relationships with their superiors as a form of protection hoping for the best. Patron-client relationships form the backbone of the traditional political structure in Cambodia and social relations are hierarchical (Chandler, 1991; Thion, 1993). 'Lop-sided friendships' or patron-client relationships describe the relations between masters and servants, monks and lay people, elders and youth (Chandler, 1996). This patron-client relationship even continued through the KR; for when one adhered to the KR dogma one was rewarded with life.

While patron-client relationships are necessarily unequal relationships, they are not necessarily oppressive ones. In order to work, the rights as well as the obligations on both sides of the relation need to be well understood by all parties (Bit, 1991). The role of the patron is to offer physical protection as well as economic assistance and moral support in times of such needs. The obligations of the client are to assure political loyalty and occasionally to supply labor for the patron (Bit, 1991).

Cambodia's language and institutions are filled with notions of hierarchy, deference, hegemony and servitude. For example,

until recently Cambodians had no words for society or consensus but many words for relationships among people. There were words for exploit, command, and persecute and words for obey, honor and respect (Chandler, 96: 317).

Khmer society is seen in familial authoritarian terms, not voluntary relationships. And, in many ways Cambodia has been held together by the relations enforced between those with power and those without. Acquiescence and fear are part of

being commanded or being without power. Tragically, terror has been an indispensable ingredient of rule (Chandler, 1992).

Within Cambodia, activities such as politics are seen as the domain of those in charge (Bit, 1991; Chandler, 1991). According to Oveson *et al*,

the historical reality of Cambodia has never included an all-embracing system of political and economic administration, and that people in all sectors of the society have therefore looked for a more powerful and influential patron to hook themselves onto, or loyal and dependent clients to support their base for economic power and political influence. This aspect of Khmer political culture is deeply ingrained throughout all sections of the population (1996: 84).

Leadership and concepts of power in Cambodia emphasize supreme authority and unquestioning obedience to authoritarian models of governance. This leadership model was practiced by Sihanouk, Pol Pot and continues into the 1990's with the Hun Sen government (Chandler, 1991). It is suggested that, even today, those people who strongly oppose authoritarian models of governance are silenced in one way or another (Bit, 1991). When one translates this to the village level, one can understand why leaders or those who hold power are not questioned. It is a risk for villagers to oppose local authority figures; indeed, there are few mechanisms in place for local people to challenge authoritarian leadership.

II.5 COMMUNITY

Kurien, speaking generally, notes that communities have,

undergone significant socioeconomic and cultural metamorphosis as a result of incorporation into larger national and international ecological and economic processes. We are therefore talking about a community which has significantly altered its relationships both within and without. It also continues to be in a process of dynamic transition (1994: 107).

When one localizes this concept of community to Cambodia, Khmer communities are further altered through the political turbulence of the last few decades. That is, Cambodian communities have been shattered and forever reformed by forced population movements, displacement and repatriation (UNICEF, 1995). At the same time, market forces are felt throughout Cambodia, especially in border

areas. There is pressure to sell goods, whether this be logs, rice or fish, to external markets. How all this change has affected Khmer communities is not well understood because there is limited existing information pertaining to Khmer communities.

Indeed, a debate exists about what constitutes a Khmer community: some argue that there are kinship and friendship ties that bind a village while others suggest that community structures have further broken down since the KR, leaving the household as the most important unit within a village. Understanding the make-up of a particular community and how this community functions is important if any outside development projects are to be implemented in a sustainable, appropriate manner.

Eibera's seminal 1968 study of Svay, an agricultural village, suggests that most households in Svay were connected not only by kinship but also by long-term friendships with the complex reciprocal obligations that such relationships bring. When Eibera and Legerwood (1994) revisited this community in the early 1990's their research indicated that Khmer traditional systems of mutual assistance and monitoring behavior are still active in that community. They further argue that "Khmer rural villages are interwoven communities capable of organizing for socioeconomic development programs (Legerwood, 1998: 141)". The re-building of temples is an example of communities working together on a mutually beneficial project. However, Legerwood (1998) qualifies that there is, of course, a range of villages in different parts of Cambodia and their organizational ability depends on the extent to which they reconstituted themselves with much of the same prewar populations after the upheavals of the KR period.

Another school of thought suggests that Khmer communities are not tightly interwoven, but rather they consist of individual households. For this reason, community-based development efforts do not necessarily work. Ovesen *et al* (1996) argue that within Khmer society there has never been a strong sense of community; moreover, the turbulence of the past 25 years has served to eradicate any community mechanisms which were previously in place.

The common picture is that the traditional social cohesion and self-help mechanisms in the villages that were destroyed under Pol Pot are now slowly

returning to normal. There is an element of wishful thinking in this view, for it is questionable whether such a normal traditional social cohesion on the village level ever existed in the first place (Oveson *et al*, 1996: 66).

Furthermore, social solidarity continues to be deteriorating (UNICEF, 1995) and is reinforced by the economic liberalization and the monetarization of most social relations beyond the home. In this view, households do not necessarily interact within a community and, therefore, do not work together on community-based projects.

II.5.1 DEVELOPMENT AND THE COMMUNITY

This debate of a Cambodian 'community' or 'lack of community' is widely discussed in development circles within Cambodia. It has been commented that the:

pervasive existence and importance of patronage-client relations has almost unanimously been deplored by development planners as an obstacle to accomplish a more democratic direction of the political and economic development in Cambodian society (Oveson *et al*, 1996: 84).

Ironically, there is virtually only one in-depth study on rural Cambodia, carried out 30 years ago in the American anthropological approach of the time (Legerwood, 1998; Oveson *et al*, 1996). Local communities are not well understood in Cambodia and by assuming that all patron-client relationships are static and run counter to 'development' underestimates Khmer culture and adaptability. Definitely, more good micro-level research is necessary and research design must be flexible and culturally adaptable.

Perhaps some development views do run counter to traditional elements within Khmer culture. For example, people-centered approaches to development aim to include a higher number of people in a decision-making process (Chambers, 1997), whereas Khmer social relationships are governed by hierarchy with the elite or those with power often making decisions within a community. Participatory development promotes democracy and relative equality. Development implies a process of change whereas Khmer culture is known for its conservatism (Chandler, 1991). It is understandable that change is

not necessarily viewed favorably given the recent political turbulence in Cambodia. However, when one understands the approach that participatory development takes and when one has a sense of Khmer culture surely there must be a medium? Somehow there must be a way to implement successful community-based projects in a culturally sustainable manner.

II.3 METHODOLOGICAL CONTEXT

All the years of organized professional social science research which we have conducted and the vast heaps of print which have somehow been contributing to that mystical void of knowledge have done little to contribute to either the reduction of suffering or the improvement of the welfare of the largest part of the world's population.

Hall, 1979: 19

Power and poverty are polarized extremes, with a global over-class and a global under-class; however, vast opportunities endure in making a difference for the better (Chambers, 1997). Hall (n.d.) states that development should be seen as an 'awakening process', a method of utilizing the ideas and creative ability of greater numbers of people, a process of liberation rather than a problem that can only be solved by planners or academics. Facilitators and researchers need to re-think their ideas and research practices if community-level development is to be beneficial, people centered and participatory (Chambers, 1983; Selner, 1996). Participatory research methodologies are committed to empowering those involved in the learning process: the poor, the marginalized, the voiceless and the untrained (Hall, 1981; Fals Borda, 1991; Selner, 1996). One approach that includes people-centered participatory development is Participatory Rural Appraisal (PRA) methodology. PRA is a family of approaches and methods designed to enable rural people to share, enhance, and analyze their knowledge of life conditions, to plan and to act (Chambers, 1994a; Burkey, 1993). The thrust of PRA is to reverse dominance, to empower more than to extract. See Appendix A for a brief summary of PRA methodology.

Communities are oppressed when the dominant paradigm suggests that only elite groups and formal institutions possess valuable knowledge; the poor

are further oppressed by their limited access to resources and information (Burkey, 1993, Hall, 1981). When oppressed humans are taught that they neither understand nor create knowledge, all too often, people believe this and feel powerless in working towards change (Fals Borda, 1991; Friere, 1968). Research agendas, conceptualization and knowledge formation and dissemination are all questions of power with profound social implications (Joyappa & Self, 1996). Burkey (1993) argues that the greatest potential contribution of development assistance is to enable the poor to either gain or regain confidence in themselves and their knowledge; unfortunately, development assistance continues to teach the poor that they 'are helpless' and need foreigners to make plans for them.

Perhaps a disindoctrination of the elite and powerful is critical if people are to become empowered by knowledge (Hall, 1981; Maguire, 1987). Often research in the South is generated by administrators and policy makers who gather information from "those who do not make decisions in order to make decisions for them" (Hall, 1981). Reversals in modes of analysis and interaction, reversals in learning and reversals of professional values are critical if development assistance is to ever succeed (Chambers, 1994; Burkey, 1993). Development workers must avoid attitudes and comments that reinforce feelings of inferiority. According to Freire (1970),

It is not our role to speak to the people about our own view of the world, nor to attempt to impose that view on them, but rather to dialogue with the people about their view and ours. We must realize that their view of the world, manifested variously in their action, reflects their situation in the world (65).

II.3.1 PARTICIPATION IN DEVELOPMENT

Oakley and Marsden (1984) suggest that if the rural poor are to participate in development activities in a meaningful manner, direct access to resources and an active involvement and influence in the decisions affecting these resources is critical. Participation is fundamental for the development of "self-confidence, pride, initiative, creativity, responsibility and cooperation" (Burkey, 1993: 56). The essence of development is when people are in charge of their own lives,

solving their own problems. This only happens when participation is central within the development process. Such participation is an on-going process. "Plans are made, action is taken, results are studied, lessons learned and new plans and action take place (Burkey, 1993: 56)". Or, stated differently, members of oppressed groups or communities identify a problem, collect and analyze information and then act upon the problem in order to find a solution (Selner, 1997). Friere (1970) has written that:

Attempting to liberate the oppressed without their reflective participation in the act of liberation is to treat them as objects which must be saved from a burning building; it is to lead them into the populist pitfall and transform them into masses which can be manipulated (43).

Selner (1997) and Chambers (1997) further make the case that within any participatory research process there needs to be a balance between what the researcher and what the community is contributing. Maguire (1987) suggests that participatory research entails a partnership: "We both know some things; neither of us knows everything. Working together, we will know more, and we will both learn more about how to know (37)". That is, participatory research assumes that everyone involved in the research process has something to offer. Community-based research is important because it seeks to involve the researched in defining the direction and purpose of the research (Denis, 1992).

II.3.2 THE NEED FOR AN ALTERNATIVE RESEARCH METHODOLOGY

MOVING AWAY FROM 'THE SURVEY'

Questionnaire survey's tend to confirm the realities of uppers, imposing their constructs and mirroring their realities. Uppers, especially senior males, patriarchs and academics, are vulnerable to being out-of-touch and out-of-date.

Chambers, 1997: 76

Although large-scale questionnaire surveys have been exposed to repeated criticism for their high costs, errors and delays, they continue to be used in a widespread manner within development circles (e.g. see Hall, n.d.; Hill, 1986; Chambers, 1997). The reason for such continuance is understandable: academics, consultants, officials and donors find in them a common

understanding. Such a fragmented, professionally constructed image of an issue offers attractive solutions that ultimately do not meet raised expectations (Rahnema, 1990; Chambers, 1994b). Gianotten and de Wit (1983) as cited in Burkey (1993) suggest that:

This [survey] application ... has led to an oversimplification of reality and to an abundance of quantitative analyses not related to history or evolving social relationships. This is like taking a snapshot of the runners halfway through a foot race – the snapshot tells nothing about how the runners arrived at their relative positions or where they will be in a few second's time (61).

Questionnaires are a 'single, peculiarly fallible, method'; unfortunately, when undertaken both local people and enumerators are often unmotivated and any complex causality is dimly discerned, if at all (Chambers, 1994c). Hall (n.d.) further problematizes the questionnaire methodology and highlights that most surveys are designed by outsiders with outsider concerns and categories. For the sake of convenience, reality is forced to fit into the professionals' familiar frame. This then begs the question, how does this framework help local people? The extent to which survey results are socially and personally constructed remains under-researched and under-recognized (Chambers, 1997).

There is a growing body of evidence that suggests there are participatory alternatives to questionnaire surveys. PRA methods, in contrast to a traditional development approach, present a plurality of methods, with triangulation and cross-checking; moreover, local analysts are often committed to complete detail (Chambers, 1994c). Importantly, PRA is meant to be an empowering process: the research activity serves marginalized groups and promotes diversity (Deshler & Selener, 1991).

Those who, through a PRA process express and share what they already know, also learn through that expression and sharing. Those who investigate and observe add to their knowledge (Chambers, 1994c: 1444).

Therefore, the outside researcher is involved in generating an indigenous capacity for collective action and analysis (Hall, 1981). PRA recognizes that research is only effective when the researcher understands the varied nuances of the social and cultural conditions of community or group if research is to have any meaning or context (Forestry for Sustainable Development, 1998).

THE DANGERS OF USING PRA

All too often, development professionals know how to fit the current 'buzz word' into a project document, suggesting that PRA techniques will replace questionnaires; however, many will not know or care what this entails (Chambers, 1997). PRA techniques cannot be diluted, the researcher must be committed to reversals in learning and community empowerment; not all elites are interested in what communities have to say. Also, as PRA gains in popularity, there is an urge to have standardized formulas for different techniques, and while this can be useful, more often than not, such standardization inhibits people and the creativity integral within PRA. If too much time is spent teaching theory in classrooms, then less time is available for field work and spontaneity is lost (Chambers, 1997). PRA, when effectively executed, is a time-consuming process that requires personal commitment, critical awareness and creativity (St. Denis, 1992).

Importantly, researchers must be aware that PRA is utilized within local power structures. If the facilitator is not aware of the power relationships within a group, PRA tools can serve to strengthen the voice of the powerful (Grenier, 1998). The public nature of these events can create and exclude particular knowledge because the output is influenced by existing social structures, particularly power, authority and gender relations.

Because PRA is intended to enable local people to conduct their own analysis and plan for change, PRA methodology suggests radical personal and institutional change (Chambers, 1994a). Therefore, the behavior and perceptions of the outsider facilitating any PRA process is important. Unfortunately, outsiders often continue to believe that their knowledge is more valid than that held in a local community. This approach offers no respect to local communities (St. Denis, 1992); moreover, such attitudes do not stimulate learning on any level nor contribute to local capacity building. In the end, the process must be seen as valuable and beneficial by the community itself (Fals Borda, n.d.).

III. METHODOLOGY

III.1 EVOLUTION OF THE RESEARCH

This research evolved from a personal curiosity about the local environmental knowledge held in rural communities and a passion for cross-cultural interactions. Having spent time in the Lao PDR and Vietnam as part of my undergraduate studies, I was attracted to the area and wanted to spend time in Cambodia.

I felt it was important to connect my research with an on-going project or process. When I learned about the 'mangroves Cambodia' project, I pursued the idea of working with this team. A series of emails and meetings both in Canada and Cambodia followed which served to shape the research in a manner that would be both useful for myself and the 'mangroves Cambodia' team.

III.1.1 PERSONAL BIASES

I question how often research, especially pertaining to 'traditional' knowledge systems (or TEK), actually benefits a local community. Unless the research process enables villagers to learn from each other, thereby enhancing their collective knowledge, outsider-driven research often does not benefit local communities. The research process must allow local communities to have ultimate input and control. Perhaps when TEK becomes recognized, understood and respected, both within and outside of a community, community-driven research can work towards planning and implementing effective resource management regimes. If real changes in how resources are perceived, valued and therefore ultimately managed are to be facilitated, local community members need to be the teachers and the facilitators (Winbourne, 1998).

However, I also believe that in some cases there is a role for an outside researcher or facilitator. Sometimes an outsider provides the 'spark' that motivates local people to share knowledge or to make plans. Or, if nothing else, a sensitive, compassionate researcher can document information that will help

people to understand the complex reality of a situation.

III.2 STUDY OBJECTIVES

One objective in undertaking this research was to learn more about how research can be conducted in a way that ultimately does benefit a local community. I was interested in learning more about how rural Khmer view their mangrove environment and what measures, past and present, were undertaken to protect the mangroves. I hope that this research will further the understanding and respect that both urban Khmer and non-Khmer have for rural Khmer villagers.

III.3 MY RELATIONSHIP WITH THE 'MANGROVES CAMBODIA' TEAM

I was in Cambodia for six months between June and December 1998. Throughout my stay in Cambodia I was able to use the 'mangroves Cambodia' offices at both the national and provincial level. The team members continuously lent me their support in the form of access to resources, translation, explanations and friendship. This support was unflagging and definitely spurred me on.

My position as student researcher was unique because without a formally designated position in the project I did not need to be given the same level of respect as a Foreign Advisor; nevertheless, the fact that I was an outsider did accord respect. My student position still allowed the team and myself a chance to interact at a more equal, less formal level. It was through these tight friendships that I really began to see how one micro-level project played out within the Cambodian context. I was given the opportunity to see work at the village level, provincial level, national level and international level. I could not have conducted any detailed research without the help of the 'mangroves Cambodia' team and I cannot emphasize enough the importance of this link enough for working in Cambodia.

III.4 RESEARCH METHODS

III.4.1 THE PRINCIPLES OF PRA

The problems of the rural poor, in the final instance, cannot be solved by anyone but themselves, and all solidarity efforts must be aimed at strengthening their own capacity for independent action.

(Sethi, 1983 quoted in Burkey, 1993)

Seiner (1997) suggests that in conducting participatory research knowledge is not created only for the sake of knowing or as an academic exercise; rather, knowledge generation is part of an on-going process that generates actions and critical reflections. PRA techniques, if properly conducted, ensure that research is of optimum benefit to a community. Within PRA methodology it is assumed that both the researcher/facilitator and community have knowledge and experience to contribute. To ensure that this knowledge is produced and shared the researcher does not adopt a 'detached stance' nor does the researcher attempt to control the research process or products (Chambers, 1997; St. Denis, 1992).

I have briefly outlined the tools that were used within this study; further on in this chapter is a more detailed description of key participatory tools used in the field research.

- ✓ Informal Discussions can happen while sharing a meal or working together and shed insight into some aspect of community life;
- ✓ Semi-structured Group Interviews allows for a guided, informal interview process which often results in more accurate, consistent shared responses within a group;
- ✓ Historical Narratives enable community members to remember past events and conditions. These document individuals' first-hand knowledge of events or changes within a community;
- ✓ Trend Lines are useful for gathering a community's perception of events and changes. Perceived changes in resources and their availability can be highlighted;
- ✓ Family Portraits paint an in-depth, detailed picture of a specific family's life within the village;
- ✓ Participatory Resource Mapping allows villagers to map where resources are within the village;
- ✓ Historical Transects allows participants to document various resource usages in a pictorial manner over time;
- ✓ Participation in daily activities allows one to gain insight into a situation from the villagers' perspective and enables the villager to teach the researcher;
- ✓ Participant Observation enables one to learn and be aware through watching village interactions;

- ✓ Updating Field Notes ensures that the researcher is always checking and re-checking their ideas and findings. This gives greater focus and understanding and suggests what else should be considered;
- ✓ Document Analysis includes a literature review of: mangrove forests; community-based management and planning; resource management; Localized Knowledge Systems; PRA tools and techniques; and the history and culture of Cambodia.

III.4.2 FIELDWORK

I gathered data throughout my six months in Cambodia. For security reasons (i.e. KR guerilla activity was winding down but local authorities still claimed that there were safety issues) we were not able to live in any of the villages. Therefore, two months were spent living in Koh Kong town and commuting through the mangrove forests to four villages located within PKWS. Living in close proximity to these fishing villages enabled myself and assistants the opportunity to facilitate group discussions, oral histories and family portraits. It was important to take time to build respect, trust and a rapport with participants. In addition, monthly visits were made to each of the communities when I was not living in Koh Kong town, and, given the time constraints, villager willingness to participate and interest in the process was strong. Field visits ensured the continued input of villagers into the research process; indeed, I wanted villagers to guide the research process as much as possible.

Background research, a literature review and information gathering were conducted throughout my time in Cambodia. Although there has been relatively little information written about Cambodia, the combination of secondary sources highlighted important aspects of Khmer culture, political turbulence and the mangrove environment. Over the six-month period I held lengthy in-person conversations with various Non Governmental Organizations (NGO) workers both Khmer and foreign, with MoE officials and with provincial officials. Importantly, extensive conversations and planning sessions were held with the 'mangroves Cambodia' team. The background and contextual material obtained is woven throughout this thesis. This information allowed me a broader perspective on issues from both a national level and foreign viewpoint.

For two and a half months I prepared for the field component of the research. Importantly, two field visits enabled the 'mangroves Cambodia' team and myself to: discuss research methodology with the relevant government authorities; introduce myself at the village level; arrange housing, translation etc. for my field stay in Koh Kong. From here, two intense months were spent in the field, living in Koh Kong town and visiting villages whenever possible. Although I based my final month and a half in Phnom Penh, follow-up visits were made several times to all villages and information was cross-checked.

Photo 2: Group Discussion in Toul Kaki Village
Villagers in Toul Kaki village.
Photo: Melissa Marschke, September 1998



III.4.3 VILLAGE SELECTION

The research was designed to encompass four villages within PKWS. These villages were selected by the 'mangroves Cambodia' team and myself after a series of discussions involving the Chief of Koh Kong Department of Environment. Because I wanted to facilitate the research in conjunction with the work done by the 'mangroves Cambodia' team, it was important to work with and through the existing government structures. The 'mangroves Cambodia' team was beginning their extensive field work component and we felt it would be

mutually beneficial to work together. This would also ensure that villagers would not be approached too many times.

The criteria for village selection included: a representative sample of villages within PKWS, team familiarity with the villages, and villager interest in the research. Given that there are only nine villages in the area, all of which the team was somewhat familiar with, the similarities and differences among the villages were discussed and four villages were selected. Time was spent with the appropriate village, commune and district chiefs to ensure that the research objectives were understood and that people were indeed willing to work with me. This process was facilitated by the 'mangroves Cambodia' team; moreover, each village chief encouraged elders to participate in the research process. As both villagers and chiefs became more comfortable with my presence in the village, the research became easier.

III.4.4 THE ENTRY POINT

Fuglesang writes,

It is easier for a village community to turn its eyes to the future if it starts by looking at its past. ... [I] have never met a group of people who is not interested in the history of its people (1982 as cited in Burkey, 1993: 47).

Fuglesang suggests that when communities look at their past and recognize all the changes that they have endured, change becomes more meaningful and enduring (cited in Burkey, 1993).

The 'mangroves Cambodia' project was looking at alternative livelihoods and potential villager-driven management strategies for PKWS. My research involved elders discussing the changes in resources and resource management in PKWS. An historical perspective was a useful entry point for my research. Taking an historical perspective and learning from the past is often useful and important when considering future management planning for an area. Only when the 'mangroves Cambodia' team and myself were both satisfied that taking an historical perspective had mutual benefit did we proceed.

INFORMATION COLLECTED IN THE FOUR VILLAGES

The following information was collected in the four villages:

- ✓ 21 oral histories;
- ✓ 4 family portraits;
- ✓ historical mapping;
- ✓ historical resource transects;
- ✓ group interviews;
- ✓ informal dialogues;
- ✓ participant observation.

III.5 FIELD WORK: THE TOOLS THAT WERE USED

What follows is a description and explanation of the various PRA tools used in the research process. These tools were gathered from various sources (see IIRR, 1998; IIRR, 1996; Pomeroy, 1993; Townsley, 1993). For an analysis of the strengths and weakness of each tool, refer to the Analysis chapter in this thesis.

III.5.1 HISTORICAL NARRATIVES

Historical narratives are used to document the oral history of an area or community. These narratives document people's personal experiences of past events and conditions and are often presented in chronological order.

Purpose:

- ✓ To examine the impact of important historical events on the life of local individuals;
- ✓ To allow for the transfer of history, stories, folklore information and lessons of specific events from generation to generation;
- ✓ To detail single perspective chronologies of a given area.

