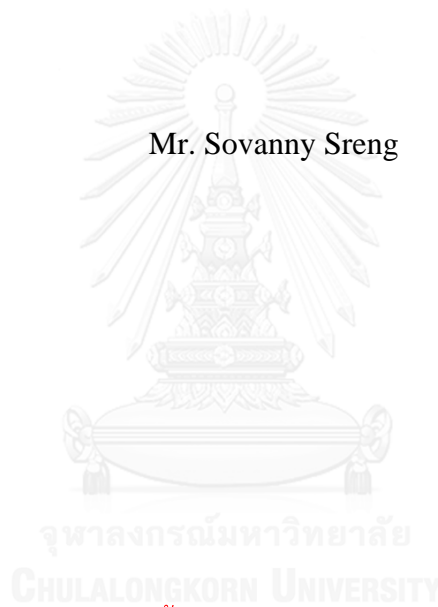


**Sand Mining and Villagers' livelihood in Prek Angkun village
of Koh Kong city, Cambodia**

Mr. Sovanny Sreng



บทคัดย่อและแฟ้มข้อมูลฉบับเต็มของวิทยานิพนธ์ตั้งแต่ปีการศึกษา 2554 ที่ให้บริการในคลังปัญญาจุฬาฯ (CUIR)
เป็นแฟ้มข้อมูลของนิสิตเจ้าของวิทยานิพนธ์ ที่ส่งผ่านทางบัณฑิตวิทยาลัย

The abstract and full text of theses from the academic year 2011 in Chulalongkorn University Intellectual Repository (CUIR)
are the thesis authors' files submitted through the University Graduate School.

**A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Arts Program in International Development Studies
Faculty of Political Science
Chulalongkorn University
Academic Year 2014
Copyright of Chulalongkorn University**

การทำเหมือง ทราย และ การทำมาหากิน ของชาวบ้าน ที่หมู่บ้าน เปร อังถุนที่เมือง เกาะ
อง ประเทศกัมพูชา



วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรมหาบัณฑิต
สาขาวิชาการพัฒนาระหว่างประเทศ
คณะรัฐศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ปีการศึกษา 2557
ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย

Thesis Title	Sand Mining and Villagers' livelihood in Prek Angkun village of Koh Kong city, Cambodia
By	Mr. Sovanny Sreng
Field of Study	International Development Studies
Thesis Advisor	Associate Professor Niti Pawakapan, Ph.D.

Accepted by the Faculty of Political Science, Chulalongkorn University in Partial Fulfillment of the Requirements for the Master's Degree

..... Dean of the Faculty of Political Science
(Associate Professor Ake Tangsupvattana, Ph.D.)

THESIS COMMITTEE

..... Chairman
(Carl Middleton, Ph.D.)

..... Thesis Advisor
(Associate Professor Niti Pawakapan, Ph.D.)

..... External Examiner
(Albert Salamanca, Ph.D.)

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

โสวันนี สแรง : การทำเหมือง ทราย และ การทำมาหากิน ของชาวบ้าน ที่หมู่บ้าน
เปร อังกุนที่เมือง เกาะกง ประเทศกัมพูชา (Sand Mining and Villagers' livelihood in
Prek Angkun village of Koh Kong city, Cambodia) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: นิติ
ภาควิศวกรรม, หน้า.

งานวิจัยชิ้นนี้เสนอการทำความเข้าใจผลกระทบเหมืองทรายต่อชีวิตความเป็นอยู่ทางด้าน
เศรษฐกิจของชาวบ้านเปร อังกุนที่เมืองเกาะกง การวิจัยมีจุดประสงค์คือ 1) เพื่อวิเคราะห์ผลกระทบของ
การทำเหมืองแร่ต่อชีวิตความเป็นอยู่ทางด้านเศรษฐกิจของชาวบ้าน 2) เพื่อระบุยุทธศาสตร์ของชาวบ้าน
ในการจัดการกับความท้าทายที่เกิดขึ้น 3) ศึกษาว่ายุทธวิธีในการจัดการปัญหาจะช่วยลดปัญหาที่เกิดขึ้นได้
มากน้อยเพียงใด

กรอบแนวความคิดเกี่ยวกับชีวิตความเป็นอยู่อย่างยั่งยืนถูกใช้ในการศึกษา นอกจากนั้นยัง
ใช้การศึกษาเชิงคุณภาพเป็นแนวทางในการศึกษา รวมไปถึงการสัมภาษณ์แบบมีโครงสร้าง การสัมภาษณ์
เจาะกลุ่ม การสัมภาษณ์ผู้ให้ข้อมูลสำคัญ ปฏิทินฤดูกาล มีผู้ให้ข้อมูลทั้งหมดจำนวน 14 คน ผู้นำหมู่บ้าน
และเจ้าหน้าที่ประจำกรมการประมงเกาะกงเป็นผู้ให้ข้อมูลในการสัมภาษณ์ ชาวบ้านจำนวน 9 คนเข้าร่วม
การสัมภาษณ์ด้วยความสมัครใจ และชาวบ้านอีก 5 คนในหมู่บ้านร่วมการอภิปรายกลุ่ม มีผู้ให้ข้อมูล
สำคัญ 2 คน หัวหน้าหมู่บ้าน 1 คน และเจ้าหน้าที่กรมประมงถูกขอร้องให้เข้าร่วมการสัมภาษณ์

ผลการวิจัยพบว่าการทำเหมืองทรายสร้างผลกระทบต่อความเป็นอยู่เชิงเศรษฐกิจของ
ชาวบ้าน เนื่องจากการทำเหมืองแร่ทำให้ปริมาณปลาที่เป็นแหล่งอาหารหลักของชาวบ้านลดลง เพื่อรับมือ
กับปัญหา ชาวบ้านใช้ยุทธวิธีในการรับมือผลกระทบดังกล่าวหลายวิธี แม้ว่าชาวบ้านจะใช้วิธีต่างๆ ในการ
รับมือ แต่ชีวิตความเป็นอยู่ก็ยังไม่เหมือนเดิมอย่างแต่ก่อน ชาวบ้านจำนวนมากอพยพออกจากหมู่บ้าน
เพื่อหางานที่อื่นหรือกู้เงินจากธนาคาร

โดยรวมกล่าวได้ว่าเหมืองแร่สร้างผลกระทบเชิงลบต่อชาวบ้านเปรยก อังกุน อย่างไรก็ตาม อย่างไรก็ดี
แม้ว่าในขณะที่ยุทธวิธีในการรับมือยังสามารถช่วยให้เขามีชีวิตอยู่รอดได้ แต่ในระยะยาวหาก
ทรัพยากรธรรมชาติยังไม่ได้รับการฟื้นฟู วิถีชีวิตแบบเดิมก็จะต้องพบกับปัญหาต่อไป

ACKNOWLEDGEMENTS

I would like to express admiration for a number of people who I owe jointly. This thesis would be impossible without their involvement, and they have a great enormous impact on this academic paper.

First of all, I would like to profusely thank to CDSSEA committee who allocated me an opportunity to pursue this master program at the university. Second, I would like to pay profound gratitude to professors, assistant professors, lectures, and staff of Department of Political Science of Chulalongkorn University who do their best and never tire to lecture, guide, and help me while I was attending classes at the university.

Third, I would like to sincerely thank committee members, Dr. Niti Pawakapan, Dr. Carl Middleton, and Dr. Albert Salamanca who provide valuable comments on every stage of writing up this thesis. Without those helpful comments, this paper would not come to this point. In addition, I have received encouragement from classmates who provided advice and gave supports during classes. Fourth, I further like to express my appreciation to villagers who voluntarily contribute to success of this paper and Andrew Hay who helps me with proofreading the thesis Last but not least, I own my family members their firm help, encouragement, care, and love in pursuing this master course.

Once again, you all have significant implication on not just this paper, but also my future career.

CONTENTS

	Page
THAI ABSTRACT	iv
ENGLISH ABSTRACT.....	v
ACKNOWLEDGEMENTS	vi
CONTENTS.....	vii
LIST OF ABBREVIATIONS.....	viii
1.1 Rationale of study	1
1.2 Background information.....	2
1.2.1 Estimation of sand trading in Koh Kong.....	2
1.2.2 Cambodia sand for local and other countries development	5
1.3 Research questions	5
1.4 Research objectives	6
1.5 Conceptual Framework	6
1.5.1 Vulnerability.....	10
1.5.2 Transforming Structures and Processes	11
1.5.3 Coping Strategies	15
1.5.4 Livelihood Outcomes	16
1.6 Method of Study	17
1.6.1 Research location	17
1.6.2 Data Collection Methods.....	17
a. Semi-structured interviews.....	18
b. Focus group discussions.....	19
1.6.3 Justifications for choosing qualitative research.....	20
1.7 Data treatment, analysis, and verification	21
1.8 Arrangement of thesis.....	22
1.9 Scope and limitation of the study	22
1.10 Ethical Issues	23
1.11 Significance of the study.....	24
CHAPTER II: LITERATURE REVIEW	25

	Page
2.1 Introduction	25
2.2 Marine fisheries in Cambodia	25
2.3 Coastal fishing livelihood in Cambodia	26
2.4 Sand mining.....	26
2.4.1 Sand mining in Cambodia	27
2.4.2 Sand mining at coastal rivers.....	27
2.4.3 Laws and institutions.....	28
2.5 Sand mining impact on coastal fishing livelihood	29
2.5.1 Impact on environment.....	29
2.5.2 Impact of sand mining on fishermen’s livelihood in the globe	30
2.5.3 Impact of sand mining on Cambodia’s coastal fishing communities.....	31
2.6 Natural resource activities impact on fishing community’s livelihood: A case study of Koh Sralao village	32
2.7 Ban on export sand	37
2.8 Knowledge gap.....	38
CHAPTER III – FINDING & DISCUSSION:VULNERABILITY, LIVELIHOOD IMPACTS	39
3.1 Introduction	39
3.2 An overview of the study area.....	39
3.2.1 Geography	39
3.2.2 Population and Education.....	42
3.2.3 Income generating activities.....	42
3.2.4 Concessions in the village	43
3.3 Vulnerabilities in the village	44
3.3.1 Shocks	44
3.3.2 Trends.....	45
3.3.3 Seasonality.....	45
3.4 Impact on villagers’ lifestyle, physical, human, natural, and social capital	46
3.4.1 Lifestyle.....	46

	Page
3.4.2 Physical capital.....	47
3.4.3 Human capital.....	48
3.4.4 Natural capital	49
3.4.5 Social capital	53
3.5 Impact on villagers’ economic livelihood	54
3.5.1 Income declined	54
3.5.2 Villagers face difficulty in affording foods on market.....	56
3.5.3 Livelihood activities in the village is changing.....	57
3.5.4 Debt	61
3.6 Summary.....	62
CHAPTER IV – FINDINGS & DISCUSSION COPING STRATEGIES & LIVELIHOOD OUTCOMES	64
4.1 Introduction	64
4.2 Coping strategies of vulnerable households	64
4.2.1 Coping strategies based on natural resources.....	64
4.2.2 Coping strategies based on non-natural resources	65
4.2.2.1 Temporary work within the village	65
4.2.2.2 Social networks.....	66
4.2.2.3 Migration	66
4.3 Livelihood outcomes after pursuing coping strategies.....	67
4.3.1 Various income activities, but incomes declining.....	67
4.3.2 Villagers’ well-being.....	68
4.3.3 Reduced vulnerability.....	68
4.3.4 Villagers’ food security	69
4.3.5 Unsustainable livelihood activities.....	70
4.4 Institutions in the village	71
4.5 Summary.....	72
CHAPTER V: CONCLUSION AND RECOMMENDATION	73
5.1 Introduction	73

	Page
5.3 Conclusion.....	77
5.4 Recommendations	79
.....	82
REFERENCES	82
VITA.....	89



Contents

THAI ABSTRACT	iv
ENGLISH ABSTRACT.....	v
ACKNOWLEDGEMENTS	vi
CONTENTS.....	vii
LIST OF ABBREVIATIONS.....	viii
1.1 Rationale of study	1
1.2 Background information.....	2
1.2.1 Estimation of sand trading in Koh Kong.....	2
1.2.2 Cambodia sand for local and other countries development	5
1.3 Research questions	5
1.4 Research objectives	6
1.5 Conceptual Framework	6
1.5.1 Vulnerability.....	10
1.5.2 Transforming Structures and Processes	11
1.5.3 Coping Strategies	15
1.5.4 Livelihood Outcomes	16
1.6 Method of Study	17
1.6.1 Research location	17
1.6.2 Data Collection Methods.....	17
1.6.3 Justifications for choosing qualitative research.....	20
1.7 Data treatment, analysis, and verification	21
1.8 Arrangement of thesis.....	22
1.9 Scope and limitation of the study	22
1.10 Ethical Issues	23
1.11 Significance of the study.....	24
CHAPTER II: LITERATURE REVIEW	25

2.1 Introduction	25
2.2 Marine fisheries in Cambodia	25
2.3 Coastal fishing livelihood in Cambodia	26
2.4 Sand mining.....	26
2.4.1 Sand mining in Cambodia	27
2.4.2 Sand mining at coastal rivers.....	27
2.4.3 Laws and institutions.....	28
2.5 Sand mining impact on coastal fishing livelihood	29
2.5.1 Impact on environment.....	29
2.5.2 Impact of sand mining on fishermen’s livelihood in the globe	30
2.5.3 Impact of sand mining on Cambodia’s coastal fishing communities... 31	
2.6 Natural resource activities impact on fishing community’s livelihood: A case study of Koh Sralao village	32
2.7 Ban on export sand	37
2.8 Knowledge gap.....	38
CHAPTER III – FINDING & DISCUSSION:VULNERABILITY, LIVELIHOOD IMPACTS	39
3.1 Introduction	39
3.2 An overview of the study area.....	39
3.2.1 Geography	39
3.2.2 Population and Education.....	42
3.2.3 Income generating activities.....	42
3.2.4 Concessions in the village	43
3.3 Vulnerabilities in the village	44
3.3.1 Shocks	44
3.3.2 Trends.....	45
3.3.3 Seasonality.....	45
3.4 Impact on villagers’ lifestyle, physical, human, natural, and social capital.. 46	
3.4.1 Lifestyle.....	46
3.4.2 Physical capital.....	47

3.4.3 Human capital.....	48
3.4.4 Natural capital	49
3.4.5 Social capital	53
3.5 Impact on villagers’ economic livelihood	54
3.5.1 Income declined	54
3.5.2 Villagers face difficulty in affording foods on market.....	56
3.5.3 Livelihood activities in the village is changing.....	57
3.5.4 Debt	61
3.6 Summary.....	62
CHAPTER IV – FINDINGS & DISCUSSION COPING STRATEGIES & LIVELIHOOD OUTCOMES	64
4.1 Introduction	64
4.2 Coping strategies of vulnerable households	64
4.2.1 Coping strategies based on natural resources.....	64
4.2.2 Coping strategies based on non-natural resources	65
4.3 Livelihood outcomes after pursuing coping strategies.....	67
4.3.1 Various income activities, but incomes declining.....	67
4.3.2 Villagers’ well-being.....	68
4.3.3 Reduced vulnerability.....	68
4.3.4 Villagers’ food security	69
4.3.5 Unsustainable livelihood activities.....	70
4.4 Institutions in the village	71
4.5 Summary.....	72
CHAPTER V: CONCLUSION AND RECOMMENDATION	73
5.1 Introduction	73
5.3 Conclusion.....	77
5.4 Recommendations	79
.....	82
REFERENCES	82

VITA..... 89



List of figures

Figure 1: Sand mining in koh kong.....	4
Figure 2: Maps of the country, city, commune, and village	40
figure 3: an unsealed road to the village during raining	41
Figure 4: Mangroves destroyed and river back collapsed	51



Bar chart 2: Literacy rate in the village	49
Bar chart 3: Estimation of the highest income.....	55
Figure 1: Sand mining in koh kong.....	4
Figure 2: Maps of the country, city, commune, and village	40
figure 3: an unsealed road to the village during raining	41
Figure 4: Mangroves destroyed and river back collapsed	51



List of tables

Table 3: Study methods	20
Table 4 : The majority of villagers added other livelihood activities	58
Table 5 : Seasonal Livelihood Calendar	60



LIST OF ABBREVIATIONS



CDB	: Commune Database
CDC	: Council for the Development of Cambodia
CEDAC	: The Cambodian Center for Study and Development in Agriculture
DFID	: Department for International Development
DoF	: Department of Fishery
EIA	: Environmental Impact Assessment
JTC	: Jurong Town Corporation
MAFF	: Ministry of Agriculture, Forestry, and Fisheries
MoE	: Ministry of Environment
NGO	: Non-Government Organization
NIS	: National Institute of Statistic
NPR	: N (Nepalese rupee)
KHR	: Riel (Cambodia's currency)
TVK	: Television of Cambodia
UNDP	: United Nations Development Program
USAID	: United States Agency for International Development
USD	: United States Dollar

CHAPTER I: INTRODUCTION

This section will describe the rationale of study, research questions, research objectives, methodologies, and scope and limitation of the study.

1.1 Rationale of study

Koh Kong is situated in Southern part of Cambodia and closed to a Thailand's province, Trat. It is also next to other provinces in Cambodia such as Pursat, Kompong Speu, Kampot, and Sihanoukville. The province is 11,160 square kilometers (MAFF; cited "Koh Kong,").

The province has population density of 10.5 people per square kilometer. A approximately six ethnic groups (Khmer, Chinese, Cham, Lao, Thai, and Vietnamese) are living in the province (Rizvi & Singer, 2011).

There were 183,000 people in an estimation in 2004, and 48 per cent was female. The total number of children aged not more than 5 year old was 24,000 which was 13 per cent of the total population in the province (NIS, 2004 cited "Koh Kong,"). There were 36,000 households in 2004, and the average household size was 5.0 persons (as cited in "Koh Kong,"). There are 8 districts comprising 33 communes and 132 villages (CDB, 2004; cited "Koh Kong,").

Cambodia's economy still depends on agricultural resources for growth. The main sectors consist of fisheries and forest which accounts for more than 40 per cent of GDP (USAID, 2007; cited Rizvi & Singer, 2011). Fisheries are still important livelihoods among other livelihoods: services (20 per cent), rice farming (31 per cent) and agriculture (64 per cent) in the province. Koh Kong province has 21 per cent of families who depended on costal fisheries (NIS, 2008; cited Rizvi & Singer, 2011). A study showed that almost 90% of households are relying on fishing for their livelihood. The coastal fishery catchment was increasing between 2000 and 2006 from 36,000 tons to 60,500 tons, and the average catchment between the two years was 50,700 tons. The study also illustrated that fish catchment is decreasing rapidly in

recent years because of some challenges, and one of them is sand mining (Rizvi & Singer, 2011).

A study undertaken by Marschke found that Sand mining is the main challenge of villagers in Koh Sralao village. They face declination of marine life, various types of crabs, lobsters, and prawns (Marschke, 2012a). However, high ranking government officials maintain that sand mining does not produce negative effects to local villagers' livelihoods and natural resources because sand mining operations are assessed by environmental experts before they are issued licenses (Sokha & Strangio, 2009; TVK, 2012, Setp 27). In addition, Cambodia has been seen to have good GDP growth in recent years, and it is expected that it will maintain growth within the next few years of about 7.0 in 2014 and 7.3 in 2015 (ADB, 2014). Thus, it is interesting to look at what the cost is that the Cambodia government has paid in order to receive this amazing growth. The Prek Angkun village is situated in a coastal area, where there has been mining for sand and no research has been conducted related to the impact of sand mining to the local's livelihood.

The study was carried out at Prek Angkun village in Koh Kong province because of the village has not been undertaken yet about the impact of sand mining on the local's livelihoods in the area. **The paper's argument is that sand mining has squashed Prek Angkun villagers' economic livelihood, and also looks at what their coping strategies are.**

1.2 Background information

1.2.1 Estimation of sand trading in Koh Kong

The Cambodian government calculates that the amount of sand extracted from Koh Kong is between 40,000 tons and 60,000 tons every month (Global Witness, 2010). However, the government does not mention how much of that extracted sand is used locally or exported. The government also announces that it puts limitation of sand extraction by allowing to have only small-scale operations; therefore, they should not have any considerable negative impacts on environment.

From UN Comtrade Database, Singapore government reported to UN that 3.8 million tons of Cambodia's sand was imported in 2008, while Cambodia's statistics for exporting sand extracted from all over the country cannot be found in the UN database.

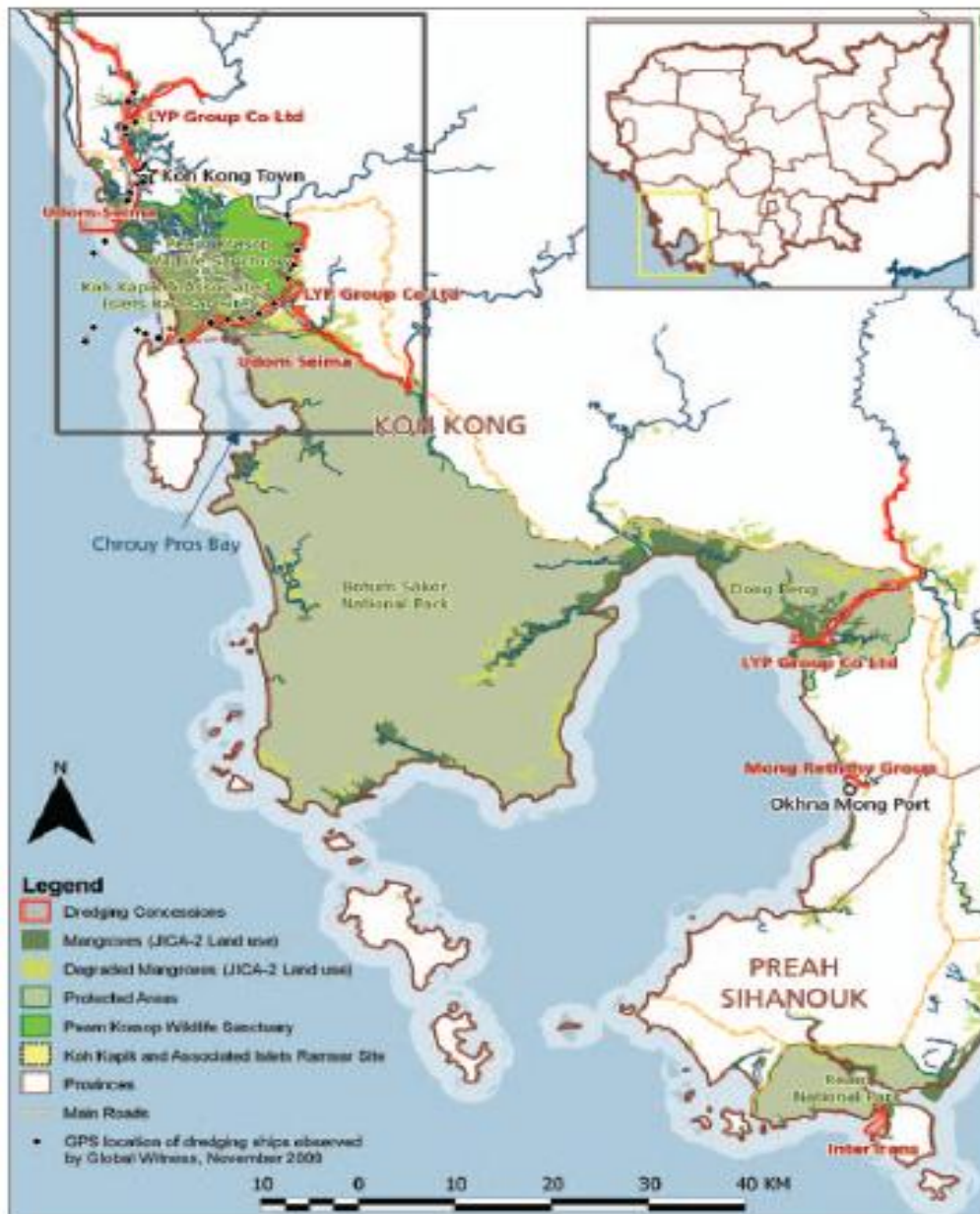
Global Witness has evidence that Cambodia's sand exported to Singapore from Koh Kong is much more than that. The organization found that only one company, L.Y.P. Group Ltd. extracts sand at a rate of about 300,000 tons. Shipping documents of transferring 77,236 tons of sand to Singapore within November, 2009 was seen by the organization. The organization estimated that there is 289,000 tons of sand extracted every month. It also reports that Mong Rethy Group received a license from Cambodia government to do sand extraction at a minimum rate of 10,000 cubic meters every day at a concession area of 54.85 square kilometers. With this license, the company can extract about 379,000 tons of sand every month. Another company, Udom Seima Group Ltd, has a concession area of 17 square kilometers, and it is estimated that it could extract about 117,000 tons of sand per month. Therefore, the combination of these three companies have the capability to extract about 796,000 tons of sand from Koh Kong per month (Global Witness, 2010).

At the place of extraction sand dredgers can sell USD 3 per tons; therefore, with 796,000 tons per month, the value from sand mining sector could be USD28.7 million per year. In addition, the price of selling at Koh Kong port is USD5.60 per tons. However, the Singapore government agency JTC reported that it buys sea sand from mediator companies for about USD26 per tons, which is about 9 times higher in price. With the price and 796,000 tons of sand monthly imported from Cambodia, the sand trading in Koh Kong would be about USD20 million per month, and USD248 million per year. However, this is just only an estimation from only three companies which are undertaking sand mining in only Koh Kong Province; there are 11 more concession companies which are operating to extract sand along Cambodia's other coastal areas who still remain unknown (Global Witness, 2010).

The Cambodian government issued a Prakas (proclamation) announcing in 2009 to set the cost of sand per tonne at USD 1.50, which is nine times different from the actual price. With the estimation of 796,000 tons of sand extraction per month, the government is expected to receive revenue of USD 10.7 million per month. Due to

lack of information of the budget and how it is calculated, it is not possible to know how much the revenue kept in the Cambodian national treasury (Global Witness, 2010).

Figure 1: Sand mining in koh kong



Source: (Global Witness, 2010)

1.2.2 Cambodia sand for local and other countries development

Although, due to the boom in demand for sand for local construction, and other countries' demand for their development, sand extraction is occurring at a massive scale, there is no clear information about where the sand goes. There is no official report from the government stating which countries are Cambodia export sand to, and exactly how much sand is utilized locally and how much for export. However, there have been reports from Global Witness and The Cambodia Daily newspaper that a lot of Cambodian sand is exported to foreign countries. In the Global Witness's report, a lot of Cambodia sand is exported to Singapore for massive development projects (Global Witness, 2010). The Cambodia Daily reported that Cambodian sand worth USD1.5 million could be seen at India's port of Cochin in 2013, although the Cambodian government announced that it banned the export of sand in 2009 (Willemys & Naren, 2013).

1.3 Research questions

This study conducted to explore for answers of the following three research questions:

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

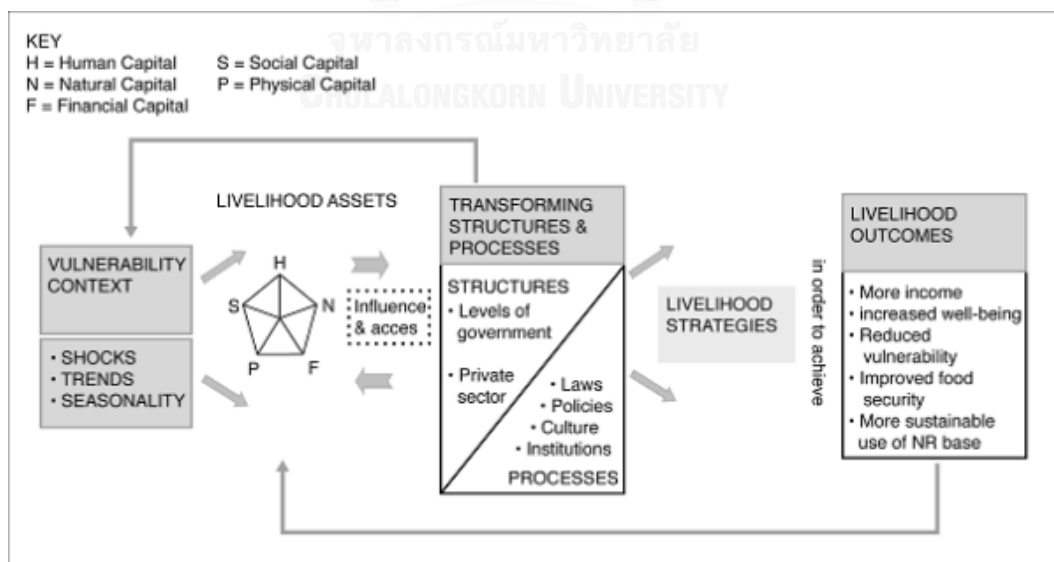
1.4 Research objectives

The study has 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.

1.5 Conceptual Framework

DFID's Sustainable Livelihood framework was used in this study. Within the framework, there are five assets that influence villager livelihood activities which are: livelihood assets, vulnerability context, transforming structures and process, and livelihood outcomes (DFID, 1999)



Source: (DFID, 1999)

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

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

. Accessibility to those activities and assets is allowed by *Transforming structures and processes*.

. The sustainability of livelihood is also impacted by outside factors which are *vulnerability context* consisting of trends, shocks, and seasonality. *Trends* may involve increasing and decreasing price of fishes and declining fish stock, and other factors that are not relate to fisheries which affect to households, increasing price of commodities. *Shocks* consist of natural disasters: storms, tsunamis that destroy facilities, value of money decreasing affects cost of inputs for fishing and loss or damage of fishing tools. *Seasonality* consists of availability of employment and food during difficult circumstances.

. Livelihood assets allow *coping strategies* to be utilized by affected households to response to livelihood challenge.

. Last but not least, *outcomes* is related to the results after affected households have pursued coping strategies. Livelihood sustainability is achieved when people can meet their present needs, without compromising the future generation's needs. When vulnerability to seasonality, trends, and shocks is reduced, food security is improved, and there is sustainability in natural resource usage, social engagement and empowerment.

Although the framework has been used for a while and attracted some popularity, there are weaknesses that have been discovered. First of all, the framework focuses only on marginalized people, and does not consider the implications of rich people in the area (Moser et al., 2001). In addition, there are some elements, class, gender, market, and ethnicity, that are absent from the framework. Furthermore, the framework emphasizes exploring the causes or phenomena that affect particular public institutions (O'Laughlin, 2002). The framework does not focus in detail on the environment, human rights or poverty (Carney, 2002).

The assets of households are influenced by structures and processes, and the structures and processes influence the access to particular resources. This defines livelihood strategies. If the households near sand mining have less access to natural resources, their livelihood structures would change also. The outcomes are they are more vulnerable or they have better income. They have lower natural capital, but they might have higher social capital. So, they are able to migrate. Based on interview, a number of households have migrated. So, the reduction of natural capital due to sand mining has a temporary impact on households, but over the long run it might not be too bad for them because they are able to migrate to make a living somewhere else.

Even though DFID provides an interesting framework for analyzing livelihood assets of marginalized households being affected, there is one more thing which is very important to households which is “**lifestyle**”, and it should be included. The lifestyle term is defined as the way that individuals or a group of people function in their daily lives (Lifestyle, 2014)

Fishing communities residing on the shoreline in Hawaii have maintained their ways of fishing as subsistence fishermen. They catch fishes not for selling, but for local consumption. 39 % of catches are not sold, and 97 % of fishers mentioned that they join in the fishing because they intend to have network in sharing fishes caught with other peers and relatives. More than sixty per cent stated that those fishes are important for food consumption in their family. According to the study of Molokai conducted in 1994, twenty eight per cent of participants' food consumption received

from subsistence fishing which rose to 38 per cent for those fishers living at Hawaii's shoreline. Almost everybody states that subsistence fishing is crucial to the lifestyle of the people living on Molokai Island because they not only undertake fishing for food, but also for other purposes like doing exercise, the feeling of having relationship with environment, and enjoyment with nature. The way of subsistence fishing is mainly for sharing and giving to those who cannot manage to have fishes by themselves (Griffis & Howard, 2013, p.185). This reflects a unique lifestyle of the fishing communities on Molokai Island. Fishing is not for commercial purposes, but for mainly for local consumption, sharing catches to others, and enjoyment of nature.

Similarly, Fishermen in Vanuatu have kept their culture of managing fisheries in their own way, without letting outsiders intervene. The way people work is very promising because they utilize a tradition of fishing closure over a very long period of time, and people in Vanuatu still practice this tradition until today, they have been successful in sustaining their livelihood based on fishing. The main aim of this tradition is to let fishes recover after harvesting for a period of time. The period of closure varies according to locations, i.e. at Uri, the closure period is from 3 months to 7 months, then extended to one year, and at Seviri, the closure period is from two to five years. The study found that only 3 out of twenty seven villages followed the tradition. Concerning disputes, and in order to enforce the tradition, two village headmen had adapted the tradition to be an important ceremony. It involves killing pigs, having feasts, and inviting local priest leaders to bless the tradition. Practicing this way makes villagers respect the seriousness of this tradition. The two village headmen mentioned that doing this is really effective. In the past, magic words were arranged on the reef, by doing that if anybody broke the regulation was going to have bad luck and punishment. This kind of magic is still used at some villages take it seriously nowadays. There was a man who broke the norm that died while he was cooking and standing on the reef that had magic put on it. This true story causes villagers remember it forever (Johannes, 1998).

However, some scholars argue that the practice of traditional ways of managing fisheries will not last long because the period of closure is usually short, not

more than a year. This period of time is not enough for marine life to recover from any damaging effects. When the damage is so devastating, those fisheries that take a long time to recover might be severely damaged, even though there is a period of closure. In addition, although the closures might be able to recover small species, it cannot help to recover large species (Tungale, 2008).

There have been other lifestyles that are very important to people, especially to those who heavily depend on natural resources for their livelihood. In the study of (Marschke, 2012a), she revealed a number of Koh Sraloa villagers' lifestyle has been changed because it is being affected by natural resources extraction activities. Since villagers face the decline of fish stock, they have to change their fishing style in order to catch fishes. They have to use bigger traps and set them up deeper than before in the water and use bigger fishing nets in order to collect fishes. In addition, villagers have to change their traditional lifestyle of livelihood which based on fishing to other non-resource based livelihood activities.

1.5.1 Vulnerability

A scholar pointed out that vulnerability refers to the condition that pressures linked with the change of society and environment and from without having capability to adjust (Adger, 2006). In addition, an organization defined vulnerability as the result of several aspects which are closely linked to limitations of capital which contain natural, physical, financial, human, and social factors. The effects of institutions and policies also affect marginalized people in accessing resources (DFID, 1999).

Vulnerability varies considerably among individuals in a community depending on sex, and social classes in society. The vulnerability is more than poverty because it is closely linked to net capital. For instance, marginalized people tend to look for other ways of living once they meet poverty ranging from looking for credit to doing businesses with their own resources (Chambers, 1989). However, these activities are very risky with a high chance to fall into debt and failure, which can cause them to be even more vulnerable. It is vital to know that decreasing vulnerability could help people be more secure, and might not only involve increasing

income to reduce poverty (Chambers, 1989). Vulnerability at local level has strong connection with livelihood assets. Vulnerability of community levels is closely connected to three factors: shocks, trends, and seasonality. First of all, shocks can destroy assets in the community which affects the people's livelihoods, i.e. drought, earthquake or cyclone. They are also the causes of moving people away from their living areas and abandoning assets as coping strategies. Second, trends might or might not be dangerous, although they are foreseeable. Third, seasonality changes in employment options, cost, and meal availability are the most challenging for marginalized people in unindustrialized countries (DFID, 1999).

Although the framework has been used for a while and attracted some popularity, there are weaknesses that have been discovered. First of all, the framework focuses only on the marginalized people, but does not consider implications for rich people in the area (Moser et al., 2001). In addition, there are some elements, class, gender, market, and ethnicity, that are absent from the framework. Furthermore, the framework emphasizes exploring the causes or phenomena that affect particular public institutions (O'Laughlin, 2002). The framework does not focus in detail on the environment, human rights or poverty (Carney, 2002).

1.5.2 Transforming Structures and Processes

Transforming structures and processes are legislations, policies, institutions, and organizations that have influence on people's livelihood. They are vital at all levels of public and private spheres, from local to international, because they have direct implication on people's feeling of happiness, and health and inclusion. They powerfully influence accessibility of capital, governing bodies, livelihood activities, causes of implication (DFID, 1999).

Structures and Processes establish and carry out legislations, policies, and other functions that affect economic activities. Therefore, having good structures and processes is necessary because without their present is a barrier to have sustainable

livelihoods (DFID, 1999). They are obstacles to livelihoods when legislations, policies, norms, and relations between people and intuitions do not function effectively, and there is restriction of people's accessibility to assets. They are helpful once they work efficiently and enhance people's access to assets in a sustainable manner (North, 1990, p. 97). Although people might have a notion that they act decisively in livelihood activities without any interfering from outsources, legislations or policies, but according to Control Theory, every one of us is driven by both inner controls and outer controls which are in a position of directing our decisions and outcomes of our economic activities. The former consists of right or wrong notions, conscience, desire..., and the later consists of family members, institutions... (Henslin, 2014, p. 163).

DFID presents meaningful definitions of structures and processes. It refers to laws, intuitions and their policies impact on people's livelihood, and the influence can be either positive or negative, or both to livelihood activities.

(Marschke, 2012b) argues that Cambodian policies of natural resource management do not work properly. She found that involvement of unofficial practices of some officials and ineffective law enforcement affect both fishers and natural resources negatively. A fishers committee intends to patrol their controlled area, and they have to invite an officer from the police department to participate with approval from police commander. However, on that day the commander was away from the village, and there were some police officers present in the office, therefore, the fishers committee invited one of them to take patrol with them. During the patrolling, they caught some perpetrators and confiscated banned fishing tools. However, when the commander realized that the fishers committee and his officer caught trawling fishers, he was very angry. He punished his officer by officially taking his officer's gun and condemned him publicly. This caused the fishers committee and the officer to become very upset. The officer resigned and moved to work in another province as an officer. The fishers committee complained about the case to the officer of Department of fishery by accusing the Commander of breaking the law. The committee reported that whenever it catches illegal trawling fishers, those illegal fishers pay USD 1.5 per day to a money collector, so that those illegal fishers can continue fishing again.

However, this does not reflect that all institutions, legislations, and policies are ineffective. There is a case conducted by International Centre for Living Aquatic Resources Management to assess management strategies of fishery sector in Asia countries. The result shows that strategies of co-management of fishery work efficiently, although the success of the management among those Asian countries are varied. The study reveals that there are some core principles and conditions that contribute to the success of those strategies.

Various support from individuals. Those individuals might consist of resource consumers, resource owners, and politicians. The process of co-management strategies frequently include compromising short-term advantages of individuals in order to achieve long-term benefits. The contribution of loss of benefits and labor are high. Those individuals must be aware and agree to those co-management strategies. If resource consumers realize the importance of involving in implementing those strategies by their themselves, the implementation of those strategies are faster and easier than external agents involvement in informing the importance of those strategies. One way to evaluate the support from individuals in operating these strategies is when they spend their own time and money with implementation of those strategies. 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 at coastal areas. These activities are very important to their business as they could earn more income if involve in implementation of the strategies. For politicians, the benefits they could earn support people in recognizing their effectiveness in managing natural resources and more votes in election.

Capable leadership. This is a vital factor that contributes to the success of co-management strategies because leaders at grassroots level are the ones that act as a paradigm for other people to follow and provides guidelines for undertaking any actions involving to achieve the goals of co-management strategies. In order to have leaders that are capable and have support from their supporters, there is one way to do this is via election. Fishers at Bangladesh elected their leaders by voting. By doing

that it can help to reduce corruption and provide chance to other potential leaders. There is a case in The Philippines where a lot of projects which are 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. External agents should not perform as committee leaders because they might not know well about the community, and the community could possibly depend on them too much. Therefore, the local community should develop the skills of leadership among its members, so that it will not depend solely on one person.

Support from politicians. The support from local authorities is also very important in achieving the success of co-management. There are some benefits as described in the previous part that if politicians involve in the co-management strategies, there will be benefits for them in election period. There is a case in Philippines where local authorities are not involved in fishery management committees, and the community projects are not successful. Local fishers might be reluctant or have no skills 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 in the community to help themselves when there is a change in the political situation.

Controversy management. The process of settling disagreement or argument over co-management organization is very important. A potential candidate for solving conflict should join and discuss to find solutions to solve any problems arise. In addition, the process of finding solutions to any conflicts should be managed at the same level because solutions could be discovered immediately. Furthermore, government official should perform as outside mentors for local controversy and appeals. Cases in Bangladesh and Philippines showed that the process of finding solutions to any controversy tend to be not a big issue once the potential candidates are engaged in enforcement and creation of regulations, and when authorization is reinforced to punish perpetrators.

North's idea is quite suitable as he illustrates that institutions, laws, and policies could be positive or negative depends on the character of those institutions, laws and policies. If they are helpful, they will provide people access to any resources efficiently.

1.5.3 Coping Strategies

Coping strategies are vital to and widely used by marginalized people to ease their livelihood challenges from shocks, trends, seasonality, for the whole year. The term of coping strategies is used to understand how marginalized people use them in order to mitigate their livelihood challenges (Bhattarai, 2005). These coping strategies are used to ease difficulties during uncertain circumstances, stress and shocks the whole year. They might decide to consume less food or not to join entertainment activities (Davies and Bhattarai as cited in Adjei, 2007). Similarly, those coping responses are deliberately used to solve individual and inter-connected problems, and to understand, endure, and reduce controversy and tension. The efficiency of those coping strategies rely on types of controversy and tension, personal, and conditions. The effectiveness of those coping strategies depends on each individuals and households' capability and available resources (Weiten et al., 2014, p.105).

Therefore, the goal of coping strategies is to help people during their livelihood challenges or disaster. Put it in other way, it is the usage of resources that are available and livelihood assets to overcome their livelihood challenges. Every person and households have different capacity to response during difficult time.

In case that the period of devastation and livelihood challenges are much longer than expectation, those households who are capable might be also vulnerable. Therefore, coping strategies can be worsened by a long period of crisis (Adams et al., 1998)

(Marschke, 2012a) undertook a study at an island, Koh Sraloa village, found that villagers' livelihood based on fishing is being affected negatively from resource extraction activities. Villagers utilized coping strategies to alleviate their livelihood constraints. They diversified their livelihood activities. Some of them are still undertaking fishing, but have already added other livelihood activities, which are not fishing. And some of them completely changed their livelihood based on fishing to involve other economic activities such as running small business at the village, money lenders, electricity supplier and migration. As a result, only villagers who are able to

switch to other livelihood activities which are not based on fishing before sand mining activities, they are able to cope with their livelihood challenge.

However, there are some villagers who, although they diversify their livelihood activities, are still encountering difficulty. In Marschke's findings two different cases from two villagers who are pursuing copying strategies, but the outcomes are different. A villager, Preun who has multiple income sources, but he still face difficulties in pursuing his livelihood. He is still undertaking fishing but it is not promising. He pursues other economic livelihood activities, but has to spend the majority of his savings on his son's education. He also has a small grocery shop selling fruit and vegetables, runs a business of electricity supply, but he has to spend almost all his money on his son's education at Phnom Penh with hoping that his son could find a job after graduating from university and send remittance back home. He is also clearing one hectare of land with hopes that he can sell it; however, no one is interested in purchasing it. Another villager, Sok, he is also facing similar situation as Preun's, but his situation is better because his eldest son has got a job at factory in Phnom Penh and has sent remittance back home every month. His other children help him with fishing activities.

Weiten and other authors provide an interesting definition of coping strategies. Weiten's is interesting because they do not just present the coping strategies used by affected families to ease their livelihood challenges, but also they explained that not all coping strategies are successful. It depends on people's capability and resources that are available to them.

1.5.4 Livelihood Outcomes

Livelihood outcomes are the results of livelihood strategies that villagers pursue, and they can be either positive or negative, or both. To begin with, the outcomes can be in different forms. To begin with, people tend to receive more income through economic activities they undertake in order to maximize their income. That increase of earnings is related to the notion of sustainable livelihood. Next, increased well-being could happen after people have pursued those coping strategies. Besides incomes and materials that people purchase, they also tend to give value to

non materilas such as self-worth, sense of control and inclusion, and household members' physical security and health status..., Then, after have undertaken coping strategies they possibly can reduce their vulnerability. In addition, those coping strategies might improve food security, and governments and organizations could provide assistance for better food security, and last but not least, they could possibly lead to more sustianable usage of the natural resource (DFID, 1999).

1.6 Method of Study

This section describes research site, methods of data collection, data treatment, data analysis, data verification and the organization of the thesis.

1.6.1 Research location

Preak Angkun village, Trapeng Roug commune, Koh Kong district at Koh Kong province is chosen to conduct the research. The community speaks two languagues, Khmer and Thai; they know each other very well. In addition, the vast majority of villagers are fishermen, and there are a number of people who are making small businesses in the village like a few grocery stores and one noodle store.

The justification of selecting this village is that because it is situated in a mining site and has never had any research conducted related to the effects of sand mining to the local people's livelihoods.

1.6.2 Data Collection Methods

The study employs qualitative research with various tools for collecting primary data. The study focuses on investigative study on the impacts of sand mining on the villagers' livelihoods. Purposive samples are used because villagers reside in the concession area, and villagers' livelihood based on natural resources. Therefore, the information regarding how livelihoods are affected by concessions can be extracted.

However, villagers' availability is limited because they have multi livelihood activities; some villagers go to do fishing at night and come back in the morning, and some other villagers go to collect forest resources in the morning and come back in the afternoon. The researcher tried to approach as many as villagers possible depending on their availability. In addition, various backgrounds, status, sex, and gender of respondents are also considered in interviewing respondents. With help from village headman, and the availability of villagers. The researcher was able to find women whose age between 22 and 58, and men whose age between 18 and 67. Furthermore, all respondents were asked to participate voluntarily in the research: nine villagers, one village headman was asked to participate in the interview because he knows more the background of the village and villagers' livelihood, constraints and opportunities, and one officer at Department of Fishery was also requested to participate in the interview because he has information regarding the trends of fish catches and its constraints. Qualitative research tools were used for conducting this study: participant observations, semi-structured interviews, focus group discussions, and seasonal calendar.

The period of data collection was scheduled within one month, July 2014 to August, 2014. The first week was spent to undertake preparation, and the last three weeks spent for collecting data in the field. A set of questions was prepared in advance before conducting the interview, however, there were other questions during interviews which the researcher utilized in order to get more information. All interviews were conducted in a friendly environment by the researcher introducing himself and utilizing simple language.

a. Semi-structured interviews

This tool was utilized to explore deeper phenomena of the village's experience, perceptions, and events which is mainly being undermined by sand mining's impact. The interviews were one-to-one (between researcher and interviewee). Initially, the researcher selected individuals who can provide reliable information, and inform them about the purpose of undertaking the research.

Furthermore, explanations about their expected engagement and appointment should be made at the beginning. In addition, recording the details of the discussion is really vital, and asking for confirmation and verification of the recorded notes from respondents.

b. Focus group discussions

The tool is used to explore the community's perceptions, understanding, and experiences of that group who has been affected by a common livelihood constraint, and their responses. The tool is utilized to discover notions, practice, and understanding of a particular group of people who have experience about events or circumstances (Kumar, 2014, p.193).

The researcher was able to manage to have one group discussion consisting of five villagers. The discussion was conducted in a villager's house because it was raining. Discussion themes are about their livelihood challenges, coping strategies, and the results of those coping strategies. Villagers with different sex and age are requested to join the discussion, and the themes for discussion were almost the same as themes used for questioning villagers in order to confirm the information received from semi-structure interview.

c. Participant observations

The tool is utilized to supplement other research tools. It can provide researcher will not participate in activities in the community, but observe, watch, and listen to those actions. The assumption can be drawn from this tool. The researcher managed to observe their houses, properties in each household, and infrastructure availability in the village.

d. Seasonal livelihood calendar

A group of five villagers from discussion group are requested to discuss about seasonal livelihood calendar. The tool is used for understanding their

livelihood activities based on natural resources changing after concession companies came.

Table 1: Study methods

<i>Respondents</i>	<i>Tools</i>	<i>Themes</i>
9 villagers	Semi-structured interview and participant observations	. General information about villagers' livelihood . Villagers' vulnerability . Coping strategies . Outcomes of those coping strategies
5 villagers	Group Discussions and Seasonal Livelihood Calendar	. Livelihoods in the past and now . Livelihood constraints . Responses
1 Village headman	Semi-structured interview	. General information about villagers' livelihoods . Livelihood challenges . Villagers' coping strategies . Literacy in the village . How he solves villagers' livelihood challenges
1 Officer of Department of Fishery	Semi-structured interview	. Information about fish catches . Sand mining . Environmental impact assessment

1.6.3 Justifications for choosing qualitative research

There are a number of reasons that qualitative research is chosen for conducting the study, although there have been critiques. The tool intends to

understand phenomena that attached to villagers, trying to realize their actions, perspectives, beliefs... in their own world (Denzin & Lincoln, 2008, p.36). Other researchers value the tool as it tries to understand the villagers' perception, evaluation, actions to social phenomena, has varieties of data, many ways of analyzing and explaining data, and produces comprehensive descriptions and thorough knowledge from local's perspectives and understanding in their social world (Bryman et al., 2008; Mason, 2002). Therefore, this tool is suitable to be utilized for this study with aims to know how much villagers realize the impact of mining on their livelihoods, to identify what actions have been taken to response to the impact, and to explore what results of those actions taken.

However, this tool has been criticized for being insufficient in reliability and validity of findings. It has been questioned on how it can receive right answers of a phenomena (Kirk & Miller, 1986). Other critiques raised are time constraints, limited budget, and institutional barriers which could prevent 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 the qualitative findings can be solved via reading back and forth of the findings and the transcripts. In this way, the findings reflect correctly with what was collected from the field (Harding, 2013, p.171). In addition, Triangulation can be utilized to verify qualitative findings, checking the results from finding of one approach against another approach (Bryman et al., 2008, p. 379).

1.7 Data treatment, analysis, and verification

All data collected from the targeted area is treated and analyzed in the following three ways: transcribed, coded and analyzed. First of all, all interviewing data recoded with recorder and in a notebook. They all transcribed into Microsoft Excel, so that it is convenient to retrieve. Second, all data is analyzed based on those transcription and recall from memory, and according to adapted conceptual framework, and presented in form of descriptive. Third, in order to ensure validity and reliability of the research findings, the researcher employs a few techniques, reading back and forth of findings against the transcribed and categorized data and triangulation, for verification.

1.8 Arrangement of thesis

The thesis is organized into 6 chapters. Chapter one describes the introduction of the thesis which consists of rationale of study, research questions, conceptual framework, research objectives, research methodology and data treatment and analysis. Chapter two consists of a literature review of research that has been conducted similar to the topic. Chapter three focuses on answering the first sub-question, which is to discover the impacts of sand mining on villagers' livelihood. Chapter four presents the findings of coping strategies, which villagers use to responds to challenges, and their outcomes. Chapter five presents a conclusion, discussions, and recommendations for the government and provides suggestions for further research.

1.9 Scope and limitation of the study

There is scope and limitation involving in this study. This research carried out in limited time, one month, and focuses on the impacts of sand mining on the local villagers' economic livelihoods but not at the impact on environment. The dynamics of sand mining in coastal and freshwater rivers could be different, thus, the study only looks at coastal rivers. The interviews conducted with only local villagers and relevant government officials, village headman and officer at Department of fishery, but not with concession company staff who are extracting the sand due to safety reasons. Furthermore, although the study focuses only on sand mining, but land concession is also another villagers' economic livelihood challenge exists in the village. Therefore, there is possibility that the land concession is also pressuring their livelihood.

In the field, researcher faced several challenges. First of all, it was raining almost all days made the researcher even more difficult in riding a bike on muddy and unsealed road (shown in Photograph 2) to the village. Second, since villagers have different livelihood activities, some go early morning to collect resources in forest and come back in the afternoon and some to fishing at night and come back in early

morning, it was not easy to catch them for interviewing. But since the field research conducted during rainy season, some villagers tended to stay at home. In addition, the researcher had difficulty with inviting villagers to have group discussion, which was planned to have 2 group discussion with each 6 villagers per group, because some villagers had gone to do their livelihoods although raining. Furthermore, some villagers reside the other side the river, so researcher had to hire a boat to invite them to participate in the group discussion. As a result, the researcher managed to have only one group discussion with 5 villagers. Third, the researcher often had to explain researching questions in very simple language. The researcher was trying to get some information about Environmental Impact Assessment related to sand mining from official working at the Department of Environment located in Koh Kong city, but the officer said that he has no information related to EIA of the area where the researcher is conducting the study because the Department's authority does not cover the area. He asked the researcher to get information from the Ministry of Environment at the Phnom Penh city. However, once the researcher had reached the Ministry at Phnom Penh, the researcher was pushed back and forth from one department to another department, a sign that the researcher cannot have that information. Last but not least, it is not possible to walk through the whole village because there are two streams in the village, and villagers live at both sides of the Preak Angkun River.

1.10 Ethical Issues

The study was conducted with warm-up and in a friendly atmosphere. The research did not start asking the questions immediately when he met interviewees, but rather introducing himself briefly, researcher's name, why the researcher had to be in the village and what the researcher was undertaking... By doing this, interviewees could feel less shy and afraid to answer the questions. In addition, the researcher will respect villagers' choice whether they intend to join the interview or not. Furthermore, the researcher informed every interviewee first about the purpose of conducting this study and before taking pictures or utilizing voice recorder. To avoid legal issues, the researcher asks permission whether or not the names of interviewees can be revealed.

Last but not least, researcher showed appreciation for the villagers' contribution once every interview was finished.

1.11 Significance of the study

The study mainly focuses on analyzing the impact of sand mining on Prek Angkun villagers' economic livelihood at the presence of Cambodia's development, with speculation that sand mining produces negative impacts on villagers' economic livelihood. The study provides significant contribution to a knowledge gap in the field of local villagers' livelihood constraints in which their livelihood activities are based on natural resources that are receiving negative effects from concessions of sand mining and land concessions which are the result of government policies not taking local people's interests into account.

The outcome of this finding can possibly contribute to the government in reconsidering to provide any concession without any thorough study on the impacts on local people's livelihood. In addition, the government is currently reviewing all concessions which do comply with regulations. Therefore, the results of this study might contribute to the review and be a reflection of the government's prior policies on sand mining concession without proper assessment and consulting with local people's interest.

CHAPTER II: LITERATURE REVIEW

2.1 Introduction

This chapter provides information regarding sand mining and coastal fishing communities' livelihood. The first part describes about marine fishery in Cambodia. The second part demonstrates about coastal livelihood in Cambodia. The third part presents sand mining in Cambodia and relevant laws and institutions. The fourth part describes about impact of sand mining on coastal fishing communities in the globe and Cambodia. The fifth part presents a case study of natural resource extraction activities impact on Koh Sralao. The last part demonstrates about banning of exporting sand to abroad.

2.2 Marine fisheries in Cambodia

Cambodia's coastal water is 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 (as cited in Gillett, 2004). There are 9 different marine fishes recorded in catch, and 2 types of fish were approximately two-thirds of catches, according to the Department of Fishery (DoF) (as cited in Gillett, 2004). Businesses of marine fishery products are seen both in families and at large commercial levels. There is an estimate that the process of about 480 million tons of marine fish was worth USD 1,131,500 in 2000, according to Touch and Todd (as cited in Gillett, 2004). These products are both for family uses and commercial purposes. Even though products are not high value, local processing techniques are usually able to produce finished products from a large amount of raw product during peak season (Gillett, 2004).

Fish is traditionally produced from small fish that has a salty flavor, however, the decline small fish catch has led to decreasing of the product. Although there were several factories were producing in the past, there are only three factories are in operation: 1 in Kampot and 2 in Sihanoukville (Gillett, 2004).

There are several companies that are producing large-scale products: crab meat processing is being done in Keb province and fish and shrimp processing for freezing and export is being done in Sihanoukville (Gillett, 2004).

2.3 Coastal fishing livelihood in Cambodia

In fishing villages along coastal areas, men can be seen solely to do fishing, while women work close to home or at the shore to undertake equipment maintenance and fish caging, fish processing and fish marketing (Ahmed et al., 1998). Women have more power in decision making than men in fishing households. They are involved in various fishing activities such as helping their husbands to remove fishes from net, processing fish caught and maintaining boats and fishing equipment. Women work about ten hours per day during dry season which is the busiest season. In addition, households headed by women work even harder because they must be involved in household work, taking care of children, cleaning the houses, cooking for their family members, and the business of fishing (USAID, 2001).

The level of poverty, literacy rate, infrastructures and others related services in Cambodia's coastal areas still need improvement. Villagers residing along the coastal areas do not have modern large equipment for large scale fishing. They utilize fishing tools that are only suitable for fishing near the shore. They are only able to catch small amounts of fish with this small scale equipment, compared to other types of large scale exploitation. The number of families and fish catches of both marine resources and inland fishes are increasing every year. In 2004 and 2006, the total number of families increased from 27,340 to 30,955 (Rizvi & Singer, 2011).

2.4 Sand mining

Sand mining defined as an action is utilized to remove sediment from sea and river beds, and beaches (Thomas, 2014). Sand on the globe's beaches is being extracted for a number of purposes (construction, filling, and beach betterment). The extraction usually causes very damage and is poorly controlled. It is happening across the globe. The practice causes destruction not only to coastal area erosion, but ecosystem, such as wetland, fauna and flora. The loss of sand because of sand mining is connected with the loss of protection from cyclones, storms and tsunamis. Indian Ocean had very bad weather, high storms, affected communities by causing death in 2004 tsunami could possibly be linked to sand extraction (Coastalcare, 2014).

2.4.1 Sand mining in Cambodia

Sand mining in Cambodia is extracted from two sources, coastal and freshwater rivers. There have been reports from local papers about sand mining causes river bank and houses collapse, disappearance of fishes, and casualties, however, Cambodia government officials claim that the sand mining operations does provide any impact, but instead they restore the sand from blocking water flow and help to avoid flooding (TVK, 2012, Setp 27).

2.4.2 Sand mining at coastal rivers

In 2009, the inter-ministry committee announced that it provided license to fourteen companies to undertake sand mining operations between 2009 and 2010. In addition, Global Witness reported that LYP group has paid other companies to export sand to Singapore. It also has evidence of receipts of two companies depositing \$200,000 for being able to ensure they get a sub-contract. However, this is different from the government *Prakas* (proclamation) which states that the official payment of transferring a license is \$500 (Global Witness, 2010).

An official at the Department of Mine and Energy said that:

*“The other companies undertake the sand dredging for one company, Ly Yong Phat Col td”
(TVK, 2012, Setp 27)*

2.4.3 Laws and institutions

2.4.3.1 Law on management and exploitation of mineral resources and responsibility of impacts

According to law, the Minister of the Ministry of Mines and Energy is responsible for allocating licenses and managing the mineral resources in the whole country. There are six types of mining. First of all, artisanal mining which is allocated to only Khmer nationality who can only utilize local available instruments and labor forces, with no more than seven people for exploring and exploiting mineral resources. In addition, operations of mining craft can only happen in loose state and in rock, sand, gravel, and silts, within no more than one hectare and five meters depth. Second, quarry and pit licenses on cement clay, titanium sand, kaolin, sand, and other mineral resources for constructional and industrial purposes can be allocated to capable individuals or legitimate entities for exploring and exploiting. Third, precious gem-stone consisting of diamonds, sapphires, rubies, smaragdites, and other quality minerals; semi-precious gem-stone consisting of topazes, zircon, amethysts, and other semi-precious gem stone, ;and ornament stones consisting of agates, jades, ashlaring, stone wood... mining license allocation can be provided to qualified and knowledgeable individuals or legitimate entities to undertake exploration and exploitation. Fourth, mineral transforming license on ornament stones or precious or semi-precious stones can be allocated to capable and competent individuals or legitimate entities. Fifth, exploration and study license on minerals can be provided to qualify and knowledgeable individuals or legitimate entities. Sixth, industrial mining license shall be provided to only holder of exploration license within the boundaries stated in the 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 in-charge minster’s approval.

Furthermore, according to the law, responsibility of the impact is the license holder who has to compensate land owner residing within or close to the area, if that has impact on more than two land owners. The agreement between the license holder and land owners should be made before undertaking mining operation. The compensation shall be fairly reasonable. In the condition that both parties cannot reach agreement, the Minister of Ministry of Industry Mining and Energy shall help to facilitate the agreement. If the Minister of the Ministry cannot find any solutions, the case brought to the court for judgment (RGC, 2001).

2.4.3.2 Law on environmental protection and natural resource management

Article 6 of this law which has been in force since 1996 states that an environmental impact assessment shall be implemented on all public or private projects and that all activities need to be assessed and discussed by the MoE. The assessment should also be required for current project activities, which have not assessed environmental impacts yet.

The method of environmental impact assessment should be arranged by Sub-decree with appealing from the MoE. All types of project activities, current and ongoing activities, are under the authority of MoE, and should be required to undertake the assessment of environmental impacts (RGC, 2001).

2.5 Sand mining impact on coastal fishing livelihood

The mining puts constraint indirectly to villagers' livelihood living a long coastal areas by destroying natural resources which their dependence for livelihood activities.

2.5.1 Impact on environment

Sand mining causes impact on environment, decline fauna and flora life, and coastal area erosion. The mining operations occur in coastal water produce effects on all animals living and plants are on the floor of the sea (Krause et al., 2010). The extraction of sand from seabed destroys biodiversity and its shelter; it leads to decline of marine life stock (Desprez et al., 2010). Sand mining ships release unwanted substances back to the water causing turbidity, changes to living thing in or near the water, habitats, and river banks to other areas.

2.5.2 Impact of sand mining on fishermen's livelihood in the globe

A news report from Nigeria reported that sand mining happened in Lagos area which is a port city in the country. The mining affected both the fishing businesses and people's livelihoods in the area. A fishing business man mentioned that his business declined because the sand mining made the river beds deeper, and it makes it difficult for fishermen to catch fish. A fishermen said that the sand mining caused rivers to be muddied and destroyed his traps. He used to earn approximately 3000 NGN¹ to 5000 NGN, but now he hardly earns 1000 NG. He can catch only small fish that are not valuable on the market. Consequently, he depends on other livelihoods instead of fishing. Another fisherman said that the price of fish at the market is higher because of declining fishery which is mainly caused by sand mining (Balogun, 2011).

Sand mining in India had brought negative impact more than positive impact on local people's livelihoods. The only positive impact of sand mining is it created employment for the local people, while it produced a lot of harmful effects for them, especially to the fishing community. The only livelihood that people in the community had was fishing. They had no other alternative income options. One fisherman mentioned that "one boat was able feed five people, but now one boat can feed only one or two people – not provide wages. It is not easy to sustain families". Another fishermen expressed difficulty in his livelihood, saying "We cannot borrow money from any bank. We really want our children to have an education, but we do not have money". The sand mining activities destroyed their nets and decreased their

¹ 1 USD is equivalent to 179.95 NGN (Nigerian Naira)

fish catches. There was some violence between mining companies and fishermen, but no one was intending to protest (Pereira, 2014).

2.5.3 Impact of sand mining on Cambodia's coastal fishing communities

Sand mining is not new to Cambodian people and has been happening due to the fast growth of Cambodia's economy, the demand for materials for building infrastructures, houses and high-rise buildings are booming. Government officials have maintained that the mining is for hindering flooding (Abdullah & Tat, 2012; TVK, 2012, Setp 27).

The mining operations affect local livelihood activities. Traditional and commercial fishing could be impacted via sand mining destroys marine life (Cooper, 2013). Beaches and coastal area erosion impact on infrastructures and houses (Thornton et al., 2006). The damaging of river bed and channel could potentially lead to damage river bank and erode infrastructures such as roads, bridges, protection walls, and water supply lines (Padmalal et al., 2008). The sand mining is also happening in Koh Kong which is home to communities whose main livelihood is fishing and rich in natural resources: mangroves, wildlife, and marine, Irrawady dolphins and dugong are also available in the river, and flora life. The Global Witness continued that the sand mining has happened in the rivers of Koh Kong Province such as Sre Ambil, Ta Tai and Koh Por. A lot of mining boats and ships can be found along the rivers in the city (Abdullah & Tat, 2012).

A report from the IRIN organization mentioned that sand mining is the cause of the disappearance of fishes that are the main income for the people living in the area. Sand mining vessels have extracted the sand and have also removed the marine life. A fisherman said that after the dredging happen, it was impossible to catch fish. Another fisherman who has a wooden house began to be impacted from the mining industries, so he participated in a protest against the mining (IRIN, 2010).

The unsustainable ways of sand dredging along Koh Kong coastal areas and the involvement of illegal practices of Cambodia's officials have deteriorated marine life and the livelihoods of marginalized fishermen and people who are heavily dependent on the rivers for their living in villages. The report also showed that the

amount of sand mining is being mined far more than what can be used locally because there are many small and large ships involved in the mining. This pushes fishermen to file complaints to relevant government officials; and in response to that Cambodia's government banned the sand export. However, this banning affects only river sand export, but not sea sand export. Furthermore, the banning does not affect the business of sand mining (Abdullah & Tat, 2012). In fact, exporting sand from Koh Kong abroad is still happening in spite of the government's exporting ban. A Cambodian ministry official said that the ministry ordered the company to stop mining in the river to 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).

The coastal ecosystem is really important to human general health and happiness, however, it is under a number of threats. One of them is sand mining. Although biodiversity has been affected by sand mining operations, it can recover itself after sand mining, so that villagers could possibly to undertake fishing again after a period of time. Sand mining really damages fauna and flora life at mining sites, however there is the possibility that they possibly recovery post sand mining. The recovery period varies due to time consuming, conditions of destruction at the areas and interactions related to the mobility of particles, sophisticated interactions between chemistry and biology for a prolonged period. Natural resources could growth after several disturbances. In Sweden, biodiversity recolonization was almost identical 8 years after closing a pulp mill which caused damage to natural resources. Netherlands coastal areas took about 3 years, while communities at Arctic Circle could take 12 years to recover

2.6 Natural resource activities impact on fishing community's livelihood: A case study of Koh Sralao village

A study on resource extraction activities at Koh Sralao village caused villagers whose livelihoods rely on natural resources encountered constraint. During her first visit 1998, she was very impressed with the views of nature in the village. But, twelve years later 2010, she felt shock because there are many big barges filled with

sands in that area which leads to decline of crab population contributing to high debt level for inhabitants because of most of them rely on fishery. As a result, the researcher found that one-sixth of households left the village and migrated other areas. The first culprit is the government. It ignored small-scale mangrove logging in the 1998 national election. During pre-election campaign period 1998 national election, government officials neglected mangrove logging to get votes from the villagers and win in the election. The villagers can earn a lot in those days by logging mangrove trees. The researcher concluded that multiple individual actions contributed to serious deforestation by reflecting her experiences environmental degradation in the village during 12 years. The livelihoods of villagers mainly depend upon nature. As afore-mentioned, the government neglect for logging and sand mining contributed to livelihood insecurity for the local people because most of them are now in high debt and migrated to other areas. The basic services are poor to the villagers. The villagers cannot access to good healthcare. A new primary school and a new junior high school were built in 2005, but if their children intend to go to upper-high school, they have to travel to Koh Kong City. They still rely on their own generator for electricity and it cannot cover the whole village. Moreover, most of the households have to rely on just a few water pumps that belong to a handful of rich households. Nevertheless, because of globalization, cell phone coverage reached the village and the communication is easier than that of 12 years. These days, the Cambodian government is trying to expand rule of law in this region which had been lawless for over decades. As a result of government attempt to expand rule of law, there are more restrictions and limitations for resource extraction in this region. This important measures of government forced inhabitants to largely rely on only fishing for their livelihoods. In these days, more than 300 households in the village rely on fishery or fishery-related businesses. Debt levels of households is getting higher and higher because fisheries needs big investment and they have to borrow to buy fishing gear. Other inhabitants tried to change to other non-fishery livelihoods such as selling freshly picked mushrooms, green mussel in mangrove forest. But, they have no good market demand for those. They have to rely on customers from other areas and middlemen from Thailand. These kinds of resource based non-fishery livelihoods are risky for inhabitants because of seasonal jobs and insecure market demand. Other

people started to change livelihoods pattern by establishing small grocery shops in front of their houses. Other people change by working as water taxi business and water delivery pump business, pig raisin, middlemen and money lender etc. Only a few people can rely of farming because of most of them are landless. But, there are some wise people who tried to send their offspring to be educated. They send their children to school and college in Phnom Penh. One interesting finding is that one villager tried to send his son to study at the college in Phnom Penh and another villager tried hard for his son to finish grade 9th in Phnom Penh. Now, the latter one who finished his senior high school in Phnom Penh is working at a factory near Phnom Penh and send remittance to his family. So, it can be notice that, during the period from 2000 to 2010, inhabitants from Koh Sralo village tried to change other livelihoods to leave fishery sector. But, the following stresses threaten livelihoods of inhabitants in Koh Sralo. They are:

1. Too much sand was mined because of sand mining business which negatively affected fish and crab population in 2008. As a result, 17% of total population migrated to other areas.
2. Prices of food, vegetable and petrol rocketed. They could not make ends meet.
3. The rich possess good fishing gear whereas the poor own small, traditional and old fishing gear. In a restricted area, the poor cannot compete with the rich in finding fish.
4. As a result of poor, the mindsets of villagers were damaged. Fishing gear was destroyed or stolen. Authorities also neglected that important case.
5. Because the lack of enforcement of current law, environmental degradation continuously occurred contributing to decline in wildlife and fish population
6. The prices of aquatic species fluctuated and sometimes there is no demand for their main products of fish and crab because of insecure and unreliable markets.
7. The government banned the charcoal-making business which lead all people to focus on limited and restricted only one source of income, fishing.
8. Although major legal reforms lead to community-based natural resource management, the inhabitants has poor mindset of “First come, first served

frontier mentality” which remains to a large extent and very difficult to be removed.

The most important finding is that fish and crab population declined during a decade from 2000 to 2010 because of environmental degradation resulted by lack and government action and ignorant of inhabitants. In these days, villagers rely on combinations of business both fishery and non-fishery sectors can survive with less debt and fulfil basic services. The study concluded that sustainable resource-based livelihoods for local people is a long way. The important measures and support of government is urgently needed meanwhile disseminating to change the mindset of local people to actively participate for the implementing of sustainable livelihoods for them. Creating of alternative livelihoods options, reliable and secure market, community participating, law enforcements are important measures for the sustainable livelihoods for inhabitants in Koh Sralo village (Marschke, 2012a, pp. 250-268).

Even though DFID provides interesting framework for analyzing livelihood assets of marginalized households being affected. However, there is one more asset is very important to household which is lifestyle, and the asset should be included. The lifestyle term defined as the way that individual or a group of people function as their daily life (Lifestyle, 2014)

Fishing communities residing on the shoreline in Hawaii have maintained their ways of fishing to be subsistence fishermen, they catch fishes not for selling, but for local consumption. 39 % of catches are not sold, and that 97 % of fishers mentioned that they join in the fishing because they intend to have network in sharing fishes caught with other peers and relatives. More than sixty per cent stated that those fishes are important for food consumption in their family. According to the study of Molokai conducted in 1994, twenty eight per cent of participants’ food consumption is received from subsistence fishing which rose to 38 per cent for those fishers living at Hawaii’s shoreline. Almost everybody states that subsistence fishing is crucial to lifestyle of people living Molokai Island because they not only undertake fishing for food, but also to meet other purposes, doing exercises, the feeling of having

relationship with environment, and enjoyment with nature. The way of subsistence fishing is mainly for sharing and gifting to those who cannot manage to have fishes by themselves (Griffis & Howard, 2013, p.185). This reflects a unique lifestyle of the fishing communities in Molokai Island do fishing is not for commercial purposes, but for mainly for local consumption, sharing catches to others, and enjoyment of nature.

Similarly, Fishermen at Vanuatu has kept their culture of managing fisheries with their own way, without letting outsiders' intervention. The way people work is very promising because they utilize tradition of fishing closure over a very long period of time, and people in Vanuatu still practice this tradition until today, they have been success in sustaining their livelihood based on fishing. The main aim of this tradition is to let fishes recover after harvesting a period of time. The period of closing is vary according to locations, i.e. at Uri, the closure period is from 3 months to 7 months, then extended to one year, and at Seviri, the closure period is from two to five years. The study found that only 3 out of twenty seven villages compromised the tradition. Concerning disputes, and in order to enforce the tradition, two village headmen had adapted the tradition to be an important ceremony. It is involved with killing pigs, having feast, and inviting local priest leaders to bless the tradition. Practicing this way make villagers more admired the seriousness of this tradition. The two village headmen mentioned that by doing this way is really effective. In the past, magic words were arranged on the reef, by doing that if anybody broke the regulation was going to have bad luck and punishment. This kind of magic is still used at some villages take it seriously nowadays. There was a man broke the norm, he died while was cooking and standing the reef had been put magic on it. This true story causes villagers remember it forever(Johannes, 1998).

However, some scholars argue that the practice of traditional ways of managing fishery is not last long because the period of closure is usually short, not more than a year. With this period of time is not enough for marine life to recover from any damaging effects. When the damaging is so devastating, those fisheries that take a long time to recover might be severely destroyed although there is a period of

closure. In addition, although the closures might be able to recover small species, it cannot help to recover large species (Tungale, 2008).

2.7 Ban on export sand

In the wake of protests, the government called for a stop all sand exporting activities because it is worried that the operations can cause devastating damage to areas that are close to the sand mining operations. 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 are the cause of the disappearing of fish stock. A local village headman acted on behalf of 1,397 households who are from three districts that are being affected badly by the oil flows and muddy water caused by sand mining operations, and asked for those sand mining companies to stop their operations (David, 2009). Despite the government ban and establishment of a committee to solve the sand issues in 2009, the wording of the ban is not valid for all types of sand and the committee has failed to implement the legislation. According to the Global Witness report the Cambodian government ban the export of sand in response to protesters, and its objectives are to improve the management of the sector and ensure that the environment is protected. The organization discovered that the content of the legislation is 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 has failed to make sure that sand exploitation complies with socio-economic and environmental legal frameworks (Global Witness, 2010). Willemys and Naren, journalists of The Cambodia Daily, reported that the ban not include parts where sand is 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 (Willemys & Naren, 2013).

In third world countries, legislations in sand mining operation often lack of proper scientific knowledge about the results, and all sand mining projects are implemented without conducting proper environmental impact assessment (Maya et al., 2012; Saviour, 2012). As a consequence, sand mining does not provide protection and reservation to ecosystem.

2.8 Knowledge gap

There are a lot studies looking at the impact of sand mining on environment, and there is a few studies look at the sand mining affect people's livelihoods, especially in Cambodia's coastal fishing communities. However, these studies mainly look at sand mining's impact on people's livelihood in general. Therefore, this study undertakes more specific aspect on sand mining's effects on people economic livelihood at coastal area of Prek Angkun village, Koh Kong.



CHAPTER III – FINDING & DISCUSSION: VULNERABILITY, LIVELIHOOD IMPACTS

3.1 Introduction

This section presents 4 sections. The first section briefly overviews the village's geography, the population in the village, literacy rate, main economic activities, and sand mining in the village. The second section presents different form of vulnerabilities: shocks, trends, and seasonality that are happening in the village. The third section demonstrates about the impacts of sand mining on lifestyle, natural, human, social, and physical asset in the village. The fourth section presents the impact of sand mining on villagers' economic livelihood which is one of the main research questions. The fifth section presents about the summary of this section and introduction of the next chapter.

3.2 An overview of the study area

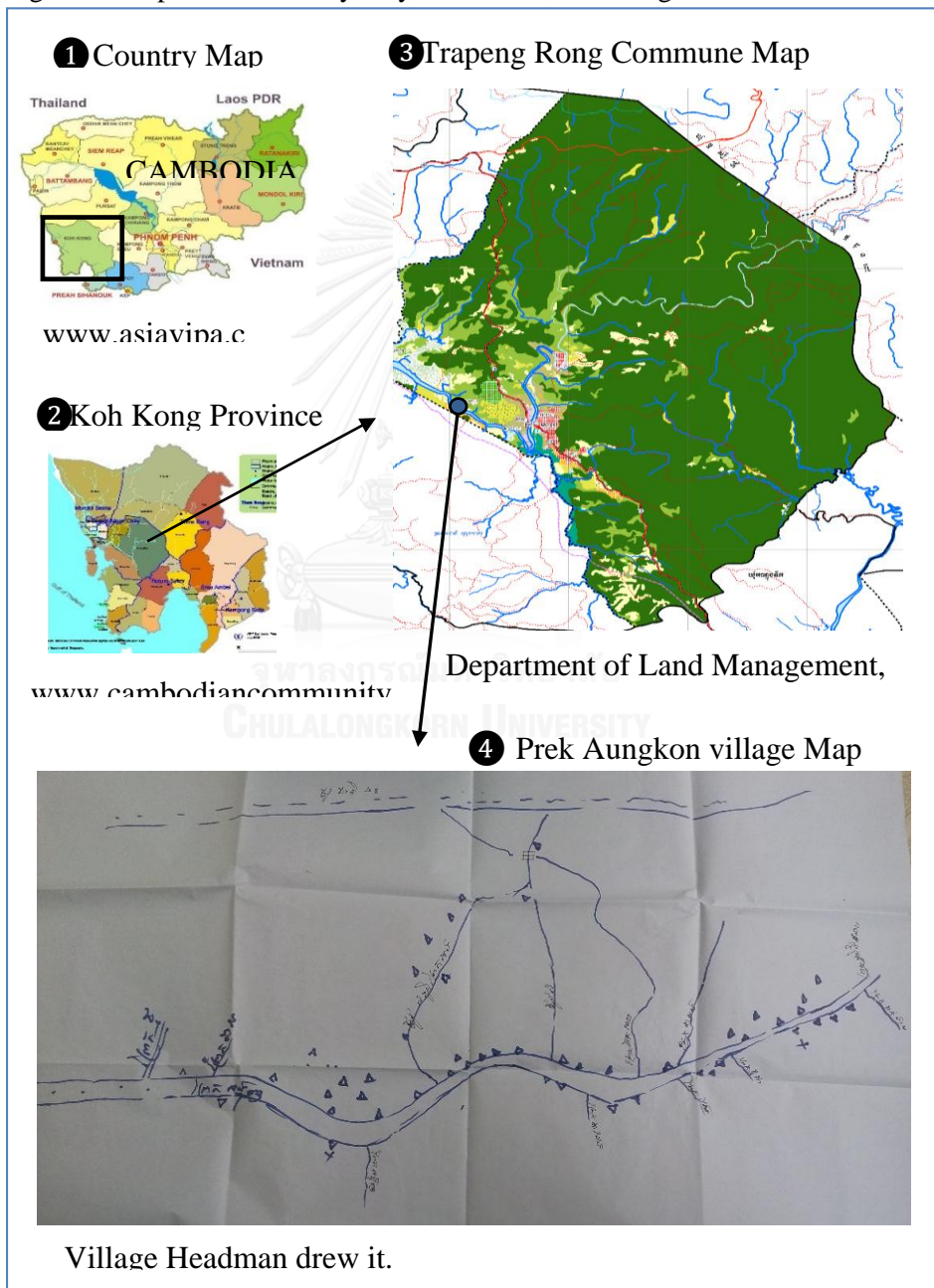
3.2.1 Geography

Cambodia shares borders with Thailand, Lao, and Vietnam and has 181,035 square kilometers of land. Cambodia has two main seasons which are monsoon initiating from the middle of May to October, and dry season starting from November to April (UNDP, 2013). Cambodia is having promising economic growth for years, and is projected to have an economic growth of rate of 7.0 in 2014 (ADB, 2014).

Koh Kong is located at the southwest bordering Preah Sihanouk Province, Kampong Speu Province, and the ocean. It consists of six districts and one town (CDC, 2014).

Prek Angkun village shares border with Deytamneib and Kaskongknong village in Trapang Rung commune, and is about 59 Kilometers from provincial town, Koh Kong. The village is located very closely to Prek Angkun River where it was mined for sand by sand mining companies.

Figure 2: Maps of the country, city, commune, and village



The village does not have adequate infrastructures to meet the local demands, and they are needed improving and further building. There is an unsealed road connected from a main road to the village, however, it becomes difficult to travel during rainy season. The village can be accessed by car and motorbike. There is no school and medical center, and if people intend to send their children to receive education or access to medical treatment, they have to travel to either the commune which is about 8 kilometers or the town which is about 59 kilometers from the village. On one hand, villagers can access to water wells were donated by organizations. On the other hand, not all of households have sanitation facility; among 43 households, there are only 16 households that have sanitation facilities (Proasrachanachak kmboucha, 2013).



figure 3: an unsealed road to the village during raining



3.2.2 Population and Education

The village has a small population and low education. Prek Angkun village consisting of 198 people of 43 households (Proasrachanachak kamboucha, 2013). Some households are extended family. Since the village has quit small number of people, it could be the reason that their houses are not close to each other, and villagers reside along Prek Angkun River. The number of people has not increased in 2014.

Since there is no school in the village, it might be one of the reasons that the literacy rate in the village is very low. Almost all villagers had not attended lower secondary school, and only one villager attended it, while only two villagers attended upper secondary school (Proasrachanachak kamboucha, 2013).

3.2.3 Income generating activities

There have been two main livelihoods, fishing and collecting resources in forest. Villagers are able to go to fishing only on the shore; they cannot go to undertake fishing in ocean because they possess only small machinery boat, and poor households own only simple boat to do fishing. They go to forest to collect ant nest, herbs, rattan, wild fruits, and leaves for making leaving roof, and hunting. In addition, some of them also growing one or two fruits near their houses such as Durian, Rambutan, and Plae-Phnhiew, but they could not earn much from theses fruits because middlemen offer relatively poor prices compared to the price on the market.

The two main livelihoods are facing challenges. First of all, sand mining which causes marine life disappear in the river along the village; however, some of them still manage to undertake fish by going far away from the village. Second, government issued land concession to Chinese company. The company had cleared the majority of forest that villagers used to go to collect resources was cut down and planted Acacia trees instead. It was good before sand mining and forest-concession-received companies arrived. Villagers could find enough fishes and resources to

support their families, but for the time being it is hard to find fishes and forest resources because they are all gone. There have been other economic activities that run by a few households selling groceries, meat and vegetables, and noodles. In addition, there are some villagers migrating to the town and Thailand to find economic opportunities (Village headman, Interview, July, 2014).

3.2.4 Concessions in the village

Through observation, the researcher finds that sand mining is not the only mining concession that villagers encounter, but also land concession. The mining concession has stopped extracting sand within the village, however, the damages can be seen along the river in the village, mangroves destroyed and riverbank collapsed. However, the operations are still going on along the river at other villages because there have been a few large ship always can be seen on the river to go somewhere else. According to Global Witness, the village is under the dredging concession of Udom Selma Peanikch Industry and Mine Co Ltd (Global Witness, 2010).

Although there had been protest in Koh Kong city from other villagers, the Prek Angkun villagers did not participate the protesting because they are not dare to take that action and realize that it is not going to work because no one is going to listen their voice.

However, the Prek Angkun villagers did take action in order to let their voice heard. They filed a complaint to the village headman. After that the village headman filed a complaint to a higher level officer, but he has not received any responses.

The sand mining causes a reaction from a villager. A villager in a household mentioned that he used to use catapult secretly to shoot the large ship with stones because he is not happy with the presence of the ship because it causes riverbank collapse and produces a lot of noise.

3.3 Vulnerabilities in the village

Vulnerabilities in forms of shocks, trends, and seasonality occur in the village are described in this section. All villagers express their similar perception that barriers to their livelihoods are sand mining and land concession.

3.3.1 Shocks

Shocks defined as events that cause assets in particular areas disappear gradually or affect people are residing in those places negatively (Ellis, 2000). Shocks are drought, famine, and floods that cause suddenly devastating (Chambers and Conway, 1992). This study demonstrates sand mining and land concession causes physical shocks and economic shocks in the village. Both shocks have affected negatively to the villagers' livelihoods. The former destroys villagers' fishing equipment and causes river bank collapse without paying any compensation. Villagers need to spend their own money to repair it. Although villagers barely find forest resources near the village, they still can go to find resources at the part of forest which has been left from cutting down or go to locate forest resources at other areas which are quite far from their village.

There are different reports from which company is undertaking mining in the village. During interviews, villagers said that the sand mining company belongs to Ly Yong Pat Co. Ltd, however, according to Global Witness map shows that the village is under the mining concession of Udom Selma Peanikch Industry and Mine Co Ltd.

Ministry of Agriculture, Forest and Fishery issued land concession to a Chinese company, The Green Rich Co.,Ltd, in 1998 for planting acacia trees and oil palm trees in the area of 60,200 hectares, however, in 2003, 42,200 hectares was cancelled. The company currently has 18,000 hectares for planting. During group discussion, a group of villager express their voice over the sand mining that:

“...sometimes sand mining ships destroy our nets, and on one dares to ask for compensation because we are aware that they won't pay any compensation, and we dare not do so.” (Group Discussion, 05-08-2014)

The latter is in form of small income earning from those traditional livelihoods is part of reasons that cause villagers' food insecurity. One villager raised 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.” (Focus Group Discussion, August 5th, 2014)

3.3.2 Trends

Trends can or cannot be dangerous although they are more foreseeable (DFID, 1999). The decline of income is the trend in the village, although villagers still engage in fishing and collecting resources. Their income has dropped significantly. In addition, forest resources and fish stock are dropped significantly.

3.3.3 Seasonality

Seasonal changes in employment and food availability are important to villagers' livelihoods, therefore, they are being discussed in this section. First of all, Looking at seasonal livelihood calendar, it can be said that villagers can go to catch fishes and collect resources in forest whenever they want to within the whole year,

while go to catch crab and prawn depend on seasons. But now it has been changed, some of villagers are no longer follow the same routine. Through interviewing, adult villagers tend to season and long-term migrant to be added to their livelihood. Villagers used to keep small amount of catches for eating and sell the large proportion to middle men or market. But it is different now some days they cannot catch any fishes, and some of them cannot afford proper meal. There are a few types of temporary jobs are available in the village, laundry and cutting grass.

3.4 Impact on villagers' lifestyle, physical, human, natural, and social capital

3.4.1 Lifestyle

Villagers' lifestyle: traditional culture, family habits, emotion, are being negatively affected by sand mining and land concession. The village's culture of contribution of money during Pchum Ben day (a period of 15 days of Ancestor days) which a group of people take their turn to purchase foods and other items to be offered to monks is disappearing. Village headman mentioned that villagers used to contribute more money, but now some households contribute only small amount of money, and sometimes cannot afford to contribute. He understands the villagers' difficulties in pursuing livelihood because villagers do not earn much like before; they are having main livelihood constraints because of sand mining and land concession. The two livelihood constraints are also destroying family habits in the village. He also mentioned that villagers used to have more time to relax with their family members, but now they have to work harder than before and go away to pursue additional livelihoods. Furthermore, the sand mining and land concession cause villagers unhappy because their livelihoods which based on natural resources are being damaged (village headman, interviewed, 2014).

Sand mining companies do not just produce negative effects to households' livelihood asset, but also their lifestyle. The study finds that sand mining adversely affects Preak Angkun villagers' lifestyles. Villagers do not have enough money to contribute to Pchum Ben ceremony which is very important ceremony. Its importance

is equal to Khmer New Year ceremony. There is a belief that souls of relatives might be trapped in hell by king of devils, and during the period of Pchum Ben ceremony (15 days) is the period that the king of devils release all of those souls to come to take offering from their sons or daughters because those souls are tortured and starved by the king of evils. Therefore, only within 15 days, those souls are released to be free and can have enough foods. People cannot offer those foods to their ancestors or souls directly, but they have to do it via monks; thus, they have to bring foods to monks at pagoda, so that monks can pass this offering to their ancestors. If they do not that, their ancestors or souls will curse them, so that they will face unfortunate in their daily life, especially to their livelihood. Other villagers' lifestyle also have been affected are they have to go far away from their homes, where they used to do fishing along the river near their houses and villagers have to spend more time to locate fishes than before.

3.4.2 Physical capital

Physical capital consists of infrastructures and other necessary goods that are needed to support livelihood. Infrastructures are public goods that can be utilized without any direct payment as well as houses are owned privately and other that can be accessed with payment, i.e. energy supplies and toll roads... Necessary goods might refer to goods that individually owned or can be rent.

Through observation, most of infrastructures are available in the village do not meet the villagers' needs. An unsealed road, as shown in Photo 1, to the village connected to a main road becomes difficult during rainy season. It puts burden to villagers as they have to travel to health center, which is far from the village when there is patient needed to be transported to the center. In addition, electricity is also another issue, some villagers manage to have electricity from their own small generator, and those who are not able to afford that they are unfortunate to have electricity. Furthermore, the majority of villagers have wooden houses, however some villagers are still living in hut, and some even without wall, especially households that have only one breadwinner. Possessions which villagers own individually are small fishing boat, small engine boat, fishing nets, motorcycle, and head torch. Not all

villagers possess these goods, but at least unfortunate villagers have small fishing boat, fishing nets, and head torch.

Through interview revealed that sand mining produce negative impact on villagers' live hoods. Villagers reported that their fishing net sometimes are destroyed by sand mining ships, and they do not receive any compensation from those mining companies. One villager in group discussion said that:

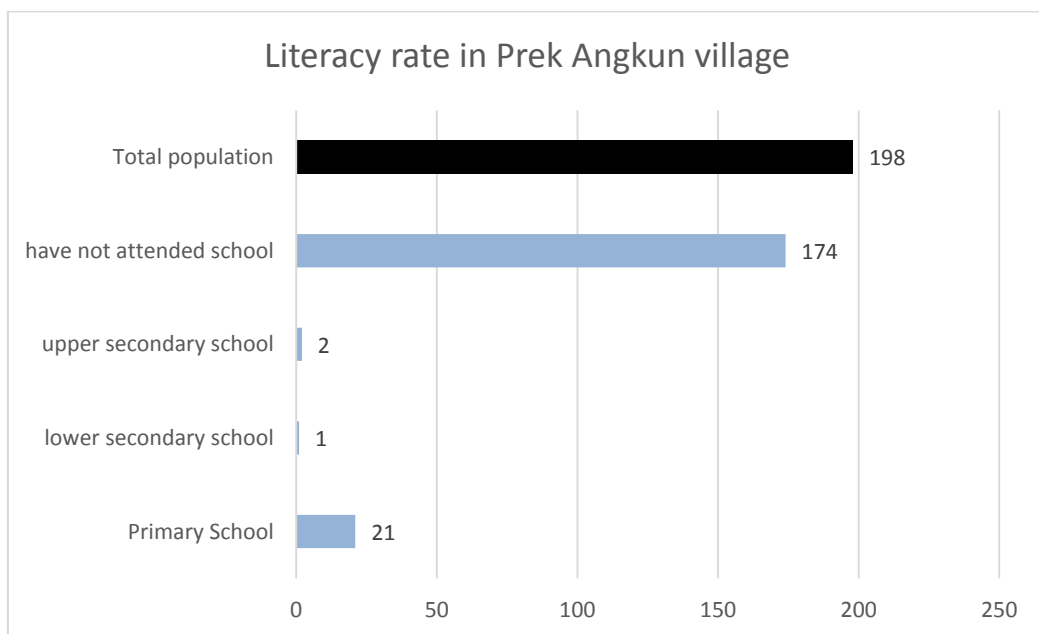
“Sometimes sand mining ships come, and they destroy our nets and go away without paying any compensation, and we have to spend around R 20,000 to repair those nets by ourselves. We cannot ask for any compensation.” (H8, Interviewed on 03/08/2014)

3.4.3 Human capital

Human capital consists of skills, education, knowledge, good health that help villagers to pursue their livelihood activities. First of all, beside fishing and collecting resources in forest which are almost all villagers' main livelihoods, and they also possess other skills, such as growing crops and rice, the latter is grown occasionally for their only own consumption. A few households possess other know-how skills such as building house and making boat. Among nine households interviewed, breadwinner in a household possesses a skill of making boat, and another household's breadwinner owns a skill of constructing house in addition to their main livelihood skills. Second, according to Village-Commune Record, most villagers have very low literacy rate because most of them do attend the secondary school yet, except two villagers managed to accomplish that educational level. Third, villagers are able to speak two languages, Khmer and Thai. Fourth, poor health of elderly people in the village are in really need of supports because they are not able to participate in the main economic activities. They mainly receive support which is not regular from their sons and daughters who have migrated to work in Thailand, and they have been doing

a bit of work around their house, growing crops and helping other villagers out in farm in return of some supports which are not permanent.

Bar chart 1: Literacy rate in the village



(Proasrachanachak kmboucha, 2013)

On the one hand, low education is a barrier that stop villagers from getting proper jobs, and sand mining and land concession's negative effects exacerbate the situation. Since their income is dropping because of livelihood challenges, some of them have migrated to find jobs at the town or to Thailand. With that level education, jobs that they can find are economic opportunities that require labor intensive with payment is barely enough such as factory workers or construction jobs. Village headman mentioned that a lot of adults who are capable to work, they have migrated to Thailand. On the other hand, both sand mining and land concession companies and government do not provide assistances to villagers as compensation.

3.4.4 Natural capital

Natural capital refers to natural resources, land, water, biodiversity that villagers can access for their secure livelihood. Due to the fact that villagers in Prek Angkun mainly rely on forest and marine life for their livelihood, however, those resources are being declined by sand mining and land concession companies. Sand mining affects the seabed and other closed areas.

Villagers can go to fishing wherever and whenever they want, but for the time being they cannot fish in the river nearby because they barely find fishes. They have not choice, but have to go far away from the village to do fishing and collect forest resources.

3.4.4.1 Sand mining's impacts

Impact on Land and Mangroves along the river

There have been a significant negative impacts on mangroves and river banks in the village where villagers used to do fishing. They can be seen along the Prek Angkun river. Villagers reported that they cannot fishing near the village anymore because sand mining operation make the bottom of the river very deep and fishes , therefore, fishes are all gone. That makes them have to go far away from the village about 10 kilometers. They also said that before sand mining companies came, they could find fishes easily along the river near their village. Village headman said 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” (village headman, interviewed, 17-07-2014)

“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 which cause the bank collapse and mangroves which are home and food to marine life are also destroyed” (village headman, interviewed, 17-07-2014)

Figure 4: Mangroves destroyed and river back collapsed



Source: (Fieldwork note, 2014)

Pollute water

The mining operations pollute the water and cause it to become turbid. Within the period of conducting the study in the village, the researcher does not see any strange liquid floating in the river, but it could be the reason that sand mining is no longer in the village. However, the researcher witnesses that sand mining ships always pass by the village. From conducting key informant interview of a fishery officer, he said that the assessment was conducted to be looked good and showing that there is not negative impact at all. However from interviewing villagers and an

official of the Department of Fishery at Koh Kong, they express that they see a liquid floating, which flows from washing sand to become white, on river and sand mining operations causing turbid water at other areas they are doing operation. With those pollutions, villagers said that they cannot do any fishing. An officer at Koh Kong Department of Fishery expressed that:

“He said that the assessment does not reflect the reality. A lot of villagers complained about the sand mining and he, himself, reported the incident to high ranking official, but he has not received any responses. He continued that sand mining operations cause villagers cannot do fish farming and water pollution” (an officer at Koh Kong Department of Fishery, 05/08/2014)

3.4.4.2 Land concession’s impact on forest resources

Land concession is another villagers’ livelihood challenge. It is allowed by the Cambodia government to a Chinese company which received land concession to clear almost all forest, villagers used to go to collect resources, near the village. This is an additional livelihood constraint to the villagers. 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, interviewed, 17-07-2014)

The village head man continued that the Chinese company makes a lot of profit from valuable trees demolished to be exported to China. After demolishing the majority of forest, the company has planted Acacia trees. A villager reported that

the company utilized chemical fertilizer to spread on land had been cleared before planting the trees. By doing that other plants will not grow, except the Acacia trees.

Some villagers still can go to the area of the forest which has been left after the Chinese company cuts down the majority of it to collect forest resources. Furthermore, some other villagers are still pursuing forest resources, but they have to travel far away from the village.

“Sand mining makes the water becomes turbid, and it is impossible to catch fishes: 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 interviewed, July 5th, 2014)

3.4.5 Social capital

Social resources can be in forms of networks and relationships that exist in household. In rural livelihoods, the social resources, influence people’s access to resources that they utilize them for their livelihood strategies.

Among villagers interviewed, those households that have family members could migrate to work in Thailand because they have relatives or friends working there. In addition, a breadwinner of a household who has gone to work in factory construction, and also has brought his son-in-law to work with. Another household

who have a family member is working in town factory is asking her sister-in-law to work with her.

Family disintegration

The mining causes family member separation. Village headman mentioned that a lot of adult villagers have migrated to work in Thailand. Among 9 households, two households interviewed who are very old and sick have no sons and daughters are have gone to work in Thailand because they cannot make a living depending on natural resources. Their sons and daughters only visit them sometimes. Through observation, it is true that researcher rarely met male and female adult. Some villagers take seasonal migration which is usually they migrate to town to work in factory or construction sector.

Quality of life

The researcher can have a sense of unhappiness in the village toward sand mining operation and local authority. Through interviewing 9 villagers, all of them answered that they are discontent with the mining. It is even worst, when villagers filed the complaint to local authorities, and they never have any response or solution from them.

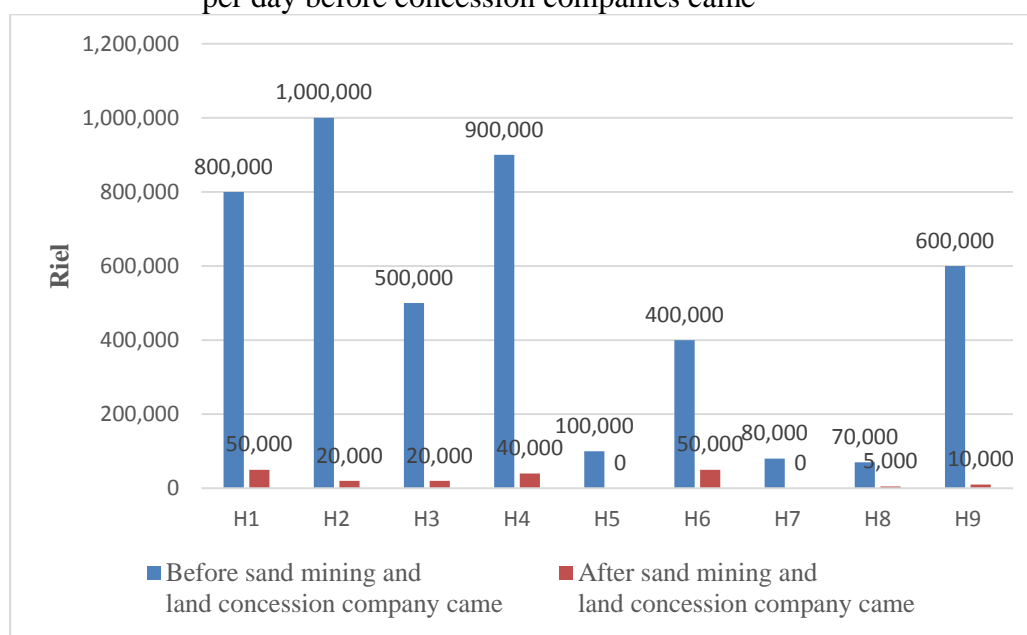
3.5 Impact on villagers' economic livelihood

Because of income decline from primarily relying on natural resources in the village, villagers starting to turn to other livelihood activities which are not natural base, and some of other villagers

3.5.1 Income declined

Most villagers express that their declining incomes caused from sand mining and land concession because their catches and income are declining significantly compare to before.

Bar chart 2: Estimation of the highest income per day before concession companies came



A villager mentions that before sand mining companies came he used to catch fishes, crabs, and prawns approximately between 10 to 30 Kilograms per day, and earned about Riel 800,000 to Riel 900,000, but now he is able to catch fishes between only ½ to 1 kilogram or sometimes he catches nothing, and makes profit less than Riel 50,000. Another villager interviewed, H2, expresses similar trend that he made profit approximately between Riel 200,000 to Riel 1, 000,000 per day from selling the catches that he could find between 20 to 30 kilograms. However, for the time being, he is able to make profit less than Riel 20, 000 per day from selling forest resources or catches by travelling to another area where they undertake the fishing or collecting sources in forest.

This also causes a lot of people face financial constraint. Having interviewed nine villagers, there are six people are already in debt and borrow money from neighborhoods. There are two households interviewed mainly dependent on

their son's and daughter's remittances. Furthermore, households that are extended family, although their family members are also involving in economic activities in order to earn income to support their family, they also receive loan from bank.

Sand mining companies utilize large and heavy dredging ships to extract sand not only from the bottom of river, but also from river banks where mangroves grow, this causes very damage to mangroves and flat land. Extracted sand was packed and loaded into big trucks and delivered to meet the needs of construction business. The mangroves were available at estuary area in 2012 has been cleared to build port for sand mining ships and other sand mining activities, packing and loading sand into big trucks. Another part of flat land has been cleared to build platform for transportation structure. Sand mining destroys riverbank, it eliminates nutrition site for specific birds that always looking for food at riverbank (Panchang, 2014). Mangroves are home and full of abundant food to 164 types of fish species. Once fishes grow a little bit bigger about 3 inches, they tend to move to hide from dangerous species and find nutrition in mangroves (Roach, 2004). In addition, riverbed is also home to a number of species. Thus, when sand mining destroys mangroves and riverbed mean it destroys biodiversity which is the villagers' livelihood.

3.5.2 Villagers face difficulty in affording foods on market

Since villagers encounter income decreasing because of sand mining and land concession, although they have multi income sources, they face difficulty in coping with purchasing foods because they cannot find enough money like before. Some villagers cannot afford to have proper meals, and some others buy foods on credit.

“I face difficulty in affording proper meal, I eat eggs almost every day because our household mainly relies on our sons and daughters’ remittance, which they send about B5000 or B6000 in 3 to 4 months, and my irregular incomes

*from helping other villagers out in the village”
(H6 interviewed, 05-07-2014)*

Another household that has diversified their livelihood with help from family members, they also encounter similar situation. She said that:

“I sometimes purchase food on credit at the market because I do not have enough. After a few days, I have to pay” (H9 interviewed, 03-08-2014)

3.5.3 Livelihood activities in the village is changing

The sand mining and land concession produce negative impacts on the Prek Angkun villagers' livelihood activities. Although three breadwinners of three households interviewed mentioned that they are still pursuing only fishing and collecting resources, they have to go far away. Other households interviewed said that they have added other livelihood activities and had their family members also entail in pursuing economic activities in order to earn more income, while their incomes from fishing and collecting resources in the forest are not enough to support their living. One daughter-in-law of an extend family mentioned that:

“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 Interviewed, 05-07-2014)

Table 2 : The majority of villagers added other livelihood activities

	Livelihood activities before sand mining and land concession came	Livelihood activities after sand mining and land concession came
H1	Fishing, collecting resources in forest, and growing fruits	Fishing, collecting resources in forest, and growing fruits
H2	Fishing and collecting resources in forest	Fishing and collecting resources in forest
H3	Fishing and collecting sources in forest	Fishing, collection resources in forest, and laundry
H4	Fishing and collecting resources in forest	Fishing and collecting resources in forest
H5	Growing rice, fruits, and fishing	Stays at home because he is sick. His son and daughter migrated to work in Thailand. The household mainly rely on remittance and other villagers' assistance in the village.
H6	Hunting, collecting resources in forest and fishing	Hunting in forest and fishing. His family members also involve in economic activities. His son help with fishing, and his daughter and daughter in law migrate to the town to work in factory. His wife occasionally helps him to do fishing.
H7	Fishing and collecting resources in forest	Stays at home. Her sons and daughters are working in Thailand. She occasionally hired

		by villagers in the village to do a bit of work in the village.
H8	Fishing and collecting resources in forest	Her husband undertaking fishing, collecting resources in forest, and she involves in raising chicken and making leafing root. In addition her son also involve in collecting resources in forest and fishing
H9	She stays at home, but her husband were undertaking only fishing and collecting resources in forest.	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 resources in forest, and growing rice.

Source: (Fieldwork note, 2014)

From group discussion with other 5 villagers and interviewing with village headman, the researcher finds that some villagers are no longer follow their routines of livelihoods. Although some villagers still follow the routine, they admit that their income is not like before.

Table 3 : Seasonal Livelihood Calendar

Season \ Month		Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	
		Rain					—————							
Hot		—————												
Cool	—————										—————			
Fishing	Fish	—————												
	Crab		—————											
	Lobster					—————						—————		
Collecting resources in forest	—————													

Source: (Fieldwork note, 2014)

Having seen the calendar, it can be presumed that villagers had rich ways of making a living with natural resources. Basically, they all could do fishing for fishes and collecting forest resources throughout the whole year. Only the hot and cool season, from February to May, is the most promising period because they could find fishes, fish, crab, lobster. Two types of fish, crab and lobster, are very valuable on market. They could earn more than the other seasons. Although villagers undertake fishing for fishes and collecting resources in the forest, they more interested in fishing for crabs and lobsters.

It is also interesting to look at the ways villagers exploit natural resources; their livelihood activities based on natural resources does not follow any regulations. Villagers undertake fishing throughout the whole year without break, even during breeding season, i.e. villagers also collect lobsters from May to July which is the period that lobsters move to elsewhere to lay eggs. In addition, villagers go to hunting and set up traps for wild animals that are banned by laws. However, for the time being, their catches and collections are different from the past. Their earning is declined markedly because of sand mining and land concession. Their traditional livelihoods are being damaged.

With multiple ways of making a living base natural resources, although those resources almost all disappear by sand mining and land concession, some villagers

still can make a living by collecting natural resources at other places. 3 out of 9 villagers interviewed who are still undertaking livelihood activities based only natural resources. They 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 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 interviewed, 03-07-2014)

In addition, some villagers do not follow the routines anymore. They still do fishing, but since they have less income from fishing, their family members have to migrate to involve working in garment or construction sectors during rainy season and come back to their traditional livelihoods after the season. The rainy season is their most difficult time to do fishing because of high level of water, heavy rain, big waves, and turbid water (caused from sand mining

The majority of households own small machine boat, and some other households own very simple small fishing boat, therefore, they are able to do fishing only at coastal areas. Furthermore, a lot of adult villagers take long-term migrate to work in Thailand because they could not depend on natural resources for their livelihood.

Since there are multiple ways of exploiting in the village, this is could be the reason that 3 villagers still mainly rely on natural resources for their income.

3.5.4 Debt

Villagers earn less from fishing because they can catch only small amount of fishes and some days they can catch nothing, not like before. With that trend they can barely earn enough to support their families, and that could be the reason that causes a

lot of them borrow money from bank or neighbors. 5 villagers out 9 villagers interviewed borrowed money from bank, and a few of them used to borrow money from relatives. A villager mentioned that:

“My son came from fishing at other 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 interviewed, 05-07-2014)

2 villagers interviewed do not want to borrow money from bank because they said that:

“I do not have money to pay back, so I dare not to borrow money from bank”

The other 2 villagers, one of them used to borrow money from relative, and another one also used to borrow money from bank and is thinking to borrow money from bank because she does have enough money to treat her sick husband.

Villager 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” (villager headman interviewed, 03-07-2014)

3.6 Summary

Although sand mining and land concession are the main challenges affect the local's livelihoods. Sand mining company is destroying marine life stock, and land concession causes almost depletion of forest that villagers used to go to collect

resources. These two main livelihood challenges cause natural resources, fishes and forest resources, depletion. Their catches and collections are dropping dramatically. This could be the reason that a lot of them are in debt, and adult villagers tend to migrate to find job outside of the village. Villagers' traditional ways of living contributing money to religious ceremony and spending more time with family members are being affected negatively. The next chapter is demonstrating about finding and discussion of coping strategies and livelihood outcomes.



CHAPTER IV – FINDINGS & DISCUSSION COPING STRATEGIES & LIVELIHOOD OUTCOMES

4.1 Introduction

This section describes the findings to answer the sub-question 2 and 3 regarding coping strategies that vulnerable villagers, who are being affected by sand mining, are pursuing, and their outcomes after they have pursued those strategies.

4.2 Coping strategies of vulnerable households

The study finds that households are diversifying their economic activities, and members in households also are involved in economic opportunities in order to cope with challenges. Almost households interviewed involve more than three coping strategies, but at least, they have two main livelihood activities, fishing and collecting forest resources. Those coping strategies are 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).

4.2.1 Coping strategies based on natural resources

As mentioned early that villagers have at least two main livelihoods which are undermined by sand mining and land concession. Although they face these challenges, some villagers can still manage to find natural resources which are not much available near the village, but they have to travel far away from the village. One villager said she can collect leaves and rattan that are still available nearby, but not much. She and some other women make leaving roofs she receives an order, which is

not regular, from buyer outside of the village. In addition, another villager said he has to go somewhere where sand mining does not happen, therefore, he can catch fishes, fish, crab, and prawn. Even though he still can catch fishes, his catches are not the same as before. He said his catches are significant drop.

In addition, to cope livelihood challenges, villagers also involve in other economic activities based on natural sources. These coping strategies are doing farm and rearing livestock. Villagers can still collect herbs in forest where is far away from the village. Furthermore, some organizations used to help villagers with raising livestock, but they seem not successful because there are only few household raise chickens.

4.2.2 Coping strategies based on non-natural resources

These types of strategies are economic activities which villagers are undertaking involve in pursuing casual work that available in the village, social networks, and three forms of migration.

4.2.2.1 *Temporary work within the village*

There have been casual works exist in the village and migrations are chosen by villagers to cope with their livelihood challenges. Among interviewees, there are two households involve in manual jobs which are occasionally available in the village. A woman whose husband is sick and stays at home, and her sons and daughters migrated to work in Thailand helps other villagers with taking care of farms. A widow who is a breadwinner of a household involves in providing labor service of laundry to other villagers in the village. 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 interviewed, 03-07-210)

4.2.2.2 *Social networks*

This coping strategy consists of accessing to loans, receiving gifts, providing alternative lands for livelihood purposes, motivation and remittances. There is no financial institution is stationed in the area, but a number of banks’ staff pay visit once and twice per month, so that villagers can receive loans if they attempt to. 5 out of nine villagers interviewed admitted that they received loans from bank or neighbors. There is a saving group operating in the village, and there are twelve people can afford to join the group.

Village headman reported that almost all households have extra land besides their housing land, except few a households. However, those plots of land have not been used intensively for economic activities; they are used for growing crops and rice for local consumption, and some households do not grow anything on their land.

There are four households interviewed receive remittances from their son, daughter, or husband who have migrated to work in town or Thailand. However, among the four households that have family members migrate to work outside of the village, there are two households strongly rely on remittances.

4.2.2.3 *Migration*

Migration is a type of coping strategies that people take in order to ease their livelihood difficulties. In the village, villagers take various forms of migration, seasonal, long-term, and permanent migrations, to cope with their livelihood challenges. First of all, some household members tend to take seasonal migration in town, especially during rainy season, in order to ease their livelihood difficulties, and they come back to do fishing once the season ends. Two households’ members have

migrated to work at factory or as factory constructor in town. Daughters of a household are working at factory that does not need to have any specific skills, but they need to use her labor force. A husband and his son in law of a household are able to be involved in building factory because the husband received training in that skill before.

Two households interviewed, their sons and daughters have migrated to work in Thailand. They occasionally send remittances and visit them.

According to village headman, there have been 13 families that migrated permanently either to live somewhere else in Koh Kong province or to work in Trat, Thailand's province where is close to Cambodia's border. He continued that a lot of adults in the village has come to Thailand to find job opportunities. Furthermore, villagers mentioned that they have relatives and friends live in the 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 from fishing. The catches were not enough for paying on gasoline.” (H5 interviewed, 05-07-2014)

4.3 Livelihood outcomes after pursuing coping strategies

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

4.3.1 Various income activities, but incomes declining

Although they have multisource incomes from various livelihood strategies, but their income does not the same as before. Their catches are considerable decline. A villager said that he used to earn about Riel 800,000 per day have dropped to approximately Riel 20,000 per day or nothing. That leads to the future of villagers'

livelihood in limbo. In addition, despite family members also jump in order to earn additional incomes, their incomes are very different from before as shown in Figure 1.

4.3.2 Villagers' well-being

The sense of losing general health and happiness in the village is growing. Some villagers can still maintain their culture of looking for natural resources for their livelihoods, but some of other villagers have begun to turn to other income sources. There is no support from government or organization to elderly people, but they have to depend on themselves and some help from neighbors and remittances sent from their sons and daughters working in Thailand. One elder villager mentioned that:

“I am thinking of getting a loan again from a bank in order to treat my husband's ill health.” (H7 interviewed, 08-07-2014)

In addition, villagers hope to have a better leader to change their situation, but they cannot do so. They can go to vote, but they are under influence of a political group. A village headman said that during commune election period, villagers did not vote for that particular commune leader, but that person is still in the same position. Furthermore, they are not happy with the sand mining and land concession companies, but nothing they could do about, except filed a complaint to government officers who have never responded to. At last but not least some families have moved out of the village permanently, their reasons of leaving could be either because they cannot make a living or they married with other villagers outside of the village, so they have no choice, but have to follow their partners.

4.3.3 Reduced vulnerability

Since all households have at least two main livelihoods, and some households are extended families even have three or four economic activities because

their family members also involve in economic activities, they are able to ease the negative effects of shocks. They help each other to make a living. However, households that are old or sick, and have their sons and daughters migrate to work in Thailand, their livelihoods are even more difficult. Out of nine households interviewed, there have been two households that have parents who are sick and old and mainly rely on remittances of their sons and daughters are more likely not able to cope with the livelihood challenges. Other villagers help them with providing foods and a bit of work for them to do in farm in exchange for some money. One household, their sons and daughters have worked in Thailand, has land with crops, but they are not able to take care of them because the husband is sick and his wife is busy with taking care of him. Another household also has similar situation.

“Although the incomes from fishing and collecting forest resources can help to support my family, my income dropped dramatically” (H4 interviewed, 03-07-2014)

“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 from neighbors and relatives plus remittances from son and daughter working in Thailand. These can help my wife and me to survive” (H5 interviewed, 05-07-2014)

4.3.4 Villagers' food security

Despite having less income from fishing and forest resource collection, coping strategies that villagers are pursuing can help them to ease the negative impact on food security, however there are still some households that do not have proper meal because they do not have adequate money to buy foods. One household that

have three sons and parent, wife is taking care of home and sons and farther participate in economic activities, still face difficulty in having money to buy food.

“I sometimes have to get foods first and pays money later after one or two days because she has not enough money. Furthermore, households that have parents are old or sick, they have no proper meals that consist of only rice with boiled eggs.” (H9 interviewed, 03-08-2014)

4.3.5 Unsustainable livelihood activities

Having looked at seasonal calendar in addition to shocks of sand mining and land concession are happening show that the sustainability of villagers’ livelihood based on natural resources is debatable. Some households still manage to have adequate resources for their living, but they manage to go to fishing and collecting forest resources the whole year without break. They catch fishes and lobsters during breeding season exacerbate their livelihoods in the long run.

(Allison & Ellis, 2001) argues that villagers’ traditional ways of fishing might not cause the decline of marine fish stock. This is might be partial right but, in the context of this village might be slightly different. Addition to above argument, since lobsters and crabs are so valuable, and villagers could earn a lot of money per day, between Riel 800,000 1,000,000 per day. There could be a lot of people from other parts of the city to do fishing too because in the villager there is no fishery community boundary. In 2004 and 2006, the number of families involve in fishing is increasing, from 27,340 to 30,955 (Rizvi & Singer, 2011). In addition, population growth causes environmental issues which affect negatively to biodiversity, and possibly danger sustainable livelihood and production of food (Pimentel, as cited in Bhandari & Grant, 2007). Furthermore, an officer from Koh Kong Department of Fishery mentioned that:

“The total catches in Koh Kong city this year is increased, but individual catches have decreased because there are many people fishing nowadays” (Officer of Koh Kong city Department of Fisheries interviewed, 05-08-2014)T

6 out of 9 villagers interviewed have started to add other livelihood activities which are not natural resource based. Although the argument that natural resource depletion due to increasing of population, there are some other threats to marine lives such as overfishing and illegal fishing. Although sand mining and other threats, because marine lives depletion, cannot be segregated, all villagers interviewed express that the decline of fish stock due to sand mining. Therefore, these indicators demonstrates that their livelihoods based on natural resources are in danger.

4.4 Institutions in the village

There is administrative structure from the village to ministry’s level. Starting from the village to Communal, which composed of 3 villages; then to district, and provincial level before it goes up to department of mining in the region (such as Koh Kong in this thesis) and to the Ministry of Mining that can revoke the license of the sand mining company.

The Prek Angkun village is under Trapeng Rong commune of Koh Kong district. They had undertaken an action was file a complaint to village headman, and then village headman filed that complaint to commune and district level. This action did not produce any solutions from the high levels.

“We are minority, and those superior officers will listen to our voice” (Group discussion, 05-08-2014).

As mention in quotation above, all villages interviewed were aware that the complained action might not help them to find any solution. However, villagers did not participate in any protests, although there were villagers from other villages protested against the sand mining in the town, were mainly from the human right

abuses in Cambodia. Villagers were also afraid of government officers, and they had no confidence that those officers are going to help them.

4.5 Summary

Villagers have pursued a number of coping strategies in response to their livelihood challenges which were caused by sand mining and land concession. Those responses are migration, diversifying their livelihoods, family members also engaging in livelihood activities, consuming less food, and buying food on credit. The findings shows that although they pursue these coping strategies, their livelihoods are changing. The majority of villagers have started adding other livelihood activities which are non-natural resource based. Their income is dropping dramatically which could be one reason that leads a lot of villagers to borrow money from bank. Their well-being is being affected negatively because villagers are not happy with those concession companies. Villagers have to work harder than before, while their benefits from work are not like before. Households that still depend on natural resources, and households that have livelihood combination of natural resource based and non-natural resource based livelihoods might be able to sustain their livelihoods for now, but it is questionable for their livelihood in the future. There have been trends that sustainability of their livelihoods are not sure, due to the fact that they can go to fishing even during mating season which is danger to marine life, and sand mining companies are still undertaking their operations in coastal areas. These could put villagers' livelihoods based on fishing in danger. The next chapter presents the conclusion and recommendations.

CHAPTER V: CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter aims to discuss, conclude all the findings, and provide recommendations, and suggestions for some research questions to do further research. Therefore, the chapter is separated into three sections: Section 5.2 presents about discussion; Section 5.3 shows the summary of the findings; Section 5.4 presents about recommendations and suggestions for conducting further research.

The study aims to analyze impact of sand mining on Prek Angkun villagers' economic livelihood, to identify local villagers' coping responses, and to assess those coping strategies. The study employs sustainable livelihood approach for analyzing in this study. However, to suit this study, one more asset which is lifestyle of household needed to be added.

In chapter 3, vulnerability context and livelihood impact in the village are revealed. In the village, there are two main livelihoods, fishing and collecting resources in forest. However, these two types of their livelihoods are encountering challenges of sand mining and land concession. The former cause depletion of fish stock and the later affects affect forest resources. There are two types of shock affect the villagers' livelihood. First of all, physical shock which are fishing nets and traps have been destroyed by sand mining. Second, villagers have to spend money to repair it. Second, trend in the villager is found to be the decline of earning from natural resource based livelihood. Third, seasonality is found that a few temporary employments are available in the village

As mentioned earlier that sand mining does not only produce adverse effects to livelihood assets, but also villagers' lifestyle. The study discovered that lifestyle of villagers in the village has been changed. They used to contribute a lot of money to Pchum Ben ceremony, but for the time being they contribute only a little bit of money or nothing. The ceremony is vital to them because it dedicates to their ancestors, and if villagers do not participate in the ceremony they will encounter bad luck, especially

to daily life which includes villagers' livelihoods. Sand mining affects physical asset is also being affected by sand mining. It destroys villagers' fishing net and crab traps. Sand mining affects human asset in term of making villagers even more vulnerable because of the literacy rate in the villager is not that high; therefore, villagers cannot find any proper vacancies. They mainly involve in garment factories and construction. Natural resources are available in the village in term of marine life and forest resources. There two companies which received concession from the government, sand mining concession and land concession. Sand mining destroys marine life and pollute water, and land concession cleared almost all the forest villagers used to collect resources. Social asset is affected adversely by sand mining. A lot of villagers migrate to find job in the town and Thailand. Some of adult villagers migrate and left old and sick parents at home – no one takes care them.

Villagers' economic livelihood is the main objective in this study. It is found that sand mining cause villagers encounter financial constraint. Villagers' earning has been dropped dramatically. Sand mining destroys mangroves which are shelters and food for marine life, therefore, when mangroves are damaged, marine fishes are also disappeared.

In chapter 4, coping strategies are explored and assessed. Coping strategies in the village 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 have fishing and collecting forest resources. For non-natural resource based coping strategies, villagers utilize a number of coping response tools such as temporary works that are available in the village (laundry and cutting grass), social networks (saving, receiving loans and gift, alternative lands for livelihood, motivation, and remittance), and migration.

The study finds that sand mining produces negative impact on villagers' economic livelihood. Their catches and earning are very different from before (as shown in Bar Chart 2) because fishes stock decline due to sand mining. With less income from fishing, a lot of villagers are in debt, some people encounter difficulty in

purchasing foods on market, all villagers have to add other livelihood activities which are non-natural resource base. Their livelihood activities have been changed from solely depend on natural resources into adding other economic activities which are not based on natural resources (as shown in Table 2).

It can be acknowledged that there are some other pressures affect villagers' livelihood, however, through interviewing 9 villagers, they express that sand mining is their major livelihood constraint on fishing.

Villagers in the village possess only small simple boats and machinery boats, therefore, they could only do fishing only in the shore. Fishing is their main livelihood, and the majority of villagers in Prek Angkun village would prefer fishing as their main livelihood. Their income was quite high before sand mining arrived. Some villagers could manage to earn between Riel 800,000² to 1,000,000 per day, however, for the time being, their income dropped significantly or they could earn nothing. Sand mining companies are extracting sand in the river caused river bank collapsed and destroyed mangroves. Therefore, sand mining not only destroys shore and mangroves by extracting sand, it also damages fish production which is villagers' main livelihood.

In addition, it is interesting that sand mining is not the only issue, there is another issue which is land concession. Cambodia government provided a Chinese company an area of land, is close to the village, which was covered by valuable forest trees for planting Acacia trees. The Chinese company demolished almost all of those valuable trees, and it might also benefit from selling those trees. Since villagers solely depend on natural resources, fishes and forest resources, for their main livelihoods, their income drop dramatically compare to prior sand mining companies and land concession firm came.

The results of the study is expected that the sand mining has adversely affected on villagers' livelihoods.

² 1USD is equivalent to 4063 Riel

The research's findings are in line with Marschke (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 is a major livelihood stress in the Koh Sralao village because it causes decline of fish stocks. In her study, she found that there are still some households are pursuing the fishing activities because they do not have other options, but the majority of households in the community have diversified their livelihood activities in order to cope with the livelihood stress the community is facing. The study also discovered that the community's diversified livelihood activities help them to cope with those challenges, but she is doubt whether those diversified livelihoods are sustainable. In addition, one among six households had left the village because they want to pursue other livelihood activities elsewhere, get away from debt, and they could not depend on fishing for their man livelihood. Therefore, these two studies combined could potentially reflect the reality of the negative effects of sand mining are in operations at other areas across the whole country.

However, the study's findings seem contrast to Pereira's report (Pereira, 2014) which sand mining operations in India also provide relatively small amount of positive contribution to local residents compared to adverse effects. It provides employment, but destroys their fishing livelihood which considered as far more important than the employment. While the study cannot find any improvement undertake by sand mining companies to Prek Angkun villagers and their village.

Regarding to the sustainable livelihood framework, sand mining causes villagers vulnerable because it produce negative effect to their economic livelihood. It found out that their earning from natural based livelihood declines steeply. This could be an underlying cause that villagers do not mainly rely on natural resource base for their livelihood.

Although some households still pursuing traditional livelihood activities which base on natural resources, the majority of them begins adding other livelihood activities which are not natural base. Their coping strategies are migration, diversification of their livelihood, other family members also involve in income earning activities, involve in temporary works are available in the village, reduction

the proportion of meal consumption, and buy foods on credit. Migration is a frequent coping strategy among other coping strategies that villagers in the village utilize.

However, the study also finds that although villagers have different coping strategies to cope with the challenge, decline of income, and to ease the negative impact, but their livelihoods are still unstable. They have to migrate out of the village to participate in garment factories and construction which are relatively low payment, and a lot of villagers receive loan from bank. Two households that are medium they also encounter difficulties in earning enough to support their living. Although they diversify their livelihood activities, their family members involve in earning activities by migrating to work in the town, they still borrow money from bank. Furthermore, those households that are poor, they even face more difficulties, especially to those are widows and have only old couple whose sons and daughters migrate to work in Thailand.

5.3 Conclusion

The study focuses on assessing economic livelihood, discovering coping strategies, and evaluate the outcomes of those coping strategies of Prek Angkun villagers. The study utilizes qualitative tools to conduct the study, semi-structure interview, group discussion, key informant interview, and seasonal livelihood calendar. The study is conducted in very limited time. It can be concluded that sand mining causes negative effects to villagers' economic livelihood,. It does not provide any improvement to the villagers. The sand mining does not only produce negative effects on livelihoods, but also lifestyle.

The mining produces adverse effects to villagers' livelihood assets. First of all, livelihoods of villagers are being affected negatively because sand mining destroys natural resources which villagers mainly rely on. It causes disappearing of marine life by destroying mangroves and river bed which are their shelters and food sources. As shown in Photograph 3 that mangroves and riverbank along Prek Angkun River are destroyed and collapsed. In addition, the mining also causes water becomes turbid, and its operation produces noisy sound which disturbs people's daily life, and it flows liquid waste from washing sand into river. Secondly, it causes family member

disintegration which a lot of adult villagers migrate to work outside of the village, and the majority of them migrate to work in Thailand. They have no choice, but they have to do it because they cannot rely on natural resources for their livelihood. Thirdly, villagers encounter financial constraints because they cannot earn like before, and some days if they cannot find any fishes, they can earn nothing. Before sand mining companies came, villagers could earn a lot of money and did not have to worry about their livelihood.

Fourthly, villagers reported that mining companies destroy their fishing net, and they do not pay any compensation. They have to spend more money by themselves to repair it. Fifthly, sand mining has caused low-educated villagers even more vulnerable. Since some of villagers cannot earn enough to support their living from natural resources, they are looking for jobs that are available in town or other places. However, with that educational level, they cannot find suitable vacancies, but can find only jobs that are temporary or require intensive labor, with low payment.

The sand mining not only produced adverse effects to Prek Angkun villagers' livelihood, but also affected their way of living. It has destroyed the habits of contribution in the village. Villagers used to contribute a lot of money to ceremony, Pchum Ben day, before sand mining and land concession companies came, but now they rarely do so. In addition, it produces adverse effect to family members' get-together. Before villagers went to do fishing, and it was enough for a few days. This situation is no longer happened.

A number of coping strategies that villagers in the Prek Angkun develop to cope with livelihood challenges. They diversify their economic activities, a household involves at least two economic activities, fishing and collecting resources in forest. Those households are extended families, their family members also step in other economic opportunities in order to support their living. Borrowing money or receiving loans from bank is another option that villagers have. There are six households interviewed who have borrowed money from neighbors or banks. The village headman mentioned that now a lot of villagers are getting loans from bank, and it

never happened before. Reducing proportion of meal consumption and purchasing foods on credit is another coping response that some of villagers employ. Some villagers reported that they sometimes have rice with eggs or porridge because they do not have enough money. Villagers have chosen to migrate to other places to involve in economic activities. They practice many forms of migration, permanent, seasonal, and long-term migration. Some of villagers already moved out of the village, and some tend to find jobs in the town or other places temporarily, but come back to the village to do their traditional livelihoods again. In addition, some family members have migrated to work other places, especially to find opportunities in Thailand, and come back a few times per year.

The results of coping strategies that villagers pursue vary among households interviewed, but there are two things that all villagers share in common are their incomes from depending on natural resources are decreasing significantly and they are disappointed with the sand mining and land concession companies. Three out of nine households interviewed are single family, and their livelihoods only depend on fishing and collecting forest resources. They said that they can find small amount of catches compare to before, and sometimes they can find nothing and they have to go far away from the village. One villager said he can earn only R 20,000 per day from going far away from the village, which is quite different from before. Some households also have their family members involve in economic activities. Even though family members also take economic opportunities, they still face financial issues. They have to borrow money from bank. Some other households even face more difficulty, especially to households are widow and have elder sick parents. In addition, some families and household members that could not depend on natural resources for their livelihood, they have to migrate to somewhere else.

5.4 Recommendations

This section describes some recommendations to the Government officials who have duties which have direct impacts on local villagers' livelihoods and to the Prek Angkun villagers to help themselves rather than waiting for outside helps. In addition, the researcher suggests some research questions for conducting further research.

5.4.1 Recommendations

To Government officials at high-level

The researcher would like to raise some notions that could possibly contribute to help ease villagers' livelihood challenges. High-level decision makers should revise legislation and reinforce the laws. The law on Mineral Resource Management and Exploitation shall be revised because it does not mention which party will be responsible for if mining affects villagers' livelihoods, but it states only if mining affects landowners, and the holder of license has to negotiate with affected people before initialing the operation 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 in more detail that what the incentive packages are to be paid for affected local residents if the mining cannot be avoided. If the government allows mining companies negotiate with local residents, it might not work because those companies do not realize the local cultures, and they might try to exploit local residents, and the local residents might do not how to negotiate with those companies. In addition, those might be not able to determine precisely how many residents affected and how much those mining affect local residents; therefore, the government should involve in these process, rather than allow the companies do it alone.

To government at local level

Government officials at local levels can take some initiatives in order to help villagers. The government officials at local level should cooperate with other NGOs which can support villagers' livelihoods by providing alternative or similar

livelihoods that they want and have similar or acceptable income. For instance, government officials should cooperate with CEDAC organization which specialized in certain fields of agriculture such as raising pigs and growing vegetables which are valuable on market. In addition, the government officials should cooperate with other NGOs which have expertise in rebuilding those natural resources, planting mangroves to allow fishes and lobster come back, so that villagers can still depend on natural resources for their living and their traditional way of living.

To Prek Angkun villagers

Through observation, the researcher see that there are potentialities which villagers can help themselves rather waiting for assistances. They can grow more several kinds of fruits such as Durian and Phniev because they are very valuable at the town market, as some households already have one or two trees. These kinds of fruits are very valuable at the town, if they sell them directly to customers, not through middle men. In addition, since people still can collect rattan from forest nearby and forest at the other areas, they do not have to sell the unfinished products to customers directly because they cannot a lot of money from selling them directly. They can make them into furniture or other equipment for being used in home, and sell them at the town market. By doing that they can earn more without assistance from outsiders.

REFERENCES

- ADB. (2014). Economy. from <http://www.adb.org/countries/cambodia/economy>
- Adger, W. N. (2006). Vulnerability. *Global Environmental Change*, 16(3), 268-281. doi: <http://dx.doi.org/10.1016/j.gloenvcha.2006.02.006>
- Balogun, I. (2011). Sand miners eroding fishermen's livelihood. Retrieved 26 Apr., 2014, from <http://www.vanguardngr.com/2011/04/sand-miners-eroding-fishermen%E2%80%99s-livelihood/>
- Bhattacharai, K. P. (2005). *Livelihood strategies of Squatter Households in an Urban Environment, A case study of Kathmandu Metropolitan City, Nepal*. Univeristy of Bergen, Bergen Norway.
- Carney, D. (2002). *Sustainable livelihoods approaches: progress and possiblities for change*. London: Department for International Development.
- CDC. (2014). Koh Kong Province. Retrieved 19, 2014, from <http://www.cambodiainvestment.gov.kh/koh-kong-province.html>
- Chambers, R. (1989). Editorial Introduction: Vulnerability, Coping and Policy. *IDS Bulletin*, 20(2), 1-7. doi: 10.1111/j.1759-5436.1989.mp20002001.x
- Coastalcare. (2014). Sand Mining. Retrieved 15, 2014, from <http://coastalcare.org/sections/inform/sand-mining/>
- Cooper, K. M. (2013). Setting limits for acceptable change in sediment particle size composition: Testing a new approach to managing marine aggregate dredging. *Marine pollution bulletin*, 73(1), 86-97.
- David, S. (2009). Koh Kong villagers protest against dredging operation. <http://www.phnompenhpost.com/national/koh-kong-villagers-protest-against-dredging-operation>
- DFID. (1999). Sustainable Livelihoods Guidance Sheets. Retrieved 20 Apr., 2014, from <http://www.enonline.net/pool/files/ife/dfid-sustainable-livelihoods-guidance-sheet-section1.pdf>
- Ellis, F. (2000). *Rural households and diversity in developing countries*. Oxford University: New York Press Inc.
- Gillett, R. (2004). The marine fisheries of Cambodia. Retrieved 28 Apr., 2014, from <http://www.fao.org/docrep/007/j1617e/j1617e00.htm>
- Global Witness. (2010). Shifting Sands: how singapore's demand for Cambodian sand threatens ecosystems and undermines good governance (pp. 44).
- IRIN. (2010). CAMBODIA: Sand dredging prompts fishermen's protests. Retrieved 20 March, 2014, from <http://www.irinnews.org/report/89839/cambodia-sand-dredging-prompts-fishermen-s-protests%20accessed%20on%2006/03/2012>
- Lifestyle. (2014). In *Oxford English Dictionary online*. Oxford: Oxford University Press. Retrieved from <http://www.oxforddictionaries.com/definition/english/lifestyle?searchDictCode=all>.
- O'Laughlin, B. (2002). Proletarianisation, Agency and Changing Rural Livelihoods: Forced Labour and Resistance in Colonial Mozambique. *Journal of Southern African Studies*, 28(3), 511-530. doi: 10.1080/0305707022000006495
- Panchang, R. (2014). Sand mining and industrail effluents threaten mangroves along central west coast of India. *Open journal of ocean and coastal sciences*, 1.

- Pereira, K. (2014). Sand mining: The High Volume – Low Value Paradox. Retrieved 27 Apr., 2014, from <http://coastalcare.org/2012/10/sand-mining-the-high-volume-low-value-paradox/>
- Proasrachanachak kmboucha. (2013). *Siev phoaaw tinoney phome chhnam 2013: samrab kaksang phaen ka aphe vdhoan khom sngkat.*
- Law on mineral resource management and exploitation (2001).
- Roach, J. (2004). Mangroves are nurseries for reef fish, study finds. Retrieved 21, 2014, from http://news.nationalgeographic.com/news/2004/02/0204_040204_mangroves.html
- Thomas, S. (2014). *Illegal river sand mining* [PowerPoint slides]. Retrieved from http://webcache.googleusercontent.com/search?q=cache:oCB_1Hgb7hIJ:www.slideshare.net/snealthomas/illegal-sand-mining-ppt+&cd=1&hl=en&ct=clnk&gl=th
- Tungale, R. (2008). *Livelihoods and customary marine resource management under customary marine tenure: case studies in the Solomon Islands.* Lincoln University.
- TVK (Producer). (2012, Setp 27). *Sand dredging and eco-tourism in Tatai river.* [Video file] Retrieved from http://www.youtube.com/watch?v=G_XxAyl_1kc
- UNDP. (2013). About Cambodia. from <http://www.kh.undp.org/content/cambodia/en/home/countryinfo/>
- USAID. (2001). Cambodia environmental review: status and trends in environmental management and options for future action.

APPENDIX

Focus Group Discussion in Prek Angkun village (05-08-2014)

No	Sex	Age	Livelihoods	Place
1	F	22	Fishing and Collecting resources in forest	Prek Angkun
2	M	49	Fishing and Collecting resources in forest	Prek Angkun
3	M	18	Fishing and Collecting resources in forest	Prek Angkun
4	F	56	Making leaf roofing	Prek Angkun
5	F	28	Making leaf roofing	Prek Angkun

List of interviewees

No	Coding Label	Sex	Age	No. of members in household	Livelihoods	Interview date
1	H1	M (Ban Loa)	48	5	Fishing and Growing crops	03-07-2014
2	H2	M (Khiev Chat)	27	3	Fishing and Collecting resources in forest	03-07-2014
3	H3	F (Kit tuk - window)	27	3	Fishing, Collecting resources in	03-07-2014

					forest, and laundry	
4	H4	M (Nate Bunsung)	38	4	Fishing and Collecting resources in forest	03-07-2014
5	H5	M (Lean Bunsung)	67	4	Growing crops and rice, and Fishing	05-07-2014
6	H6	M (Man Mom)	65	6	Collecting resources in forest and Fishing	05-07-2014
7	H7	F (Khem Kheoun)	57	8	Fishing and Collecting resources in forest	08-07-2014
8	H8	F – Phon	35	7	Making leaf roofing and Raising chicken	03-08-2014
9	H9	F (Tham Tha)	58	5	Staying at house	03-08-2014

Key informant interview

No	Sex	Occupation	Interview Date
1	M	Village headman	03-07-2014
2	M	Officer of Department of Fisheries	05-08-2014

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 do prices of fishes 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 access to service 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 do you have meal a day?
11. What do you usually have for meals? And compared to before are there any differences?

12. Do you satisfy 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 are your livelihood before?
20. What are 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 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 neighborhood?
6. Have you ever experienced of skipping meals or reducing the proportion of meal?

List of questionnaires for key informants

1. What kinds of agricultural products which the community can produce?
2. Are there differences in the types of work men and women can do?
3. Which group in the community has accessibility to any particular resource? which group does not? