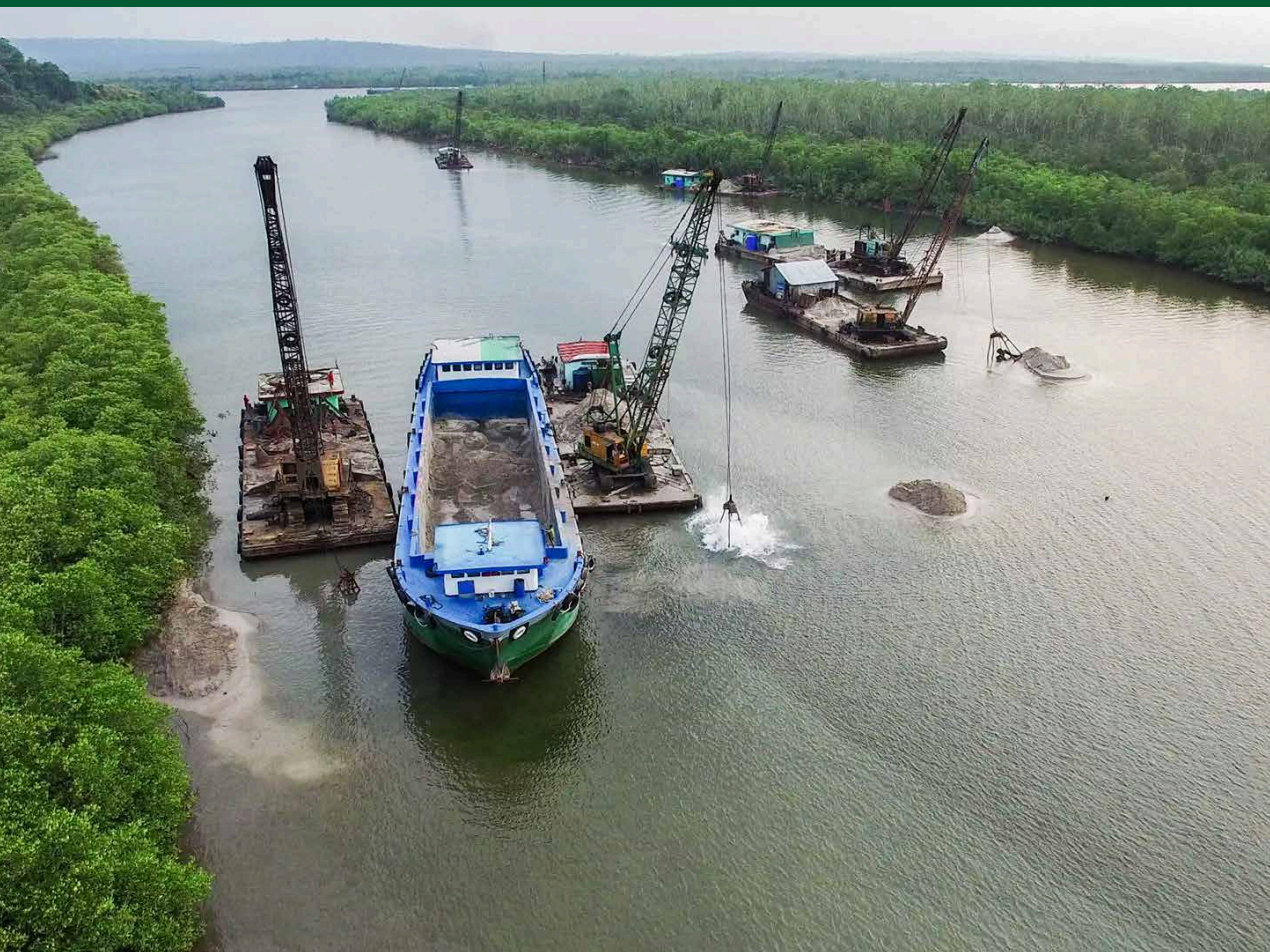


Sand Mining and Villagers' Livelihoods in Prek Angkun, Koh Kong, Cambodia

Sovanny Sreng



Consortium of Development Studies
in Southeast Asia (CDSSEA)

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The Consortium of Development Studies in Southeast Asia has drawn on primary postgraduate research undertaken for theses from the master's programs of Asian Institute of Technology's Master of Science in Gender and Development Studies (MGDS), Chiang Mai University's Master of Arts in Social Science (Development Studies) (MASS); and the Chulalongkorn University Master of Arts in International Development Studies (MAIDS). Scholarships for the students of CDSSEA has been generously provided by the International Development Research Centre (IDRC) of Canada. With a diversity of academic approaches (gender studies, political science, social sciences), the individual works of this collection have in common a focus on the increasing interconnection and regionalization of the five mainland Southeast Asian countries (Myanmar, Thailand, Laos, Cambodia and Vietnam), and examine these exchanges and encounters within the context of the Greater Mekong Sub-region (GMS).

The publication series engages with physical and social mobility, boundary crossing, and the construction of ethnic identities. Within these concerns, the series also addresses issues of social, cultural and environmental sustainability, and the ways in which livelihoods are sustained and transformed in the mainland Southeast Asian sub-region. The series seeks to strike a balance between the experiences of urban and rural life and examine the rich variety of responses and adaptations to regionalization and globalization.

Sand Mining and Villagers' Livelihoods in
Prek Angkun Village of Koh Kong, Cambodia

Sovanny Sreng



The Regional Center for Social Science
and Sustainable Development
Chiang Mai University

Sand Mining and Villagers' Livelihoods in Prek Angkun, Koh Kong, Cambodia

**Consortium of Development Studies in Southeast Asia
(CDSSEA) series**
Volume 5

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Author: Sovanny Sreng
Series Editor: Chayan Vaddhanaphuti
Senior Editorial Adviser: Victor T. King
Publisher: Regional Center for Social Science and Sustainable Development (RCSD)
Faculty of Social Sciences, Chiang Mai University
Tel: +66 (0) 53 943 595-6 Fax: +66 (0) 53 893 279
web: rcsd.soc.cmu.ac.th, e-mail: rcsd@cmu.ac.th

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Contact: Regional Center for Social Science and Sustainable Development (RCSD)
Tel: +66 (0) 53-943595 Fax: +66 (0) 53-893279
web: rcsd.cmu.ac.th, e-mail: rcsd@cmu.ac.th

Series Foreword

The Regional Center for Social Science and Sustainable Development (RCSD) at Chiang Mai University has extended its publication program to include Master's dissertations from The Consortium of Development Studies in Southeast Asia (CDSSEA). The CDSSEA series covers mainland Southeast Asia: Myanmar, Thailand, Cambodia, Laos and Vietnam, and regionalization, development encounters and exchanges within the Greater Mekong Sub-region (GMS).

The CDSSEA program brings together resources and expertise from three of Thailand's leading institutions offering Master's degrees in development studies: Chiang Mai University's Master of Arts in Social Science (Development Studies) (MASS); Chulalongkorn University's Master of Arts in International Development Studies (MAIDS); and the Asian Institute of Technology's Master of Science in Gender and Development Studies (MGDS). Although the Consortium's program focuses on the relationship between development studies and social sciences, each of the programs has a different emphasis. The Chiang Mai degree focuses on social sciences and anthropological perspectives, with research interests in environmental and resource management, food security and local livelihoods, labour migration and trans-border issues, ethnicity and development, health, tourism, and agrarian transitions. Chulalongkorn's program concentrates on the political dimension of development, including democratization, human rights, conflict resolution, international and civil society development organizations, community development and globalization. The Asian Institute of Technology focuses on the relationships between gender and development—including women's rights, civil society, and gender dimensions of urbanization and industrialization.

The CDSSEA program has a practical dimension, building leadership capacity in mainland Southeast Asia's regional development, bringing together postgraduate students, encouraging debate, and promoting the rethinking of development alternatives in such areas as social equality, justice and participation, environmental and economic sustainability, and community development. In this regard, a major objective is to develop the knowledge and skills of development practitioners and to enhance the quality and effectiveness of policy-making and its implementation in the region.

The publications in this series—selected from the CDSSEA Master's program—are designed to express this diverse range of interests in development studies and regionalization, and to emphasize the relationships between empirical and theoretical research, policy-making and practice.

Victor T. King, Senior Editorial Adviser,
Critical Perspectives on Regional Integration Series

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Abbreviations

| | |
|------------|--|
| ADB | Asian Development Bank |
| CEDAC | Centre d'Etude et de Développement Agricole Cambodgien |
| DFID | Department for International Development |
| DoF | Department of Fishery |
| EIA | Environmental Impact Assessment |
| GDP | Gross Domestic Product |
| GW | Global Witness |
| IRIN | Integrated Regional Information Networks |
| KHR | Cambodian Riel |
| LYP Group | Ly Yong Phat Group Co., Ltd. |
| MAFF | Ministry of Agriculture, Forestry and Fisheries |
| MIME | Ministry of Industry, Mining and Energy |
| MoE | Ministry of Environment |
| NGN | Nigerian Naira |
| NGOs | non-governmental organizations |
| NIS | National Institute of Statistics |
| NTFPs | non-timber forest products |
| RGC | Royal Government of Cambodia |
| THB | Thai Baht |
| TVK | National Television of Kampuchea (Cambodia) |
| Udom Seima | Udom Seima Peanikch Industry and Mine Co., Ltd. |
| UN | United Nations |
| USAID | United States Agency for International Development |

Glossary

| | |
|------------------------|--|
| <i>Durian</i> | a large tropical fruit found in southeast Asia with a hard thorny husk and a very strong smell |
| <i>Lifestyle</i> | the interests, opinions, behaviors, and behavioral orientations of an individual, group, or culture |
| <i>Pchum Ben</i> | a Cambodian religious festival where souls of deceased relatives are provided offerings |
| <i>Pla-Phniev</i> | a small exotic fruit found in southeast Asia also known as Guest fruit in Khmer |
| <i>Prakas</i> | an official announcement of regulation issued by a Minister or by the Governor of the National Bank of Cambodia concerning banking or financial issues |
| <i>Rambutan</i> | a hairy tropical fruit closely related to Lychee |
| <i>Rattan</i> | a tropical climbing plant with thin and tough stems |
| <i>Sdach Yomareach</i> | believed to be the keeper of the underworld known as either the King of Devils or God of Death |

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Sovanny Sreng

Chapter 1

Introduction

The Kingdom of Cambodia has seen promising economic growth for years. Over the past few years it was projected to have an economic growth rate of about 7.0% in 2014 and 7.3% in 2015 (Asian Development Bank [ADB], n.d.). Thus, it was interesting to look at the cost of which the Cambodian government has paid in order to receive this amazing growth.

Cambodia's economy still depends on agricultural resources for growth. The main sectors consist of fisheries and forests which accounts for more than 40% of Gross Domestic Product (GDP) (Rizvi & Singer, 2011). The study by Rizvi & Singer (2011) showed that almost 90% of households rely on fishing for their livelihoods. The coastal fishery catchment had increased between 2000 and 2006 from 36,000 tons to 60,500 tons, and the average catchment in-between these years was 50,700 tons. The study by Rizvi & Singer (2011) also illustrated that fish catchments were rapidly decreasing over recent years because of some challenges and one of them was sand mining.

Marschke (2012a) found that sand mining was the main challenge to villagers in the Koh Sralao village. They faced a decline of marine life which included various types of crabs, lobsters and prawns. However, high ranking Cambodian government officials maintained that sand mining did not produce negative effects to local villagers' livelihoods and natural resources because sand mining operations were assessed by environmental experts before they were issued licenses (Sokha & Strangio, 2009; National Television of Kampuchea [TVK], 2012, Sep 27).

There have been a lot of studies looking at the impact of sand mining on the environment, but there were only a few studies looking at the affects of sand mining on people's livelihoods, especially in Cambodia's coastal fishing communities. However, these studies mainly looked at sand mining's impact on people's livelihood in general. Therefore, my study explored more specific aspects of sand mining's affects on people's economic livelihood in the coastal areas.

The Prek Angkun village is situated in a coastal area of Koh Kong province where there had been sand mining activity nearby and no known research was previously conducted in relation to the impact of sand mining on the local's livelihood. My study focused on how sand mining has squashed the Prek Angkun villagers' economic livelihood and also looks to explore what their coping strategies were.

Background Information

Sand Trading Estimates in Koh Kong

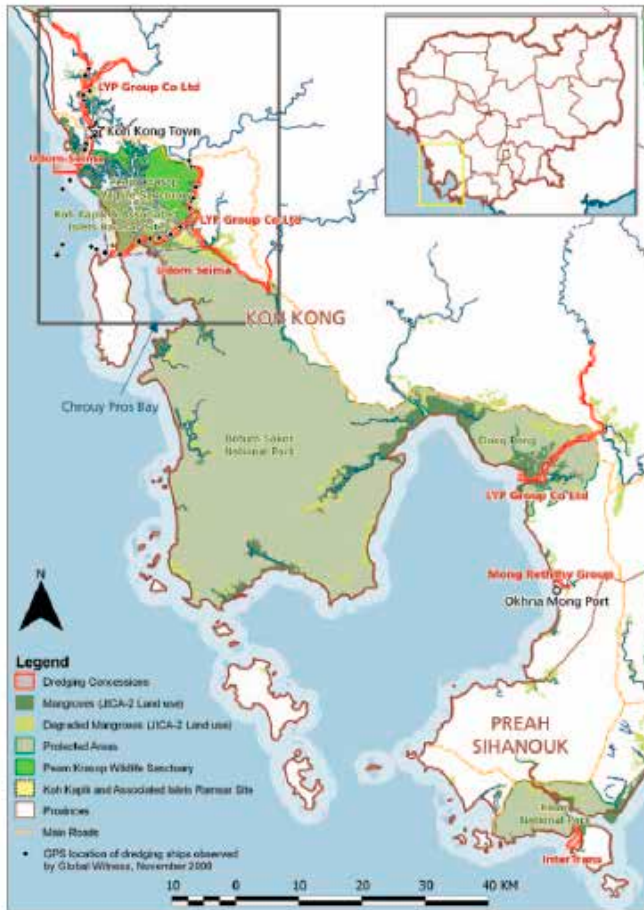
The Cambodian government calculated that the amount of sand extracted from Koh Kong was between 40,000 tons and 60,000 tons every month (Global Witness [GW], 2010). However, the government did not mention how much of the extracted sand was used locally or used for export. The government has also stated that it had put limitations on sand extraction by only allowing small-scale operations; therefore, there should not be any considerable negative impacts on the environment. From the United Nations (UN) Comtrade Database, the Singapore government reported to UN that 3.8 million tons of Cambodian sand was imported in 2008, while Cambodia's statistics for exporting sand extracted from all over the country could not be found in the UN database.

GW (2010) found evidence showing the amount of Cambodian sand exported into Singapore was in fact much more than what the Cambodian government had claimed. The organization found that only one company, Ly Yong Phat Group Co., Ltd. (L.Y.P Group), extracted sand at a rate of about 300,000 tons. Shipping documents were found to show transfers of 77,236 tons of sand into Singapore in November 2009. The GW (2010) report estimated that around 289,000 tons of sand was extracted every month. It also reports

that Mong Reththy Group Co., Ltd. (Mong Reththy Group) received a license from the Cambodian government to conduct sand extraction at a minimum rate of 10,000 cubic meters (m^3) per day in a concession area of 54.85 square kilometers (km^2), with this license the company could extract about 379,000 tons of sand every month. Another company, Udom Seima Peanikch Industry and Mine Co., Ltd. (Udom Seima), had a concession area of $17km^2$ and it was estimated that it could extract about 117,000 tons of sand per month. Therefore, the total combined sand extraction from these three companies alone was estimated at 796,000 tons per month.

At the place of extraction, sand dredgers could sell US\$3 per ton; therefore, with 796,000 tons per month, the estimated value of the sand mining sector could reach US\$28.7 million per year. In contrast, the price of selling sand at Koh Kong province port was US\$5.60 per ton. However, the Singapore government agency Jurong Town Corporation reported that it bought sea sand from mediator companies for about US\$26 per tons. With the price and 796,000 tons of sand exported monthly from Cambodia, the sand trade in Koh Kong could be estimated at about US\$20 million per month and US\$248 million per year at least. However, this was just only an estimation from three known companies which undertook sand mining activities in Koh Kong Province (Figure 1.1); there were still 11 more concession companies extracting sand along other parts of Cambodia's coastal areas that remained unknown (GW, 2010).

The Cambodian government issued a *Prakas* announced in 2009 to set the cost of sand per ton at US\$1.50. Using the estimation of 796,000 tons of sand extracted per month, the government could have expected to receive US\$10.7 million per month in revenue. Due to lack of information about the budget and how it was calculated, it was not possible to know exactly how much revenue was generated by the Cambodian General Department of National Treasury (GW, 2010).



Known dredging concessions along Cambodia's coast, plotted using the coordinates from the company's licenses. Map 2 focuses on dredging operations in Koh Kong for the area represented by the frame in map 1

Figure 1.1: Known dredging concessions in Koh Kong and Preah Sihanouk Provinces, Cambodia

Source: Global Witness, 2010

Cambodian Sand for Local Development and Other Countries' Development

Due to the booming demand for sand in local construction and in other countries' development, sand extraction was occurring on a massive scale and there was no clear information about where the sand went. There was no official

report from the Royal Government of Cambodia (RGC) to state which countries Cambodia has exported the sand to, exactly how much sand was utilized locally and how much was for export. Reports from GW (2010) and The Cambodia Daily newspaper stated that a lot of Cambodian sand was exported to foreign countries. According to the GW (2010) report, a lot of Cambodian sand was exported to Singapore for massive development projects. The Cambodia Daily reported that US\$ 1.5 million worth of Cambodian sand could be seen at Cochin port, India in 2013, although the Cambodian government stated that it banned the export of sand in 2009 (Willemys & Naren, 2013).

Research Questions

This study explored the answers for the following three research questions:

1. To what extent has sand mining impacted villagers' economic livelihood in Prek Angkun village, Koh Kong Province, Cambodia?
2. How do Prek Angkun villagers cope with economic livelihood challenges which are caused by sand mining?
3. Can those coping strategies help villagers to mitigate their livelihood challenges?

Research Objectives

The study had three main objectives which are listed below:

1. To analyze the impacts of sand mining on the local villagers' economic livelihood.
2. To identify coping strategies villagers employ to cope with adverse effects of sand mining.
3. To discover whether those coping strategies can help villagers to ease their livelihood challenges.

Method of the Study

Research Location

Prek Angkun village is located in a coastal area in south west Cambodia, situated in Trapeng Rong commune of Koh Kong district in Koh Kong province. The community speaks two languages, Khmer and Thai; they were fluent in both languages. The vast majority of villagers were fishermen and there were a number of people running small businesses in the village like a few grocery stores and one noodle shop.

Primary Data Collection Methods

The research was focused on investigative study and used qualitative research tools such as semi-structured interviews, focus group discussions, participant observations and a seasonal livelihood calendar for collecting primary data.

Data was taken from personal interviews in a sample size of 14 villagers and two key informant interviews. Factors such as background, status and gender were taken into consideration during the sampling of interviewees. I had found women whose ages varied between 22 and 58, then men whose age varied between 18 and 67. Furthermore, all respondents were asked to participate voluntarily and all interviews were conducted in a friendly environment using simplified Khmer language.

The period of data collection was scheduled within one month, July 2014 to August, 2014. The first week involved preparations including sets of questions, and the remaining last three weeks was for collecting data in the field.

Semi-structured interviews were utilized to explore the deeper phenomena of the villager's experience, perceptions and events undermined by the sand mining impacts. The nine interviews were conducted one-to-one (between researcher and interviewee). The two key informants were the village headman and an official from the Department of Fishery (DoF). Data was gathered from the village headman's background knowledge and also data from the DoF regarding the trends of fish catches.

Focus group discussions explored the community's perceptions, understanding and experiences from a common group of people affected by

similar livelihood constraints and their responses. The tool was utilized to discover notions, practices and understanding of a particular group of people who had an experience about events or circumstances (Kumar, 2014, p.193). Another five villagers with different genders and ages were requested to join the discussion. The themes for discussion were similar to those used for questioning the other nine villagers to confirm and verify the information received from semi-structured interviews.

Participant observations were utilized to supplement other research tools. While I did not participate in the activities within the community, observations were made while villagers' attended to their normal daily lives, including houses, properties and belongings in the each household, and infrastructure availability in the village and the surrounding areas.

Table 1.1 shows the overall study method of research tools employed, and themes discussed with respondents.

| Respondents | Tools | Themes |
|-------------------------------------|--|--|
| Nine villagers | Semi-structured interview and participant observations | <ul style="list-style-type: none"> • General information about villagers' livelihood • Villagers' vulnerability • Coping strategies • Outcomes of those coping strategies |
| Five villagers | Group Discussions and Seasonal Livelihood Calendar | <ul style="list-style-type: none"> • Livelihoods in the past and present • Livelihood constraints • Responses |
| The village headman | Semi-structured interview | <ul style="list-style-type: none"> • General information about villagers' livelihoods • Livelihood challenges • Villagers' coping strategies • Literacy rate in the village • How to solve villagers' livelihood challenges |
| Official from Department of Fishery | Semi-structured interview | <ul style="list-style-type: none"> • Data about fish catches • Sand mining • Environmental impact assessment |

Table 1.1: Study Methods

Source: Author, based on interviews from 3 July to 8 August 2014

Justifications for Selecting Qualitative Research

There were a number of reasons why qualitative research was chosen for conducting the study. The tool intended to understand the phenomena that were attached to villagers trying to realize their actions, perspectives, beliefs etc in their own world (Denzin & Lincoln, 2008, p.36). Other researchers valued the tool as it tried to understand the villagers' actions to social phenomena, perception and evaluation. It also provides a variety of data, different ways of analyzing and explaining data, and produces comprehensive descriptions and thorough knowledge from local's perspectives and understanding of their social world (Bryman, Bell & Teevan, 2008; Mason, 2002). Therefore, this tool was suitable to demonstrate how much the villagers realized the impact of mining had on their daily livelihoods, to identify what actions had been taken to respond to the impact, and to explore the results of those actions taken.

However, this tool has been criticized for the validity of the findings and being insufficient in reliability. It has been questioned on how it can receive right answers of phenomena (Kirk & Miller, 1986). Other critiques raised were time constraints, limited budget and institutional barriers which could prevent the researchers' ability to notice all factors that might affect the circumstances of the study (Shaffir & Stebbins, 1991, pp. 243-245). Some optimists claimed that the issues of validity and reliability of qualitative findings could be solved via reading back and forth the findings and transcripts. In this way, the findings correctly reflect what was collected from the field (Harding, 2013, p.171). In addition, triangulation can be used to verify qualitative findings and checking the results from the findings of one approach against another approach (Bryman et al., 2008, p. 379).

Data Treatment, Analysis and Verification

All data collected from the targeted area was treated and analyzed in the following three ways: transcribed, coded and analyzed. First, all interview data was recorded with an audio recorder and typed into a notebook by transcribing into Microsoft Excel, to be retrieved later. Second, all data was analyzed based on these transcriptions. Third, in order to ensure validity and reliability of the research findings a few techniques were employed such as, reading back and forth the findings against the transcripts, categorizing data and triangulation for verification.

Conceptual Framework

The Department for International Development's (DFID), (1999) Sustainable livelihood framework was used in this study as shown in Figure 1.2. Within the framework there were five assets that influenced villager livelihood activities, they were: livelihood assets, vulnerability context, transforming structures and processes, and livelihood outcomes.

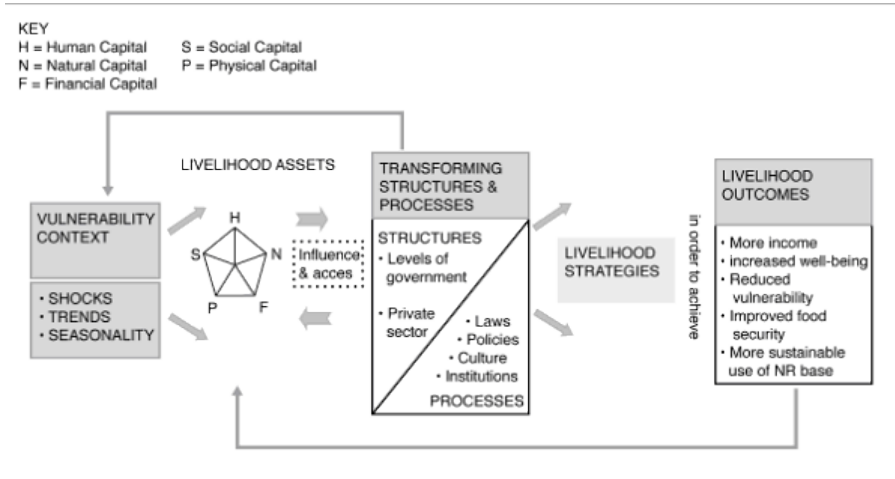


Figure 1.2: Sustainable Livelihoods Framework

Source: Department for International Development, 1999

The framework provides important factors that influence the livelihood capital of people and presents connections among those types of capital. It can be utilized for planning development projects and evaluating services or actions that contribute to the sustainability of livelihoods with current activities. The framework also presents a list of necessary issues and general descriptions of the way issues connect to one another. In addition, the framework pays attention to vital processes and influences. It stresses interactions among parts which influences livelihoods (DFID, 1999).

Livelihood assets comprise of five assets: financial assets (financial institutions, savings etc); natural assets (air, water, forest, land, crops, and fruits); physical assets (roads, schools, medical center, house etc); human assets (knowledge, skills, education, and health); social capital (networks, membership of organizations). Accessibility to those activities and assets was allowed by

transforming structures and processes. Livelihood assets allow for coping strategies to be utilized by affected households to respond to their livelihood challenges and livelihood outcomes were related to the results of coping strategies.

The sustainability of livelihoods was also impacted by outside factors such as vulnerability context, consisting of trends, shocks, and seasonality. Trends for my case study was the increase or decrease of fish prices and declining fish stock, and other factors which affect households, e.g. increasing prices of commodities. Shocks consist of natural disasters such as floods, storms, and tsunamis that destroy facilities and equipment thus increasing input costs for fishing and deficit from damaged fishing tools. Seasonality was the food and employment availability during difficult times and circumstances. Livelihood sustainability was achieved when people can meet their present needs, without compromising on the future generation's needs. When vulnerability to seasonality, trends, and shocks were reduced, food security was greatly improved.

The assets of households were influenced by structures and processes, and thus influence the access to particular resources, defined as livelihood strategies. If the households near sand mining sites have less access to natural resources, their livelihood structures would change also. For example, people were more vulnerable when they have lower natural capital, but they might have higher social capital and so were able to migrate. The reduction of natural capital due to sand mining had a temporary impact on households, but over the long run it may not be too bad if they were able to migrate to make a living somewhere else.

Although the sustainable livelihoods framework has been used for a while and attracted some popularity, there were some weaknesses. First, the framework focuses only on marginalized people, and it did not consider the implications of rich people in the area (Moser, Norton, Conway, Ferguson & Vizard, 2001). Second, there were some elements such as class, gender, market and ethnicity, that were absent from the framework. Third, the framework emphasizes on exploring the causes or phenomena that affect particular public institutions and focuses on present circumstances (O'Laughlin, 2002). Fourth, the framework does not focus in detail on the environment, human rights or poverty (Carney, 2002).

Even though DFID (1999) provides an interesting framework for analyzing livelihood assets of affected marginalized people there was one more aspect which was very important to Cambodian households and this was *lifestyle*, and it should be included. The *lifestyle* term was defined as an individuals or a group of people that function in their daily lives (Lifestyle, n.d.).

Vulnerability

Adger (2006) pointed out that vulnerability refers to the condition that was likely to damage a person after the exposure to pressures linked with changes in society and the environment, and thus they lacked the capability to adjust. In addition, the DFID (1999) defined vulnerability as the result of several aspects which were closely linked to limitations of capital which contain natural, physical, financial, human, and social factors, i.e. the effects of institutions and policies that affect marginalized peoples' access to resources.

Vulnerability varied considerably among individuals in a community depending on their gender and social class. For instance, marginalized people tend to look for other ways of living once they reach poverty, ranging from looking for credit to doing businesses using their own resources. However, these activities were very risky with a high chance to fall into debt and failure, which can cause them to be even more vulnerable. It was vital to know that decreasing vulnerability could help people become secure and might not only be limited to involve increasing income in order to reduce poverty (Chambers, 1989).

Vulnerability at a local level has a strong connection with livelihood assets. Vulnerability at community levels were closely connected to three factors: shocks, trends, and seasonality. First, shocks can destroy assets in the community i.e. drought, flood, earthquake or cyclone. They were also the causes for forcing people to move away from their homes, so abandoning assets was a coping strategy. Second, trends might or might not be dangerous, although they were foreseeable. Third, seasonality changes employment options, cost, and meal availability (DFID, 1999).

Transforming Structures and Processes

DFID (1999) definition of structures and processes refers to laws, institutions and their policies impact on people's livelihood and the influences can be either positive or negative, or both to livelihood activities. Structures and Processes establish and carry out legislations, policies and other functions that affect economic activities. Therefore, having good structures and processes was necessary because without their presence, was a barrier to have sustainable livelihoods (DFID, 1999). Obstacles to livelihoods occur when legislations, policies, norms, relations between people and institutions do not function effectively, resulting in the restriction of people's accessibility to assets. They were helpful once they work efficiently and enhanced people's access to assets in a sustainable manner (North, 1990, p. 97). North (1990) illustrates that institutions, laws and policies could be either positive or negative depended on the character of those institutions, laws and policies. Although people might have a notion that they act decisively in livelihood activities without any interference from outside sources, legislations or policies, but according to Control Theory, every one of us was driven by both inner controls and outer controls directing our decisions and outcomes of our economic activities. The former consists of right or wrong notions, conscience, desire etc, and the latter consists of family members, institutions etc (Henslin, 2014, p. 163).

Marschke (2012b) argued that Cambodian policies of natural resource management did not work properly. She found that involvement of unofficial practices by some government officials and ineffective law enforcement affects both fishers and natural resources negatively. In her example, a fisher's committee intended to patrol their controlled area with approval from the police commander to invite an officer from the police department. However, on that day the commander was away and there were some police officers present in the office, therefore, the fishers committee invited one of them to join the patrol. On the patrol they caught some perpetrators and confiscated the banned fishing tools. Unfortunately, when the commander returned and realized that they caught trawling fishers, he punished his officer. The officer later resigned and moved to work in another province. The fishers committee complained about this case to an official at the DoF accusing the police commander of breaking the law. The committee reported that whenever they catch illegal trawling fishers, those illegal fishers pay US\$1.5 per person to a money collector and those illegal fishers can continue fishing again.

However, this does not mean that all institutions, legislations and policies were ineffective. A case conducted by International Centre for Living Aquatic Resources Management to assess management strategies of fishery sectors in Asian countries had results that showed strategies of co-managed fisheries did work efficiently, although the success was varied. The study revealed that there were some core principles and conditions that contribute to the success of those strategies (Marschke, 2012b).

Various Support from Individuals

Individuals might consist of resource consumers, resource owners, and politicians. The process of co-management strategies frequently includes compromising short-term advantages of individuals in order to achieve long-term benefits. The contributing loss of benefits and labor were high. Individuals must be aware and agree to those co-management strategies. If resource consumers realize the importance of involving and implementing those strategies by themselves, the implementation of those strategies were faster and easier than using external agents involved in informing them of the importance of those strategies. One way to evaluate the support from individuals in operating these strategies was when they spent their own time and money with the implementation. Natural resource consumers can benefit from these strategies in terms of more benefits and more availability of food. Resource owners such as resorts and restaurants owners could help by being involved in cleaning and protecting the environment in coastal areas. These activities were very important to their business as they could earn more income if they were involved in implementation. The benefit for the politicians were they could earn support from the people recognizing their effectiveness in managing natural resources and thus gaining more votes in elections.

Capable Leadership

This was a vital factor that contributes to the success of co-management strategies because leaders at grass root levels were often the ones that act as a paradigm for other people to follow and provide guidelines for any actions. From an example in Bangladesh, fishers elected their leaders by voting, reducing corruption and providing a chance to other potential leaders. In a case in the Philippines, a lot of projects under one leader failed because a local project leader died or moved away from his office and no one was able to take his

position. So, external agents should not perform the role of committee leaders because they might not be as knowledgeable as committee members and the community would become too dependent on them. Therefore, the local community should develop the skills of leadership among its own members, so that they will not depend solely on one person.

Support from Politicians

The support from local authorities was also very important in achieving the success of co-management strategies. As described earlier, if politicians become involved in the co-management strategies, there will be advantages for them in an election period. In another example, in the Philippines local authorities were not involved in fishery management committees and the community projects were not successful, so local fishers might be reluctant or lacked the skills required in engaging local authorities. However, some fishers committees implement a policy of “no-political-alliance” and develop non-official connections with various politicians from all parties.

Controversy Management

The process of settling a disagreement or argument over co-management organization was very important. A potential third party candidate at the same level should join and discuss solutions to resolve any conflicts that might arise.

Furthermore, a government official should perform as an impartial mediator for local controversy and appeals. Example cases in Bangladesh and the Philippines showed that the process of finding solutions to any controversy tend not to be a big issue once the potential candidates were engaged in enforcement, the creation of regulations and when authorization to punish perpetrators was reinforced.

Coping Strategies

Coping strategies were vital to and were widely used by marginalized people to ease their livelihood challenges and difficulties during uncertain circumstances caused by shocks, trends and seasonality for the whole year. The term coping strategies was used to understand how marginalized people react to mitigate their livelihood challenges (Bhattarai, 2005). They might decide to consume less food or not to join entertainment activities (Adjei, 2007). Similarly, coping responses were deliberately used to solve individual and inter-connected

problems, understand, endure, and reduce controversy and tension. The efficiency of coping strategies relies on the types of controversy and tension, and personal conditions. The effectiveness of coping strategies depended on each individual, a households' capability and available resources (Weiten, Dunn & Hammer, 2012, p.105). Therefore, the goal of coping strategies was to help people during their livelihood challenges or disaster. To put it in other way, it was the use of available resources and livelihood assets to overcome their livelihood challenges. In cases where the period of devastation and livelihood challenges were much longer than expected, those households who were capable might be also vulnerable. Therefore, coping strategies can be made worse by a prolonged period of crisis (Adams, Cekan & Sauerborn, 1998).

A study on an island in Koh Sralao village by Marschke (2012a), found that villagers utilized coping strategies to alleviate their livelihood constraints by diversifying their livelihood activities. Some of them were still undertaking fishing, but had already added other livelihood activities. Some others completely changed their livelihood to other economic activities such as running a small business in the village, became money lenders or electricity suppliers and migrating to find work. Villagers that were able to switch to other livelihoods were able to cope with the livelihood challenges.

Although some villagers had diversified their livelihood activities, some were still encountering difficulty. Marschke (2012a) found cases of two villagers who pursued coping strategies, the outcomes were very different. One villager had multiple income sources, he still went fishing while pursuing other livelihood activities like a small grocery shop selling fruit and vegetables and ran an electricity supply business. He also cleared one hectare of land with hope that he could sell it; however, no one was interested in purchasing it. He spent most of his savings on his son's university education in Phnom Penh with the hope that his son could find a job after graduating and send remittances back home. In contrast, another villager had a slightly better situation because his eldest son had already got a job in a factory in Phnom Penh and sent remittances back home every month and his other children helped him with fishing activities.

Weiten et al., (2012) provided an interesting definition of coping strategies because they did not just present the coping strategies used by affected families, but also they explained that not all coping strategies were successful. It depended on the people's capability and resources that were available to them.

Livelihood Outcomes

Livelihood outcomes were the results of livelihood strategies that villagers pursued and they could be either positive or negative, or both. To begin with, the outcomes could be in different forms. People tend to receive more income through economic activities that they undertook and the increased earnings was related to the notion of sustainable livelihood. Increased well-being could occur after people have pursued coping strategies. Besides incomes and materials that people purchase, they also tended to give more value to non-materials such as self-worth, sense of control, inclusion, household members' physical security and health status etc. Then, after having undertaken the relevant coping strategies they can possibly reduce their vulnerability and might improve food security. Governments and organizations could provide assistance for better food security and they could possibly lead to more sustainable usage of the natural resources (DFID, 1999).

Scope of the Study

This study focused only on the impacts of sand mining and not on the impacts on the environment. The dynamics of sand mining in coastal and freshwater rivers could be different, thus, the study only focuses on coastal rivers. Although this study focused solely on sand mining, the interviews were conducted with only local villagers, relevant Cambodian government officials from the DoF and the village headman. There were no interviews conducted with any of the sand mining concession companies or staff due to safety issues.

Ethical Issues

The study was conducted in a friendly atmosphere and questions were not immediately asked when I first met interviewees, but rather introduced myself briefly with my name, why I came to the village and what research I was undertaking etc. By doing this, interviewees could feel unafraid and less shy to answer the questions. In addition, I respected the villagers' choice of whether they intended to join the interview or not.

Furthermore, I first informed every interviewee about the purpose of conducting this study prior to taking any pictures or using of a voice recorder. To avoid legal issues, I asked for the permission of each interviewee whether

or not if their names can be revealed. In order to keep the identities of my interviewees anonymous, the five villagers from the group discussion were labeled G1-G5, Appendix 1 “Focus Group Discussion in Prek Angkun village.” The nine villagers from the individual households were labeled H1-H9, Appendix 2 “List of Prek Angkun individual household interviewees.”

Significance of the Study

This study mainly focused on analyzing the impact of sand mining on Prek Angkun villagers’ economic livelihood in the presence of Cambodia’s development, with speculation that sand mining produced negative impacts on villagers’ economic livelihood. This study also provided a significant contribution to a knowledge gap in local Prek Angkun villagers’ livelihood constraints in which their livelihood activities based on natural resources were suffering from negative effects of sand mining concessions and land concessions as a direct result of government policies not taking the local people’s interests into account.

The outcome of this finding could possibly contribute to the Cambodian government reconsidering to provide any future concessions without any thorough study on the impacts on local people’s livelihood. Currently, the government was reviewing all concessions which do comply with regulations. The results of this study might facilitate the review and may lead to the government’s reflection of prior policies regarding sand mining concessions without a proper Environmental Impact Assessment (EIA) and consultation with the local people’s interest.

Chapter 2

Literature Review

This chapter provides information regarding Koh Kong province, sand mining communities and coastal fishing communities' livelihood; this includes marine fisheries, sand mining, the impacts of sand mining on the environment and fishing communities' lifestyle in Cambodia and abroad, relevant mining laws and the ban on the export of sand. To have more understanding on the issues regarding natural resource extraction activities impact on villagers' livelihood, a case study of the Koh Sralao village was also presented.

Koh Kong Province

Koh Kong province is situated in the southern part of Cambodia. It is close to Trat, a province of Thailand. It is also next to other Cambodian provinces such as Pursat, Kompong Speu, Kampot, and Sihanoukville. Koh Kong province is 11,160 km² (Koh Kong, n.d.), with six districts comprising of 33 communes and 132 villages (Council for the Development of Cambodia [CDC], n.d.).

The province has a total population of 132,106, with a population density of 12 people per km² (Koh Kong, n.d.). There were approximately six ethnic groups (Khmer, Chinese, Muslim, Laotian, Thai, and Vietnamese) living in the province (Rizvi & Singer, 2011).

Koh Kong was home to communities whose main livelihood was fishing, in an area rich in natural resources: mangroves, flora, wildlife and marine life, i.e. Irrawady dolphins, Dugong and Coral reefs (GW, 2010). Fisheries were

still important livelihoods amongst others in the province: services (20%), rice farming (31%) and agriculture (64%). Koh Kong province had 21% of families who depended on coastal fisheries (Rizvi & Singer, 2011).

Marine Fisheries in Cambodia

Cambodia's coastal waters were home to a wide variety of species. They have both English and Khmer names documented: 476 types of marine fishes, 20 types of marine crabs, 42 types of marine gastropods and 24 types of marine bivalves, according to Try (Gillett, 2004). There were nine different marine fishes recorded in fishermen's catch and two types of fish were approximately two-thirds of catches, according to the DoF (Gillett, 2004). Businesses of marine fishery products were seen both in families and at large commercial levels. According to Touch and Todd, it was estimated that 480 million tons of marine fish was worth US\$1,131,500 in 2000, (Gillett, 2004). These products were both for family consumption and commercial purposes. Even though products were not high in value, local processing techniques were usually able to produce finished products from a large amount of raw products during the peak season (Gillett, 2004).

Fish paste was traditionally produced from small fish that had a salty flavor; however, the decline of small fish catches has led to a decrease in fishery products such as fish paste, smoked fish and salted fish. Although there were several factories that were producing these products in the past, there were only three factories that remained in operation: one in Kampot and two in Sihanoukville (Gillett, 2004). There were several companies that were producing large-scale products: crab meat processing was done in Kep province, fish and shrimp processing for freezing and export was done in Sihanoukville province (Gillett, 2004).

Coastal Fishing Livelihoods in Cambodia

In fishing villages along coastal areas, men could be seen solely to do fishing, while women work closer to home or on the shore to undertake equipment maintenance, fish caging, fish processing and fish marketing (Ahmed, Navy, Vuthy & Tiongco, 1998). Women have more power in decision making than men in fishing households as they were involved in various fishing

activities such as helping their husbands to remove fishes from the net, processing caught fishes, maintaining boats and fishing equipment. Women worked about 10 hours per day during the dry season which was the busiest season. In addition, households headed by women often worked even harder because they must be involved in household work, taking care of children, cleaning the house, cooking for their family members and the business of fishing (ARD-BIOFOR IQC Consortium, 2001).

The level of poverty, literacy rate, infrastructure and other related services in Cambodia's coastal areas were still in needed improvement. Villagers residing along the coastal areas utilize small-scale fishing tools that were only suitable for fishing near the shore when compared to other types of large scale fishing exploitation. The number of families and fish catches of both marine resources and inland fishes were increasing every year. In 2004 and 2006, the total number of families increased from 27,340 to 30,955 (Rizvi & Singer, 2011).

Sand Mining

The definition of sand mining is an action to remove sediment from the sea riverbeds and beaches (Thomas, 2014). Sand from the globe's beaches was being extracted for a number of purposes such as construction, filling and beach betterment. Sand mining was not new to Cambodian people and had been occurring due to the fast growth of Cambodia's economy resulting in the booming demand in materials for building infrastructure, houses and high-rise buildings. The extraction usually causes severe damage and was poorly controlled across the globe.

Sand mining in Cambodia was extracted from two main sources, coastal and freshwater rivers. There were local reports in the Phnom Penh Post and the Cambodia Daily about sand mining causing riverbanks and houses to collapse, the disappearance of fishes and casualties. However, Cambodian government officials claimed that the sand mining operations did not produce any impact, but instead they restored the sand from blocking water flow and help to avoid flooding (TVK, 2012, Sep 27). Government officials have maintained that the mining was for hindering flooding (Abdullah & Tat, 2012; TVK, 2012, Sep 27).

In 2009, the inter-ministry committee announced that it provided licenses to 14 companies to undertake sand mining operations between 2009 and 2010. In addition, GW (2010) had reported that L.Y.P Group had paid other companies to export sand into Singapore. GW (2010) also had evidence from receipts of two companies depositing US\$200,000 for being able to ensure they get a sub-contract. However, this was different from the government *Prakas* which stated that the official payment of transferring a license was US\$500. An official of the Ministry of Industry, Mines and Energy (MIME) said that “The other companies undertake the sand dredging for one company, L.Y.P Group” (TVK, 2012, Sep 27).

Impacts of Sand Mining on the Environment and Fishing Communities

Mining puts indirect constraints on villagers' livelihood especially for those living along coastal areas by destroying the natural resources which they depend on. The practice caused destruction of not only coastal areas, but the ecosystem, such as wetland, fauna and flora. The loss of sand due to sand mining was connected with the loss of natural protection from cyclones, storms and tsunamis. The Indian Ocean had very bad weather, high storms, affecting communities by causing death in 2004 where the tsunami could possibly be linked to sand extraction (Coastalcare, n.d.). Other sand mining affects on the environment include a decline in fauna, flora life, and coastal erosion. When mining operations occur in coastal waters it produces effects on all animals and plants living on the sea floor (Krause, Diesing & Arlt, 2010). The extraction of sand from the seabed destroyed biodiversity and the natural shelter leading to the decline of marine life stock (Desprez et, Pearce & Le Bot, 2010). Also, sand mining ships released unwanted substances back into the water causing turbidity changes for living things in or near the water, habitats and riverbanks.

A news report from Nigeria reported that sand mining in the port city Lagos was found to affect both the fishing businesses and people's livelihoods in the area. A fishing businessman mentioned that his business declined because the sand mining operations made the river beds deeper and made it difficult for fishermen to catch fish. A fisherman said that the sand mining caused rivers to be muddy and destroyed his traps. He used to earn approximately 3,000 NGN to 5,000 NGN (US\$ 1 was equivalent to 179.95 Nigerian Naira [NGN]),

but now he hardly earns 1,000 NGN because he could only catch small fish that were not valuable on the market. Consequently, he depended on other livelihoods instead of fishing. Another fisherman said that the price of fish at the market was higher because of declining fisheries also caused by sand mining (Balogun, 2011).

In India, sand mining had brought negative impacts more than positive impacts on local people's livelihoods. The only positive impact of sand mining was that it created employment, while it produced a lot of harmful effects to the local people, in particular for the fishing community. Originally, fishing was the only livelihood for the people in the community; they had no other alternative income options. One fisherman mentioned that "In the past, 5 people depended on one boat but today one boat can support only 1-2 people – can't give wages. It is difficult to maintain families." Another fisherman expressed difficulty in his livelihood, saying "No bank is willing to give us a loan. We need to educate our children but we can't afford it." The sand mining activities destroyed their nets and decreased their fish catches. There was some violence between mining companies and fishermen, but nobody intended to protest (Pereira, n.d.).

Traditional and commercial fishing could be impacted via sand mining and destroying marine life (Cooper, 2013). The mining also negatively affects beaches, infrastructure and houses (Thornton et al., 2006). The damage caused to the riverbed and channel could potentially lead to further damage to the riverbank and erode infrastructure such as roads, bridges, protection walls and water supply lines (Padmalal, Maya, Sreebha & Sreeja, 2008).

A report from the Integrated Regional Information Networks (IRIN), (2010), found that sand mining was the cause of disappearing fishes, which were the main incomes for the people living in the area. Sand mining vessels had extracted the sand and had also removed the marine life. A fisherman said that after the dredging took place, it was impossible to catch fish. The unsustainable ways of sand dredging along coastal areas combined with the involvement of illegal practices from Cambodian officials, has deteriorated marine life and the livelihoods of marginalized fishermen and communities who were heavily dependent on the rivers for their living.

The coastal ecosystem was really important to general human health and happiness, although biodiversity had been affected by sand mining

operations; it could recover eventually, so villagers could possibly one day go fishing again after a set period of time. The recovery period can vary on the level of destruction in the area.

In Sweden, biodiversity recolonization was almost identical eight years after the closing of a pulp mill which caused damage to natural resources. Also, in the Netherlands coastal areas took about three years, while communities in the Arctic Circle could take 12 years to recover (Thornton et al., 2006).

Lifestyles from Around the World

Fishing communities residing on the shoreline in Hawaii have maintained their *lifestyle* of fishing as subsistence fishermen. Fishing was not limited to commercial purposes; they caught fishes not just for selling, but for local consumption. 39% of catches were not sold and 97% of fishers mentioned they participate with fishing because they intended to share the fishes in a network with other peers and relatives. More than 60% stated that those fishes were important for food consumption in their family. According to the Molokai study conducted in 1994, 28% of participants' food consumption was received from subsistence fishing, this rose to 38% for those fishers living on Hawaii's shoreline. Almost everybody stated that subsistence fishing was crucial to the *lifestyle* of the people living on Molokai Island. Fishing activities was not just for food, but also for other purposes like exercise, the feeling of having relationship with environment, and enjoyment with nature. The way of subsistence fishing was mainly for sharing and giving to those who cannot manage fish by themselves (Griffis & Howard, 2013, p.185). This reflects a rather unique *lifestyle* of the fishing communities on Molokai Island.

Similarly, fishermen in the Republic of Vanuatu have kept their culture of managing fisheries without letting outsiders intervene in their *lifestyle*. They adopted the tradition of "fishing closure" over a very long period of time. People in Vanuatu still practiced this tradition today and they have been successful in sustaining their livelihood based on fishing. The main aim of this tradition was to allow the fish stock numbers to naturally recover after harvesting for a set period of time. The period of closure varied according to locations, i.e. at Uri, the closure period was from three months to seven months, then extended to one year. At Seviri, the closure period was from two to five years. To preserve the tradition, two village headmen had effectively adapted the tradition to

become an important part of ceremony, which involved killing pigs, feasting and inviting local priest leaders to bless the traditional ceremony. In the past, magic words were arranged on a reef, and if anybody broke the regulation, they were to suffer bad luck and punishment. A man once broke the norm and died whilst cooking after standing on the reef. This true story caused villagers to respect the seriousness of this tradition (Johannes, 1998).

However, some scholars argue that the traditional practice of managing fisheries will not last long because the period of fishing closure was usually short, not more than a year. This period of time was not long enough for marine life to recover from any damaging effects, even though there was a period of closure. In addition, although the closures might allow the recovery of small species, it cannot help to recover larger species (Tungale, 2008).

Mining Laws

According to the Law on Mineral Resource Management and Exploitation, the minister of the MIME was responsible for allocating licenses and managing the mineral resources for the whole country. In Chapter 3: Mineral Resource License Categories, Article 11 describes six types of mining licenses, summarized briefly as follows:

1. Artisanal - for minerals in loose state, sand, gravel, silts and rock within a limited area of up to one hectare and five meters in depth. Allocated only to people of Khmer nationality who use their own labor or family with no more than seven people.
2. Pit and Quarry - for sand, gravel, crushed stone, laterite, clay, cement clay, coral, fossil, phosphorite, limestone, dolomite, marble, kaolin, pagodite, salt, potash, gypsum, peat, coal, titanium sand, silica sand or any other mineral compounds used for construction and industrial purposes.
3. Gem-stone - for precious stones, semi-precious stones and ornament stones
4. Mineral Transforming -for the purpose of transforming precious or semi-precious stones or ornament stones.

5. Exploration -for the purpose of conducting exploration of minerals and studying its potential.
6. Industrial -for the purpose of conducting exploration and mining of economically viable mineral deposits established within the boundaries of the exploration license. The holder of the license shall submit the analyses of technique, finance, environment, and social and economic aspect in order to determine the feasibility in continuing of mining operation and to ask the minister in charge for approval (Ministry of Industry, Mines and Energy [MIME], 2001).

Furthermore, according to the law, it was the responsibility of the license holder to compensate the land owner residing within or close to the area. The agreement between the license holder and land owners should be made before any mining operation as stated in Article 25: “The land owner shall permit the holder of the license to conduct the mining operation on such land with prior mutual agreement whereby the owner shall receive fair and just compensation” (MIME, 2001). In the condition that both parties cannot reach an agreement, the minister of the MIME shall help to facilitate the agreement. If the minister cannot find any solution, the case will be brought to court for judgment (MIME, 2001).

In article six of the law on Environmental Protection and Natural Resource Management it states that

An EIA shall be implemented on all types of public or private project activities. Both current and ongoing activities are under the authority of Ministry of Environment (MoE), and existing projects which have not yet been assessed should be required to undertake an EIA. (Ministry of Environment [MoE], 1996).

Ban on the Export of Sand

According to the IRIN (2010) report, the amount of sand being mined was far more than what can be used locally because there were many small and large ships involved in the mining. This pushed fishermen to file complaints to relevant government officials and in response; the Cambodian government banned sand export.

In the wake of protests, the Cambodian government called for a stop on all sand exporting activities because of concerns that the sand mining operations could cause devastating damage nearby. The Phnom Penh Post newspaper reported that a lot of fishermen rallied in Koh Kong city to protest against the sand mining operations because they were the cause of the disappearing fish stock. A local village headman acted on behalf of 1,397 households from three districts that were being affected badly by the oil flows and muddy water caused by sand mining operations and asked for those sand mining companies to stop (David, 2009). However, the ban did not affect the business of sand mining (Abdullah & Tat, 2012).

Despite the government ban and establishment of a committee to solve the sand issues in 2009, the precise wording of the ban was not valid for all types of sand, hence the committee failed to implement the legislation. A Cambodian official of the DoF said that the ministry ordered the three companies to stop mining in the river in order to review its process. However, the company still received a license from the ministry to undertake the mining until September 2012 (Willemys & Naren, 2013).

According to the GW (2010) report, the Cambodian government's ban on the export of sand was a response to protesters, its objectives were to improve the management of the sector and ensure that the environment was protected. GW (2010) had found that the content of the legislation was to ban the export of river sand, but not sea sand. Furthermore, the inter-ministerial committee was established to reinforce the legislation. But, the committee still allowed the exploitation of both types of sand to be exported and had failed to make sure that sand exploitation complied with socio-economic and environmental legal frameworks. In third world countries, legislations in sand mining operations often lacked a proper scientific knowledge about the results, and all sand mining projects were implemented without conducting a proper EIA (Maya, Santhosh, Padmalal & Kumar, 2012; Saviour, 2012). As a consequence, sand mining did not provide protection and preservation of the ecosystem.

Willemys and Naren (2013), journalists from The Cambodia Daily reported that the ban did not include parts where sand was blocking waterways and that approximately 31,333.71 metric tons of sand dredged from a river in Koh Kong was seen in India's Cochin port. In fact, exporting sand abroad from Koh Kong was still occurring despite the government's export ban.

Natural Resource Extraction Activities Impact on a Fishing Community's Livelihood: A Case Study of Koh Sralao Village

During Marschke's (2012a) first visit to Koh Sralao in 1998, she was very impressed with the views of nature in the village. But, twelve years later in 2010, she was shocked and saw many big barges filled with sand leading to the decline of the crab populations and contributing to high levels of debt for the village's inhabitants because most of them relied on the fishery. As a result of natural resource extraction activities, Marschke (2012a) had found that one-sixth of households left the village and migrated to other areas.

The first culprit was the Cambodian government. During the pre-election campaign period for the 1998 national elections, government officials neglected mangrove logging in order to get votes from the villagers and win in the election. Back in those days, villagers could earn a lot by logging mangrove trees. Marschke (2012a) concluded that multiple individual actions contributed to serious deforestation by reflecting on her experiences of environmental degradation in the village during the past 12 years.

The livelihoods of the villagers mainly depended upon nature. The aforementioned government's neglect for logging and sand mining contributed to livelihood insecurity for the local people because most of them were now in high debt and migrated to other areas. The basic services were poor and villagers could not access good healthcare. A new primary school and a new junior high school were built in 2005, but if their children intended to go to upper-high school, they had to travel to Koh Kong city. They still relied on their own generator for electricity and it could not cover the whole village. Moreover, most of the households had to rely on just a few water pumps that belonged to a handful of rich households. Nevertheless, as a result of globalization, cell phone coverage had reached the village and modern communication was easier than 2 years ago.

These days, the Cambodian government was trying to expand the rule of law in this region which had been lawless for decades. In the government's attempt to expand the rule of law, there were more restrictions and limitations for resource extraction in the region. This important government measure forced inhabitants to largely rely only on fishing for their livelihoods.

Nowadays, more than 300 households in the village relied on fisheries or fishery-related businesses. Debt levels of households were getting higher and higher because fisheries needed bigger investment and they had to borrow money to buy fishing gear. Other inhabitants tried to change to other non-fishery livelihoods such as selling freshly picked mushrooms and green mussels from mangrove forests. But, there was little market demand for such products. They had to rely on customers from other areas and middlemen from Thailand. These kinds of resource based non-fishery livelihoods were risky for inhabitants because of seasonal jobs and insecure market demand.

Some people started to change their livelihood patterns and established small grocery shops in front of their houses. Other people changed i.e., like working as a water taxi business, or a water delivery pump business, raising pigs, becoming middlemen and money lenders etc. Only a few people can rely of farming because of most of them were landless.

But, there were some wiser people who tried to send their children to be educated and they send their children to school and college in Phnom Penh. One interesting finding was that one villager tried to send his son to study at a university in Phnom Penh and another villager tried hard for his son to finish ninth grade in Phnom Penh. For the latter, the boy finished his senior high school in Phnom Penh and was now working at a factory nearby and sent remittance back to his family.

So, during the period from 2000 to 2010, inhabitants from Koh Sralao village tried to change other livelihoods to leave the fishery sector. But, the following stresses still threatened the livelihoods of inhabitants in Koh Sralao. They were:

1. Too much sand was mined by sand mining businesses which negatively affected fish and crab populations in 2008. As a result, 17% of total fish population migrated to other areas.
2. Prices of food, vegetables and petrol rocketed. They could not make ends meet.
3. The rich possessed good fishing gear whereas the poor own small, traditional and old fishing gear. In a restricted area, the poor could not compete with the rich in finding fish.

4. Fishing gear was destroyed or stolen and authorities also neglected that important case.
5. Lack of enforcement of current laws and environmental degradation continuously occurred contributing to a decline in wildlife and fish populations.
6. The prices of aquatic species fluctuated and sometimes there was no demand for their main products of fish and crab due to insecure and unreliable markets.
7. The government banned the charcoal-making business which lead all the people to focus on one limited and restricted source of income, fishing.
8. Although major legal reforms lead to community-based natural resource management, the inhabitants retain a poor mindset of "First come, first served" frontier mentality which still remains to a large extent and was very difficult to overcome.

Marschke's (2012a) most important finding was that fish and crab populations declined during a decade from 2000 to 2010, because of environmental degradation caused by a lack of government action and ignorance of inhabitants. These days, villagers relied on a combination of business in both fishery and non-fishery sectors where they could survive with less debt and fulfill basic services.

Her study concluded that sustainable natural resource-based livelihoods for local people were not permanent. The important measures and support from government was urgently needed, meanwhile disseminating to change the mindset of local people to actively participate for the implementation of sustainable livelihoods was also needed. Creating alternative livelihoods options, reliable and secure markets, community participation, law enforcements were important measures for the sustainable livelihoods for inhabitants in Koh Sralao village (Marschke, 2012a, pp. 250-268).

Chapter 3

Vulnerability & Livelihood Impacts

This chapter was presented in four sections. The first section briefly overviews the village's geography, the village population, literacy rate, main economic activities, and sand mining. The second section presents different forms of vulnerabilities: shocks, trends, and seasonality that occur in the village. The third section demonstrates the impacts of sand mining on *lifestyle*, natural, human, social and physical assets. The fourth section presents the impacts of sand mining on villagers' economic livelihood and was one of the main research questions.

An overview of the study area

Geography and Infrastructure

Cambodia has 181,035 km² of land, sharing its borders with Thailand, Laos and Vietnam. Cambodia has two main seasons; monsoon season starting from the middle of May to October, and dry season starting from November to April (United Nations Development Program, n.d.).

Koh Kong province is situated in the southern part of Cambodia close to Trat, a province of Thailand. It is also next to other Cambodian provinces such as Pursat, Kompong Speu, Kampot, and Sihanoukville, where it consists of six districts and one town (CDC, 2014).

Prek Angkun village (Figure 3.1) shares its border with Deytamneib and Kaskongknong village in Trapeng Rong commune (Figure 3.2) and is about 59 kilometers (km) from the provincial capital city, also named Koh Kong. The village is located very closely to Prek Angkun River where it was mined for sand by various sand mining companies.

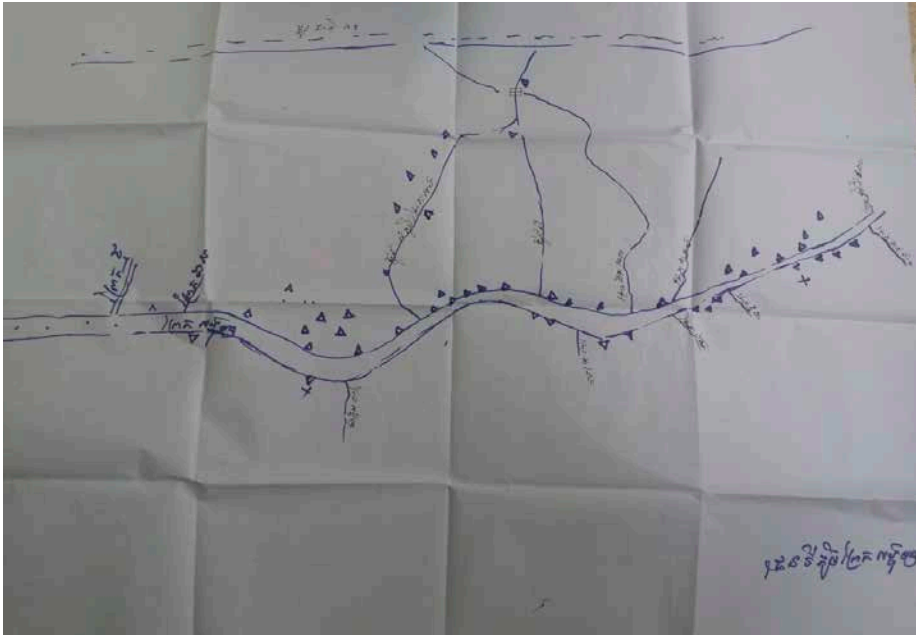


Figure 3.1: Village Headman's hand drawn map
Source: Author, fieldwork note, 2014

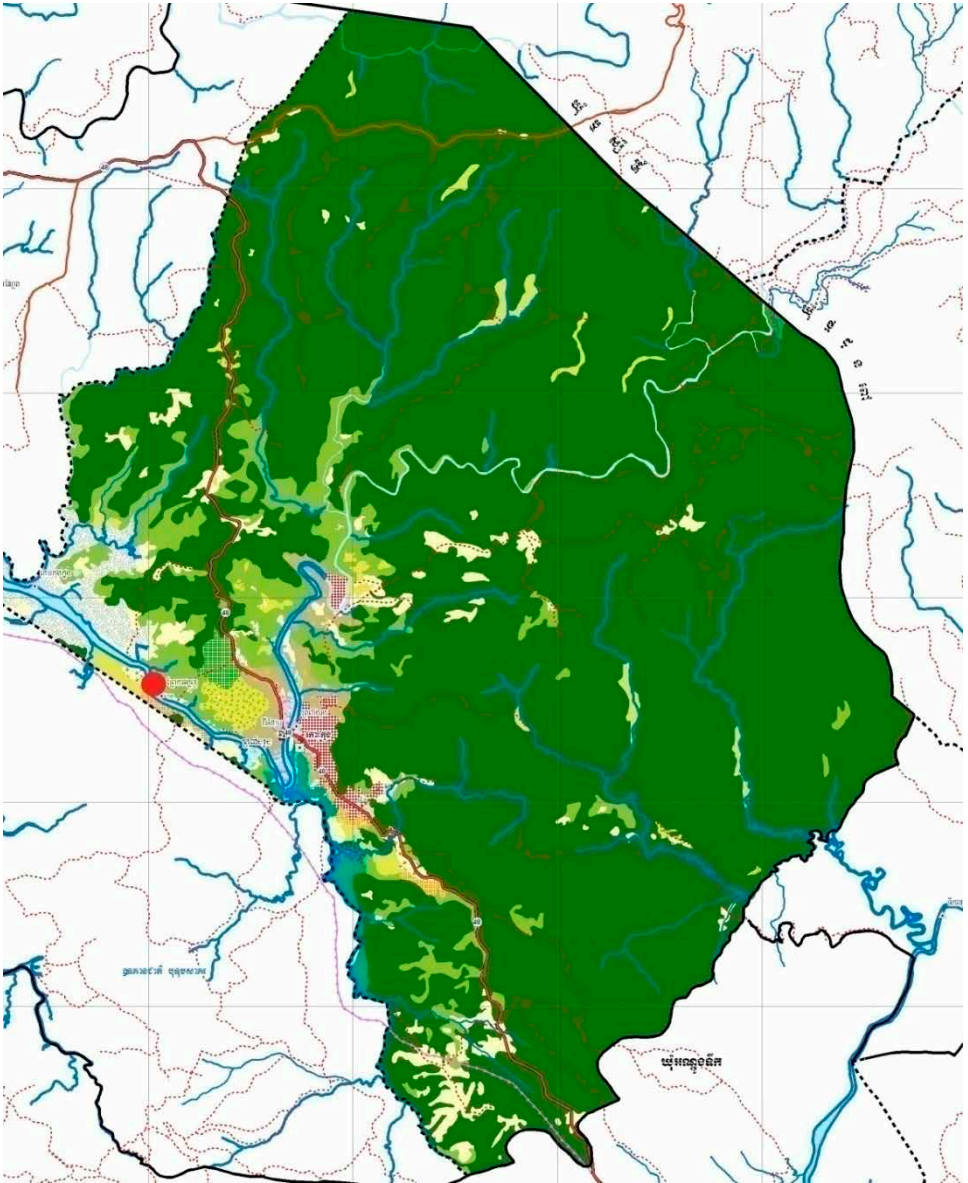


Figure 3.2: Trapeng Rong Commune Map

*Source: Department of Land Management,
Urban Planning and Construction, 2013*

The village does not have adequate infrastructure to meet the local demands and they were in need of improvement and further building development. The village could be accessed by car and motorbike using an unsealed road connected from the main road to the village (Figure 3.3). However, it became difficult to travel during the rainy season. There was no school and no medical center, if people intended to send their children to receive an education or access to medical treatment; they had to travel to either the commune which was about eight km away or the town which was about 59km away. On one hand, villagers can access water wells which were donated by organizations. On the other hand, not all of households have sanitation facility; among 43 households, there were only 16 households that have sanitation facilities, i.e., a latrine (Kingdom of Cambodia, 2013).

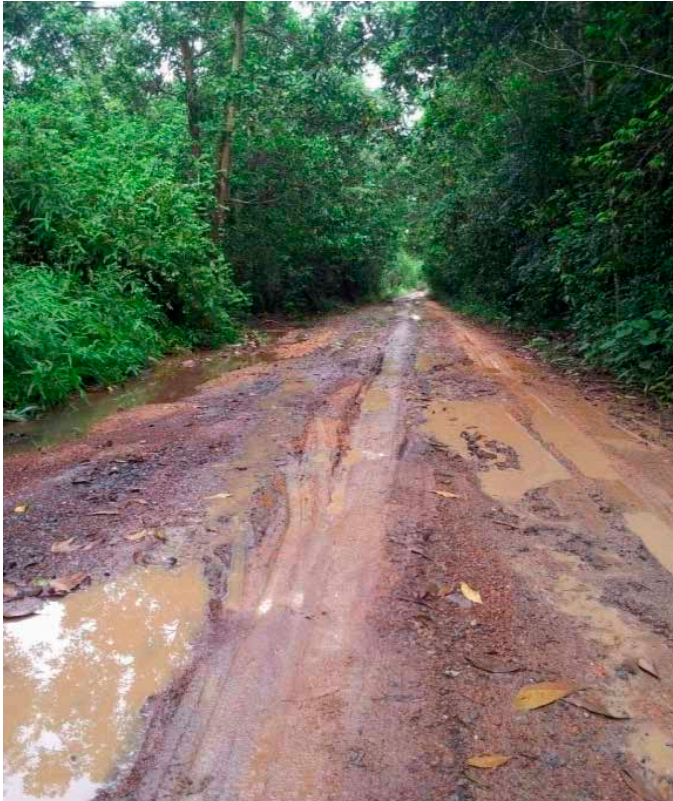


Figure 3.3: An Unsealed Road to the Village

Source: Author, fieldwork note, 2014

Village Population and Education

The Prek Angkun village had a small population consisting of 198 people from 43 households (Kingdom of Cambodia, 2013). Some households were extended family members. Since the village had quite a small number of people, this could be the reason why their houses were not close to each other and villagers reside along Prek Angkun River. The number of people had not increased in 2014.

There was a low education rate and no school in the village which explained the reason why the literacy rate in the village was very low. Figure 3.4: shows almost all villagers had not attended lower secondary school except one who did, while only two villagers attended upper secondary school.

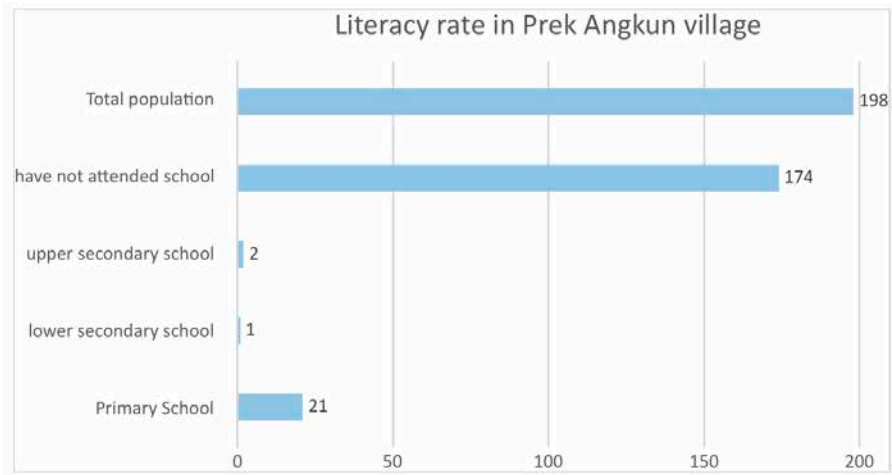


Figure 3.4: Literacy Rate in the Village

Source: Kingdom of Cambodia, 2013

Income Generating Activities

There had been two main livelihoods, fishing and collecting non-timber forest products (NTFPs) from the forest. NTFPs were the natural forest resources that were available other than timber, such as hunting, collecting ant nests, herbs, *rattan*, wild fruits and leaves for making leaf roofing, which were gathered for food and construction. Villagers were able to go to fishing only along the shore; they cannot go fishing in the ocean because they possessed only small

machinery boats and poorer households owned simple rowing boats for fishing. In addition, some of them also grew one or two fruits near their houses such as *Durian*, *Rambutan* and *Pla-Phniev*, but they could not earn much from these fruits as middlemen offered relatively poor prices compared to the prices on the market.

These two main livelihoods were faced with challenges. First, sand mining caused marine life to disappear from the river. However, some of them still managed to undertake fishing by traveling far away from the village. Second, the Cambodian government issued a land concession to a Chinese company. The majority of forest where the villagers had collected NTFPs was cut down by the Chinese company and replaced by planting *Acacia* trees instead.

The villager's livelihood was good before sand mining and land concession companies came to the area. Villagers could find enough fishes and resources to support their families, but for the time being it was hard to find fish and forest resources because they were all gone. There were other economic activities that were run by a few households such as selling groceries, meat and vegetables, and noodles. In addition, some villagers had resorted to migrating to the Koh Kong town and to Thailand to find economic opportunities (Village headman, personal communication, 3 July 2014).

Concessions in the Village

From my observations, I found that sand mining was not the only mining concession that villagers encountered, but also land concessions. The mining concession had stopped extracting sand within the village, but the damage remained along the river from the destroyed mangroves and the collapsed riverbanks, as shown in Figure 3.5. A villager from a household mentioned that he used to secretly catapult stones at the large ship because he was not happy with the presence of the ship causing the riverbank to collapse and producing lot of noise. However, the operations were still continuing along the river in other villages because there were sightings of a few large ships sailing somewhere else. According to GW (2010), the village was under the dredging concession of Udom Seima.



Figure 3.5: Destroyed Mangroves and Collapsed Riverbanks

Source: Author, Fieldwork note, 2014

Although there had been protests in Koh Kong city from other villagers, the Prek Angkun villagers did not participate in the protests. The Prek Angkun villagers did not dare to take action and realized that it will not work because nobody would listen to their voice. However, the Prek Angkun villagers took a different course of action to let their voices be heard by filing a complaint to the village headman. After that, the village headman filed a complaint to the Koh Kong Provincial Governor, but he had not received any response.

Vulnerabilities in the Village

Vulnerabilities in the forms of shocks, trends and seasonality that occurred in the village are described in this section. All villagers expressed

similar perceptions, that the barriers to their livelihoods were sand mining and land concessions.

Shocks

Shocks were defined as events that cause assets in particular areas to disappear gradually or affect people who were residing in those places negatively (Ellis, 2000). Examples of shocks were drought, famine and floods that suddenly cause devastation (Chambers & Conway, 1992). This study demonstrated sand mining and land concessions caused physical shocks and economic shocks to the Prek Angkun village. Both shocks had negatively impacted the villagers' livelihoods. Sand mining companies destroyed villagers' fishing equipment and caused riverbanks to collapse; and villagers had not received any compensation from the companies. Villagers needed to spend their own money for the repairs. Although villagers barely found forest resources near the village, they still could find NTFPs from the part of forest which was not cut down or went to other areas which were quite far from the village.

There were different reports about which company was undertaking sand mining in the village. During my interviews, villagers said that the sand mining company belongs to L.Y.P Group. However, according to GW (2010), their map shows that the village was under the mining concession of Udom Seima.

In 1998, MAFF issued a land concession to a Chinese company, The Green Rich Company Limited, for planting Acacia trees and palm oil trees in an area of 60,200 hectares. However, in 2003 an area of 42,200 hectares was cancelled and the company had 18,000 hectares for planting. Land concessions were granted by the government, causing villager's livelihood to struggle. The company received the concession and cleared the forest which was a source of food for villagers. During the group discussion, G2 stated that:

It is hard to make a living now. The money I have got from selling the resources I have collected from the forest is not enough to buy food at the market, i.e. Money I have received from selling a bunch of rattan, consisting of 10 rattans, I am not able to afford pork meat per kilogram. And some months I cannot afford a pack of rice from selling those resources. (personal communication, 5 August 2014)

Trends

Trends might or might not be dangerous although they were foreseeable (DFID, 1999). The decline of income was the trend throughout the village, although villagers still engaged in fishing and collecting NTFPs, their income had dropped significantly. In addition, forest resources and fish stock had also declined significantly.

Seasonality

Seasonal changes in employment and food availability were important to villagers’ livelihoods. Looking at the seasonal livelihood calendar Table 3.1, it showed that villagers can catch fishes and collect NTFPs whenever they wanted during the whole year, but to catch crab and prawn would depend on the season. Times have changed, some villagers were no longer able to follow the same routine.

From my interviews, adult villagers tended to take seasonal and long-term migration for their livelihood. Before, villagers were able to keep a small amount of catches aside for their own consumption and sell the large proportion to middle men or to the market. But now it was very different, some days they could not catch any fishes, and some of them could not afford a proper meal. There were a few types of temporary casual jobs available in Prek Angkun village, such as laundry service and cutting grass, but they were not always available and they were not permanent.

| | | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|-------------------|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Season | Rainy | | | | | ■ | ■ | ■ | ■ | ■ | | | |
| | Hot | | ■ | ■ | ■ | ■ | | | | | | | |
| | Cool | ■ | | | | | | | | | ■ | ■ | ■ |
| Natural Resources | NTFPs | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | Fish | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | Crab | | ■ | ■ | ■ | ■ | | | | | | | |
| | Lobster | | | | | ■ | ■ | ■ | | | ■ | ■ | ■ |

Table 3.1: Seasonal Livelihood Calendar

Source: Author, based on interviews dated 3 July to 8 August 2014

Impact on Villagers' Lifestyle

This study found that sand mining adversely affected Prek Angkun villagers' *lifestyle*: traditional culture, family habits and emotions. All of which were being negatively affected by sand mining and land concessions.

The culture of contributing money during *Pchum Ben*¹ day and offering other items to Buddhist monks was slowly disappearing. Villagers did not have enough money to contribute to *Pchum Ben* festival which was considered a very important religious festival. Its importance was equal to the Khmer New Year festival. It was believed that the souls of deceased relatives might be trapped in hell by *Sdach Yomareach* known as the King of Devils, and during the period of *Pchum Ben* the *Sdach Yomareach* releases all of the souls to come to collect the offerings from their living relatives, such as sons or daughters because those souls were tortured and starved. Therefore, only within these 15 days, those souls were released to be free and could have enough food for the afterlife. People from the living world could not offer such food to their ancestor's souls directly, they must perform a ceremony via monks; thus, they had to bring food to monks at a pagoda, so that monks could pass this offering to their ancestor's souls. If they did not do that, their ancestor's souls will curse them, so that they will face misfortune in their daily life, especially to their livelihood. The village headman mentioned that villagers used to contribute more money, but now some households contribute only a small amount of money and sometimes cannot afford to contribute any money at all. He understands the villagers' difficulties in pursuing livelihood because villagers do not earn much like they did in the past (personal communication, 3 July 2014).

The livelihood constraints from sand mining and land concession also destroyed family leisure habits in the village. Other aspects of villagers' *lifestyle* that had also been affected was that they have to travel further away from their homes and spend more time to locate fish, compared to before when they could just easily fish along the river near their homes. The village headman also mentioned that villagers used to have more time to relax together with their family members, but now they have to work harder than before and go further away to pursue additional livelihoods. Furthermore, the sand mining and land

1 Pchum Ben day is an annual 15 day festival in the Khmer religious calendar dedicated to paying respects to deceased relatives and ancestors by giving food and offerings.

concession caused villagers to be unhappy because their livelihoods which based on natural resources were being damaged (personal communication, 3 July 2014).

Impact on Villagers' Physical Capital

Physical capital consists of infrastructure and other necessary goods that were needed to support daily livelihoods. Infrastructures were public goods that can be utilized without any direct payment.

Through my observations of Prek Angkun and the surrounding area, the infrastructures available did not meet the villagers' needs. During the rainy season the unsealed roads were hazardous (refer to Figure 3.3), putting burden on villagers when they had to travel to the nearest health center, which was far away from the village.

In addition, electricity was also another issue, some villagers managed to have electricity from their own small generator and for those who could not afford the price of a generator simply had no electricity. The majority of villagers lived in wooden houses; however some villagers still lived in huts, and some even without walls, especially households that had only one breadwinner.

Typical possessions that villagers usually owned individually were items like a small fishing boat, a small engine boat, fishing nets, a motorcycle, and a head torch. Not all villagers possessed these items, but at least villagers will have the basic small fishing boat, fishing nets and a head torch.

Through my interviews, villagers reported that their fishing nets were sometimes destroyed by sand mining ships and they did not receive any compensation from those mining companies. One villager said: "Sometimes sand mining ships destroy our nets, no one dares to ask for compensation because we are aware that they won't pay any compensation and we dare not do so" (G1, personal communication, 5 August 2014). Also, another villager said that:

Sometimes sand mining ships come, they destroy our nets and go away without paying any compensation, and we have to spend around 20,000 [KHR]² to repair those nets by

2 US\$ 1 is equivalent to 4,063 Cambodian Riel (KHR)

ourselves. We cannot ask for any compensation (H8, personal communication, 3 August 2014).

So it could be said that sand mining companies, land concession companies and the RGC did not provide any assistance to villagers in the form of compensation.

Impact on Villagers' Human Capital

Human capital consists of skills, education, knowledge and good health that helped villagers to pursue their livelihood activities. Besides fishing and collecting NTFPs, the villagers also possessed other skills, such as growing crops and rice, the latter was grown occasionally for their own consumption only.

A few households possessed other know-how skills such as building a house and making a boat. Among the nine households that were interviewed, the breadwinner of the household usually possessed the skill of making a boat. Another household's breadwinner had the skill of constructing houses to supplement their main livelihood skills. According to Village-Commune Record, the village has a very low literacy rate but, villagers were able to speak two languages, in both Khmer and Thai fluently.

However for the elderly, due to ailing health they were not able to actively participate in the main economic activities and so became dependent on financial support which was not permanent, i.e. doing a bit of work around the house, growing crops and helping other villagers on the farm. They mainly received non-regular financial support from their sons and daughters, who had migrated to work in Thailand. The village headman mentioned that a lot of adults who were capable to work had migrated to Thailand (personal communication, 3 July 2014).

On one hand, low education was a barrier that prevented villagers from getting proper jobs which was exacerbated further by the negative effects of sand mining and land concessions. Since villagers' income was dropping because of livelihood challenges, some have migrated to find jobs in the town or to Thailand. With this low level of education the jobs that they could find were limited to jobs that required intense labor with little payment, such as factory workers or construction jobs.

Impact on Villagers' Natural Capital

Natural capital referred to natural resources, land, water and biodiversity that villagers can access to secure their livelihood. Prek Angkun villagers relied on these very same natural resources that were in decline, which was caused by the presence of sand mining and land concession companies. Forests and marine life were vital for their livelihood and survival. However, those natural resources, sea beds and other areas were being affected. Villagers could usually go fishing wherever and whenever they wanted, but for the time being they could not fish in the river nearby due to the lack of fishes available. So there was no choice, but to go far away from the village to go fishing and collect NTFPs.

Sand Mining Impacts on Land and Mangroves Along the River

Sand mining companies utilized large and heavy dredging ships to extract sand from the bottom of river and also from river banks where mangroves grew, this caused much damage to mangroves and flat land. Extracted sand was packed and loaded into big trucks and delivered to meet the needs of construction businesses. In 2012, the mangroves that were in the estuary of the Prek Angkun river was cleared to build a port for sand mining ships, and for other sand mining activities, such as packing and loading sand into big trucks. Another part of the flat land had been cleared to build a platform for a transportation structure. Sand mining destroyed the riverbank and it eliminates nutrition from the site for specific birds that search for food at the riverbank (Panchang, 2014).

Mangroves were home to 164 types of fish species and they provide food and safe shelter to small fishes (Roach, 2004). In addition, the riverbed was also home to a number of fish species. Thus, when sand mining destroyed mangroves and the riverbed it meant it destroyed the biodiversity which the villagers' relied on for their livelihood.

There had been significant negative impacts on mangroves and river banks along the Prek Angkun River (refer to Figure 3.5). H7 reported that they cannot fish near the village anymore because the sand mining operations have made the bottom of the river very deep therefore, the fishes have all gone. This forces villagers to travel as far away as about 10 km from the village just to find fish. H7 also said that before sand mining companies came, they could find

fishes easily along the river near their village (H7, personal communication, 8 July 2014). The village headman added that:

Before sand mining companies came, villagers did not have to worry about their livelihood because there were a lot of fishes in the river along the village. Villagers could go to do fishing one time and stayed at home a few days. It was enough for a few days. Sand mining only damages riverbed which is home to marine life by extracting sand from riverbed, but it also extracts sand near the riverbank where mangroves growth [grow] which cause [causes] the bank [riverbank to] collapse and mangroves which are home and food to marine life are also [to be] destroyed (personal communication, 3 July 2014).

Polluted Water

The GW (2010) report found that sand mining had also occurred in the other rivers of Koh Kong Province such as Sre Ambil, Ta Tai and Koh Por. The mining operations polluted the water and caused it to become turbid. At the time of collecting the primary data in the field, I did not find any strange liquid floating on the river, but this could be due to the fact that sand mining was no longer in operation in the village. However, I did witness many sand mining ships constantly passing through the Prek Angkun village. A lot of mining boats and ships can be found along the rivers in the city (Abdullah & Tat, 2012).

In the key informant interview with the official from the DoF, Koh Kong, he said that “the EIA was conducted in a way to show that there is no negative impact at all, making it look only good” (personal communication, 8 August 2014). However, villagers and the DoF official claimed that they saw floating liquid which was the result of using chemicals to wash sand. They continued to say that sand mining operations had caused the turbid water. Although they had seen these pollutants, they could not do anything (personal communication, 5 August 2014). The official from the Koh Kong DoF stated that:

The assessment does not reflect the reality. A lot of villagers complained about the sand mining, and I reported the incident to a higher ranking official, but I have not received any response. Sand mining operations causes water pollution and

make the villagers unable to do fish farming (personal communication, 5 August 2014).

Land Concession's Impacts on Forest Resources

Land concession was another challenge and constraint to villagers' livelihood. The Cambodian government had allowed a Chinese company to receive a land concession to clear almost all of the forest where villagers used to collect NTFPs nearby. The village headman mentioned that: "Before land Concession Company came, there were plenty of forest resources. If it would not be destroyed, villagers can harvest the resources in ten years or more than that" (Village headman, personal communication, 3 July 2014).

The village headman continued to say that the Chinese company made a lot of profit from demolishing valuable trees to be exported to China. After demolishing the majority of the forest, the company had planted Acacia trees (personal communication, 3 July 2014). The village headman also reported that before planting the trees, the company used a chemical fertilizer to spread over the land after it had been cleared, and in doing that the other plants will not grow, except only the Acacia trees (Village headman, personal communication, 3 July 2014).

Furthermore, some other villagers were still pursuing NTFPs, but they have to travel much farther away from the village.

Sand mining makes the water becomes turbid, and it is impossible to catch fishes, crabs, prawns, lobsters. Also company that receives concession has cut down almost all the forest I used to go to collect resources. If the forest had not been cut down, I would not have to worry about livelihood. Before sand mining and land concession Company came, there were a lot of fishes and forest resources, and I could find them easily, but now they are hard to find. Some days I cannot find any (H4, personal communication, 3 July 2014).

Impact on Villagers' Social Capital

Social resources were in the forms of networks and relationships that existed in households. In rural livelihoods, the social resources influence people's access to physical resources that they utilized for their livelihood strategies.

Among villagers interviewed, households that had family members who could migrate to work in Thailand already had relatives or friends working there. For example, one breadwinner of a household had gone to work in a construction factory, and introduced his son-in-law to work there. In another household, one family member worked in a town factory and had asked her sister-in-law to join her.

Family Disintegration

The mining caused family separation. The village headman mentioned that a lot of adult villagers had migrated to work in Thailand (personal communication, 3 July 2014). Among the nine households in this study, two households were very old and sick, and had no sons and daughters to help take care of them because they had gone to work in Thailand. They left the village because they could not make a living from natural resources anymore. So for the elderly, they only got to see their sons and daughters when they returned from Thailand to visit. Through my observations, it was rare to meet young male and female working adults. Some villagers took up seasonal migration work which was usually in the town; or a factory; or in construction.

Quality of Life

There was a great sense of unhappiness in the village toward sand mining operations and the local authority. Both sand mining companies, land concession companies and the government did not provide any assistance to villagers in the form of compensation. All nine of villagers answered that they were discontent with the mining. It was made even worse when villagers filed complaints to local authorities and they never received any response or solutions for the issues that they raised

Impact on Villagers' Economic Livelihood

One of the primary sources of income for the villagers was natural resources. When these declined, villagers turned to other non-natural resource based livelihood activities.

Declining Income

Most villagers claimed that their declining incomes were caused by sand mining and land concession as their catches and income declined significantly compared to before. Figure 3.6 shows the before and after earned income results from the nine households interviewed. One villager, H1 stated he used to catch fish, crabs and prawns from approximately 10 kilograms (kg) to 30kg per day and earned about 800,000 KHR to 900,000 KHR. But, now he was only able to catch between only half kg to one kg or sometimes he catches nothing, and makes less than 50,000 KHR (personal communication, 3 July 2014).

Another villager interviewed, H2 used to make a profit between approximately 200,000 KHR to 1, 000,000 KHR per day selling catches of between 20kg to 30kg. Now he makes less than 20,000 KHR per day selling NTFPs or catches by travelling to other areas. (personal communication, 3 July 2014).

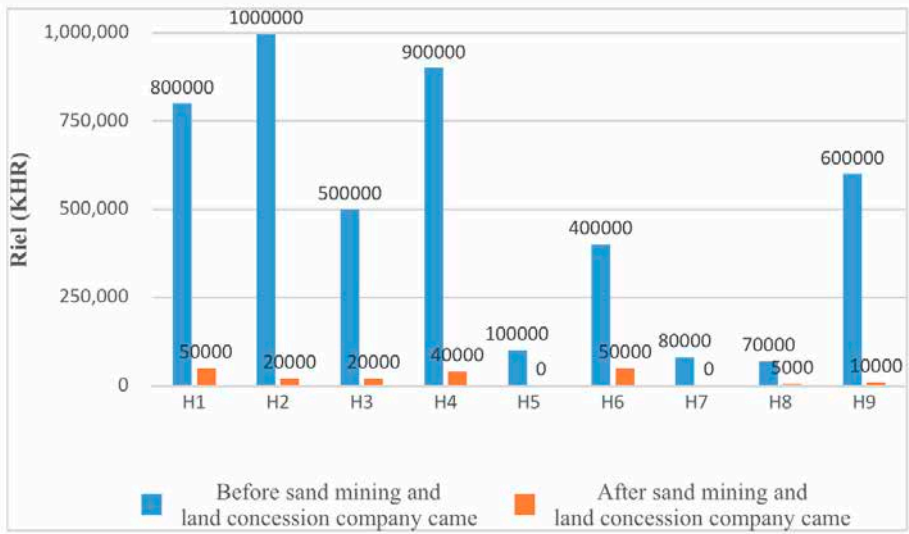


Figure 3.6: Income Estimates

Source: Author, based on interviews dated 3 July to 8 August 2014

This also caused a lot of people to face financial constraints. Having interviewed nine villagers, six people were already in debt and borrowed money from neighbors. There were two households who were mainly dependent on their son's and daughter's remittances. Furthermore, households that had extended family also received a loan from the bank, even though their family members were involved in economic activities in order to earn income to support their family.

Villagers Face Difficulty in Affording Food in the Market

Despite having multiple income sources, villagers still faced difficulty in coping with purchasing foods because they could not find enough money like before. Some villagers could not afford to have proper meals and some others bought foods on credit.

I face difficulty in affording [a] proper meal, I eat eggs almost every day because our household mainly relies on our sons and daughters' remittance, which they send about 5,000THB³ or 6,000 THB in three to four months, and my irregular incomes from helping other villagers out in the village (H6, personal communication, 5 July 2014).

Another household that had diversified their livelihood with help from family members, also encountered a similar situation. She said "I sometimes purchase food on credit at the market because I do not have enough. After a few days, I have to pay" (H9, personal communication, 3 August 2014).

Livelihood Activities in the Village are Changing

Breadwinners of three of the households interviewed mentioned that they still pursued only fishing and collecting NTFPs, but farther away. While other households said that they had added other livelihood activities, and had their family members also entail pursuing economic activities in order to earn more income because their incomes from fishing and collecting NTFPs were not enough to support their living. One daughter-in-law of an extended family mentioned that:

3 US\$ 1 is equivalent to 32 Thai Baht (THB)

Since we cannot earn enough nowadays, and also this season it is hard to catch lobsters and crabs; therefore, one of our family members is working at a factory in the town, and I am going to follow her as well in order to earn money to support our family (H6, personal communication, 5 July 2014).

From the group discussion with the other five villagers and an interview with the village headman, I found that some villagers were no longer able to follow their normal livelihood routines. Table 3.2 showed that from the nine households, the households had changed their livelihoods when compared to the time before the sand mining and land concessions came to the area. Although some villagers still followed the same routine, they admitted that their income was not as high like before. Since there were multiple ways of exploiting resources in the village, this could be the reason that only three villagers still mainly relied on natural resources for their income.

| | Livelihood activities before sand mining and land concession | Livelihood activities after sand mining and land concession |
|----|---|---|
| H1 | Fishing, collecting NTFPs and growing fruits | Fishing, collecting NTFPs, and growing fruits |
| H2 | Fishing and collecting NTFPs | Fishing and collecting NTFPs. |
| H3 | Fishing and collecting NTFPs | Fishing, collecting NTFPs, and laundry |
| H4 | Fishing and collecting NTFPs | Fishing and collecting NTFPs. |
| H5 | Growing rice, fruits, and fishing | Stays at home because he is sick. His son and daughter migrated to work in Thailand. The household relies on remittances and other villagers' assistance. |

| | Livelihood activities before sand mining and land concession | Livelihood activities after sand mining and land concession |
|----|--|---|
| H6 | Hunting, collecting NTFPs and fishing | Hunting in forest and fishing. His family members are also involved in economic activities. His son helps with fishing, and his daughter and daughter-in-law migrated to the town to work in a factory. His wife occasionally helps him fishing. |
| H7 | Fishing and collecting NTFPs. | Stays at home. Her sons and daughters were working in Thailand. She occasionally hired by villagers in the village to do a bit of work in the village. |
| H8 | Fishing and collecting NTFPs. | Her husband undertaking fishing, collecting NTFPs, and she was involved in raising chickens and making leafed roofing. In addition her son also involved in collecting NTFPs and fishing |
| H9 | She stays at home, but her husband were undertaking only fishing and collecting NTFPs. | Her husband has to migrate to work in the town during rainy reason with her son-in-law. Her son also involves working in fishing, collecting NTFPs, and growing rice. |

Table 3.2: Villager's Livelihood Activities

Source: Author; based on interviews dated 3 July to 8 August 2014

Having seen the seasonal livelihood calendar in Table 3.1, it can be presumed that villagers had many ways of making a living from natural resources. Basically, they all could go fishing and collect NTFPs throughout the whole year. Only at the end of the hot season, from May, was the most promising period because they could find fishes, fish, crab and lobster. Two types of fish, crab and lobster, were very valuable on market and this was when they could potentially earn more than in other seasons. Although villagers usually undertook fishing for fishes and collected NTFPs, they were actually more interested in fishing for crabs and lobsters.

It was also interesting to look at the ways villagers exploited the natural resources; their livelihood activities based on natural resources did not follow any regulations. Villagers continued to undertake fishing throughout the whole year without a break, even during breeding season, i.e. villagers also collected lobsters from May to July which was the period where lobsters migrate elsewhere to lay eggs. In addition, villagers went hunting and set up traps for wild animals that were usually banned by Cambodian laws. However, their catches and collections differed from the past, as their earnings had declined markedly, leading to traditional livelihoods being damaged.

From the multiple ways of making a living based from natural resources, although those resources have almost all disappeared, some villagers could still make a living by collecting natural resources from other places. Three out of nine villagers interviewed were still undertaking livelihood activities based only natural resources expressed that:

Although my income dropped because of those concessions, I am still doing it because I really like doing it. In addition, when my son [grows] growth, I want him to undertake this livelihood because it is easy to make money. If he gets a job at factory, he will not earn as much as this (H1, personal communication, 3 July 2014)

In addition, some villagers did not follow the same routines anymore. They still went fishing, but since they have less income from fishing, their family members had to migrate to find jobs' working in garment making factories or construction sectors during the rainy season and come back to their traditional livelihoods after the rainy season was over. The rainy season was their most difficult time of year to do fishing because of the high level of water, heavy rain, big waves and turbid water caused from sand mining. The issue of migration is discussed in more depth in the next chapter.

Debt

Unlike the past, villagers now earned less from fishing because they could catch only a small amount of fishes and some days they caught nothing. This growing trend where families could barely earn enough to support themselves seems to be the driving factor that caused a lot of them to resort to borrowing

money from the bank or neighbors. Five out nine villagers said they had borrowed money from bank and a few of them used to borrow money from relatives. H6 mentioned that:

My son came from fishing at other [another] village, and he not only could not catch any fishes, but had to spend a lot of money on gasoline. We need to borrow money from bank in order to buy some crab traps and gasoline (H6, personal communication, 5 July 2014)

Two villagers interviewed did not want to borrow money from bank , they said that:“I do not have money to pay back, so I dare not to borrow money from bank” (H7, personal communication, 8 July 2014 & H6 personal communication, 5 July 2014). For another two villagers, one of them used to borrow money from relative, and the other also used to borrow money from bank and was thinking to borrow money from bank again because she does not have enough money to treat her sick husband (H9, personal communication, 3 August 2014). The village headman mentioned that:

A lot of villagers borrowed money from bank. They get loan because they need money to buy crab traps which are not good quality and prepare other materials to do fishing. Although many villagers receive loans for bank, but so far there is no one has left the village because of debt (Village headman, personal communication, 3 July 2014).

Chapter 4

Coping Strategies & Livelihood Outcomes

This chapter described my findings regarding pursued coping strategies demonstrated by vulnerable villagers and their livelihood outcomes. This chapter explored how Prek Angkun villagers coped with economic livelihood challenges which were caused by sand mining and land concessions, and if those coping strategies could help villagers to mitigate their livelihood challenges.

Coping Strategies of Vulnerable Households

This study found that households diversified their economic activities. Also, other household members were becoming involved in economic opportunities in order to cope with challenges. Almost all of the interviewed households were involved in more than three coping strategies, but at the very least, they had two main livelihood activities which were fishing and collecting NTFPs. These coping strategies were divided into four main parts, such as economic activities based on natural resources and non-natural resources, social networks and various types of migration (seasonal, long-term and permanent migration).

Coping Strategies Based on Natural Resources

As mentioned earlier, villagers' had at least two main livelihood activities. They were undermined by sand mining and land concessions. Despite these challenges, some villagers still managed to find natural resources which were less abundant near the village, but consequently they had to travel farther away from the village. One villager had said she can collect leaves and *rattan* that were still available nearby, but not much. She and some other women made leafed roofing when she received an order from buyers outside of the village, which was not regular (H8, personal communication, 8 August 2014). In addition, another villager said he had to go somewhere where sand mining had not yet taken place in order to catch fishes, crabs, and prawns. Although he still could catch fishes, his catches were not the same as before. He said his catches have significantly dropped (H4, personal communication, 3 July 2014).

To cope with livelihood challenges, some villagers were also involved in other economic activities such as farming and rearing livestock. Villagers could still collect herbs and other NTFPs from forests located far away from the village. Furthermore, some non-governmental organizations (NGOs) had helped villagers with raising livestock, but as there were only a few number of households that raised chickens, it seems the projects were unsuccessful.

Coping Strategies Based on Non-Natural Resources

These types of strategies were economic activities in which the villagers had pursued casual work that was available in the village or outside the village through social networks and three forms of migration.

Temporary Work within the Village

The existence of casual work and the option to migrate were often chosen by villagers to cope with their livelihood challenges. Among the interviewees, two households were involved in manual labor jobs which were available occasionally in the village. In one case, a woman helped other villagers with taking care of farms, and her sons and daughters have migrated to work in Thailand (H9, personal communication, 3 August 2014). In another case, a widow was the breadwinner of the household and was involved in providing laundry services to other villagers. She mentioned that:

If villagers call me to do laundry, I will come. But I prefer to do fishing because I can earn more than this work. Since the fishing now is very difficult because of sand mining, which is the reason why I do the laundry to supplement my income (H3, personal communication, 3 July 2014)

Social Networks

This coping strategy consisted of access to loans, receiving gifts, providing alternative lands for livelihood purposes, motivation and remittances. There were no financial institutions stationed in the area, but a number of bank staff regularly visited once or twice per month, so that villagers could request loans if they attempted to. Five out of nine interviewed villagers admitted that they received loans from the bank or from neighbors. There was a saving group⁴ in operation in the village with twelve people that could afford to join the group.

The village headman reported that, with a few exceptions, almost all households had extra land besides their housing land (personal communication, 3 July 2014). However, these plots of land had not been used intensively for economic activities; they were used for growing crops and rice for local consumption, and some households did not grow anything on their land.

Four of the interviewed households received remittances from their son, daughter, or husband who had migrated to work in the town or in Thailand. However, amongst these four households, there were two households that strongly relied on remittances.

Migration

Migration was another type of coping strategy that people resorted to in order to ease their livelihood difficulties. In the Prek Angkun village, villagers took various forms of migration, seasonal, long-term and permanent to cope with their livelihood challenges. In order to ease their livelihood difficulties some household members tended to take seasonal migration to the town, especially during rainy season and then returned to the village to resume fishing once the season ends. Members from two households had migrated to work in a factory or as factory constructor in the town. The husband and the son-

4 A group of twelve villagers pay 10,000 KHR every month per person.

in-law of H7 were able to work in building a factory because the husband received training in that skill before. Typically, daughters of the households usually worked in a factory that did not require any specific skills. When interviewing H5 & H7, both said their sons and daughters have migrated to work in Thailand, they occasionally sent remittances and returned to the village to visit them.

According to the village headman, there had been 13 families that migrated permanently to live elsewhere in either Koh Kong province or to work in Trat province in Thailand. Furthermore, villagers mentioned that they already had relatives and friends living in the Trat province, therefore, they can find economic opportunities there.

My sons and daughters have migrated to work in Thailand because they could not make any profits [profit] from fishing. The catches were not enough for paying on [the] gasoline. (H5, personal communication, 5 July 2014).

Livelihood Outcomes after Pursuing Coping Strategies

This section demonstrates the results of livelihood strategies that villagers of Prek Angkun have pursued in order to cope with shocks, trends and seasons.

Incomes Declining Despite Various Income Activities

Although villagers had multiple sources of incomes from various livelihood strategies, their income was still in decline. In one example, H4 said that he used to earn about 800,000 KHR per day, but now it has now dropped to approximately 20,000 KHR per day or even nothing (H4, personal communication, 3 July 2014). In addition, despite additional family members also jumping in with additional incomes, their incomes were very different from before and after sand mining as shown in Figure 3.6, leading to the future of villagers' livelihood in limbo.

Villagers' Well-being

The sense of deteriorating general health and unhappiness in the village was growing. Some villagers could still maintain their livelihood and culture

of looking for natural resources, but some of the other villagers had begun to turn to other income sources. There was no support from the RGC or NGOs for the elderly people, so they have to depend on themselves, get help from neighbors and remittances sent from their sons and daughters working in Thailand. One village elder mentioned “I am thinking of getting a loan again from a bank in order to treat my husband’s ill health” (H7, personal communication, 8 July 2014).

In addition, villagers hoped to have a better commune chief to change their situation. According to the village headman, the villagers could vote⁵ but villagers were under the influence of a political group. He continued to say that during commune election period, villagers did not vote for that particular the commune chief, but that person was still in the same position (village headman, personal communication, 3 July 2014).

Furthermore, they were not happy with the sand mining and land concession companies. They were powerless and there was nothing they could do about it except file a complaint to government officials who never responded. Eventually, some families moved out of the village permanently, their reasons for leaving were either they could not make a living or they had married with other villagers from outside of the village, so they have no choice but to follow their partners.

Reduced Vulnerability

Since all households have at least two main livelihoods and some households contain extended families with a combination of three or four economic activities they were able to ease the negative effects of shocks. As a collective group they could help each other to make a living. However, households that were old or sick, and where their sons and daughters have migrated to Thailand, their livelihoods were made even more difficult.

From the nine interviewed households, those that could not cope with livelihood challenges were the two households that have parents who were sick and old, and relied heavily on remittances. Other villagers helped them out

5 In Cambodia, there are two elections, village/commune election and national election. The former is where people vote for a party to hold positions at village and commune level. The latter is where people vote for party that can lead the country.

with providing food and a bit of work for them to do on the farm in exchange for some money, i.e. one household has land with crops, but they were not able to take care of the land because the husband was sick and his wife was busy taking care of him, and his sons and daughter were working in Thailand (H4, personal communication, 3 July 2014). Another household also has similar situation, stating that

My wife and I are not able to do any livelihood activities because I am old and sick, and my wife has to be with me most of the time. We always receive helps [help] from neighbors and relatives plus remittances from [our] son and daughter working in Thailand. These can help my wife and me to survive (H5, personal communication, 5 July 2014)

Villagers' Food Security

Despite having less income from fishing and NTFPs collection, the villagers' coping strategies of consuming less food and buying food on credit helped them to ease the negative impacts of food security. One household, the parents and three sons still faced difficulty in earning money to buy food, the wife took care of the home, and the sons and father participated in economic activities "I sometimes have to get food first and pay money later after one or two days because I have not got enough money." (H9, personal communication, 3 August 2014).

However, there were still some households that did not have proper meals because they did not have adequate finances to buy food. Furthermore, households that have parents that were old or sick, have no proper meals which consist of only rice with boiled eggs (H9, personal communication, 3 August 2014).

Unsustainable Livelihood Activities

Having looked at the seasonal livelihood calendar (refer to Table 3.1), in addition to shocks from sand mining and land concessions, the sustainability of villagers' livelihood based on natural resources was debatable. Some households still managed to have adequate resources for their living, where they manage to go fishing and collect NTFPs for the whole year without break.

They caught fishes and lobsters during breeding season which might exacerbate their livelihoods in the long run.

Allison & Ellis (2001) argue that villagers' traditional ways of fishing might not cause the decline of marine fish stock. This might be partially right, but in the context of the Prek Angkun village it may be slightly different. Since lobsters and crabs were so highly valuable, the villagers could earn a lot of money, somewhere between 800,000 KHR to 1,000,000 KHR per day.

Since there was no fishery community boundary or restrictions on the Prek Angkun river, outsiders from other villages or cities may also come to fish for lobsters and crabs. In 2004 and 2006, the number of families involved in fishing increased from 27,340 to 30,955 (Rizvi & Singer, 2011). In addition, population growth caused an environmental issue which negatively affected biodiversity, possibly endangering sustainable livelihoods and the production of food (Bhandari & Grant, 2007). Furthermore, an official from Koh Kong DoF mentioned that "The total catches in Koh Kong city this year has increased, but individual catches have decreased because there are many more people fishing nowadays" (personal communication, 8 August 2014).

Six out of nine interviewed villagers had started to add other livelihood activities which were non-natural resource based. The depletion of marine life could not be segregated, although the argument that natural resource depletion was due to increasing human population; there were other threats to marine life such as overfishing and illegal fishing. Therefore, these indicators demonstrated that their livelihoods based on natural resources were in great danger.

Chapter 5

Conclusion, Discussion and Recommendations

This final chapter aims to conclude all the findings, discuss the limitations, and provide recommendations and suggestions for further research.

Summary

The aim of the study was to analyze the impacts of sand mining on Prek Angkun villagers' economic livelihood, to identify local villagers' coping responses and to assess those coping strategies for a sustainable livelihood. One more asset, which was *lifestyle* of households, was also explored.

Regarding the sustainable livelihood framework, sand mining caused villagers to be vulnerable because it produced negative effects to their economic livelihood. It found that their earnings from natural based livelihood declined steeply and was the underlying cause that villagers no longer relied on natural based resources.

Although some households in the Prek Angkun village were still pursuing traditional livelihood activities based on natural resources, the majority had begun adding other livelihood activities which were non-natural based. Their coping strategies were migration, diversification of their livelihoods, integrating other family members with various income earning activities, take up temporary work available in the village, reduced food consumption and buying food on credit.

However, my study found that although villagers had different coping strategies, the decline of income and livelihoods were still unstable. Furthermore, the households that were poor faced more difficulties, especially for those who were widows or an elderly couple.

Limitations of the study

This research was carried out in a limited time of one month and arranging time to meet the villagers was also limited because they each had multiple livelihood activities, i.e. some villagers went fishing at night and returned in the morning, and other villagers went fishing or to collect NTFPs in the morning and came back in the afternoon.

In the field, I faced several physical challenges. First of all, it was raining almost every day, making it difficult to ride a bike on muddy and unsealed roads to the village (refer to Figure 3.3).

Second, originally two group discussions were planned with six villagers per group, but due to the topography of the village, it was not possible to walk through the whole village because there were two streams, and villagers live on both sides of the Prek Angkun River. I had to hire a boat to invite them to participate in the group discussions. There was some difficulty with inviting villagers to have group discussions as some villagers still continued with their livelihoods despite the rain. As a result, I managed to have only one group discussion consisting of five villagers conducted in a villager's house during the rain. But, since the field study was conducted during rainy season, most villagers tended to stay at home.

Third, I often had to explain research questions to villagers in very simple Khmer language.

Fourth, I was trying to obtain some information about EIA related to sand mining from an official working at the Provincial Department of Environment in Koh Kong city, but the official stated he had no information related to EIA of the area in question because the department's authority did not cover that area. He recommended that I request the information from the MoE in Phnom Penh. However, once I had reached the MoE in Phnom Penh, I was passed back and forth from one department to another, a sign that I could not have that information.

Conclusion

The study found that sand mining produced negative impacts on Prek Angkun villagers' economic livelihood. Their catches and earnings were very different from before (refer to Figure 3.6) because fish stock has declined due to sand mining. With less income from fishing, a lot of villagers were in serious debt, and some people encountered difficulty in purchasing foods on market. All villagers had to add other livelihood activities which were non-natural resource based. Their livelihood activities had changed from sole dependency on natural resources into adding other economic activities which were not based on natural resources (refer to Table 3.2).

The mining also produced adverse effects to villagers' livelihood assets in various ways. First, livelihoods of villagers' were being affected negatively because sand mining destroyed the natural resources which villagers' relied on, i.e., mangroves and riverbeds which provided shelter and food sources (refer to Figure 3.5), and it was the cause of disappearing marine life. In addition, the mining caused water to become turbid, the operation produced noise, disturbed people's daily life, and it discharged liquid waste from washing sand into the river.

Second, it caused family disintegration where a lot of adult members migrated to work outside of the village, and the majority of them migrated to work in Thailand. They had no choice, because they could not rely on natural resources for their livelihood anymore.

Third, villagers encountered financial constraints because they could not earn as much like before. Some days if they did not find any fishes, they earned nothing, adding to the deficit as they have used up gasoline for the boat journey. Fourth, villagers reported that mining companies destroyed their fishing nets, and they did not pay any compensation, so villagers had to spend more of their own money to make the necessary repairs.

Fifth, sand mining had caused low-educated villagers to be even more vulnerable. Since some of the villagers' could not earn enough to support their living from natural resources, they went looking for any available jobs in the town or other places. However, with such a low level of education, they were strictly limited to jobs that were temporary or required intensive labor with low payment.

The mining did not only produce adverse effects to Prek Angkun villagers' livelihood, but also to *lifestyle*. It was destroying the traditional ancestor offerings and contribution customs in the village. The study discovered that the *lifestyle* of villagers had changed around the *Pchum Ben* ceremony, where they used to contribute a lot of money, but now they could only contribute a little bit of money, or nothing, or they rarely did so. In addition, it produced adverse effect to quality time with family members' get-together as more time was being spent on fishing or looking for NTFPs, compared to before, when villagers went fishing and one catch was enough for a few days.

Vulnerability context and livelihood impacts in the village were revealed in the two main livelihoods, fishing and collecting NTFPs. First, physical shock was where fishing nets and traps had been destroyed by sand mining. Second, villagers had to spend money to repair them. Third, the trends in the village were found to be the decline of earnings from natural resource based livelihood. Fourth, seasonality has found that a few temporary employment opportunities were available in the village. Human assets were found to make villagers even more vulnerable because the literacy rate in the village was not that high, therefore villagers were limited to work in a garment factory or in construction.

Social assets were also found to be affected adversely by sand mining. A lot of villagers had migrated to find jobs in the town and/or Thailand. Some of the adult villagers had migrated, leaving behind old and sick parents with nobody to take care of them.

Villagers had pursued a number of coping strategies in response to their livelihood challenges. Coping strategies in the village were divided into two types, coping strategies based on natural resources and coping strategies based on non-natural resources. For natural resources based coping strategies, villagers' had fishing and collecting NTFPs. And, for non-natural resource based coping strategies, villagers' utilized a number of coping response tools such as temporary work available in the village (laundry and cutting grass), social networks (savings, receiving loans and gifts, alternative lands for livelihood, motivation, and remittance), and migration.

They diversified their economic activities, and households were now involved in at least two economic activities, fishing and collecting NTFPs. Households with extended families, family members also stepped in with other economic opportunities in order to support their living. Borrowing money or receiving loans from bank was another option that villagers had. Six of the

interviewed households had borrowed money from neighbors or banks. The village headman mentioned that now a lot of villagers were getting loans from bank which never happened before.

Reducing meal portions for consumption and purchasing foods on credit was another coping response that some villagers employed. Some villagers reported that they sometimes ate rice with eggs or just porridge because they did not have enough money.

Villagers had chosen to migrate to other places to be involved in economic activities; they practiced many forms of migration, such as permanent, seasonal, and long-term migration. Some of villagers already moved out of the village and some tended to find jobs in the town or other places temporarily, but returned to the village to do their traditional livelihoods again for certain parts of the year. In addition, some family members had migrated to work in other places, especially to find opportunities in Thailand and come back a few times per year.

The results of the coping strategies that villagers pursued varied among the households interviewed, but there were two things that all villagers shared in common which were: their incomes from natural resources were decreasing significantly, and they were disappointed with the sand mining and land concession companies. Three out of nine interviewed households were single families, and their livelihoods only depended on fishing and collecting NTFPs. They said that they could find small amount of fishes compared to before, and sometimes they found nothing, so they had to go far away from the village. Some households who had their family members involved in economic activities, and despite more family members taking up economic opportunities, they still faced financial issues and continued to keep borrowing money from the bank.

In addition, it was interesting that sand mining was not the only issue here; there was another issue which was land concessions. The RGC provided a Chinese company an area of land close to the village, which was originally covered by valuable forest trees to be replaced by planting Acacia trees. The Chinese company demolished almost all of those valuable trees, and perhaps might have benefitted from selling those trees for export. Since villagers' solely depended on fishes and natural forest resources, their income dropped dramatically in comparison to the time prior to the arrival of the sand mining companies and land concession firms.

My research findings were in line with Marschke (2012a, pp. 250-268) when she was looking at the intersection of resource extraction activities and Koh Sralao fishing community's livelihoods. Her study found that sand mining was a major livelihood stress in the Koh Sralao village because it caused a decline of fish stocks. Also, in her study, she found that there were still some households that pursued the fishing activities because they did not have any other options, but the majority of households in the community had diversified their livelihood activities in order to cope with the livelihood stress the community was facing. The study by Marschke (2012a) also discovered that the community's diversified livelihood activities helped them to cope with those challenges, but she was in doubt whether those diversified livelihoods were sustainable. In addition, one among six households had left Koh Sralao village because they wanted to pursue other livelihood activities elsewhere, and get away from debt because they could not depend on fishing for their main livelihood anymore.

Therefore, combining these two studies could potentially reflect the reality of the negative effects from sand mining in operations across the whole of Cambodia. My study's findings seemed to contrast with a report by Pereira (n.d.) in which sand mining operations in India also provided a relatively small amount of positive contribution for local residents. It provided employment, but destroyed their fishing livelihood which was considered far more important than the employment. However, my study did not find any improvement for Prek Angkun villagers and their village.

It can be concluded that sand mining has caused negative effects to villagers' economic livelihood, *lifestyle* and it did not provide any improvement to the villagers.

Recommendations

This section provided some recommendations for the Cambodian government officials whose duties have direct impact on local villagers' livelihoods. There were also suggestions for the Prek Angkun villagers to help themselves rather than waiting for outside aid and assistance, and a recommendation for further research to be explored.

To Government Officials at the Higher-level

I would like to raise some notions that could possibly contribute to help ease villagers' livelihood challenges. Higher level decision makers should revise legislation and reinforce the laws. The law on Mineral Resource Management and Exploitation (2001) should be revised because it does not clearly state which party will be responsible in the case of mining where it affects villagers' livelihoods, instead it states only if mining affects the landowners, and so the holder of license has to negotiate with affected land owners before commencing operations by paying acceptable compensation to land owner.

The government officials at this level should do everything in their capacity to ensure that mining companies follow the law. The law should be made with more clear and precise detailed guidelines of what the incentive packages were to be paid for affected local residents, if mining cannot be avoided.

If the government allows mining companies to negotiate with local residents, it might not work fairly because those companies may not be aware of the local cultures, and they may try to exploit local residents for their own business interests. Also the local residents may not know how to negotiate with those companies with their low level of education. In addition, this alone might be not able to determine precisely how many residents were affected, and how much of the mining affects local residents; therefore, the government should be involved in these processes acting as an impartial mediator, rather than to allow the companies do it alone.

To Government Officials at the Local-level

Government officials at local levels can take some initiatives in order to help villagers. The local government officials should cooperate with NGOs which can support villagers' livelihoods by providing alternative or similar livelihoods that they want and have a similar or acceptable income. For instance, government officials could cooperate with the Centre d'Etude et de Développement Agricole Cambodgien (CEDAC); a Cambodian Center for Study and Development in Agriculture which specializes in certain fields of agriculture such as raising pigs and growing vegetables which were highly valuable on the market.

In addition, the local government officials could cooperate with other NGOs which have expertise in rebuilding and restoring natural resources, and planting mangroves to allow fishes and lobster numbers to come back, this way villager's can still depend on natural resources for their living and continue with their traditional way of living.

To the Prek Angkun Villagers

Through various observations, I have found that there were plenty of potential opportunities in which villagers can help themselves, rather than waiting for assistance. They can make use of available un-used land to grow several more kinds of fruits such as *Durian* and *Pla-Phniev* because they were very valuable at the town market, as some households already have one or two trees. If they sold them directly to customers, instead of through middle men, they can receive better profits.

In addition, since people still can collect *Rattan* from forests nearby and other forests in the other areas, they do not have to sell the unfinished products to customers directly because they cannot make a lot of money from selling them directly. They can make them into furniture or other equipment for being used in the home and sell them at the town market, by doing that they can earn more without assistance from outsiders and can fully utilize their traditional craft making skills.

Suggestions for Further Research

The research was conducted in short period of time and only covered an element of sand mining phenomena which was the effects of the mining on villagers 'economic livelihood.' It would be more interesting if a research topic of "Political economy of sand mining" could be further explored.

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Appendix 1

Focus Group Discussion in Prek Angkun village (5 August 2014)

| No | Coding Label | Gender | Age | Livelihoods |
|----|--------------|--------|-----|------------------------------|
| 1 | G1 | F | 22 | Fishing and Collecting NTFPs |
| 2 | G2 | M | 49 | Fishing and Collecting NTFPs |
| 3 | G3 | M | 18 | Fishing and Collecting NTFPs |
| 4 | G4 | F | 56 | Making leaf roofing |
| 5 | G5 | F | 28 | Making leaf roofing |

Appendix 2

List of Prek Angkun individual household interviewees.

| No | Coding Label | Gender | Age | No. of members in household | Livelihoods | Interview date |
|----|--------------|--------|-----|-----------------------------|---|----------------|
| 1 | H1 | M | 48 | 5 | Fishing and Growing crops | 3 July 2014 |
| 2 | H2 | M | 27 | 3 | Fishing and Collecting NTFPs | 3 July 2014 |
| 3 | H3 | F | 27 | 3 | Fishing, Collecting NTFPs, and laundry | 3 July 2014 |
| 4 | H4 | M | 38 | 4 | Fishing and Collecting NTFPs | 3 July 2014 |
| 5 | H5 | M | 67 | 4 | Growing crops and rice, and Fishing | 5 July 2014 |
| 6 | H6 | M | 65 | 6 | Collecting NTFP-sand Fishing | 5 July 2014 |
| 7 | H7 | F | 57 | 8 | Fishing and Collecting NTFPs | 8 July 2014 |
| 8 | H8 | F | 35 | 7 | Making leaf roofing and raising chicken | 3 August 2014 |
| 9 | H9 | F | 58 | 5 | Staying at home | 3 August 2014 |

Appendix 3

Key informant interviews

| No | Gender | Occupation | Interview Date |
|----|--------|---|----------------|
| 1 | M | Village headman | 3 July 2014 |
| 2 | M | Official from the Department of Fisheries | 8 August 2014 |

Appendix 4

List of Questionnaires for Villagers

I. Vulnerability

1. Do you think the number of fishing households or fish catchments are decreasing or not? Why?
2. What proportion of output is marketed?
3. How does the price of fish vary through the year?
4. How predictable is seasonal price fluctuation?
5. Through the whole year, when do you spend the most? Does this coincide with the times at which you can earn consistently?
6. Do you have access to services of any financial institution in order to save for the future?
7. How do income-earning opportunities vary through the year?
8. What are the obstacles that have negatively affected your livelihood?
9. What is the main obstacle?
10. How have people reacted to those obstacles?
11. What are the results of those reactions?

II. Livelihood

1. How many members in your family?
2. When did you leave school? Why?
3. What are the knowledge or skills that you possess?
4. What do you make for living?
5. How important is fishing to your livelihood?
6. What are the obstacles make your livelihood difficult? Why?
7. Besides fishing, do you have other livelihood activities?

8. Do you have other properties: Land, Saving, and other reserves?
9. How many income sources do you have?
10. How many times a day do you have meal?
11. What do you usually have for meals? Compared to before are there any differences?
12. Are you satisfied with your meals?
13. Where do you buy your foods?
14. Which month are the leanest times in terms of food?
15. What substitute foods can be used when food is in short supply?
16. What are the major economic activities people doing?
17. How much did you earn per day before sand mining and land concession came?
18. How much do you earn per day now?
19. What was your livelihood before?
20. What is your livelihood now?

III. Coping strategies

1. What are your additional livelihood activities?
2. Before you could involve in other livelihood activities, what are the necessities, skills or requirements that you need to possess?
3. Can those additional livelihood activities help to ease livelihood challenges?
4. Do you prefer fishing or the coping strategies? Why?
5. Have you ever borrowed money from your neighbors?
6. Have you ever experienced skipping meals or reducing the proportion of meal?

Appendix 5

List of Questionnaires for Key Informants

1. What kinds of agricultural products can the community produce?
2. Are there any differences in the types of work men and women can do?
3. Which group in the community has accessibility to any particular resource? And which group does not? Why?
4. What are the prices of foods available in market?
5. What substitute foods can be used when food is in short supply?
6. Describe the types of diseases the community has experienced over the past years?
7. Is there any medical center in the village?
8. Who can access the medical center? Can villagers afford the cost of treatment?
9. Has the community's sanitary conditions become better in the past five years?
10. Are there any non-government organizations working in the village?
11. Do people get social support when they run out of food or income?
12. Do some groups have more social support than others?
13. Is there any discrimination due to ethnicity, stigma, religious or political affiliation?
14. What are the difficulties that the community is facing to pursue its livelihood?
15. What is the main cause?
16. How did people in the community react to the cause?
17. How has the cause affected the community's livelihood?

18. What are the coping strategies that people in the villagers are undertaking?
19. How can they pursue them?
20. How many fishing communities are there in Koh Kong?
21. Is there any fishing community in Trapeng Rong commune?
22. What is the trend of fish catches in the city?
23. What are the challenges of fishing community?
24. In the capacity of local authority, what has been done in order to help villagers to solve those challenges?
25. Do the Koh Kong Fishery Department staff get involved in the EIA of sand mining on fishing communities in coastal areas?

Sand Mining and Villagers' Livelihoods in Prek Angkun, Koh Kong, Cambodia

Sovanny Sreng

Sand mining has been taking place over the past several years—with operations still ongoing—across various parts of Cambodia, especially in the coastal regions. In the southwest region of Cambodia, large areas of natural resources have been damaged, extracted, or replaced. This volume is an attempt to understand the impacts of sand mining on the economic livelihood of villagers in Prek Angkun village of Koh Kong province.

The author examined and explored how local villagers have suffered from nearby mining activities and what they have done to counteract those impacts. This study documents the villagers' various strategies for coping with sand mining and land concessions in their daily lives and documents how they have been struggling with drastic changes to their environment and their traditions—affecting the core aspects of their livelihood and survival.

This research highlights loopholes in current government legislation and offers suggestions for both government and locals alike to ease the impact of sand mining.



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