How this tool worked:

While one can use a number of different participatory-type methods to engage in an oral narrative type of discussion, I choose to use a semi-structured interview and to emphasize any changes and differences in the village

environment over time and the impacts of such changes. The Cambodian concept of 'environment', while loosely defined, included the idea of everything surrounding oneself i.e. home, fishing grounds, mangroves. Although the key informants in this activity were village elders, younger people listened and learned from these discussions to ensure an information transfer.

I choose to use this tool as an entry point for my village-level discussions. Although I was focusing on TEK pertaining to mangrove resources, many issues were touched upon within these discussions that are woven throughout this thesis. Most of the historical information came from these informal dialogues.

Who participated:

Within each village, the village chief and a number of male and female

Table 1: Details of the Historical Narratives.

Village	# of oral histories	Male:Female ratio	Elders involved
Tou Kak	4	3:1	All
Koh Sralao	5	4:2	All
Koh Kapic	6	4:2	All
Koh Kang	4	2:2	2
Peam Krasaop	2	1:1	All

elders participated in the oral histories. These discussions varied in length between 30 min and 2h 30 min. Generally oral

histories began with one male or female elder sharing information and often other villagers gathered around to listen to the information being shared. In a number of cases couples began this process together e.g. in Koh Sralao. Two historical narratives were done in Peam Krasaop, a village that I otherwise was not working in, because it was recommended by other village elders that I spend time with these two elders because of their extensive local environmental knowledge.

Historical Narrative Statistics:

- ✓ A total of 21 oral histories done: 60% male, 40% female;
- ✓ 18 of 21 oral histories were with elders (those villagers considered to be an elder in the community, often over the age of 45);
- ✓ Only 9 of the 21 interviews (43%) were born in the area prior to the Khmer Rouge;

- ✓ Of the 9 people born in the area, 3 held extensive local environmental knowledge, 3 held extensive knowledge in specific areas i.e. fishing and 3 held limited local environmental knowledge;
- ✓ 5 of the 21 people whom participated in the oral histories also participated in the Workshop (described next).

III.5.2 FIELD WORK: ENVIRONMENTAL EDUCATION AND COMMUNITY MANAGEMENT OF MANGROVE RESOURCES TRAINING COURSE WORKSHOP, SEPTEMBER 28-30 1998

The purpose of the *Environmental Education and Community Management of Mangrove Resources Training Course* was to involve community members of four selected villages within PKWS to share information about their living environment. The 'mangroves Cambodia' team and myself worked to organize this workshop. Much time was spent deciding which PRA tools would be used and what the focus of the workshop would be. The 'mangroves Cambodia' team chose to concentrate their energy on facilitating various PRA activities to draw upon local socio-economic and environmental knowledge. I was given time to facilitate two PRA activities: historical mapping and historical transects. These activities were seen to be beneficial to both the 'mangroves Cambodia' team and to my own research. I had finished my series of oral histories and I was interested in cross-checking information with various pictorial activities and different informants.

Who participated

The village groups included women, elders, village chiefs, fishers, farmers and business folks. Each village chief designated the additional seven villagers besides himself (chiefs were always male) who would attend the workshop, except in the case where the team made a specific request.

HISTORICAL MAPPING

This is a mapping tool, which can identify where certain resources and features are/were located within a village.

Purpose:

- ✓ To help identify and analyze the distribution of and the relationships between specific resources or features;
- ✓ To show topography, water, land use, socio-economic data.

Who participated:

- ✓ All Workshop participants from each of the four villages participated in the mapping activities.

HISTORICAL TRANSECT

A historical transect is a pictorial representation of an area over a given area of time. Such transects can illustrate both bio-physical and socio-cultural conditions using variables such as land use, vegetation, income and population.

Purpose:

- ✓ To help establish correlations between various parameters over time e.g. the relationship between mangrove decline and fish decline.

Who participated:

- ✓ All Workshop participants from each of the four villages participated in the mapping activities.

III.5.3 FIELD WORK: FAMILY PORTRAITS, OCTOBER 2-15

A family portrait is a description or a detailed profile of a selected family in a community and presents a detailed account of the interactions of that family with the biophysical, socio-cultural, economic and political environment. A family portrait is generated through the use of semi-structured interviews and also makes use of other participatory methods such as daily activities, seasonal calendars or time lines.

Purpose:

- ✓ To determine the characteristics of certain types of families and how these affect or influence their attitude and behavior towards the coastal environment;
- ✓ To provide insights into the dynamics of family life in coastal communities.

Who participated:

- ✓ Each village chief and family participated for a full day in the Family Portrait activities. Village chiefs were chosen because of their local leadership position within the community. I wanted to get an in-depth picture of daily life in the village for each chief and family. Equally important, I was interested in the chief's connection to the environment. That is, was the chief involved in illegal resource extraction activities or in mangrove protection measures?

III.6 DATA ANALYSIS

Using a variety of PRA methods provided complementary sources of data and enabled me to triangulate data sources in order to validate information. I analyzed textual and pictorial data generated from initial interviews with chiefs, from oral histories, group interviews, PRA mapping and transects and family portraits. Data was compared and contrasted between and within the four villages, and then compared with any additional information provided by government officials, mangroves Cambodia team members and secondary sources.

As themes and trends were identified, a snapshot picture began to emerge in each of the four villages in which the research took place. Simultaneously, the research process was scrutinized and analyzed enabling me to theorize about reasons underlying these observations and their potential connections. My field notes, observations and impressions of the research process all led to a greater understanding of the research material and process. Generally, this research was community generated and, whenever appropriate, information was shared and discussed with the 'mangroves Cambodia' team.

Also, an analysis of the different PRA tools used in the field enabled me to understand the type of information that was generated with each tool. I examined reasons why different activities provoked different information and why some PRA tools were more effective than others. Personal observations, team discussions and extensive secondary literature sources helped to shape this section of my thinking.

These research findings are my perceptions of village experiences and impressions regarding mangrove resource management in four coastal

communities in PKWS. I will communicate these understandings through: detailed descriptions and quotations; mapping and transect exercises; diagrams, figures and photos; and presenting varied, often differing, attitudes of rural Khmer towards mangrove resource management. Equally important, I will examine the methodology used to gather such information. This written account reflects the influence that Khmer culture, and Khmer people, had on my comprehension of both the research material and the research process.

Ultimately, each community owns this information and knowledge. The point of undertaking a PRA research process is to empower because a communities' knowledge is re-enforced allowing villagers to build up their collective knowledge. That is, the reality of the community is expressed, shared and strengthened. "In this final reversal, it is more the reality of local people than that of outside professionals that counts (Chambers, 1994b: 1266)".

III.6.1 LIMITATIONS

The greatest limitation for this field study was the length of time I spent in Cambodia. Six months enables me to only to begin to grasp the cultural context that I was surrounded by and working in. My language skills did not get beyond mere 'grunting' until the end of my stay in Cambodia. The research would have been far more effective had I been able to live in each of the villages over time once I had a greater understanding of both Khmer language and culture.

Another limitation was my need for translation in most activities. Especially in the beginning of my fieldwork I relied heavily on translation in most interviews and activities. Unfortunately, this language barrier limited my interactions to that of joking around and undertaking the appropriate social greetings.

I worked with two provincial assistants from the 'mangroves Cambodia' team, one associated with the Department of Environment and one working for the Department of Fisheries, who each provided translation for me. It took some time before I realized that government officials, often not through personal

choice, were involved within the hierarchy of officials benefiting from the continuation of illegal resource extraction activities. Therefore, I was generally not privy to any information regarding government encouragement of resource extraction other than in a vague manner. Villagers were sometimes hesitant to share such information and translators were not always fully translating sensitive information. Once I understood this, I emphasized my role as a student working on generating information with villagers but not working for the Government in any manner. Definitely this connection created hesitancy amongst villagers to discuss all aspects of resource management.

Understanding the effects of the brutal KR regime upon Khmer people and communities is next to impossible, no matter how well informed or compassionate one is. Moreover, how information is shared and transferred in rural Cambodian villages is difficult for an outsider to grasp. Many elders and elite, the traditional transmitters of information, were killed during the KR. However, one can safely assume that within many Khmer communities a hierarchy of knowledge exists that is not freely accessible to all villagers.

People, recognizing that I was new to Khmer culture, explained concepts and ideas to me patiently. However, some information could not be passed onto me especially regarding sensitive issues and considering my own inexperience. It was especially difficult to access traditional knowledge in the study site given the net influx of people into the area and lack of elders and long-term villagers.

VI. BACKGROUND TO THE STUDY AREA

IV.1 A SNAPSHOT OF KOH KONG PROVINCE

Koh Kong province was established in 1957, formerly being part of Kampot province (Khim, 1997). Like other Cambodian provinces, the administrative structure found within Koh Kong includes Districts, Communes and Villages. Koh Kong province was set up to include 7 Districts, 30 Communes and 120 Villages. Information and regulations are passed on within this hierarchy: from the Provincial Governor to District Chief to Commune Chief to Village Chief and, lastly, to the villagers. This power structure continues to exist, especially in remote provinces.

The end of the catastrophic KR regime resulted in many internally displaced Khmer (Thion, 1993). At this point, villages had been destroyed and KR guerilla activities continued in parts of Cambodia; therefore, some people could not return to their villages and instead sought to make their livelihood elsewhere. In Koh Kong there has been a net influx of people since 1979; in fact, it is estimated that the average annual growth rate in Koh Kong is 16 % (Dara, 1996 as cited in Khim, 1997). People have migrated into Koh Kong from Cambodian provinces including Takeo, Kampong Speu, Svay Rieng, Prey Vieng, Kompong Cham and Kampot. Many of these newcomers have migrated into the coastal communities within PKWS.

IV.1.1 PROVINCIAL POWER

In Koh Kong real power (control) continues to be held by the provincial Governor. Although under UNTAC Cambodian law gives power to provincial departments to carry out the mandates of their corresponding national Ministry, what in fact happens is that the Governor, especially in isolated Koh Kong, continues to yield power and District Chiefs receive their mandates directly from the Governor. This makes it difficult for provincial Departments to carry out their mandates since the Governor can in fact veto or change decisions that have

come from lead agencies in Phnom Penh (Khim, 1997). For example, the role of the Provincial Department of Environment is, to date, to facilitate any projects under the MoE. Yet, if any serious actions are to be taken, the Department of Environment must have the support of both the Ministry of Environment and the provincial Governor (Kim, 1998).

Given that political rule in Cambodia is hierarchical, a large part of any management regime within any protected area must have the support and backing of high-ranking officials. If any of the protected areas within Koh Kong are to be protected in reality rather than just on paper, the Governor's support is essential. It is rumored that the provincial Governor offered to buy large mangrove trees from villagers at US\$ 1.25 during the turbulent election period of 1998 as a way of winning their political support (Department of Environment, 1998). Considering that many poor villagers only make US\$ 1.00 per day it is hardly surprising that people would carry out illegal logging activities to support their livelihood. A new Governor has recently replaced the old Governor and the implications for resource management are, as of yet, not known.

The distribution of power and authority within Koh Kong is difficult for an outsider to understand; however, it is possible to have an inkling of who exerts influence. Villagers refer to those with power as 'powermen' (those holding the most money, guns and influence). Villagers and chiefs alluded to other authority figures exerting power, besides the Provincial Governor, including members of: the military; the police; and the Ministry of Agriculture. Although undoubtedly commune and village chiefs do influence their villages, it is difficult to understand the extent of this influence. Power relations within a community are community specific; but the point is that there are various players who exert power within this system.

IV.2 THE STUDY AREA: PEAM KRASAOP WILDLIFE SANCTUARY

This large Wildlife Sanctuary, 23 750 ha, was created because of the unique mangrove habitat: the mangroves are some of the largest and densest in

Southeast Asia (AWB, 1994; DNCP/MoE, 1995). Many different birds use the Wildlife Sanctuary on their migratory routes, substantial wildlife lives within the area, and aquatic life flourishes within the mangrove ecosystem. Humans also depend upon the mangroves for various livelihood activities including fishing, crabbing and charcoal kiln production and exportation. Generally speaking villagers, being long-term users of mangrove forests, have an in-depth understanding of the resources within this ecosystem (Ferrer, Cruz and Domingo, 1996).

IV.2.1 VILLAGES WITHIN PKWS

Administration within PKWS is complex and multi-layered. The Wildlife

Table 2: Villages found within PKWS

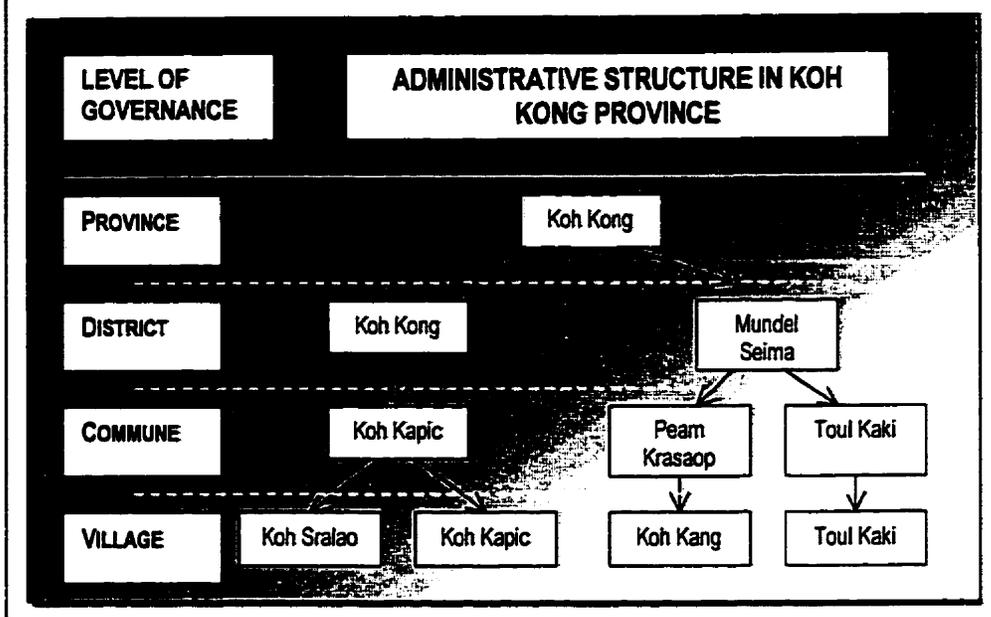
Within each village people fish, make charcoal, export mangrove wood, sell goods, upland farm etc. These classifications are general to give an idea of the make-up of the village, a variety of jobs are done within every village.

Village Name	Main Livelihood in Village
Peam Krasaop 1	Fishing
Peam Krasaop 2	Fishing
Koh Kang	Charcoal
Toul Kaki Lower	Farming
Toul Kaki Upper	Farming
Koh Kaptic 1	Fishing
Koh Kaptic 2	Fishing
Koh Sralao	Fishing, Charcoal
Prek Popeil	Charcoal

Sanctuary covers 3 Districts and within these Districts there are 7 Communes with 22 villages; however, only 9 of these villages are within the Wildlife Sanctuary. The population of the villages ranges from only a handful of families to over 500 families. Of these 9 villages, 2 are charcoal villages that were founded in the 1980's. The remaining villages probably were established in the area during French colonial rule.

I worked in four villages in PKWS. Two villages, Koh Kaptic and Koh Kang were part of the same commune and, therefore, the same district. The other two villages, Toul Kaki and Koh Kang belonged to separate Communes within the same District. For this work there was no important difference between Peam Krasaop 1 and 2, Koh Kaptic 1 and 2 and Toul Kaki 1 and 2 and the numerical designations will not be used. That is, although Toul Kaki and Koh Kaptic village

Figure 1: The Administrative Relationship of Study Villages in PKWS



were considered two villages administratively, in reality these villages functioned nearly as one unit. Figure 1 illustrates the relationships of the four study villages within the communes and districts.

In addition to being able to spend time in each village, I was able to talk to the various commune chiefs. In the case of Koh Kaptic and Koh Kang, I was also able to learn more about district-level administration. It is worth stating once again that both district and commune chiefs yield great influence over the village chief. Table 3 shows my ranking of the chiefs of the village, commune and district in terms of supporting extensive, illegal resource extraction activities including illegal charcoal production, logging and explosive fishing.

Table 3: Illegal Resource Extraction –Tendency of the Chief for Supporting such Activities

	Village Chief	Commune Chief	District Chief
Toul Kaki	Not supportive	Not supportive	Not certain
Koh Kang	Supportive	Not supportive	
Koh Kaptic	Supportive	Supportive	Supportive
Koh Sralao	Somewhat supportive		

I ranked the chiefs' perspectives on illegal harvesting after holding discussions regarding resource extraction in the area with these officials. I confirmed my understanding of resource extraction in PKWS with the 'mangroves Cambodia' team, and through the various group dialogues held with villagers.

I did not hold any discussions with the district chief for Mondul Seima in which both Toul Kaki and Koh Kang are included. However, both commune chiefs for Toul Kaki and Koh Kong did not support heavy resource extraction activities and discussed this with me. The village chief in Toul Kaki instigated mangrove protection measures unlike the chief in Koh Kang, for whom resource extraction was the only way to make a livelihood. In Koh Kapic and in Koh Sralao both the commune and district chief (Koh Kong District) were actively involved in resource extraction activities. Early in 1999, the district chief was fired because of his extensive involvement in resource extraction.

IV.2.2 PROVINCIAL DEPARTMENT OF ENVIRONMENT'S ROLE IN PKWS

The provincial Department of Environment is responsible for stopping all illegal activities within PKWS including charcoal and logging exportation. However, Koh Kong's Department of Environment is severely under-funded, and personnel are insufficiently trained and lacking in the necessary equipment and materials for law enforcement, environmental education and protection. This is not to suggest that there are not talented individuals who are committed to environmental protection, rather that it is difficult for this young department to carry out its mandate.

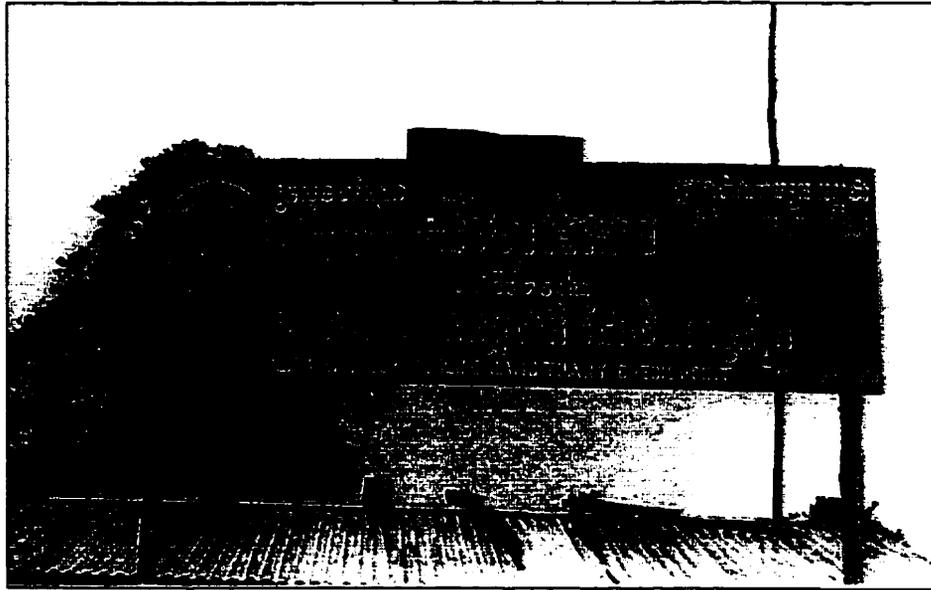
The Department has established an environmental Checkpoint in the middle of PKWS to monitor and control illegal resource extraction activities. Checkpoint is equipped with one 30 Hp speedboat, two guns and little else. In fact, the only resource extraction activities that can be stopped are those carried out by villagers. Generally this post serves only as a stopping point for smaller boats to pay informal taxes. Any large-scale extraction operations carried out by the military or police cannot be stopped. Those with bigger boats simply ignore this checkpoint and proceed with their activities as usual.

Ironically, collecting this informal tax is necessary if the Department is to have money to pay for the gas needed to destroy illegal charcoal kilns. Some charcoal kilns are destroyed, thereby curbing some illegal practices. Often this

Photo 3: Checkpoint in PKWS

This photo shows the sign post for Checkpoint. Checkpoint, located in the heart of PKWS, was established by the MoE to control illegal resource extraction activities. However, Checkpoint has limited resources or personnel making it difficult to curb illegal activities such as logging, explosive fishing or charcoal production.

Photo: Melissa Marschke, August 1998



action forces villagers to cut mangrove wood and to make charcoal at night, deep inside the mangrove forests. This situation is complicated, and without the necessary resources for enforcement activities it is difficult to monitor or enforce anything consistently. As one Department of Environment official explained to me,

How can we stop charcoal exportation or logging when they are protected by men with bigger guns than ours? Already people do not like that we destroy their kilns and it unsafe for us to be here, we do not need to make it worse.

Management options in PKWS are complex. This isolated province is known for the illegal trading and smuggling done with neighboring Thailand. Those who hold the most power rule, and resource extraction currently offers large amounts of money. This is not to suggest that individuals cannot make choices within this system but it is difficult and takes perseverance.

IV.2.3 DEGRADATION: ITS RELEVANCE WITHIN PKWS

Mangrove trees are being cut down at an alarming rate. Large boats exporting either charcoal or mangrove wood constantly flow out of PKWS. The famous Koh Kaptic stream, once hosting some of the most pristine mangrove forests in Southeast Asia, has been decimated. As one travels along the stream, clear-cuts are visible everywhere. This degradation continues. With each visit to PKWS more trees are cut.

Photo 4: Cut mangroves in Koh Kaptic Stream

Koh Kaptic stream is famous for its dense, lush mangroves whose canopy provides relief from the sun and keeps the stream cool. Tragically, during the 1998 election period rapid cutting turned this mangrove area into one large clear-cut. This diagram shows the mangrove stumps left behind after cutting. Photo: Melissa Marschke, September 1998



Not only have extensive areas been razed for unsuccessful shrimp farms, the insides of many mangrove stands are void of trees. Charcoal producers take their wood from deep inside these wood stands. Villagers routinely commented on the decrease in aquatic species and wildlife found in the mangroves. This degradation is serious not just from an environmental point of view: humans

interacting with the mangroves will soon have no resources left from which to make their livelihoods. Indeed, there are few mangroves left near the villages.

IV.2.4 THE DEAL: ACTIVITIES HARMING PKWS

AQUACULTURE ACTIVITIES

Shrimp farming practices in Koh Kong have not been sustainable, environmentally safe or profitable. In Koh Kong, an estimated 500 ha of ponds were developed over the last few years (mangroves Cambodia, 1997). Indeed, the latest wave of razing mangroves for shrimp ponds within PKWS happened in early 1997 (Koh Kong Department of Fisheries, 1998). However, many shrimp farms became 'diseased out' (self-polluting and unmanageable) and were forced to shut down in early 1998. Between over-use of chemicals and unsuitable waste ponds, the farms polluted each other. Needless amounts of chemicals entered the sea, entire tracts of mangroves were cut down and local laborers lost their jobs. As of November 1998, it was estimated that over 80 % of the shrimp farms were no longer active. Those remaining in operation were operating at a net loss and, of these operating farms, a few were trying to raise other fish species within the ponds (Koh Kong Department of Fisheries, 1998). The devastation of the local environment is easy to spot because of the inactive shrimp farms throughout PKWS. Many areas will never grow back because of the altered saline content in the soil (Baird, 1993; Ahamed, 1997).

CHARCOAL ACTIVITIES

Although there has always been charcoal production in PKWS, such activities were minimal and monitored, controlled and managed during the Sihanouk regime by a Department of Fishing, Forestry and Hunting (DFFH) official in conjunction with village chiefs. This will be further expanded upon in the next chapter. However, in the 1990's charcoal production has rapidly expanded in partial response to market demands from neighboring Thailand and the opening of the Thai-Khmer border. For the past few years the market price for charcoal has been US\$ 0.18/kg although the market price dropped in the

summer of 1998 to US\$ 0.11/kg (Department of Environment, 1998). Whether a drop in market price will increase or decrease the amount of activity within PKWS is not yet known. Current levels of production and exportation are unsustainable. Even though charcoal activities are illegal and charcoal kilns have been destroyed, the number of charcoal producers continues to rise.

Official Department of Environment statistics suggest that in 1996 there were 475 charcoal kilns in PKWS. An Anti-Charcoal Committee working group, led by the Department of Environment, was established to destroy all charcoal kilns within PKWS. In spite of kiln destruction, charcoal activities continue unabated. What charcoal kiln destruction does is force people deeper inside the mangroves or to work at night. Villagers point out that there is more charcoal kiln activity now than ever before in PKWS. In 1998, the Department destroyed 5 % of all charcoal kilns in PKWS, equivalent to 25 charcoal kilns. Official numbers indicate that there are now over 500 small charcoal kilns in PKWS but unofficial statistics suggests that there are even more charcoal kilns (Department of Environment, 1998).

Destroying livelihoods without offering any alternatives is an unacceptable solution. It is the poorest villagers, who do not have the protection of a well-connected official, whom are hit the hardest. Villagers are left without livelihood options and a huge debt load for the building or rental of the kiln. Ironically, local charcoal producers are poor because little money is made from charcoal production; the money comes from charcoal exportation or from renting out charcoal kilns to laborers. Unfortunately, these illegal activities are often backed by local police or the Military.

Photo 5: Charcoal Kiln in Koh Sralao Village

This is a typical charcoal kiln found in PKWS. Mangrove wood is piled into the kiln that is then sealed and fired. The wood takes about 18 days to turn into charcoal. The charcoal is bagged and sold to a charcoal exporter who then exports the charcoal into Thailand.

Photo: Melissa Marschke, November 1998

**LOGGING**

Global Witness, an environmental watchdog NGO, produced a well-researched report looking into illegal logging practices within Cambodia in 1998. Illegal logging activities are happening near PKWS, and the mangrove waterways are used to export the timber into Thailand. Villagers reported that increased logging has led to greater siltation in parts of PKWS; siltation results in higher water temperatures and a decrease in aquaculture. Global Witness reports that "every night 16-30 timber boats pass the Cambodian navy's Lam Dam checkpoint in PKWS, each paying Bt5 000 (US\$ 125) to the checkpoint (1998: 22)." Furthermore, a government official is quoted as saying that:

the Cambodian Government cannot completely ban logging ... when the forests become extinct then the activities will automatically stop (1998: 23).

Villagers have little control over the cutting and transporting of timber; moreover, the logging is supported by the military. Given that the military are one of the major power players in Koh Kong, villagers do not dare to protest the extent of the illegal logging activity. Local officials stated that:

...the only way to curb illegal logging is to ask the Thai government to prevent the illegal imports of timber, or to allow the loggers to cut all the trees so that they can get no more (Global Witness, 1998: 23).

Unfortunately, village chiefs have little power in controlling this illegal activity. Recently, the Royal Cambodian Government called for a halt to all illegal timber practices. If this will curb logging activities in Koh Kong or how long it will take to implement this order is questionable.

IV.2.5 GETTING THE VISUAL: SHRIMP AND CHARCOAL ACTIVITIES IN PKWS

In 1994, and again in 1997, a Coastal Zone Land Use/Land Cover Map for PKWS was produced through satellite imagery for the MoE by the Integrated Resource Information Center and the Environmental Technical Advisory Programme. These maps indicate: mangrove forest types found in PKWS; other vegetative cover including forest types, bushland and grassland; agricultural land including rice fields and upland areas; and other land use activities such as villages, shrimp farms and charcoal kilns. Such maps present an image of PKWS at two specific points in time and are useful for comparing differences in the area over a three-year timeframe. However, the situation in PKWS is not static: since 1997 most shrimp farms have become in-active and charcoal activity has increased. Therefore, a 1997 map does not adequately reflect what is happening in PKWS.

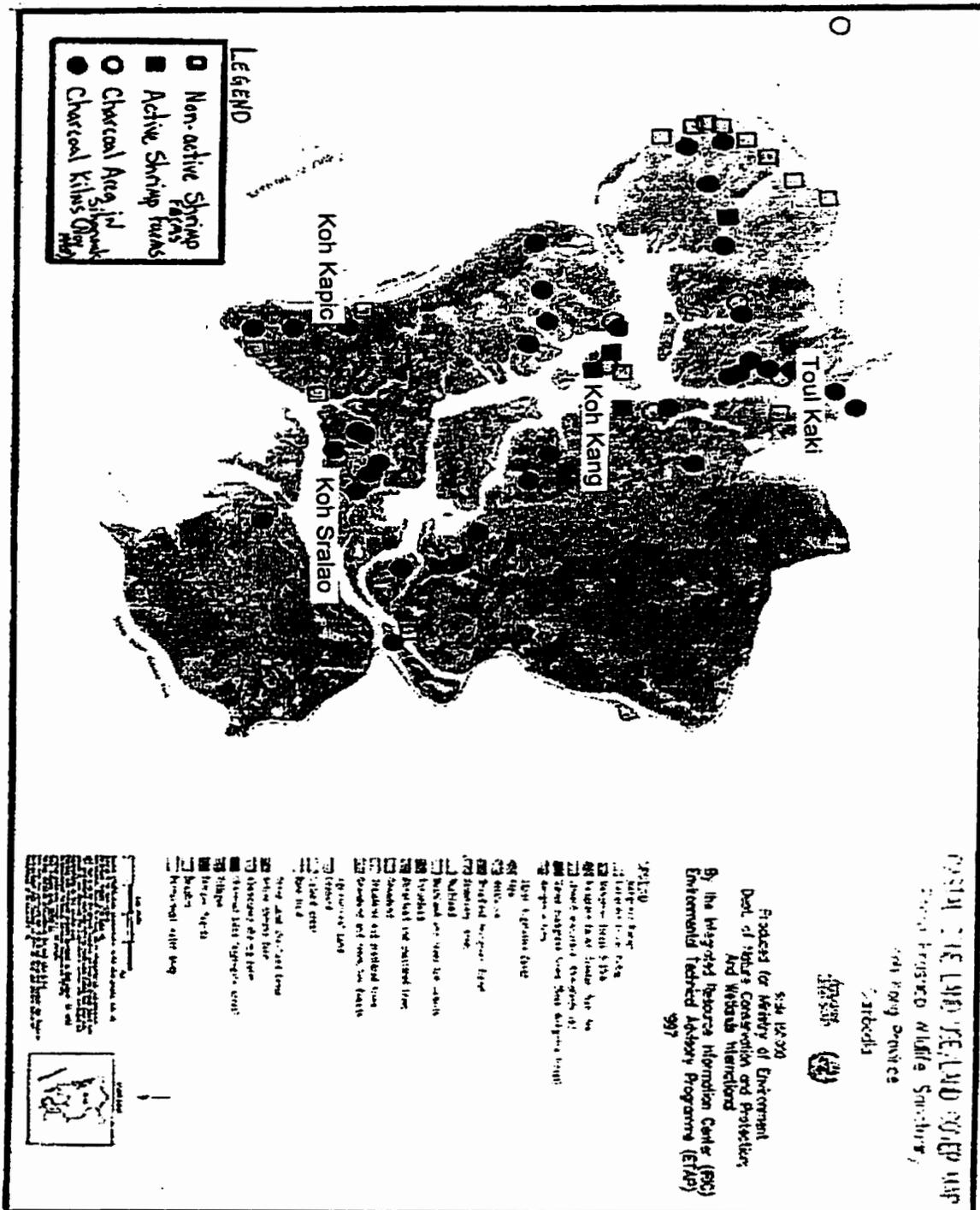
Although there are no official maps indicating charcoal production or shrimp farm activities in Koh Kong province, a few officials working for the Department of Fisheries and the Department of Environment in Koh Kong town are well aware of the location of charcoal kilns and shrimp farms. Also, Commune chiefs know the location of shrimp farms and whether or not these farms are active. Although the location of charcoal kilns in PKWS are constantly

changing (when kilns are destroyed new kilns emerge elsewhere) both Checkpoint officials and charcoal producers could roughly indicate where kilns were located if they chose to share this information with me.

In order to understand the extent and magnitude of varied resource extraction activities, time was spent learning where charcoal was produced and where shrimp farms were located within PKWS from officials, chiefs and villagers. What emerged was a general picture of shrimp farm and charcoal activity in PKWS. This information was compiled from a variety of perspectives and is not intended to portray an exact picture of PKWS rather to indicate the extent in which charcoal and shrimp farm activities are undertaken.

The map, PKWS Resource Extraction - November 1998 (found on the following page), denotes both abandoned shrimp farms and active shrimp farms in PKWS. Moreover, charcoal kilns found in PKWS in November 1998 are indicated. Also included on this map are the abandoned charcoal kiln areas that elders indicated to me were used for charcoal production during the Sihanouk regime. This information will be further discussed in the following chapters.

Map 2: Map of Charcoal and Shrimp Activity in PKWS



V. A SNAPSHOT: THE 4 VILLAGES AND THE 4 VILLAGE CHIEFS

Little written information is available regarding village-life in PKWS, past or present. Koh Kong province is isolated from the rest of Cambodia: village life, in mangrove coastal communities, is not well understood by either urban Khmer or outsiders. One cannot use the scant village-level information from other parts of Cambodia and assume that it is relevant to the situation in PKWS.

This research focused on local environmental knowledge held in four coastal communities within PKWS: chiefs, elders and villagers shared their thoughts about mangrove resources with myself and with each other throughout the research process. The following provides a snapshot of characteristics found in each of the four villages. Most historical information was shared by elders and chiefs, and other information was gathered through the use of various PRA techniques both within the village and at the September 28-30th *Environmental Education and Community Management of Mangrove Resources Training Course Workshop* held in Koh Kong town.

For each village, resource maps from two different time periods were initially drawn by village workshop groups and were then designed and drawn onto the computer. These maps will be found throughout the following section of the thesis. This information combines initial village workshop group maps with knowledge shared from villagers, elders and chiefs that I then interpreted in pictorial form. Generating computerized maps helped me to grasp the significance of resource depletion over time in PKWS.

V.1 THE FOUR VILLAGES

Although all four villages are located in PKWS and rely on mangrove resources, there is not necessarily extensive communication between villages. It is difficult, time consuming and expensive to travel through the mangroves. Still, the trading and sharing of resources means that some villagers do have connections in other villages. For example, villagers in Koh Sralao sell water to villagers in Koh Kapic during the dry season. The following village snapshots

attempt to share some characteristics found in each village. It should be realized that there are also many differences (historical, political and environmental) among the villagers within each village.

V.1.1 TOUL KAKI

Toul Kaki is a long established rice-farming village surrounded by both mangrove and upland forests. Most villagers earn their livelihood through rice farming and upland agriculture; the remaining villagers fish, cut mangrove wood, sell goods or make charcoal. For farmers, fishing practices supplement the family income or are undertaken for subsistence use. There are 95 families living in this village.

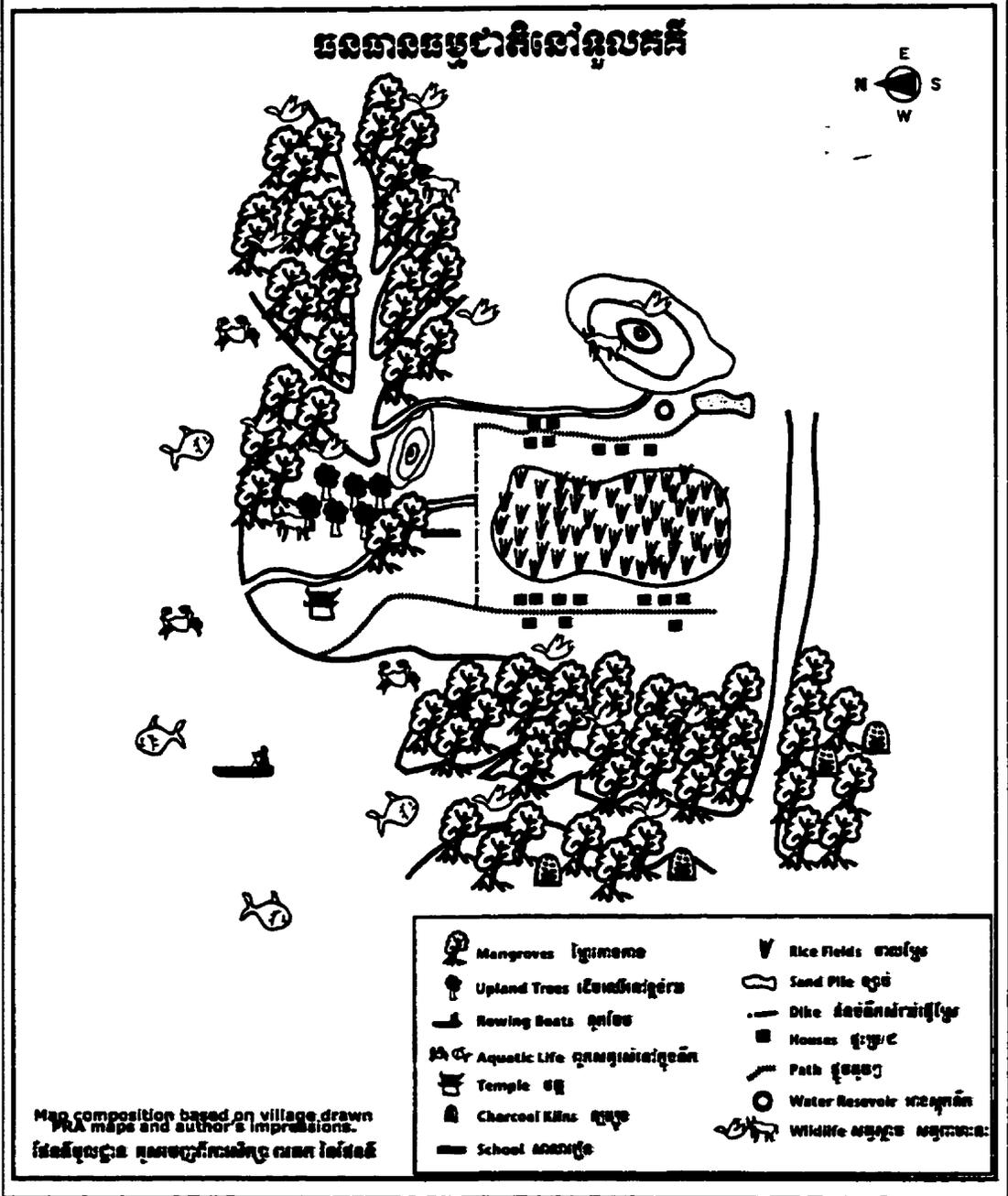
SIHANOUK REGIME

Elders remember that during the Sihanouk period 90 families lived in Toul Kaki, nearly the same number as in the present. Villagers farmed their land: rice, fruits and vegetables were grown. Everyone used a buffalo and plow to farm rice. There were no chemical fertilizers then, and villagers milled rice in the village. Rice yields were on average 1-2 tones per hectare. Fish species were abundant; one could easily fill their boat with fish species, shrimp or crab. Villagers fished in the mangroves surrounding the village for subsistence purposes; there was no market for fish production in Thailand. Villagers traded amongst each other and with nearby villages for various goods and services. Thai was spoken in Toul Kaki and villagers referred to themselves as Koh Kong-Thai.

Elders, the commune and village chiefs recall a strong management regime during Sihanouk. The Department of Fishing, Farming and Hunting (DFFH) sent an official trained from the Royal University of Agriculture of Phnom Penh to live in Peam Krasaop, a nearby village. This inspector carefully monitored and controlled the use of resources in the area with the support of commune and village chiefs. Tigers, bucking deer, pigs, wild lizards roamed

Map 3: Natural Resources in Toul Kaki Village 1970.

Natural resources were once plentiful in Toul Kaki village. Elders all spoke of abundant wildlife and fish species surrounding this village.



throughout the village and elephants were found near the mountain; hunting, regulated by DFFH, was for subsistence purposes.

Mangrove cutting was controlled by the DFFH and charcoal kiln activity was designated for specific areas. In fact 11 areas were intended for charcoal activities (refer to Map of PKWS found in Chapter 4). In the specified charcoal

kiln area near Toul Kaki village, there existed four large charcoal kilns that were owned by a handful of rich villagers. Each kiln could perhaps burn 30 000 kg per time. Much of the production was sent to Phnom Penh. Mangroves near the appointed kiln areas were cut for charcoal production, therefore, replantation programs were undertaken twice monthly by villagers, school children and the local authority. Mangrove wood was not often used for construction purposes because of abundant upland wood supplies.

KHMER ROUGE

During the KR, villagers were forced to evacuate Toul Kaki and were sent to communal work camps further inland. Toul Kaki was used as a base camp for KR officials and rice fields were ploughed and farmed daily by workers who came in to work the fields. This KR legacy remains: rice fields were squared into 1 ha plots and many abandoned fields linger on. All infrastructure was destroyed by the KR; temple reconstruction was only completed in 1997.

COMMUNIST REGIME

Perhaps seven families returned to Toul Kaki when the KR regime ended; in addition, newcomers also settled into the village. Villagers continued to farm rice, some switching in the late 1980's to mechanized methods and adding chemical fertilizers. Rice yields increased to 2 - 3 tones per ha. Villagers suggest that both wildlife and fish species began to decline in the late 1980's.

THE 1990'S

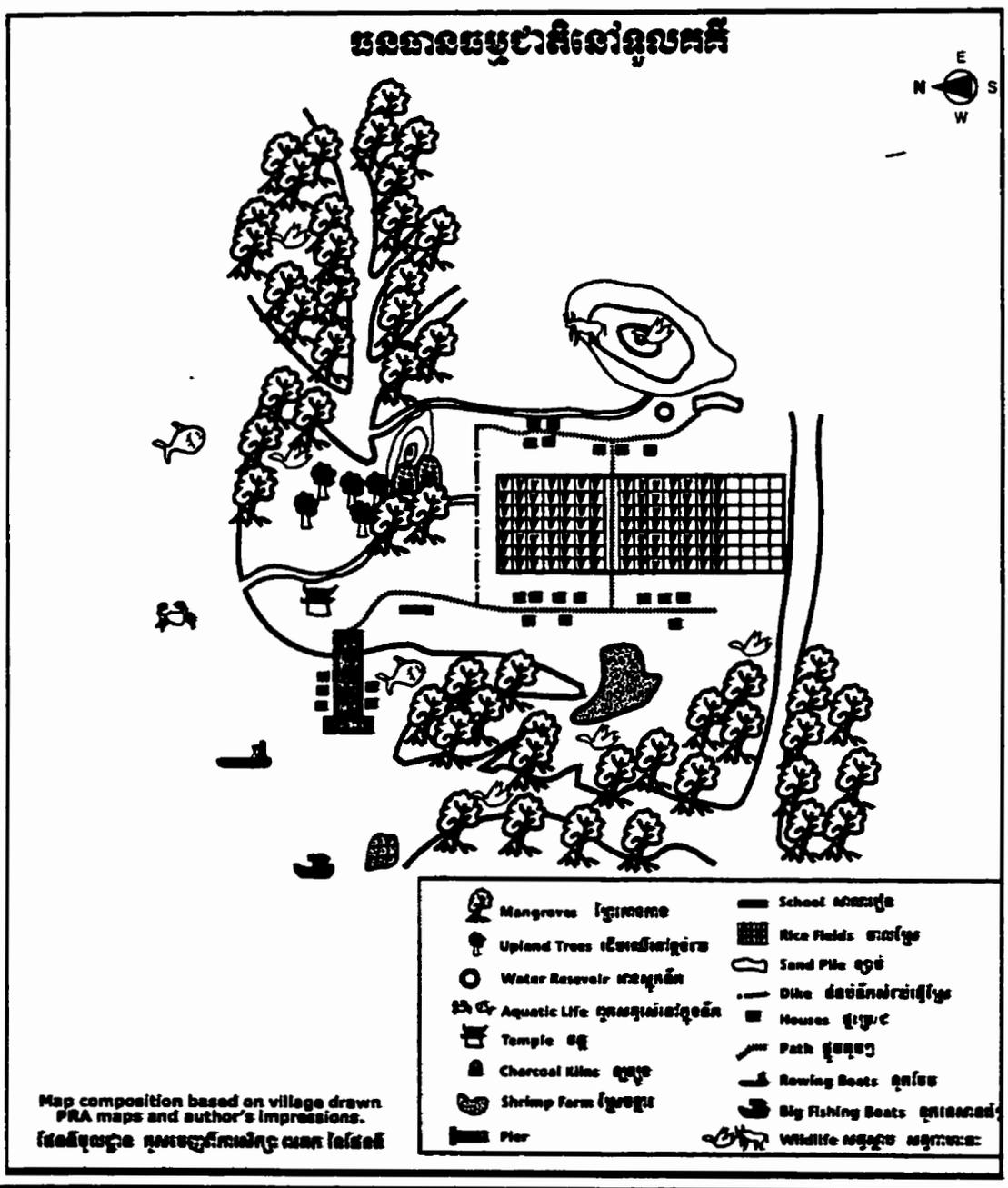
After UNTAC more newcomers settled in Toul Kaki, mostly to farm. Indeed, only in the past few years has this village returned to the same size as before the KR. Newcomers are welcomed into the village to farm the abandoned rice paddy fields.

Charcoal activity was active in the early 1990's; however, in 1994, 18 kilns were destroyed by the Department of Environment in an attempt to curb illegal

charcoal activity. Few villagers in Toul Kaki continue to make charcoal: this activity depletes resources, is illegal and offers little income to the producer.

Map 4: Natural Resources in Toul Kaki Village 1998

Less wildlife is found near Toul Kaki and people no longer fish in the surrounding mangrove streams. Rice fields are in 1 ha plots, a legacy of the KR. There continue to be abandoned rice fields in Toul Kaki.



However, charcoal activity in PKWS has increased and there are now fewer mangroves for the fish to live in. In 1998, one could catch 3 kg of fish per night, 3

- 4 kg per night of crab and 2 - 3 kg per night of shrimp. The combination of an increased population, upland logging and mangrove cutting means that far fewer animals are found near Toul Kaki. Even though one can see the effects of resource depletion around Toul Kaki, the mangrove forests here are far denser than those surrounding other villages.

LOCAL ENVIRONMENTAL KNOWLEDGE

Village leaders all lived in the area prior to KR and take pride in the history of Toul Kaki and in transferring local knowledge. Chiefs encourage newcomers to respect the mangrove trees and discuss how important the mangroves are for fish to live, to protect the village and to ensure the future of the village. One newcomer who came in 1980 explained:

I was taught by the Elders how to keep my house clean and to follow the traditions of Toul Kaki. I share this information when other newcomers come and live here.

Toul Kaki is a small village, and many families returned here in 1979. Newcomers, until recently, have slowly come into the village and this has made it easier for chiefs and elders to share local knowledge. Villagers take responsibility for informing their chief of any illegal mangrove cutting they see near Toul Kaki.

There is a unique resource management system in Toul Kaki. Once villagers have told their chief about illegal mangrove cutting, the village and commune chief then work together to prevent excess cutting in the area. Offenders are warned one or two times, with an explanation of why it is important to have mangrove resources, and the third time the offenders boat and axe are confiscated for a two to three week time period. The chiefs (village and commune) felt that this was enough time and that offenders did not often repeat their cutting activities, near Toul Kaki at least.

Neither villagers nor their chiefs could state when this management system began in Toul Kaki. But the commune chief and vice-chief were both clear about how resources were managed during the Sihanouk regime having both worked with the DFFH inspector in the area. They both suggested that

themselves and elders have always shared their local knowledge with newcomers and that they began stopping illegal mangrove cutting in the 1990's. This was when people began to notice a significant decline in resources.

Also Toul Kaki, possibly because it is a rice-farming village, is the one village where villagers place a water bucket outside their home. Feet are washed and then, at the top of the stairs, feet are dried. This prevents excess dirt from entering the house. Women spoke of the importance of having a clean house so one could sit comfortably and sleep at night. Villagers either bury their garbage near a tree found near their house or burn their garbage. Little garbage is found in Toul Kaki.

I question how authoritarian this mangrove resource management regime is. Do villagers participate freely in such protection measures or because they feel they have to follow the orders of their chief? That is, do villagers have a greater environmental ethic because they are interested in the sustainability of PKWS or because of an authoritarian leadership style? Also, is there room for villager suggestions within this protection system?

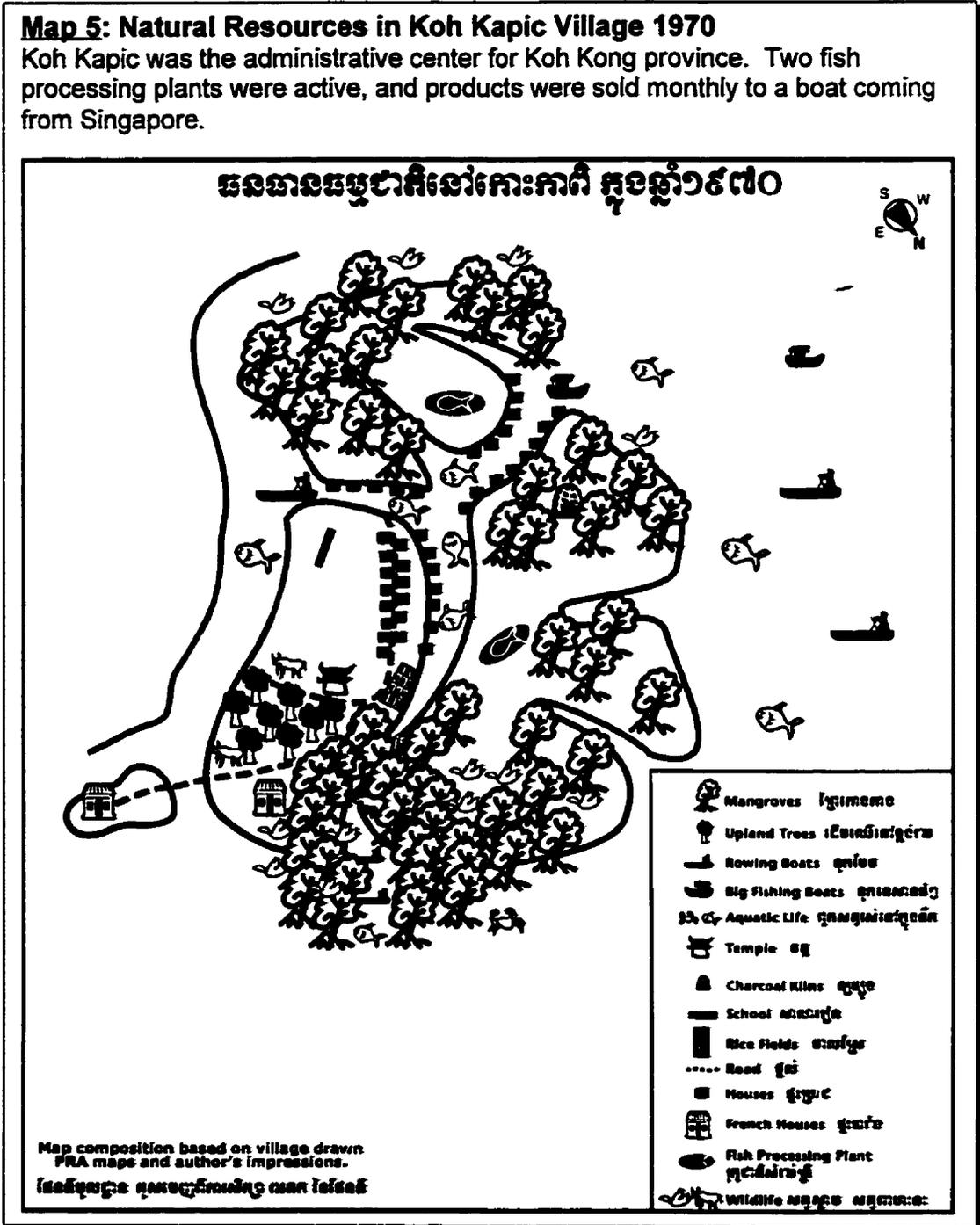
Photo 6: Fishing Boat in Koh Kapic Village

This medium sized fishing boat is one of many found in Koh Kapic.
Photo: Melissa Marschke, September 1998



IV.1.2 KOH KAPIC

Koh Kopic is a long established fishing village located in PKWS. Koh Kopic is surrounded by mangrove forests and the sea; the small upland area is a now abandoned coconut farming area. Fishing and fishing activities provide the



main livelihood for villagers, although some people cut mangrove trees, make charcoal or sell goods. Over 500 families live in this village.

SIHANOUK

Elders recall that during Sihanouk this thriving fishing village acted as the 'commercial port' for the area in addition to being the administrative center for Koh Kong province. A boat came monthly from Singapore to buy boiled fish in a basket and dried fish. Some fish was sold to Thailand or sent to Phnom Penh but most of the fish was sold to Singapore. Villagers, perhaps 10 – 15 per boat, fished commercially together paying taxes to the DFFH for commercial fishing activities. Fish species were very abundant: Spanish mackerel was plentiful as was shrimp species. There were fishing seasons for different species of fish and these seasons were respected by villagers and enforced by the DFFH officer. Being the administrative center, Koh Kaptic had two-story houses built with upland wood and a road down the center (perhaps 500m in distance, separating two rows of houses) of the village. Resources were ample and it was easy to make a good livelihood. Villagers spoke a combination of languages including Thai and French. Many 'outsiders'¹ lived here, given the central importance of the village, the connections with Thailand and Singapore and the role of the French in administrative matters. Perhaps 500 families lived in Koh Kaptic.

Firewood was used for cooking and charcoal activities were restricted to a few rich villagers with large kilns in specific areas; however, the exact details of charcoal activity could not be further commented on. A DFFH inspector either lived or came into the village to control mangrove cutting and the replantation program. School children helped to replant mangrove species: both big and small leaf species were replanted. Also, this inspector could issue a fine if houses were not kept free of garbage.

KHMER ROUGE

During the KR villagers were sent further inland to communal work camps. Koh Kaptic became a KR military post for monitoring sea-faring vessels coming into Cambodian waters. Obviously a number of boats were caught and people

¹ 'Outsiders' refers to villagers who were not born into the area; this included the various government officials who worked in Koh Kaptic and various ethnic groups living in the area (Chinese, Vietnamese, Thai).

killed because skulls and bones from KR deaths are buried near the temple. When villagers returned to Koh Kaptic, most infrastructure had been destroyed.

COMMUNIST REGIME

Like elsewhere, few original villagers returned to the area. Many administrative members working in Koh Kaptic were killed during the KR and

Map 6: Natural Resources in Koh Kaptic Village 1998

Fishing continues to be important in Koh Kaptic; however, fish yields have declined and fish are now sold to Thailand.



mostly new families have come to this village. The temple was rebuilt immediately using the remains of the temple from Koh Sralao and the remains found in Koh Kapic. However, Koh Kapic ceased to be the administrative center after the KR because Koh Kong town was established.

Shrimp farm activities began in the mid-1980's and this cleared a significant amount of mangrove forest. Villagers and elders all suggested that resources began to decline in the late 1980's including fish yields, mangrove trees and wildlife species.

THE 1990's

Fishers continue to be attracted to Koh Kapic, in part because of the central location of Koh Kapic within the mangroves and the sea. This village thrives on fishing and now three middlemen from Koh Kapic sell the villages' fish products to the Koh Kong town market. The fish catch has significantly dropped over time: the catch was nearly limitless but with the increasing population, changing fishing gear and the loss of aquatic habitat, numbers have dropped. Perhaps 3 - 5 kg of Spanish mackerel or 2 - 3 kg of shrimp can be caught per night. Larger yields can be gained from explosive fishing or if one owns a larger boat. Illegal fishing activities, such as explosive or 'dynamite' fishing, are supported by Thai fishers and rich 'powermen'. The larger fishing boats (45 HP – 200 HP) are bought in Thailand. Also, some villagers manage or own charcoal kilns although charcoal activity is not done directly in the village. In 1992 charcoal exportation to Thailand began. Kilns are small in size (D=2-4m, H=2-3m) and are deep inside the mangroves. The insides of mangrove stands, including Koh Kapic stream, are nearly gone.

LOCAL ENVIRONMENTAL KNOWLEDGE

Villagers are aware that there has been a significant changes in their environment especially since UNTAC. There are no longer any small shrimp jumping in the mangroves, and obviously there are fewer mangrove forests. People are forced to use mangrove wood for house construction more and more

as other upland resources have become degraded. Eating habits have also changed with time. For example, people now eat short-body mackerel and giant catfish both of which were not so popular in the early 1980's.

Villagers expressed frustration about the lack of environmental management within the village. Villagers feel helpless to change the destruction that is happening and believed that their chief should be doing something. The famous Koh Kopic stream leads into Koh Kopic and now stands filled with tree stumps. Villagers were, no doubt, frustrated by this devastation. Interestingly, the chief expressed the same thoughts, believing himself to be powerless and wanting the commune and district chief to stop the illegal cutting in Koh Kopic stream and elsewhere. The village and commune chiefs do not work together; in fact, there is no local management regime in place here.

In the early 1990's the commune chief of Koh Kopic left for Thailand with a few other families. It was suggested a number of times that this man held vast local knowledge, was well respected and that much had been lost with his departure from Koh Kopic. The new commune chief only came to the area in the early 1990's.

One elder commented that villagers were not necessarily more environmentally aware during the Sihanouk period, rather villagers held a stronger respect for local authority figures who also happened to be better educated. Elders suggested that villagers now follow those authority figures that they most fear and this often happens to be the local police or military. It is these 'powermen' that have the largest guns, the biggest influence and whose rules villagers follow.

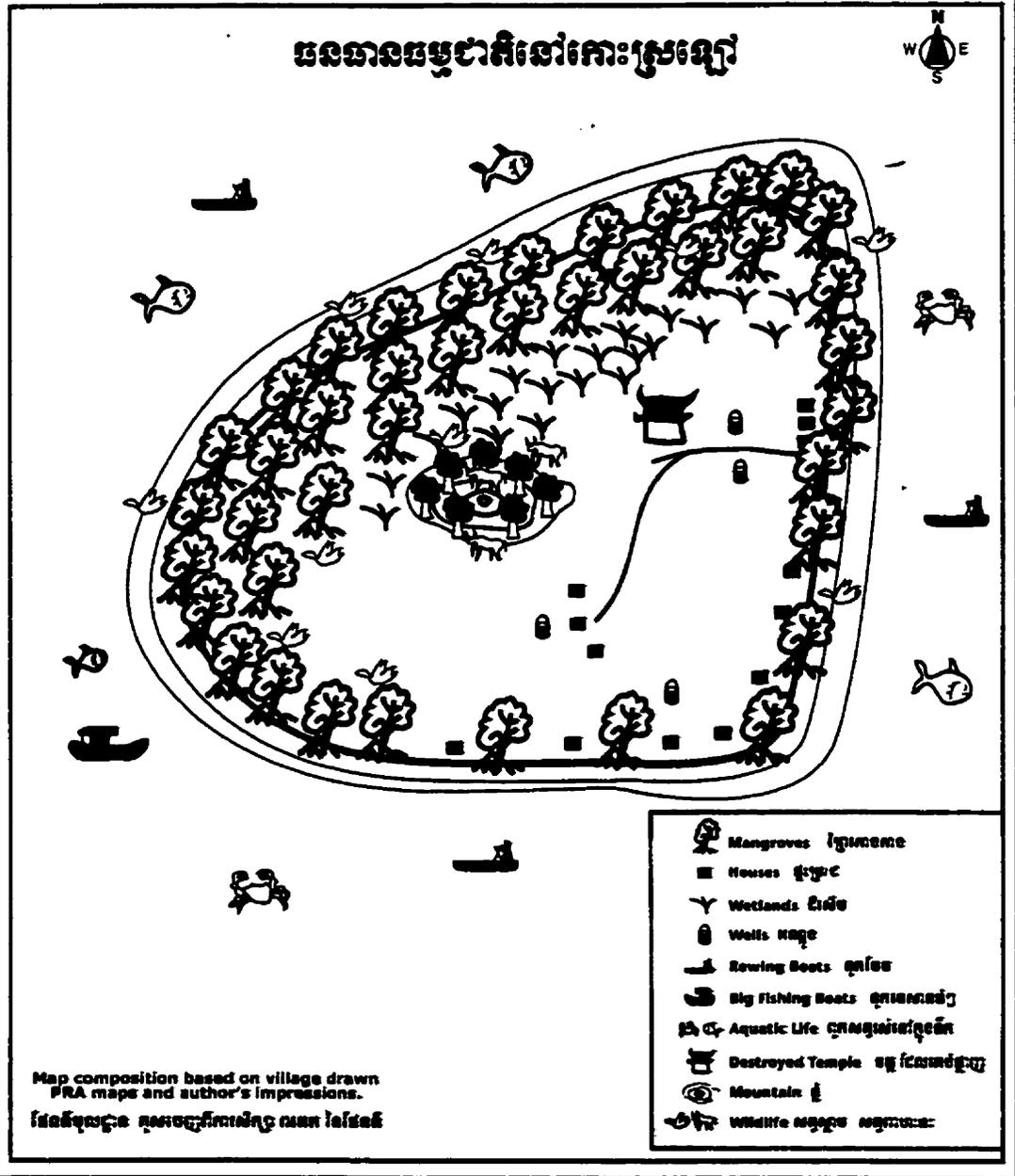
Considering that the commune and district chiefs are actively involved in resource extraction measures, it is hardly surprising that it is difficult to find an environmental ethic in Koh Kopic. In fact, I suspect that it would be difficult for villagers not to actively participate in resource extraction activities.

V.1.3 KOH SRALAO VILLAGE

Koh Sralao is another old fishing village located within PKWS. This village has attracted many newcomers over the years, often lured by the economic

Map7: Natural Resources in Koh Sralao Village 1980

Koh Sralao village was surrounded by upland trees and mangrove forests. Villagers lived at the edge of this island.



incentives found within mangroves. The majority of villagers either fish or produce charcoal. Over 300 families now live in Koh Sralao.

SIHANOUK

Koh Sralao is also an old fishing village established some time ago. Not much is remembered or known about Koh Sralao prior to the KR. Perhaps a hundred families lived around the edge of this island. The foundation of the school on the island is dated 1953; however, few Elders returned to Koh Sralao after the KR making it difficult to know the local history of this village. It is rumored that many monks lived in Koh Sralao, and that festivals for the entire area were held in Koh Sralao.

KHMER ROUGE

During the KR Koh Sralao was also evacuated. The KR did not use this village as a base and merely destroyed all village infrastructure.

COMMUNIST REGIME

During the 1980's a wave of newcomers were attracted to Koh Sralao to farm opium at one of the two factory-farms found on the island. Opium was harvested in Koh Sralao and then sent for processing to Toul Kaki. This became illegal in 1989 (or perhaps this illegal activity became enforced in 1989), and while some workers left maOnn stayed and tried charcoal production or fishing.

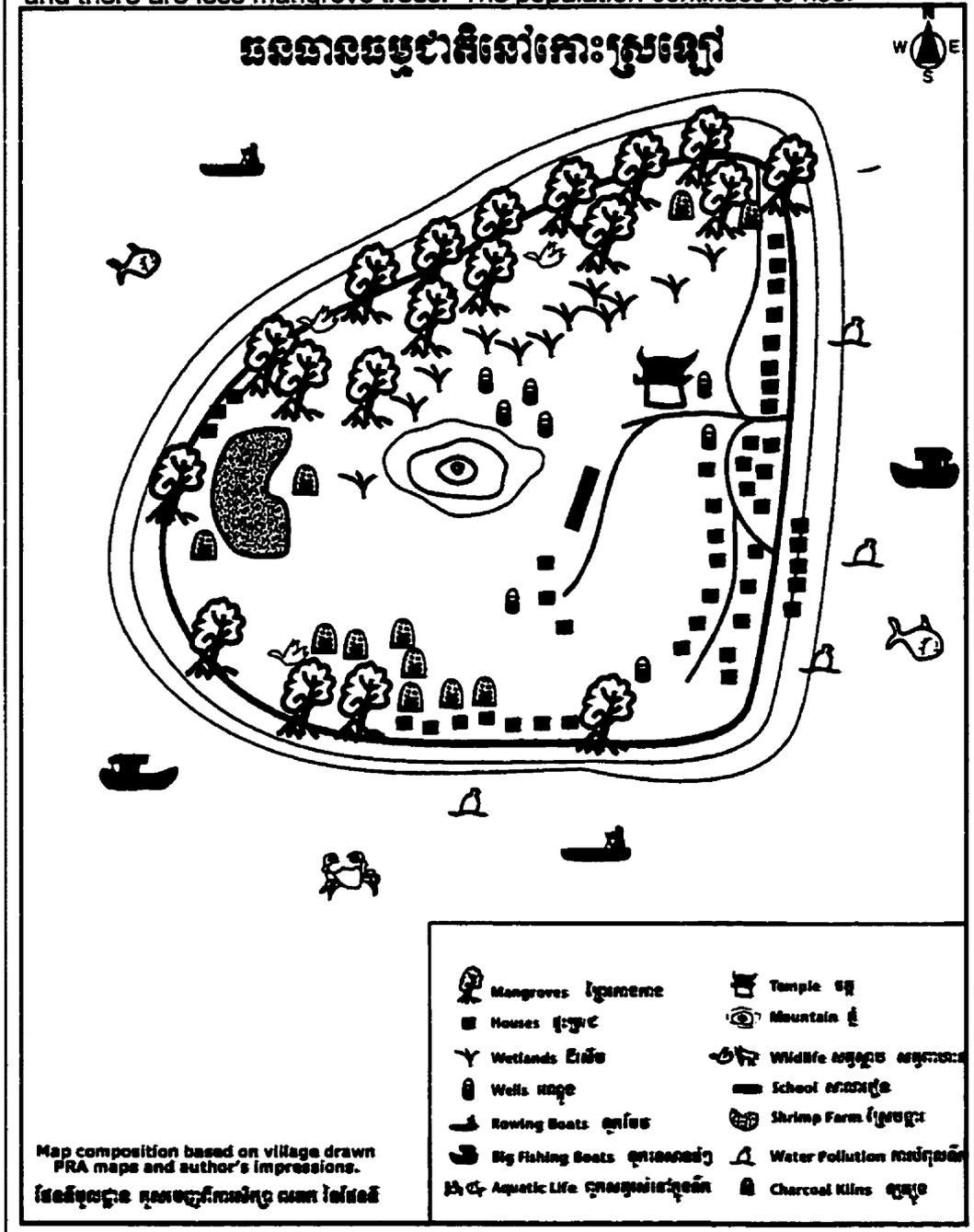
The remains of the temple were used to reconstruct Koh Kapic's temple after the KR in the early 1980's. Koh Sralao's temple was not completed until the late 1980's.

Fish species were abundant in the early 1980's. Over 100 kg of fish could be caught at night and these yields did not decline until the late 1980's perhaps in conjunction with the net in-migration into the area. In 1980, there were two charcoal kilns in Koh Sralao. This activity was limited to a few rich families and mangrove wood rather than charcoal was used for cooking.

THE 1990's

Villagers mainly fish in Koh Sralao although charcoal activity, found in one end of

Map 8: Resources in Koh Sralao Village 1998
 Resources are less abundant now: villagers fish further away from the village and there are less mangrove trees. The population continues to rise.



the village, is active. There are over 60 operational charcoal kilns. Koh Sralao is the only village within PKWS where charcoal is produced directly in the village. This is because, for some reason, this activity is supported by the local police.

In-migration into Koh Sralao continues at a rapid pace; in the fall of 1998 14 new families came to live there. Explosive fishing is popular: the necessary chemicals are bought in nearby Thailand. For those who have never fished before it is an easy, quick way to make money.

Fishing yields have decreased, forcing fishers to fish further from home and for longer periods of time. Only a few kg of fish can now be caught per night unless illegal fishing gear is employed. Villagers suggest that there are perhaps 70 % less resources than what was available in the early 1980's.

LOCAL ENVIRONMENTAL KNOWLEDGE

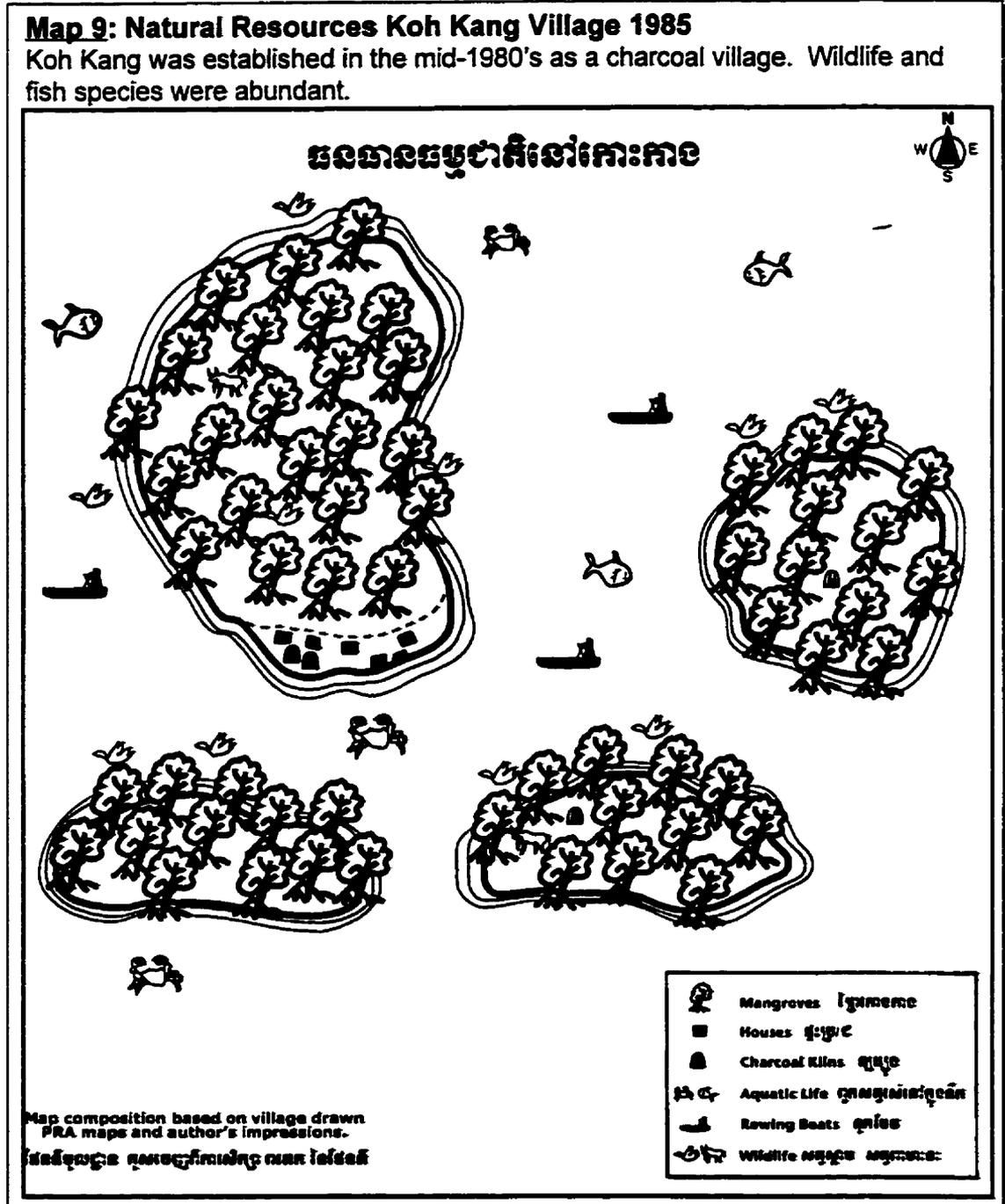
Several elders suggested that the younger generation is clever, and that this generation has a better idea of where to access resources. Elders were aware that the mangrove resources are degraded; however, it is seen as the responsibility of the chief to protect these resources. One elder indicated that they wanted,

the environment to be just like before: it was clean with fresh air and water and many trees and animals. For some reason all the animals have gone away and there are no more birds and few trees. People used to replant the trees but they have stopped doing that and school children no longer learn about the environment and the importance of these trees.

Another elder implied that there was a problem with garbage in the village, although other elders did not mention this or, when asked, did not comment on the garbage strewn around Koh Sralao. The chief is interested in building a waste dump but is not sure if people will actually place their household waste in the dump. It was difficult to access local environmental knowledge in Koh Sralao: fewer elders returned here than to either Koh Kapic or Toul Kaki and the few that did return spoke a combination of Thai and Khmer even difficult for villagers to understand. Hence, little local knowledge is transmitted via elders.

KOH KANG

Koh Kang is a newly established charcoal production village. Although charcoal kilns no longer exist in Koh Kang, many villagers cut mangrove trees or

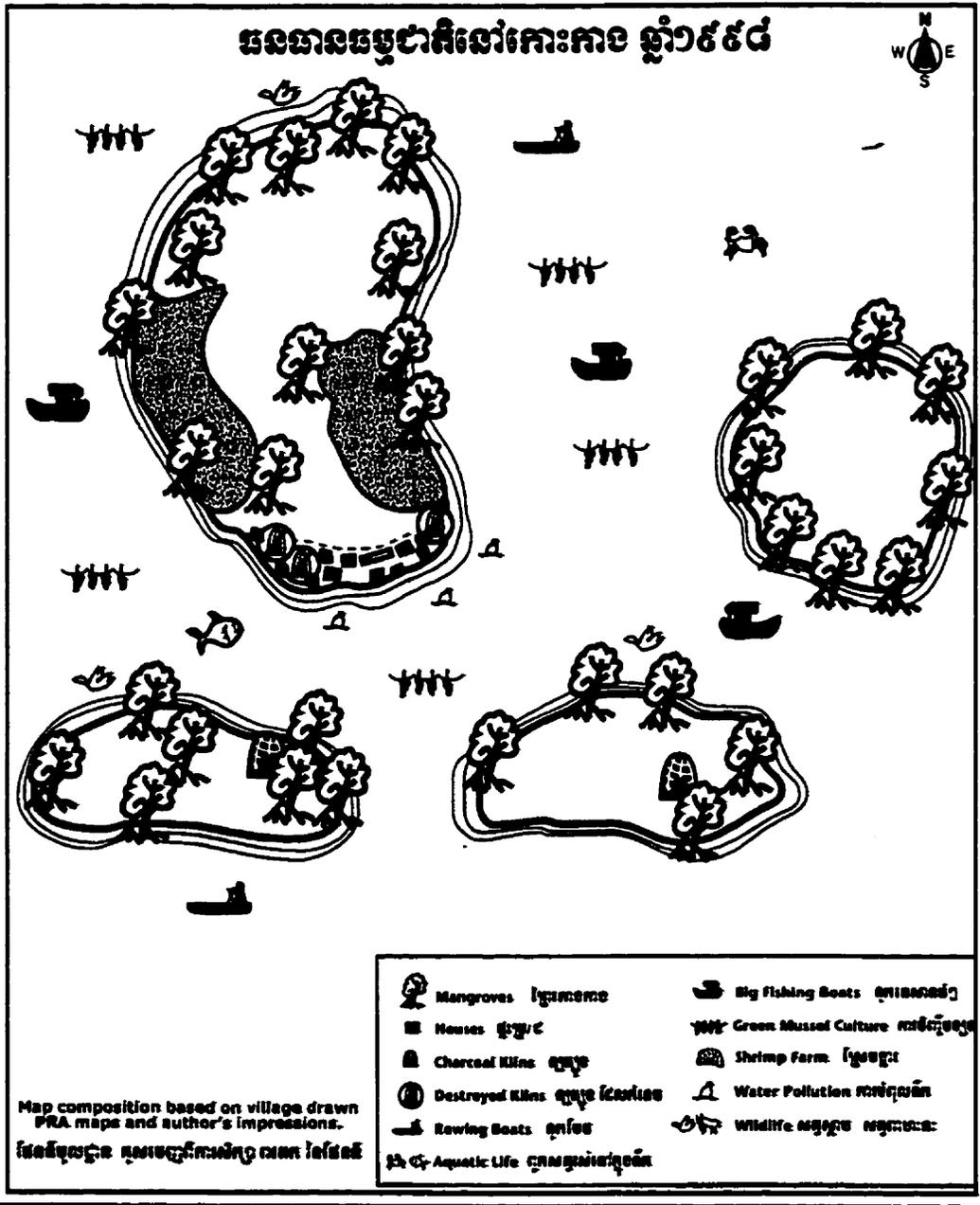


generate charcoal deep in the mangrove forest. Also, there is a large number of charcoal exporters in Koh Kang. Villagers are all newcomers to the area; indeed,

people were lured to the area because of the rumored abundant resources. There are 120 families in Koh Kang.

Map 10: Natural Resources Koh Kang Village 1998

Koh Kang is surrounded by 3 shrimp farms, which are almost non-operational. Charcoal is not produced in the village, rather kilns are located in the surrounding mangroves.



COMMUNIST REGIME

Koh Kang was established in the mid-1980's. In the heart of PKWS, this village was surrounded by mangrove trees and was an ideal spot for charcoal production. There were 35 families originally in Koh Kang.

Fish species were varied and abundant as were crab and shrimp species. For example, in 1988 one could catch 12 kg of crabs per day. One could catch as much as one's boat would hold when villagers first arrived to Koh Kang.

THE 1990's

The village houses 120 families most of whom arrived by 1990. Charcoal kiln activity has always been heavy in Koh Kang until production was first curbed in 1993 and then again in 1996. Empty charcoal kilns are scattered throughout Koh Kang. The Department of Environment Checkpoint is located beside Koh Kang. Considering that Checkpoint's mandate is to curb illegal charcoal activities, it is hardly surprising that charcoal production was stopped and enforced directly in Koh Kang village. Perhaps Koh Kang is the one example of where illegal activities have been stopped within the village; however, limiting charcoal kilns in the village has only forced laborers further into the mangrove forests.

As many as ten charcoal exporters have emerged to export charcoal from Koh Kang and surrounding villages into Thailand. An informal tax is paid to Department of Environment officials at Checkpoint. Charcoal exportation offers better money than charcoal production and this activity is supported by the Military. The Department of Environment cannot stop this activity.

Villagers not involved in charcoal production are immersed in shrimp farming, fishing activities or cultivating green mussels. In the early 1990's three shrimp farms opened in Koh Kang with 18 shrimp ponds. This gave some villagers employment as shrimp farm laborers. Also, green mussel culture activities began to provide feed for the shrimp fry. However, with the closure of many shrimp farms, villagers could only sell 25 % of their green mussel production in 1998. Indeed, only 3 of the 18 shrimp ponds remain operational.

Fishing yields have declined, now one can catch only 3 kg of crabs per day.

LOCAL ENVIRONMENTAL KNOWLEDGE

Villagers, elders and the village chief all found it difficult to assess changes in resources. People knew that there were less resources but it was difficult for people to share which resources had declined or why. People were aware that it was more difficult to find the poles that one needed for green mussel culture. One elder commented that:

There were big fish in the roots of the mangrove but now for some reason have all gone away.

I am not sure if the mangroves or the fish were being referred to. Elders suggested talking with younger people: younger people suggested talking with elders. With regards to resource degradation another elder said:

If people did not cut the mangroves for charcoal then they would fish more and there would be less fish.

When the idea of a mangrove protection system was mentioned, this concept was met with confusion. A management system such as in Toul Kaki was not considered practical because it would affect too many livelihoods. Not surprisingly, villagers were not aware of what had happened in the area during Sihanouk. And, villagers and elders did not suggest that their village chiefs should be doing more to protect the environment. The village chief is busy and does not consider it his role to protect the mangroves.

For villagers in Koh Kang, the mangrove resources are viewed through the lens of the economic potential of resources. Both the village chief and vice-chief are involved in numerous economic activities including charcoal production and exportation, large-scale fishing and green mussel culture and are benefiting from resource extraction. However, the rest of the villagers are very poor; unfortunately, many villagers are still in-debt from the massive destruction of village charcoal kilns. Villagers are, generally, not interested in environmental management nor are they thinking about the future of PKWS. Again, few villagers are connected to this area and most will return home if they can afford

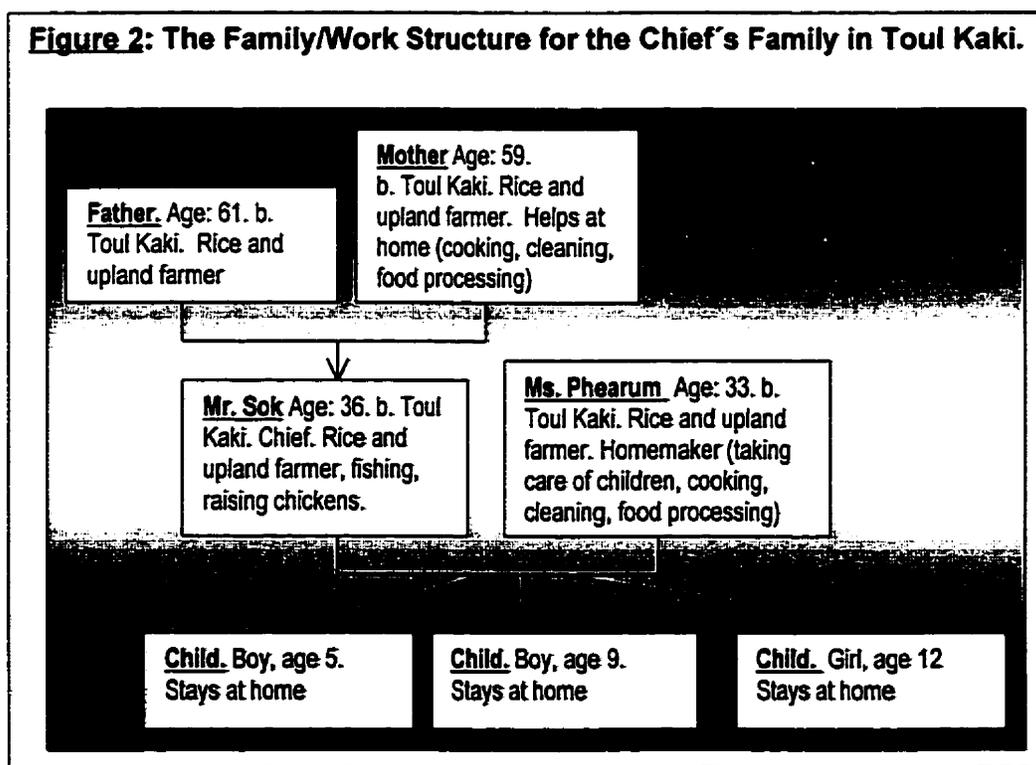
to do so when resources are significantly depleted. This is an extremely poor village filled with garbage, smudged with charcoal and strewn with maOnn green mussel shells.

V.2 VILLAGE CHIEFS

In Cambodia, village chiefs exert influence and power within a village, Khmer society being hierarchical in nature (Larsson, 1996). Even though other authority figures are also influential, the chief retains a certain amount of control. The extent of this authority and how this authority is used differs within each village. This research focused on the local environmental knowledge held by village chiefs and how this authority is (or is not) used towards mangrove protection measures. What follows is a brief snapshot that attempts to shed insight into daily village life for each chief and to reveal the attitudes of each chief and his family regarding their environment. Names used throughout this section are pseudonyms.

V.2.1 TOUL KAKI

Sok, chief of Toul Kaki, his wife, Mum, and their family live in a wooden,



stilt house overlooking their rice fields. They have one buffalo, used to plow their fields, and 10 chickens are being raised underneath their home. Their house is centrally located within this village, and both the vice-commune and commune chiefs of Toul Kaki live nearby making communication between leaders easy. Sok became the village chief in 1986.

I spent a day with Sok learning about his family, walking through the rice fields and eating a meal together. Phearum, his wife, was shy and felt more comfortable in speaking Thai than she did Khmer. Therefore, she did not participate as much in the discussions although we tried to include her as much as possible. What follows provides a snapshot of their life.

DAILY ACTIVITIES

Life for Sok and Phearum’s family is busy. Family members are either tending to crops, fishing or processing various food products depending upon the season and what is required. Most of the family’s activities are land-based

Table 4: Family History

Year	Family History
1981	Sok worked in a national bank in Phnom Penh saving money for his own house; Phearum lives with her parents and works their rice fields.
1983	Sok lived with his parents and worked their rice fields.
1984	Sok became a monk for a year;
1985	Sok and Phearum were married; they farm their own land.
1986	Sok becomes the village Chief.
1990	They continue to farm their land.

although Sok does fish for krill (small crustaceans) and green mullet. The family harvests 1 ha of rice per year which nearly feeds the family. Upland agriculture products such as rambutan, jack fruit, durian, bananas and herbs are used for both home consumption and sold locally.

Krill is processed by both Phearum and her mother-in-law and then sold at the market. The family eats green mullet and sells the rest at the local market. About 10 - 12 chickens are raised for sale annually.

In addition, Sok is occupied by his position as chief of Toul Kaki which he says takes up a fair bit of time each month. This is because Sok spends a lot of

time working with the vice-chief and chief of Toul Kaki Commune in mangrove protection measures or spending time talking with villagers about the importance of the mangroves.

ENVIRONMENTAL THOUGHTS

Sok has learned about the importance of mangrove trees, burying garbage and other environmental things from both elders and the commune vice-chief and chief. Mangroves protect the land and provide habitat for fish and other animals. Poison fishing and herbicides affect the groundwater and the mangrove trees. He is sad that the mangroves are cut, and often elders ask the younger generation to stop cutting down mangrove trees and protect them instead.

Sok feels that his responsibility as chief is to encourage villagers to protect mangroves and to stop outsiders from cutting down mangrove trees. Sok works with other chiefs in Toul Kaki commune and with the commune vice-chief and chief to stop illegal mangrove cutting. Of course, it is easier to protect the mangroves near the village rather than further away. Sok believes that because many people know that the environment is important to villagers not so many people come and try to cut down the mangroves near Toul Kaki.

Sok is often approached by powermen to take money to allow mangrove trees to be cut. Sometimes outsiders and even some villagers ask the police to give him money so he will allow charcoal kilns and mangrove cutting to occur. But Sok does not want money, it will not last a long time. He is not threatened by the powermen and refuses to take any bribes whatsoever; like his vice-chief and chief.

The family takes their garbage and buries it around a tree near their house. They do not burn their garbage because most can be 'eaten by the ground'; however, if they are to use more plastic in the future then they might have to burn their garbage. So far, the village is quite clean and garbage free.

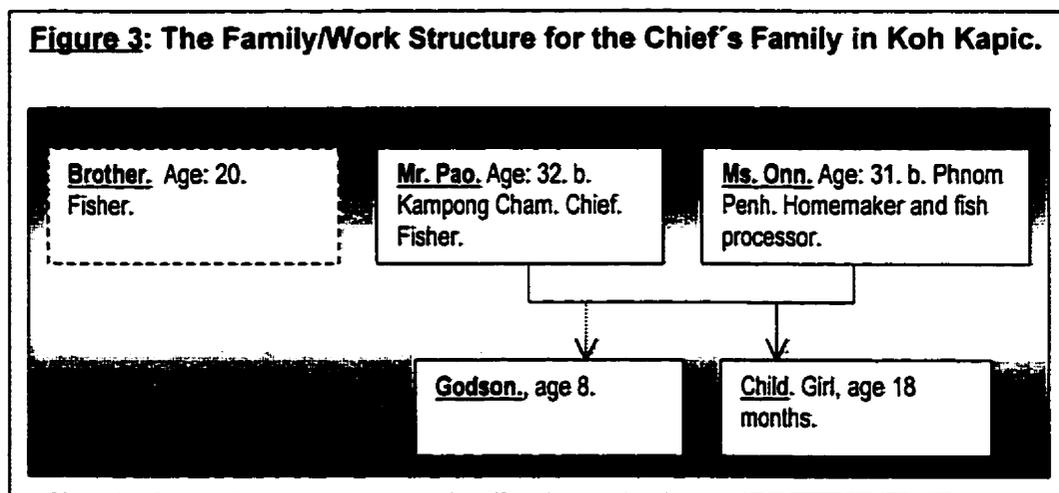
It is interesting that Sok is able to refuse bribes from local police and can continue taking measures to protect the mangroves and to educate other villagers about the village environment. I suspect this is linked to the fact that the

commune chief also has a strong environmental ethic and refuses to take bribes. I am curious as to whether this unique mangrove protection system can be maintained with the recent in-migration to Toul Kaki of newcomers who are not connected to PKWS.

V.2.2 KOH KAPIC VILLAGE

This Chief's family is new to the area; indeed, Pao only came to PKWS in 1988 with the Military. Pao and his wife, Onn, were married in 1995. The family lives near the center of the village, with their stilt house facing onto Koh Kopic stream. Behind their house one can see an abandoned shrimp farm. Pao became Chief of Koh Kopic village in 1996.

I spent a day with Pao and his brother. Onn was sick for these activities but I spent a separate afternoon with her when she was feeling better. The entire family is busy with fishing activities and did not have much free time to spend with me, which I respected.



Pao and Onn earn their livelihood through fishing activities in and around Koh Kopic. Pao catches shrimp species with two types of fishing gear: gillnet and engine boat push netter. He also catches krill with the engine boat push netter. Onn is then responsible for the krill that she processes and then sells to one of three middlemen in Koh Kopic.

The family had to borrow money from the shrimp collector and has managed to pay half of the debt off. This takes long hours of fishing and fish processing. Pao's brother helps him fish and sometimes helps Onn with the krill processing. Shrimp species are sold either to a village middleman or directly in Thailand when there is time to make the trip.

The family is fairly new to Koh Kaptic, although many other newcomers have come after them. Onn, who has only lived in Koh Kaptic for three years, enjoys living in the area although she misses Phnom Penh and hopes that they will eventually move back. Although fishing and fish processing is fairly new to each of them, they both enjoy the work.

Year	Family History
1985	Pao joins the army in Kampong Cham.
1988	Pao comes with the army to work on Koh Kong Island.
1990	Pao stops working for the army and begins working as an administrator in Koh Kaptic commune; begins fishing in his free time.
UNTAC 1995	Pao begins to fishing for a livelihood. Pao and Onn marry; Onn leaves her job as a butcher at the Olympic Market in Phnom Penh to live in Koh Kaptic.
1996	Pao becomes Chief of Koh Kaptic.
1998	The family continues to fish.

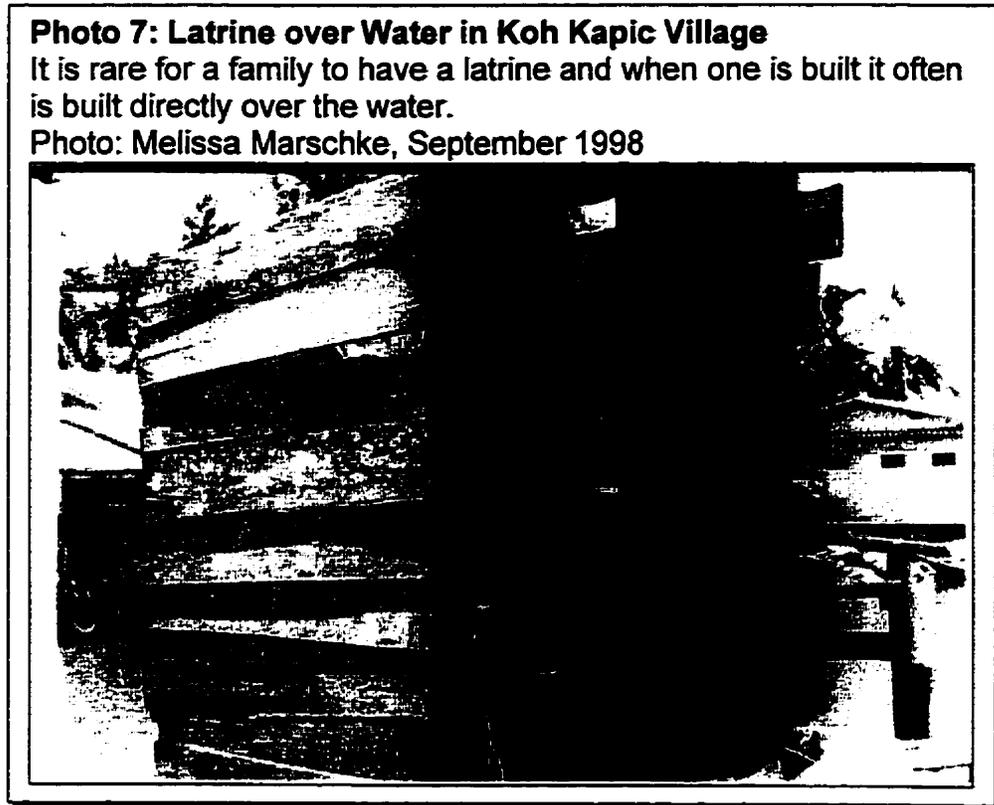
ENVIRONMENTAL THOUGHTS

Pao claims that although he loves the mangroves there is nothing he can do to protect them because the police hold power and are supporting mangrove destruction. Pao told me that once he tried to stop illegal mangrove cutting but was shot at and now is scared to undertake such an initiative again. He is quiet about his ideas because otherwise he will be stripped of his power. Those people higher in the administration support the powermen.

Pao believes that many people do not understand about environmental effects. He can explain some to them but it is up to villagers to choose whether

to listen or not. People just do not understand how mangrove destruction affects them.

Garbage and waste management issues were briefly discussed with Pao. He did not think that there was a problem in Koh Kapic or other villages. Pao believes that the sea takes away both garbage and human wastes. One cannot see these wastes, therefore there is no problem. Most latrines in Koh Kapic, as in other villages (Koh Sralao, Koh Kang), are built directly over the water.



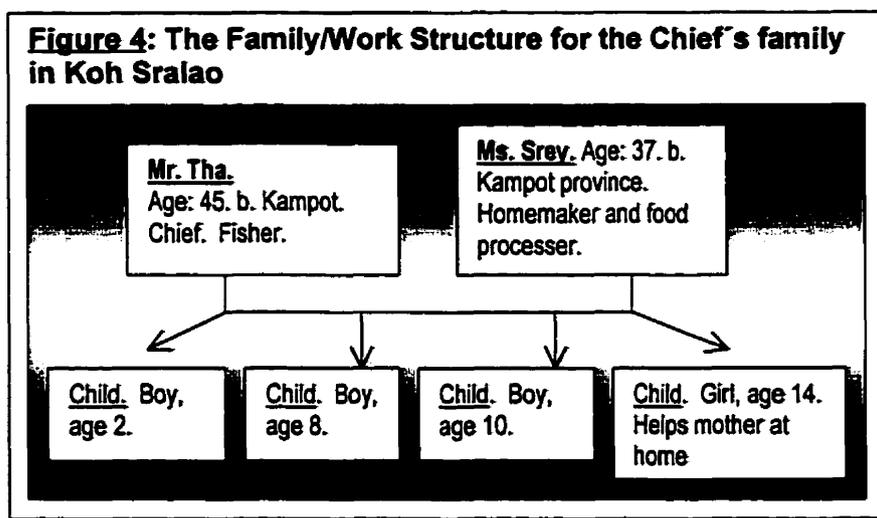
Pao is new to this area and holds little local environmental knowledge; indeed, other villagers have taught him how to fish. Considering that Pao belonged to the military for many years, it would not surprise me if Pao held some sort of military connection although I do not know how this plays out. Protecting the environment was not a large concern for Pao. Is this because Pao is following in the footsteps of the commune and district chiefs?

V.2.3 KOH SRALAO VILLAGE

Tha and Srey live in a wooden, stilt house that backs onto the water and a few remaining mangrove trees. They are located in the far end of the village in the Muslim section of town. This is considered the poorest section of Koh Sralao. The family earns their livelihood from fishing activities and Tha owns one small boat with a 6 Hp engine. Tha became village Chief in 1986.

I spent a day with Tha, Srey and their children in their home. Srey was shy around Tha but we spent time cooking together and were able to talk more then. Tha has worked extensively with the team and asked many questions especially around the idea of waste management.

Family life for Tha and Srey is dictated by fishing activities and the fishing seasons. The family had more money in earlier times but is now having a hard time getting enough money together for children's school fees and sometimes for basic food needs too. They no longer can visit their relatives in other provinces.



Tha fishes for mangrove mud crabs 3 - 4 times weekly for 4 hours during high tide (nets catch on the rocks during low tide). Srey then detangles the

crabs which takes about 8 hours and she is also responsible for repairing the nets.

Table 6: Tha and Srey's Family History

Year	Tha and Srey's History in Koh Sralao
1981	Tha leaves Kampot to fish for crab in Koh Sralao.
1983	Tha switches to fishing for green mullet.
1984	Tha becomes manager of the new 'migoty' opium company; Tha and Srey are married; she comes from Kampot after years of helping her family farm rice and works growing opium.
1986	Tha becomes Chief of Koh Sralao.
1987	Pak stays at home after second child is born.
1989	Tha fishes using crab traps but finds that too many are stolen.
1995	Tha switches to catching crabs using crab nets.

Tha devotes the rest of his time to his duties as a chief. He is busy with commune and district meetings, with mediating disputes between villagers and holding meetings. Tha has not been paid for these activities since May (this interview took place five months later).

Tha came to Koh Sralao in 1981 because he heard that there were many natural resources in Koh Kong province and that it was easy to make a living. Srey, whom he met in their home province of Kampot, came once they were married in 1984. While Tha has generally fished to support his livelihood, he was the manager of an opium processing company for 5 years. Once this illegal activity became enforced, Tha returned and continued to fish and to crab trap.

ENVIRONMENTAL THOUGHTS

Tha is aware that Koh Sralao faces many problems but he does not know how to solve these problems. What Tha has learnt is that garbage can be burned and that possibly the village can start to collect their garbage and bury and burn it. He has spoken with the Buddhist monks in Koh Sralao and has sought out their support for this project. If the monks support the idea of a landfill, he is sure that villagers will also support the idea because of the respect that villagers have for the monks.

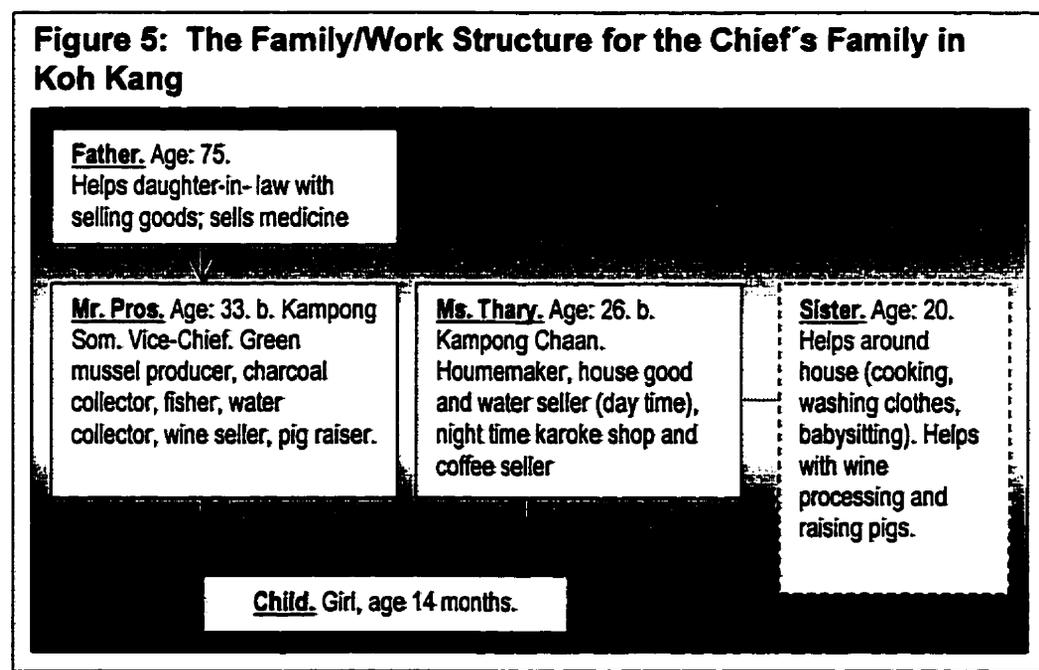
Tha has discussed the issue of abundant charcoal production within Koh Sralao with the District Chief, who suggested that Tha has the power to stop

illegal activities; however, Tha has not managed to stop illegal production. Charcoal producers believe that only the police can stop illegal charcoal practices and Tha is hesitant in approaching the police. Tha has spent some time discussing issues of environmental protection with villagers but finds that the police, who support illegal activities, have more power than he does and that villagers are not so interested to hear what he has to say.

Tha is certainly aware of the environmental problems facing PKWS; however, charcoal activities continue to increase in Koh Sralao. The local police, for some reason, exert a great deal of power and are supporting these activities whereas, it appears that Tha holds less power.

V.2.4 KOH KANG VILLAGE

Pros and Thary live in the center of Koh Kang village in a large, tin house with a concrete floor. Their house also acts as a village meeting place and is the local karaoke and coffee bar. The family owns a few chickens, and pigs are raised in a pen near the house. They sell goods in a wooden stall opposite their home. A large, concrete water tank is found behind the house for water storage. Pros became Vice-Chief of Koh Kang in 1993. Pros works with the Department of Environment more than the chief who is often away in Thailand.



I spent a day with Pros and Thary and their family. The family welcomed me into their home and all members of the family actively participated in the various dialogues. Perhaps because Thary was my age, she was comfortable in speaking with me, as was her sister. We shared a meal together, danced together and spoke of family life in Koh Kang.

Pros and Thary are actively involved in various economic activities. Pros has tried out a variety of different occupations over the years and is constantly searching for new opportunities and adapting to market conditions. In fact, Pros has hired five laborers to work with him.

Pros harvests green mussels and sells the mussels as feed to the local shrimp farm. Unfortunately for Pros, the shrimp farm is not operating at capacity and he can only sell 25% of his stock.

Pros has two large boats: one is used to export charcoal and the other is used for fishing. Pros exports 6 tons of charcoal 5 - 6 times per month to Klong Son market in Thailand. This trip takes 3.5 h one way. Pros has a special relationship with Checkpoint and does not have to pay many unofficial taxes for charcoal exportation; in return, Pros helps out with any Department of Environment initiatives that require either himself or community members. Pros's fishing boat was used, until recently, to export logs for the military. However, his boat was not large enough so the military no longer rented it out. So Pros outfitted his boat to fish short-body mackerel and crabs.

Thary is responsible for water selling activities, which is especially busy during the dry season when there is a water shortage in Koh Kang. Pros and Thary have a holding tank and Pros or one of his laborers collects the water from a nearby village. Also, Thary and/or her sister take turns selling a variety of goods, depending on what Pros has picked up in Thailand. Since the family also owns a karaoke machine, they sometimes, in the evenings, run a karaoke bar although when they have enough money they do not do this.

Various members of the family and the laborers take care of the pig raising and the wine processing. They never make enough wine to meet local

demands. Pig raising is not so successful for the family as they do not have any technical knowledge. Still they are learning.

Pros and Thary's history together indicate the variety of jobs that both have done over their time in Koh Kang. Both came from other provinces to Koh Kang in the late 1980's. Their family is one of the wealthiest families in the

Table 7: Pros and Thary's Family History

Year	Pros and Thary's History
1988	Pros comes to Koh Kang; fisher.
1989	Thary comes to Koh Kang; charcoal worker; food processor.
1990	Pros and Thary get married; Pros is the manager of 7 charcoal kilns.
1993	Pros becomes the Vice-Chief of Koh Kang Village; charcoal kilns destroyed in Koh Kang Village.
1994	Thary's sister comes to live with her and Pros; Pros is a speed boat runner from Tacklong and Dungklong and Sre Ambel to Tmal Boun.
1996	Pros's father comes to Koh Kang; Pros begins green mussel culture, Thary sells wholesale goods from home.
1997	Daughter is born; begin selling water, processing wine, raising pigs; buys a big fishing boat.
1998	Begins fishing.

village, although in Koh Kang wealth is a relative concept. For example, Pros and Thary do not have enough money to leave the village to visit their families in other provinces.

ENVIRONMENTAL THOUGHTS

Both Pros and Thary are aware that their village has a lot of garbage in it, and that not everyone takes care of their houses. Both feel that villagers, in general, do not do much to take care of their environment. Pros and the Chief of Koh Kang know about the environment, the importance of mangroves and of keeping a clean house. In fact, Pros believes that because he now only operates one charcoal kiln rather than seven kilns, he is helping to protect the mangroves. Pros does not see charcoal exportation as being harmful to the environment.

Pros says it is difficult to call the people to replant mangroves or to do any other environmental activities as their level of knowledge is poor. However, Pros does not feel that he can tell villagers what to do or how to run either their

homes or their economic activities. This is a poor village, and for many villagers charcoal production is the only option available to earn a livelihood. Families are trying to survive and many do not have time to consider their environment because they are trying to make ends meet. Moreover, both villagers and Pros are not necessarily interested in undertaking environmental protection measures.

4.2.5 THE FOUR CHIEFS

Each village chief held a different local knowledge base and a different perspective with regards to mangrove management. However, in all cases mangrove protection measures are linked to local knowledge, leadership role models (either pro environment or pro resource extraction) and the level of connection held with the local environment. Although I do not understand the various authority positions held at the local level, I suspect that chiefs can exert a great deal of power when, and if, they want to.

With the exception of Toul Kaki, chiefs were more interested in the short-term gain found from illegal resource extraction measures. However, this is influenced by the length of time a chief has lived in PKWS and their connection to the area. For example, the chief in Koh Sralao has lived in the area for a long time and I sensed that he understood a lot about the environment and the benefits of mangrove protection. Perhaps working with local chiefs to increase their environmental ethic would be one place to begin in working towards mangrove protection measures.

VI. ANALYSIS OF THE SITUATION WITHIN PKWS

Since the KR regime, people have been attracted into PKWS because of the rumored abundance of resources. As one newcomer who came after UNTAC, 1993, explained,

I came here because I heard that there were many trees and fish and that it is easy to make money.

As the Khmer Rouge border activities in Koh Kong have subsided, this area becomes even more attractive for potential fishers and charcoal producers. Koh Kong is known in Cambodia for high levels of exploitation, including resource exploitation. Given the isolated nature of Koh Kong province, there is an abundance of resources left here in comparison to other parts of Cambodia. However, the ability of communities to organize themselves for resource protection greatly depends upon their organizational skills (Legerwood, 1998). With the weak capacity of government to enforce resource protection, one option is local community control of resource exploitation.

It is difficult to provide an analysis of villages within PKWS considering the limited village-level information available for PKWS, the limited length of field research and the researcher's own naivete within both the culture and the research methods used. Generalizations do little justice in explaining this complex situation and in making recommendations for resource management measures. Many players are interested in utilizing PKWS's resources, and each player has her/his own agenda. In this section, I have attempted to draw upon personal observations and examine significant trends that I perceived within PKWS.

VI.1 NET IN-MIGRATION INTO PKWS

Each village has faced an increase in population. Some chiefs, elders and villagers were quite specific about numbers and when their population had increased, others could not be as specific suggesting that population had been steadily increasing especially since UNTAC. The following population statistics

were gathered during group interviews and through discussions with each village and commune chief. There are no official census statistics held in Koh Kong province. Examining population trends suggests that there are different growth rates in the villages within PKWS. Consider the following data:

Figure 6: Population Changes in Peam Krasaop Wildlife Sanctuary

Year	Toul Kaki	Koh Kapic	Koh Sralao	Koh Kang
1970	90 families	More than in 1998	100 families	
1975 KR				
1979/81	7 families	50-70 families	27-40 families	
1985	40 families		70 families	20-30 families
1990	50 families	250 families	140 families	120 families
1995	60-70 families		220 families	120 families
1998	95 families	590 families	303 families	120 families

While these statistics are rough estimates of population data, such numbers do indicate approximately when people came into each village. Overall, these figures indicate that net in-migration into the area is a factor affecting all communities. Indeed, Koh Kang emerged as a charcoal village in the late 1980's as charcoal production became more popular. Considering how few pre-KR families returned to Toul Kaki, Koh Kapic and Koh Sralao in 1979, each village has changed significantly in composition and population over the past two decades.

In Toul Kaki the population has only recently returned to the numbers that lived in this village during Sihanouk. This village has a low population with much land; abandoned rice fields from KR days exist and there is room for newcomers wanting to rice farm. I am not sure specifically why the population has increased since UNTAC except that this is a reflection of the over-all in-migration into PKWS. Many newcomers left rice fields behind and are not interested in rice farming.

What stands out in both Koh Kapic and Koh Sralao is that both villages have faced significant population increases over the past two decades and that this population increase continues.

For villagers, elders and the village chief in Koh Kopic it was difficult to express when villagers had settled into Koh Kopic. It is difficult for a newcomer to learn the history of Koh Kopic because this is a large village and few elders returned to Koh Kopic after the KR. Local knowledge is difficult to transmit and is not necessarily relevant. Also, the village and commune chiefs who often hold such knowledge have changed a number of times throughout the past two decades and are all presently recent newcomers to Koh Kopic.

In Koh Sralao there are more people now than during any other time period; and, 14 new families came in the fall of 1998 having to build their new houses over the water because of the lack of land available in Koh Sralao.

The situation in Koh Kang is different. This charcoal village has had a steady population since 1990. Villagers, in Koh Kang and elsewhere, consider Koh Kang to be poorer than other villages and less desirable to live in. Moreover, many destroyed charcoal kilns still stand in the village and are a sign of how this village used to prosper. Most villagers cannot afford to leave the area and are seriously in-debt from former charcoal production.

VI.2 CHANGES IN RESOURCES

Chiefs, elders and villagers all indicated that mangrove resources have significantly decreased over time. As the population and amount of money used in villages has increased, there has been significantly less mangrove trees or fish species and charcoal activities have continued to increase. Villagers drew an historical resource transect representing their impression of the decline of resources. Village groups only went back in time as far as they were comfortable.

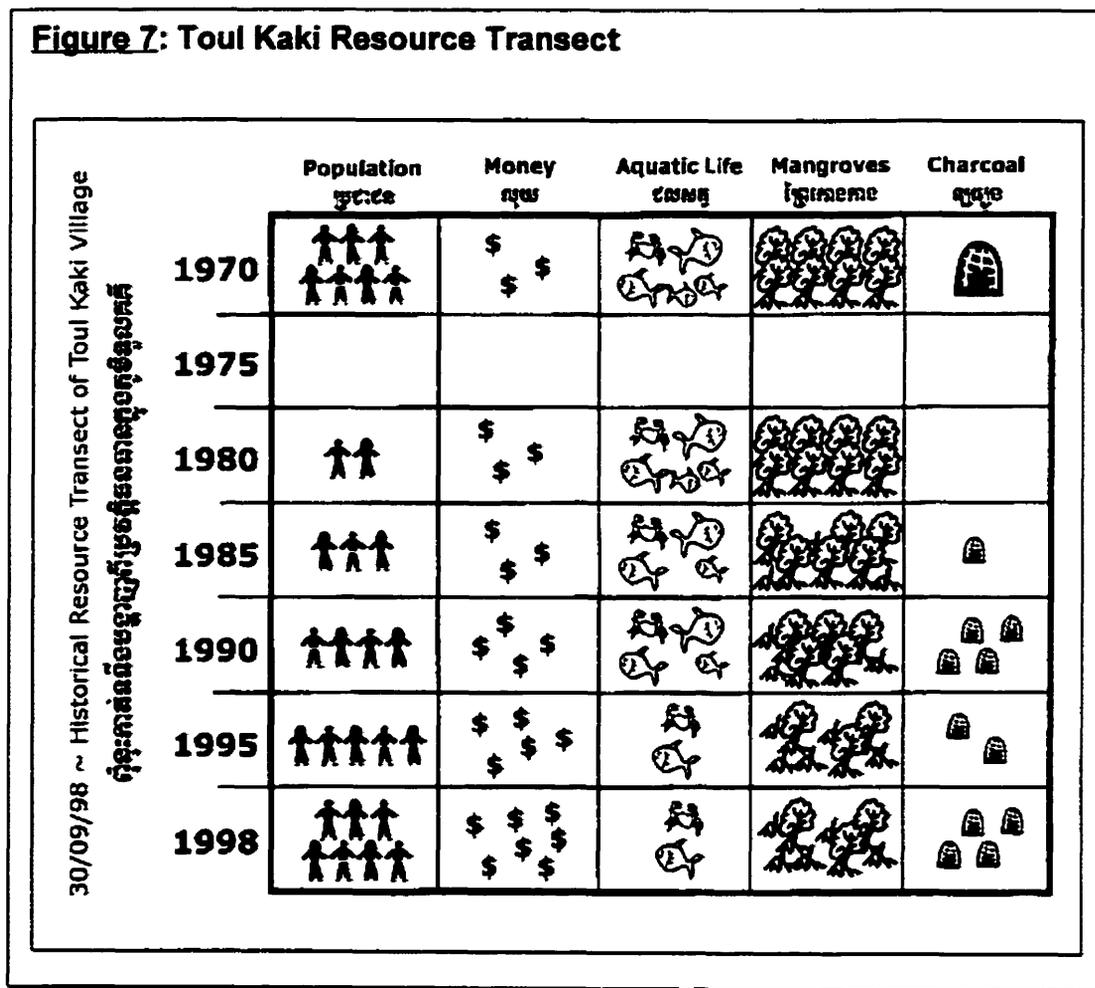
This historical transect exercise was useful because it allowed groups to first discuss the changes in their resources and then to illustrate their perception of resource depletion pictorially. Whether people have lived in the villages for a few years or for a long time, people always suggested that there were less resources than before, whatever time frame before was. Elders, village chiefs

and other villagers all spoke of this resource decline: this resource decline is an undisputed fact.

What follows are four computer-simulated village-level resource transects. The original resource transects, in Cambodia, were written on large sheets of papers with markers. The transects were then re-copied onto smaller sheets of paper and onto the computer.

Toul Kaki's historical transect illustrates a consistent population increase,

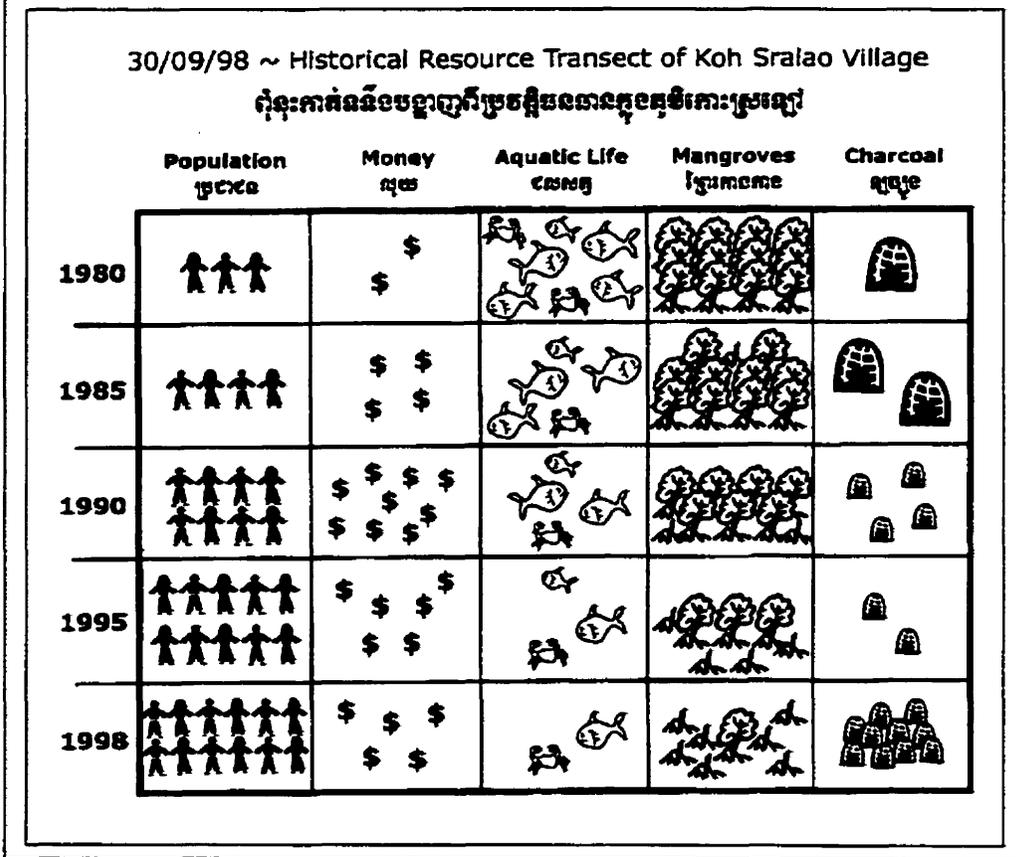
Figure 7: Toul Kaki Resource Transect



only returning to pre-KR numbers in 1998. More money is available from resource extraction, which villagers indicate is because recent newcomers into Toul Kaki rely on mangrove resources for their income rather than rice farming. Fish and mangrove species have declined since 1990 and charcoal production, while never intense within or near Toul Kaki, has fluctuated. Charcoal production

Only recently has there been a decline in the money that one can make from various resource extraction methods in Koh Kopic. Although villagers believe that fish species have declined, they did not seem to think that the fish species had declined in the significant way other villages suggested. Is this because of Koh Kopic's proximity to the ocean? However, the significant decrease in mangrove species was noted. This makes sense, considering Koh Kopic stream is close to this village and has been ravaged over the past two years. Villagers talked about the increase in charcoal use, although from what I understood charcoal use was happening outside the village not directly in the village.

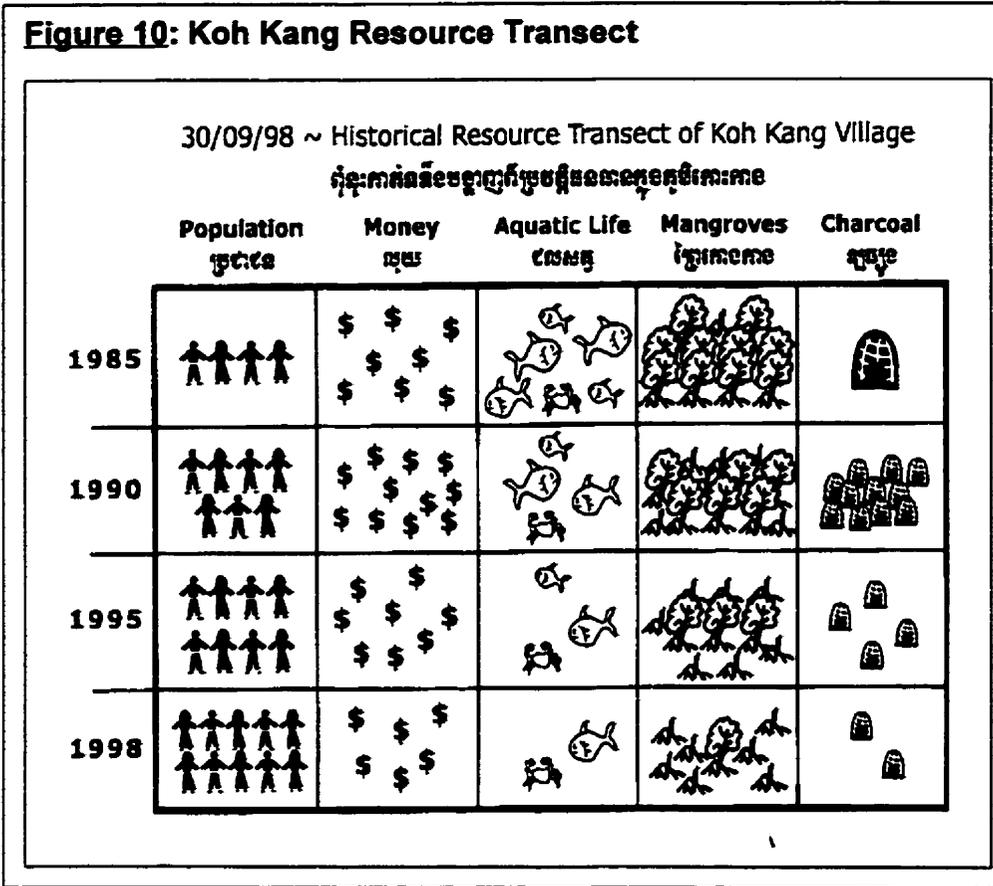
Figure 9: Resource Transect for Koh Sralao Village



The historical transect of Koh Sralao indicates a continuous, rapid population increase. Resource extraction was more profitable in 1990 and as both mangrove species and fish species began to decline so has the ability for villagers to profit from the resources. Charcoal production directly in Koh Sralao

has fluctuated, depending upon when the Department of Environment has enforced anti-charcoal regulation in the village. Charcoal use is prominent in Koh Sralao.

In Koh Kang, the historical transect indicates that the population has



steadily increased. It is interesting that the chief indicated a steady number of people in Koh Kang since 1990 whereas villagers perceived that the population was steadily increasing. Either way, people made the most profit from resources in 1990 when charcoal use in Koh Kang was most abundant. By 1995 there was significantly less: charcoal production directly in Koh Kang; aquatic life; and mangrove species.

VI.2.1 VILLAGE UNDERSTANDING OF RESOURCE DEGRADATION

Although villagers are aware that there are less resources now than ever before, some villagers have a limited understanding of why this is. As one elder commented:

Everything has gone away: there are less fish, birds and trees. I don't know why but I just want it to be like before.

The connection between cutting mangrove trees for charcoal, and thereby losing significant fish habitat is not always made. Also, a number of villagers indicated to me that resource extraction was normal and that villagers had always sustained their livelihood in this manner.

When all the trees are gone, they will grow back. And if they do not, then I will have to leave.

Survival on a daily basis is difficult in PKWS. This makes long-term planning seem irrelevant. Again, one of the many effects of the KR regime is the need to focus on immediate, day to day things rather than planning for an uncertain future (Osborne *et al*, 1997).

Having suggested this, I think that for those villagers with a connection to the area or with an interest in staying in PKWS for the long-term there was an appeal to thinking about the future of the area. This was evident to me when three elders, on different occasions, suggested that school children needed to be taught the importance of mangroves and that village chiefs needed to make sure that villagers, especially recent newcomers, understood that mangrove trees are important.

An area where strong local knowledge existed was with those few men who had fished in the area since Sihanouk times. In Koh Kapic, Koh Sralao and Toul Kaki several people shared detailed knowledge regarding the changes in fish species, eating habits and the ultimate decline of the mangrove fisheries. Although the nature of my research was not to examine in-depth aquatic-life found in PKWS, I was interested in the local knowledge that fishers held regarding changes in species caught over time. There has been a decline in the

abundance of aquatic life: some fish species are more difficult to find, and a few species have become rare.

One elder/chief from Peam Krasaop was able to remember and describe three fish species that he had not seen since Sihanouk times. He remembered the Thai name for these fish and could not find them in any Thai fish book that he looked at. Definitely this warrants further investigation. Fishers designated fish species to illustrate the differences in fish species caught during Sihanouk and caught in 1998, see Appendix B.

Many of the most common fish caught today are the same as those caught during Sihanouk period. However, villagers indicate that some species have become quite difficult to catch and that taste preferences have adapted with these changes. Again, this illustrates the adaptability of villagers given resource depletion or changes in species abundance.

In terms of mangrove species use, it was difficult to access this information. Although direct questions regarding species uses and changes in species were asked, and indirect methods such as transect walks via boat through the mangroves were tried, only one elder from Toul Kaki suggested that:

my mother used to sell a red pigment dye that she got from a mangrove species to Phnom Penh. We used to get honey from the mangroves and there was some medicine that my mother used to use. I don't remember for what but she used it for me when I was sick.

This elder, who was also a village chief, was known to hold vast environmental knowledge amongst other chiefs and elders. Discussions with him indicated that these local traditions had eroded by the beginning of Sihanouk (1953).

During Sihanouk the environment was government controlled, between the DFFH and village chiefs. Certainly the institutional arrangements that governed mangrove management have changed. Government officials no longer necessarily hold the environmental awareness or command respect to ensure that mangroves are managed sustainably.

VL.2.2 TOUL KAKI: A UNIQUE MANAGEMENT SYSTEM

In Toul Kaki it struck me that elders, villagers and especially village and commune chiefs understood more about the ecosystem. Elders were concerned for future generations and wanted to make sure that there were enough trees left for the fish to swim in so that their children could eat. The village and commune chiefs could explain why mangrove trees are important to protect both for ecological reasons and for livelihood reasons. Both the commune chief and vice-chief held vast local knowledge. It was these two men that decided to implement the mangrove protection system now in place in Toul Kaki. The commune Chief commented:

Replanting mangroves is not a good solution, they do not always grow back. We have to limit the number of trees that are cut. Mangroves provide a good barrier from the ocean, provide a place for fish and birds to live and are important for the environment.

Transmission of local knowledge has been possible in Toul Kaki. There is a small population, the chiefs all lived in the area prior to the KR and had worked with the DFFH to control mangrove cutting. The idea of resource conservation is not new to these chiefs and they are in a position of authority to implement such protection measures.

In a sense, the current management situation in Toul Kaki reflects the authoritarian management regime found in PKWS during Sihanouk. Villagers work with their chiefs and the chiefs work with the commune chiefs to protect the environment. The commune chiefs hold authority in the village, and can instigate measures that will protect the environment. The level of environmental awareness is high and chiefs can use their position to protect mangrove trees and to instigate conservation measures. Of course, for some reason the police and the Military are either not active in Toul Kaki or respect the protection measures taken by commune chiefs and this makes resource management far easier.

VI.3 WHO IS RESPONSIBLE FOR MANGROVE PROTECTION?

Although all villagers amongst the four villages agreed that mangrove species were declining at a rapid rate, not all villagers were necessarily interested in stopping this resource decline. Some villagers argued that resources would continue to diminish until all the fish and mangrove trees were gone. For other villagers, there was a belief that village chiefs are responsible to suggest mangrove protection mechanisms. Yet other villagers felt personal responsibility towards mangrove conservation. This concept of taking village-level responsibility for mangrove protection varied throughout each village and also between villages. Village views differed as did the attitude of village chiefs. However, there is some link between the attitude of the chief and the attitude of villagers towards the environment. This idea requires further exploration.

Interestingly, chiefs, elders and villagers from Toul Kaki all indicated to me that the rapid cutting of Koh Kapic stream would never have happened near Toul Kaki. People believe that they could have prevented this environmental travesty from happening. Villagers and elders both pointed to the strong role of the chief in a village, and the chiefs agreed that it was their role to prevent such degradation. One chief said,

It is up to me and my commune chiefs to take care of the future generations. I cannot take bribe money as money will not provide for my grand-children.

A strong environmental ethic persists in Toul Kaki. Moreover, it was in Toul Kaki that a number of elders mocked the idea of PKWS really being a protected area or being a real Wildlife Sanctuary. They suggested to me that in previous times the area had been filled with many different animals; now however most of these animals were gone.

As already stated, Toul Kaki is a unique village within PKWS. This village is small in number, a large number of original villagers returned to the area, chiefs and commune chiefs are long connected to the area and villagers have other livelihood options than fishing.

In Koh Kapic, there were two or three elders from which information could be drawn upon for understanding the past. This village held the largest

population of the four villages that I worked in, so obviously the transfer of information is difficult. Both commune and district chief, who live in Koh Kaptic, were rumored to actively support charcoal production and logging activities. Quietly, villagers confided about the association that the district chief held with the military. However, now that the district chief has been replaced there might be opportunities to limit the amount of charcoal production, logging and explosive fishing found in Koh Kaptic.

In Koh Sralao, the village chief was interested in doing something about waste management, which he saw as something that he could potentially implement with the help of Buddhist monks. Considering the strong-hold of the police in Koh Sralao, stopping illegal charcoal activities is difficult. In addition, the Chief faces a number of barriers in exerting his power: he is Muslim in a mainly Buddhist village and he is poor. However, he is clever, intuitive and interested in working on changes in the village that would benefit everyone.

There are few elders to draw upon regarding TEK in Koh Sralao, and the idea of having to take care of the mangroves is a relatively new concept. Villagers are not necessarily aware that once mangrove species have been degraded they will not automatically grow back. However, I sensed that some villagers were interested in learning more about their environment and potentially changing some of their activities. One storeowner, who also attended the training workshop, said that he had spoken with charcoal kiln owners (remember that kiln owners often rent their kilns to laborers). He suggested that they should:

Stop renting out their charcoal kilns because soon there would be no trees left and that the fish need mangrove trees to swim in if they were to stay around the village.

Although most villagers in Koh Sralao are afraid of the police and do not dare open their mouth in protest, this does not mean that some villagers would not support alternative livelihoods. I suspect this is the case also in Koh Kaptic.

However, in Koh Kang where the village chief and vice-chief thrived from varied resource extraction activities, there was little villager interest to change livelihood methods. As one villager indicated to me:

I need to make as much money as I can from the resources now so that I can maybe save enough money to go back to my home province.

Resource conservation was not a relevant concept in Koh Kang. Villagers were not well connected to PKWS and were seldom aware of the history of the area, often did not have extended family in Koh Kong province and were interested in making enough money to feed their families. There were no elders in Koh Kang to pass on any bits of localized knowledge and, even if there were, I wonder if such information would have been considered relevant. Most villagers were rice farmers in their home provinces and were new to fishing and charcoal production activities. Although it was only hinted at twice, I suspect that many villagers continue to be in-debt from the destruction of all the village charcoal kilns.

It is worth noting that village and commune chiefs in Toul Kaki believe that they can take measures to lessen the illegal activities in the area, whereas other village and commune chiefs suggest that they can do nothing to stop the degradation. The chief from Koh Kapic, when discussing illegal charcoal production and logging activities, commented that,

I have to keep my mouth shut about the problems. The police have more power than I do and there is nothing that I can do, I have no power.

The police and military are active in villages, supporting illegal activities. Those involved in illegal production methods stand to make a profit: the chief makes money for allowing activities to continue; Checkpoint officials are paid an informal tax for allowing charcoal to be exported; and the police and military make money, via villagers and informal taxes, allowing charcoal kilns to remain operational.

VI.4 IMPLICATIONS FOR RESOURCE MANAGEMENT IN PEAM KRASAOP WILDLIFE SANCTUARY

There is a hierarchical command regarding resource extraction in PKWS. Although the Governor of Koh Kong supports the 'mangroves Cambodia' project and charcoal kiln destruction, he also was rumored to pay villagers money for logging extraction in Koh Kapic stream during the 1998 election period. This Governor has now been replaced, and it is not yet known if the new Governor will

or will not support extensive illegal resource extraction activities. There are various power figures in the area: perhaps some of these players might see the long-term monetary benefits of resource protection and, therefore, encourage less illegal harvesting activities!

It is difficult to understand why some players have such uncontested power. However, I sensed for many villagers and chiefs that they did not consider it worthwhile to challenge these power relationships. Koh Kong province is known for its lawlessness. Chiefs found the situation overwhelming and frustrating. For many it made more sense to focus on one's livelihood activities. The police in some villages do control things; on the other hand, villagers generally suggested that their chiefs had power to change things. In the end, everyone suggested someone else had more power than themself.

Yet, amongst these power struggles a few villagers and chiefs have found ways to improve their environment. The chief in Koh Sralao is working on a waste management regime in connection with Buddhist monks and villagers in Toul Kaki have come up with a method for protecting their mangroves. The mangroves near Toul Kaki remain tall and abundant. For some reason, higher officials respect these initiatives and have not interfered in either. Can this system potentially work in other villages? Certainly it is refreshing to see that, in spite of all the negative development literature regarding the lack of community in Cambodia, communities can work together to protect their lands and resources.

To assume that all villagers are interested in mangrove protection measures is unfair. For some newcomers, making a livelihood from mangrove resources is important and once the mangroves are gone they will return to their home provinces; for others, poverty is a vicious circle. Yet, for other villagers there is still a genuine interest in protecting the area. For instance, during the workshop some villagers were genuinely interested in hearing what elders said and actively took part in participatory mapping and transect activities. This, to me, indicates a willingness to learn more about PKWS and shows an interest in the area. Poverty alleviation through sustainable mangrove management

measures must be worked upon in PKWS, and this will only be possible if one is working with those interested in sustainable conservation strategies.

Having made these points, Cambodian communities are complex and I cannot pretend to understand their make-up given that I am an outsider and my fieldwork time was short. Certainly Cambodian relationships appear, on the surface, hierarchical and this runs counter to a participatory development approach. Therefore, research needs to take place within the hierarchy in a manner as participatory as is culturally appropriate. Villagers in Toul Kaki provide an example of where villagers, elders and chiefs work together to protect a valuable resource in a manner that is culturally appropriate. That is, to argue that because Cambodia relationships are hierarchical villagers have no input would be unfair. If mangrove resources are to be protected and alternative livelihoods are to work in PKWS, they must involve local people. Legerwood comments,

If one is a firm believer in the intelligence of the common farmer, the logical explanation is that a refusal to participate is likely linked to a lack of interest on the villager's part, a clear sign that the project was designed without the input or approval of the local population. It likely also reflects the villagers' belief that the only ones to benefit from such a program will be corrupt officials (1998: 142).

Somehow, mangrove protection needs to work both at a village level and at the provincial level if PKWS is to be managed in a sustainable manner.

VII. ANALYSIS OF PARTICIPATION & THE RESEARCH PROCESS

The goals and expected outcomes of a research project often differ significantly from what actually happens, this is particularly true when conducting cross-cultural research (Chambers, 1997). The scope of this thesis was to learn how PRA methodology works in one specific cross-cultural context; and, through this process, to look at resource management practices within PKWS. The process of obtaining information warrants further comment because some interesting observations can be drawn out regarding participation and this research process.

This Master's thesis was not merely about obtaining information from which to draw conclusions but also, equally important, about the process of conducting field research. This was my first opportunity to use PRA in the field and it was fascinating for me to learn which tools worked, which tools did not and to see how the field research actually unfolded and took shape. This helped me in gaining valuable insights into PKWS while ensuring active participation of some community members throughout the research process.

VII.1 AN ANALYSIS OF THE TOOLS USED IN THE FIELD WORK

The purpose of this research was to draw upon TEK for the use of mangrove resources within PKWS. It was known that the area has faced a huge net in-migration in the past two decades (DNCP/MoE, 1995). Bann's (1997) research suggests that only 3 % of the population lived in the area prior to the genocidal Khmer Rouge regime. Although anyone who has lived in an area for a while will have developed some local knowledge, those who have been in an area longer have had a longer tradition from which to draw upon (Lickers, 1998). For these reasons, those elders who had lived in the area prior to the KR were sought out. Elders were chosen because they would have been adults during the 1960's and potentially could have been involved in local management regimes, had any existed (we did not know about management during Sihanouk

when we designed the research).

The various PRA tools used in the field have already been mentioned in the Methodology section of this thesis and alluded to throughout the Analysis of PKWS chapter. The following section will comment and analyze how historical narratives, historical resource transects, historical resource mapping and family portraits were used within this research process.

VII.1.1 HISTORICAL NARRATIVES

HOW THIS TOOL WORKED

Using a semi-structured interview format, the historical narrative enabled for both general and specific discussions surrounding TEK pertaining to mangrove resources. Key informants in this activity included village elders and/or village chiefs. Younger villagers also listened, learned and participated in these discussions therefore ensuring an inter-generational transfer of information.

The historical narrative was a useful entry point into villages. For those elders who held a long-time connection to PKWS, this was a chance for them to share valuable, interesting knowledge which was often not discussed in the village. Elders taught other villagers and myself about village life prior to the KR: all participants (elders and listeners) were able to learn varied historical perspectives of PKWS. Such discussions helped to further shape the research.

Unfortunately, it was difficult to find elders that had lived in PKWS prior to the KR regime. Many elders had arrived in the area with their families after 1980. This illustrates the net in-migration into this part of Cambodia (Lim, 1997). However, within each village there were a few members who had returned to their village after the KR and it was these community members who spent hours discussing and sharing information. Not all elders knew about specific environmental changes, but all offered something to shape perceptions of village life and resource changes that have happened over time.

Both in Toul Kaki and Koh Kapic children and relatives would slowly gather around when an elder was discussing the history of their community. This

resulted in lively discussions surrounding charcoal production and mangrove replantation programs. This information was also useful for the 'mangroves Cambodia' team members since no one knew much about the area prior to the KR.

Villagers in Koh Sralao and Koh Kang were not interested in listening to elders speak. Perhaps in Koh Kang this was, in part, due to the fact that elders held no connection with PKWS. In Koh Sralao, two elders spoke a mix of Thai-Khmer that most villagers could not understand, making the sharing of information difficult. Villagers did not listen to the other elders that I spoke to in Koh Sralao either.

VII.1.2 ENVIRONMENTAL EDUCATION AND COMMUNITY MANAGEMENT OF MANGROVE RESOURCES TRAINING COURSE WORKSHOP, SEPTEMBER 28-30 1998

When the 'mangroves Cambodia' team and myself planned this workshop, we knew that we wanted to involve a cross-section of each community. We faced a real challenge ensuring that women were included. Two of the village chiefs were hesitant to allow young women to travel to Koh Kong town and to stay in the hotel alone without the supervision of their parents. Also, not all team members wanted to pursue the idea of including women; in fact, only when the two national level team members returned to Koh Kong did we pursue the idea of finding a way in which women would be included. In the end, the two chiefs chose to include women and decided that these women had a lot to contribute to the discussions. I am sure that my simple presence, as a woman, also encouraged the idea of greater female participation. Each village included two or three women within the eight villagers who attended the workshop. Once the team embraced the idea of including women, every effort was made to ensure that their voices were also heard in the workshop discussions.

Each village chief designated the additional seven villagers besides himself who would attend the workshop, except in the case where the team made a specific request. Working in this manner was unavoidable and culturally appropriate. This cross-section of the community, in terms of occupation, age and sex, was important for discussions. However, the fact that all villagers knew

the chief meant that those with a good standing in the village were represented rather than extremely poor villagers or outsiders within the community.

There was an initial hesitancy for villagers to attend a government run workshop because of the history of government intervention in Cambodia. People were distrustful and scared; the horrific genocidal regime of the Khmer Rouge took place a mere twenty years earlier. From what I could gather, our workshop was the first community-level workshop to be held in Koh Kong town involving village-level participants and creating a formal forum for villagers to discuss various environmental issues.

What became apparent during the workshop was that the concept of the environment (mangroves, fish, villages) being inter-connected was new for some chiefs, elders and villagers. The link between cutting mangrove trees and losing fish habitat or poor sanitation affecting village health had not necessarily been made. That is, actions in one area do affect other areas. Was the reason that people appeared non-interested in environmental changes poor education or the way in which discussions were framed? Either way, discussions certainly did not interest all people.

HISTORICAL MAPPING

How this tool worked

An entire afternoon was allotted for this activity. Villagers were asked to first draw a map of their village and surrounding environment in 1998. When these maps were completed, the villagers were then asked to draw a village map for as far back as they could remember, noting where natural resources i.e. mangroves, aquatic species had been. This tool was an excellent exercise for elders to share their local knowledge.

This exercise took time, especially drawing the historical map. Elders and village chiefs were not always sure exactly where mangroves or charcoal kilns had been and were hesitant to write things on the map if they were unsure. Within each village there was a dialogue initiated by one or two elders with input from villagers. Interestingly, many of the younger villagers or newcomers did not

have a concept of what the village environment was like prior to the KR. The exercise was approached as the beginning of documenting some local environmental history and everyone appeared excited by this process.

Historical mapping sparked an exchange of information, both within the village and then between villages. The final hour was spent discussing the historical maps in a larger group discussion, facilitated by elders. People were interested in discussing what villages had looked like prior to the KR, where charcoal activity had taken place and what livelihoods people had practiced. The elders and/or village chiefs were the key transmitters of local knowledge and villagers were very receptive towards these discussions.

HISTORICAL TRANSECT

How this tool worked

Two hours were allotted for the Historical Transect activity on the last day of the workshop. The transect was designed in five-year intervals and compared population, income, aquatic abundance, mangrove abundance and charcoal activity within each village. The exercise was pictorial in nature and it was easily followed; in fact, this activity took the least amount of facilitation of any activity undertaken during the workshop. Participants had already been involved in discussions regarding TEK and changes in their village environment so the concept of thinking of what the village environment had been like was already introduced.

This activity generated lengthy discussions, with people commenting on the amount of mangrove trees cut, the growing number of charcoal kilns and the decrease in aquatic life. By creating a pictorial chart, a vivid picture emerged regarding environmental changes over time. Interestingly, villagers argued that this was not only a result of increased population: Toul Kaki holds the same population as before the KR and Koh Kang's population has been steady since 1990. All in all, this exercise was an appropriate exercise allowing for final discussions around environmental change and considering why mangrove trees and aquatic species are important to conserve.

VII.1.3 FAMILY PORTRAITS, OCTOBER 2-15

How this tool worked

After the workshop, a family portrait was generated with each village chief and his family using a variety of tools including relationship mapping; seasonal calendars; family histories and group discussions. This activity was undertaken because elders had suggested that there now were weak management systems within villages, and this was contributing to the environmental demise in PKWS. However, village chiefs exert some authority within their village, and I wondered if there could be a connection with the level of environmental knowledge held by a chief and the level of mangrove protection within the village area.

This tool enabled one to take the necessary time to gather in-depth information. Spending an entire day with each family allowed for breaks, fun time and also for serious discussion and contemplation. The variety of activities that one can use when generating a family portrait ensures creativity, interest and using the culturally appropriate tools. Family portraits are excellent, although time-consuming and draining for everyone involved. I would have liked to have facilitated the same activities with charcoal owners and fishers.

Through the generation of the family portraits, it became clear that chiefs do hold different knowledge bases. For example, while one chief showed strong local knowledge within PKWS, another chief knew how to prosper economically from the various resources. Some chiefs knew more about fish than mangrove species, others knew more about charcoal production and exportation. Also, there were different interest levels in environmental protection.

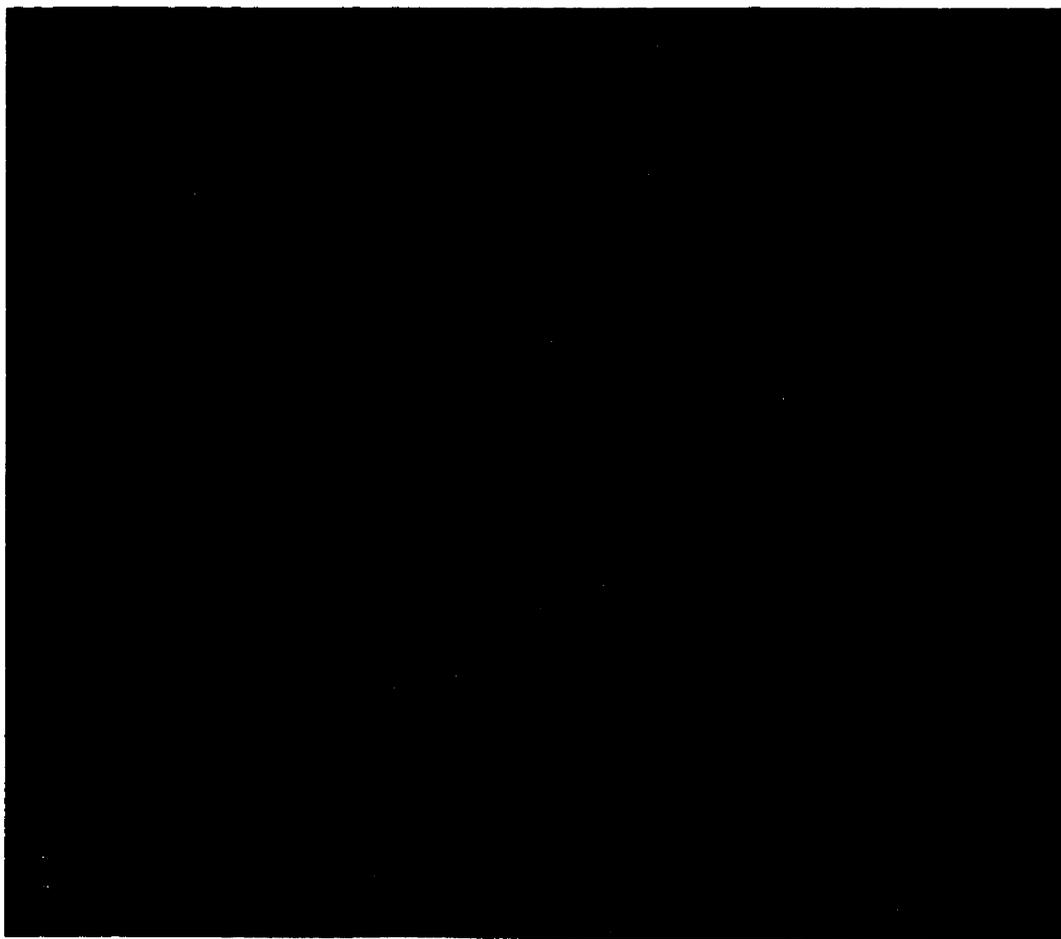
Only in Toul Kaki is there an active interest in environmental management that is practiced in reality. The environmental viewpoint of the chief must influence villagers. For instance, if a chief does not support environmental initiatives it can be difficult for villagers to initiate significant changes. These findings require further analysis and consideration.

VII.2 INTERPRETATION OF DATA

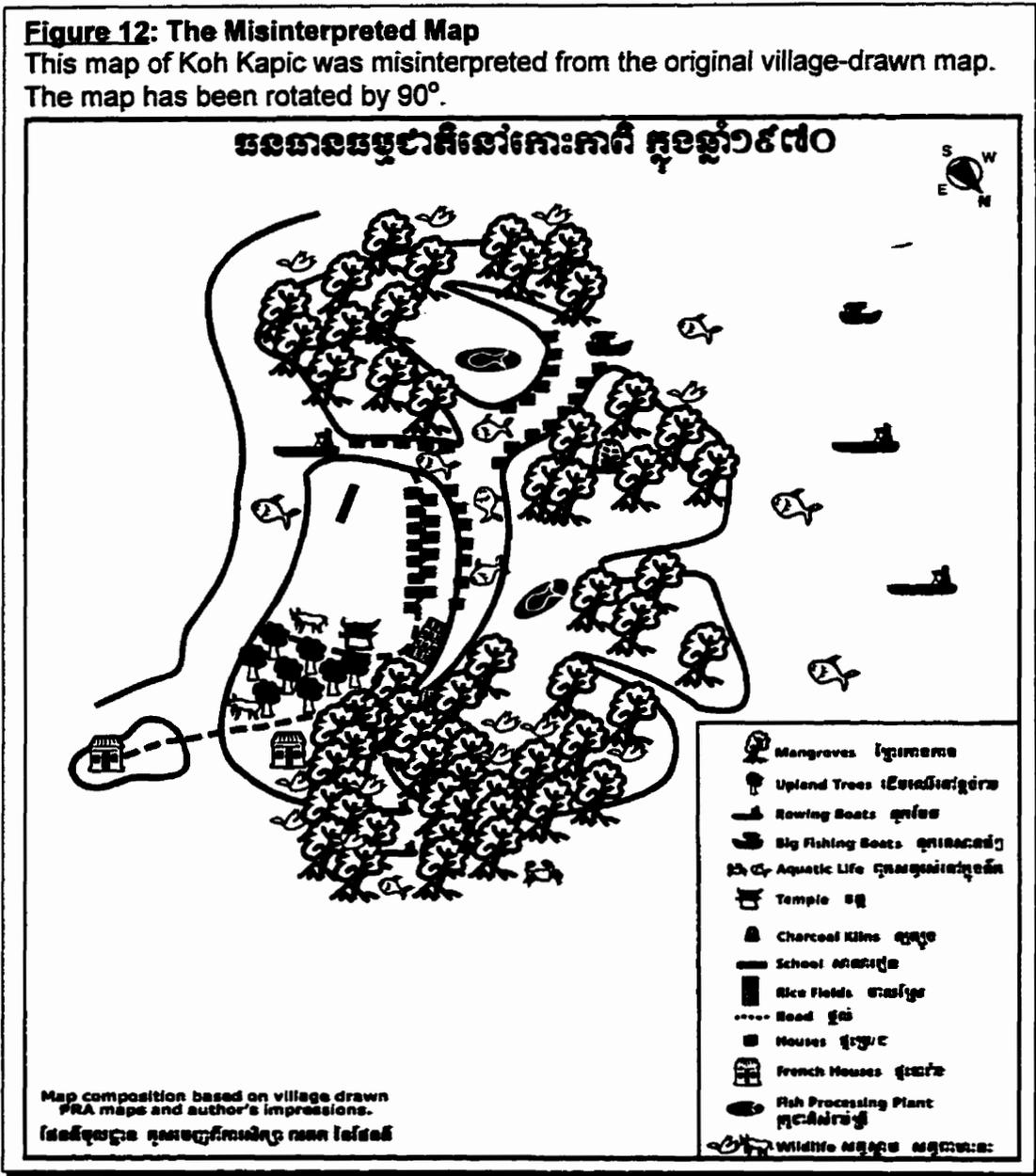
When researchers translate, transcribe and re-create pictorial information there is room for misinterpretation of village-generated data. Pictorial exercises done in the workshop or in villages were left with the 'mangroves Cambodia' team for future reference (ideally this data should have been left in the village). Because drawings were done on large pieces of paper, I needed to scale down pictures for future reference and analysis. Although I generally transferred this

Figure 11: Village Drawn Map of Koh Kopic, 1970

This original village map shows the ocean on the left hand side of the map. This information was mis-interpreted leading to confusion and a confusing computer-generated map.



information myself, I also worked with the two research assistants in compiling these data. I needed Khmer to be translated into English and found the village-generated maps difficult to interpret. Therefore, I did run into difficulty with the village-drawn resource mapping.



The village maps were re-drawn at a smaller scale by one of the research assistants. For three of the four villages there were no problems with the smaller scale maps, however, for Koh Kopic a serious misinterpretation of the village-drawn map occurred. This resulted in the map of Koh Kopic being rotated approximately 90 degrees with respect to north-south. However, because I did not catch this mistake in the scaling down phase, I thought that either villagers had found it difficult to draw the shape of their village or something had been misinterpreted with translation. While I had returned to the village for further clarification and discussed this with the 'mangroves Cambodia' team, we were all

perplexed. I should have examined and discussed the original map more closely.

My thinking in producing a scaled-down version of these maps, besides for analytical purposes, was to produce a computer-generated model (from the scaled-down drawing) for each village map. I wanted to leave this series of maps in each village. My motivation at the time was two-fold: I felt that this village-generated data was something that I could give back to villagers in a different form and I hoped that this would allow for further discussions regarding resource changes in PKWS. Moreover, this exercise helped me to understand villager perceptions of declining resources over time. Both the 'mangroves Cambodia' team and village chiefs supported this idea. My intention was not to re-create village maps on the computer that were then more 'valid' or more 'professional' than village-drawn maps although, in retrospect, I can see how this action could suggest this.

I, personally, found this process fascinating and learned a lot from making this mistake. It made me realize the persistence it takes to gather information and to correctly interpret it. I should have worked more closely with the original maps rather than the scaled down version that I had assumed to be 'correct'. Definitely the map was misinterpreted, in part, because I do not read Khmer and relied on someone else to translate information for me. Interestingly, I felt that the team was frustrated that the maps for Koh Kaptic were 'wrong' and could not be used and I sensed that they did not see the benefit in this learning process in the same way as I did. Definitely it was frustrating to realize that a mistake had been made early on and had persisted throughout the process of generating a computer map especially considering how difficult it is to draw maps on the computer.

VII.3 AN ANALYSIS OF THE RESEARCH PROCESS

VII.3.1 PARTICIPATION IN AN AUTHORITARIAN CONTEXT

The purpose of PRA is to engage and empower those involved in the learning process: the poor, the peripheral, the voiceless and the untrained (Chambers, 1994b). This research was designed to work with elders and other

community members holding strong local environmental knowledge, thereby excluding other villagers. Moreover, most villagers who participated in various aspects of the research did so through the recommendation of the village chief. Ironically, this research did little to work with and include the most marginalized members of each community. The following section looks at some of the issues brought up during the research process. This critical reflection is important if the researcher is to build upon skills and learn from mistakes made within the research process.

VII.3.2 TIME TO BUILD RELATIONSHIPS

Time was needed to establish the necessary contacts in order to work at the village-level. Had the research team not worked in close connection with each village chief, access into the village would have been delayed or participants would have been uncooperative. When doing community-based research it is important to have local support for the research (Maguire, 1987; Burkey, 1993). In retrospect, the time commitment necessary to establish contacts and to work through the appropriate hierarchy was not anticipated; for sure a longer field time would have accessed more community members. Fortunately, these connections can be built upon by the 'mangroves Cambodia' team. Given the time constraints and the hierarchy that one must adhere to when conducting research within Cambodia, it is questionable if the research could have been more participatory in nature.

VII.3.3 FINDING ELDERS

Considering Cambodia's recent political turbulence and social upheaval, it is hardly surprising that long-term residents in PKWS were difficult to find. Within this region villagers had, traditionally, held long-established kinship and friendship connections with neighboring villages in Thailand. Therefore, throughout the KR atrocity many villagers escaped into Thailand. Also, many DFFH officials working in Koh Kong, or other parts of Cambodia for that matter, were killed during the KR because the KR specifically targeted elites, intellectuals

and government officials (Chandler, 1992). Those officials that survived would not have found a job in the newly established Vietnamese Regime of 1979. The few original families that did return were small in comparison to migratory population attracted to Koh Kong. The scope of the research was limiting because so few elders had lived in the area prior to the KR.

I conducted oral narratives with elders: this tool was my entry point into the village. Before talking with elders protocol demanded that I meet the commune chief to exchange greetings, the village chief and then a recommended elder. Oral histories were facilitated with all commune and village chiefs regardless of how long the chief had lived in the area. Only in Toul Kaki village had chiefs lived in the area prior to the KR. The chiefs were involved out of respect and to ensure that chiefs would have an understanding of, and were involved in, the research process. The research definitely worked within the village hierarchy.

VII.3.4 GENDER-SENSITIVITY

I had wanted to work in PKWS with a female villager who could provide translation and be simultaneously trained for further work with the 'mangroves Cambodia' team. However, finding anyone, let alone a woman, who spoke English in Koh Kong was difficult. Instead, I chose to work with two male provincial 'mangroves Cambodia' team members and thereby increase the teams' capacity in the field.

What became apparent was that the research assistants were more comfortable working with men than with women, and it was a continuous struggle to encourage discussions with women. This became easier as my Khmer improved and we all (the team, myself, villagers) became more comfortable with our presence in a village. While I could speak of concepts of gender with men in an often all male space besides myself, my female-only interactions were limited. This meant that it was difficult to access women's local knowledge and that women potentially missed out on sharing significant information.

I sensed that women found the research questions somewhat abstract. Perhaps this is because discussions led to changes in resources and the environment outside of the home and village. It is often the men who fish or cut mangrove wood to sell or to make charcoal and, therefore, know specific names of mangrove species, fish, birds and animals. Khmer women have traditionally been homemakers and been in charge of food processing (Legerwood, 1998). In retrospect, I should have paid greater attention to the changes in fish and krill processing over time (Rodda, 1991). Roles continue to be gendered in Cambodia, and the research did not pay enough attention to women's local environmental knowledge.

VII.3.5 WORKING IN CONNECTION WITH AN EXISTING PROJECT

Although there are both benefits and drawbacks for working with an on-going project, this connection was essential in PKWS. Security issues can be tense in Koh Kong, and having a foreigner present in this isolated, 'lawless' province can present problems to local governance. The 'mangroves Cambodia' team has spent time in the area making the appropriate connections and the team ensured that I worked through the suitable channels. Without their knowledge of the local area, this research could not have been conducted.

Initial village-level discussions, while the team and provincial MoE came to understand the research focus, were large because many people were curious about the research. Moreover, the Provincial Chief of Environment insisted on attending village-level discussions; villagers were uncomfortable with such a high-ranking official in their home and this limited what villagers would say regarding government authority and environmental management. It was necessary to tolerate the presence of this official so that the research process was supported. With time, village work was facilitated with only one or two team members. Some of my initial discussions were held again, focusing on one particular aspect that I felt had been difficult to discuss.

Taking a PRA approach ensured that the 'mangroves Cambodia' team and myself could make changes in the research design to incorporate new

learnings. By having a close connection with 'mangroves Cambodia' team, field information was shared and our collective knowledge and understanding of the area significantly increased. This type of capacity building and data sharing is important, especially given the limited amount of micro-level information that is available within Cambodia.

VII.3.6 WORKING WITH GOVERNMENT OFFICIALS AS TRANSLATORS

The numerous benefits of working closely with the 'mangroves Cambodia' team have been highlighted. I was privy to information that I would not have accessed had we not been working so closely and intensively together. Villagers were not comfortable sharing information regarding specific details of government corruption, although they hinted and alluded to these practices. Working with the team helped me to understand what was going on within PKWS in a way that I could not have otherwise and contributed to my larger understanding of the project and resource depletion within PKWS.

However, the downside of this relationship was that team members held different priorities and job requirements depending upon the provincial government department they worked for. For example, the Department of Environment was responsible for destroying any charcoal kilns and curbing all charcoal kiln activity. Therefore, charcoal producers feared and disliked the Department of Environment. This was difficult for the Department of Environment assistant working with me because although he did community development work with the 'mangroves Cambodia' team, at other points he destroyed peoples' livelihoods. This sent conflicting images to villagers regarding the 'mangroves Cambodia' project, my research and left villagers wondering whom they could confide in.

VII.3.7 ACCESS

I lived in Koh Kong town, a half an hour boat ride away from the nearest mangrove fishing village. I was unable to live in the villages supposedly because of security reasons although I suspect the real reason was gender. During the

rainy season (my first month living in Koh Kong) boats could only travel through the mangroves when the waves were minimal. Boat travel was time consuming, limited to daylight hours and expensive; for these reasons, these villages were difficult for me to access.

While two of the four chiefs had hand radios, it was difficult to arrange to meet anyone other than possibly the chief. Villagers were active fishing and farming and held varied schedules depending upon the season and the weather. It was difficult to find people consistently for follow-up information or clarification, especially men who were often away from the home during the day. Villagers had livelihoods to pursue and could not always take time to discuss issues with me, which I understood and respected.

During my last field visit, in November, several elders welcomed me to stay overnight in their homes. I was touched by these offers and truly excited. Hopefully in the future team members will stay in these homes while conducting workshops or spending time in the area. Although there were serious security issues within PKWS, solid local-level relationships have been established allowing the 'mangroves Cambodia' team village-level access previously unheard of.

VII.3.8 LENGTH OF FIELD WORK

The total research time frame in Cambodia was six months, with two months spent living in the field. Therefore, actual field time was, in fact, limited. A six-month time frame for conducting relevant cross-cultural research is short. It takes time for a researcher to gain an understanding of cultural nuances. Because of the unfailing support offered to me from the 'mangroves Cambodia' team, I was able to establish village-level relationships. This would not have happened if I did not have this connection. Moreover, once Department of Environment officials, commune and village chiefs accepted and became interested in the research, they also gave their full support.

Given the short time frame, I felt lucky to be able to carry out the work that I did. I saw enough research projects that were not supported by local

communities, and was fortunate to have Khmer support for the project. Villagers, chiefs and the 'mangroves Cambodia' team all taught me so much; indeed, I learned a lot from my colleagues and from village-level work.

VII.3.9 VILLAGER UNDERSTANDING OF THE RESEARCH OBJECTIVES

One assumption taken, when designing this research, was that villagers held some local knowledge regarding the mangrove environment and, therefore, some chiefs, elders and villagers would be interested in participating in this research process. Although the assumption that people held local knowledge was true, TEK varied depending on time spent in PKWS, age, sex, and occupation. Sometimes the extent of the chiefs' or an elders' TEK was an economic link to resource extraction activities.

Certain villagers were interested in protecting the mangroves or preserving aquatic habitat, others were not. For example, some villagers related to the environment in terms of its economic potential and other villagers took a more ecological perspective on the mangroves. PKWS is not a permanent base for all villagers, and this helps to explain the varied levels of interest in environmental protection measures. Further complicating the issue is that these villages are isolated and poor: daily struggles can take precedence over long term planning for PKWS. Only a few villagers, including the local police and local authorities, actually earn good money from resource extraction activities. Environmental protection measures, for many villagers, elders and chiefs, are considered to be someone else's responsibility.

VII.4 WAS THIS USEFUL PRA RESEARCH?

Although I had done sufficient background reading to understand the nature of PRA research and to know how various tools could potentially work, I had never undertaken this methodological approach in another cultural context. A PRA approach is supposed to enable local people to share, enhance and analyze their knowledge of life conditions; unfortunately, it is questionable how much opportunity there was for local people to adequately analyze and enhance their local knowledge (Burkey, 1993; Selener, 1997). Although there were some

group and workshop discussions whereby villagers compared, contrasted and analyzed their environmental conditions, there were not enough of these kinds of discussions. Still, this research process created a platform, albeit limited, for those villagers involved in the research process to dialogue and to discuss issues.

I had high hopes that this process would build upon the collective consciousness of local environmental knowledge found within a village, however, I suspect that I benefited the most from this process in increasing my: facilitation skills; understanding of cross-cultural research; and comfort level with specific PRA tools. On the other hand, the fact that elders asked me to stay with them suggests that the experience was mutually beneficial. When I left Cambodia, I felt that the best potential product for this research would be for the 'mangroves Cambodia' team and villagers to learn from and use TEK when considering management options for PKWS.

VIII. CONCLUSIONS

VIII.1 RESOURCE MANAGEMENT IN PKWS

We abuse the land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.

Aldo Leopold, 1949

Leopold calls for humankind to foster a culture of love and respect for the land, thereby challenging the dominant economic paradigm that views the environment as something to be bought and sold on the market (1949; Witt & Swann, 1996). When this concept is applied to Cambodia's PKWS, the challenge then becomes one of building upon local environmental knowledge and community wisdom to develop and implement sustainable resource management practices. However, translating this idea into reality is nearly, although not completely, impossible.

Mangrove resources are essential for coastal protection and diversity, socio-cultural well-being of coastal communities, and livelihood potential and incentives (Ruitenbeck, 1992, Masteller, 1997). Mangrove extraction activities practiced in PKWS threaten the existence of this ecosystem and are benefiting few local people. Moreover, these activities only offer short-term livelihoods. Accessing traditional knowledge in PKWS is arduous; many newcomers, chiefs and villagers included, are only interested in the economic benefits offered by illegal resource extraction activities. If sustainable practices are to be implemented in PKWS, a radical overhaul of the established system of resource extraction and exploitation is required.

Given the breakdown of (or lack of) any resource management system in PKWS, finding solutions requires courage, flexibility, vision and steadfast determination. All villagers are touched by the tragic consequences of an unhealthy environment, by the unfair distribution of resources, by increasing corruption and violence or by the alienation that comes from the absence of a

healthy community or leadership. Most leaders, and for that matter villagers, in PKWS still need to be convinced of the long-term benefit of sustainable resource management practices.

VIII.1.1 TAPPING INTO ERODING LOCAL ENVIRONMENTAL KNOWLEDGE

Local knowledge is not necessarily viewed as relevant in PKWS: many newcomers are interested in resource extraction methods for economic gain. Environmental knowledge can be lost naturally when information and methods become modified. Grenier (1998) suggests that this loss is further accelerated by rapid population growth, environmental degradation, development processes, rapid change and international market pressures. When people migrate into an area, and thereby the population increases, it is difficult to transmit and implement local knowledge. In PKWS villagers have few choices in making a livelihood; poverty forces villagers to choose resource extraction techniques that favor short-term economic gain. Sustainable local harvesting techniques might exist but are difficult to find.

Accessing local environmental knowledge in PKWS was difficult because so few community members returned to the area after the KR. As a foreign female researcher, elders, chiefs and villagers chose which information was shared with me. For those community members who participated in this research process, the quantity and quality of environmental knowledge varied depending upon resource-based experiences, age, sex, social status and profession. That is, only a few elders returned to PKWS after the KR and those that did held different knowledge bases: some with an ecological perspective and others with an economic perspective.

Never before have so many people lived in PKWS or have resources become so depleted. Within PKWS over 500 ha of mangrove forests have been cut for shrimp aquaculture, new charcoal villages have been established and existing villages are increasing in size. If this protected area is to remain a unique ecosystem, sustainable livelihood alternatives must be found. There are a few elders and chiefs who know PKWS and hold valuable insights into potential

sustainable resource management practices. If sustainable practices are not implemented, there will soon be no resources or livelihoods for families living in the Wildlife Sanctuary.

VIII.1.2 IN SPITE OF...

Undoubtedly, most villagers and chiefs somehow gain from resource extraction and perhaps resource protection measures are seen as a threat to current livelihood practices. Moreover, I would suggest that there is a hierarchy of benefit from resource extraction activities in PKWS: first the military and local police; then district, commune and village chiefs; and, finally, villagers. Yet, amongst the complex relationships governing resource extraction activities in PKWS, a few elders, chiefs and villagers want to initiate and make changes. The excitement that these community members showed while participating in this research and in sharing knowledge offers hope that communities can begin working towards sustainable resource usage in PKWS.

In spite of Cambodia's turbulent political climate, KR guerilla activity, unequal access to resources and poverty, communities in PKWS continue to adapt and deal with complex situations. In fact, a few community initiatives are already working to curb illegal extraction activities, increase environmental awareness, cleanup garbage and waste and to think about potential solutions that would work in PKWS. Finding alternatives to charcoal production, logging activities or dynamite fishing is difficult for no other resource extraction activity offers such immediate access to cash. However, there is a small movement of chiefs and community members who are concerned about the state of resources in PKWS and are thinking about the future generations who will live in this unique area. Perhaps, as more chiefs recognize and believe that protecting the environment is a shared responsibility, there will be a greater willingness to share in necessary risks to achieve mangrove protection measures.

Appendix 1

PRA PRINCIPLES

Chambers (1997; 1994b) highlights some of the key principles in PRA methodology:

- ✓ A reversal of learning – direct learning from local people;
- ✓ Learning rapidly and progressively - conscious exploration, not following a blueprint;
- ✓ Offsetting biases - listening to villagers, seeking out poorer, less powerful villagers;
- ✓ Optimizing tradeoffs - relating to costs of learning to the usefulness of information;
- ✓ Triangulation - cross-checking; progressive learning from plural investigation;
- ✓ Seeking diversity - learning from exceptions;
- ✓ They do it - facilitator initiates a process of participatory analysis and then sits back or walks away;
- ✓ Self-critical awareness - facilitators critically examine their own behavior and embrace mistakes;
- ✓ Sharing - information is shared between local people and outside facilitators.

Appendix 2

A Time-line Comparison of the 10 most Popular Fish

SIHANOUK (AROUND 1970)		1998	
English Name	Scientific Name	English Name	Scientific Name
Diamond-scaled grey mullet	<i>Liza vaigiensis</i>	Diamond-scale grey mullet	<i>Liza vaigiensis</i>
Spinefoot	<i>Siganus</i> (spp.)	Spinefoot*	<i>Siganus</i> (spp.)
Grouper	<i>Epinephelus tauvina</i>	Grouper	<i>Epinephelus tauvina</i>
Snapper	<i>Lutjanus</i> (spp.)	Snapper	<i>Lutjanus</i> (spp.)
Blue spotted seabass	<i>Plectropmus leopardus</i>	Blue spotted seabass	<i>Plectropmus leopardus</i>
Striped sea catfish	<i>Plotosus anguillaris</i>	Striped sea catfish	<i>Plotosus anguillaris</i>
Giant catfish	<i>Arius thalassinus</i>	Short-body mackerel	<i>Rastrelliger brachysoma</i>
Banana sailfish**	<i>Istiophorus gladius</i>	Spotted half-beak*	<i>Hemirhamphus far</i>
Silver pomfret!	<i>Pampus argenteus</i>	Whip-fin mojarra*	<i>Gerres filamentosus</i>
Black pomfret**	<i>Parastromateus niger</i>	Stingray	<i>Dasyatis</i> (spp.)
Yellow quinn fish	<i>Scomberoides lysan</i>		
Spotted eagle ray	<i>Aetobatus marinari</i>		

* these species were plentiful before but were not so popular for eating. As choices have become more limited, these fish have gained in popularity.

** these fish are very rare nowadays.

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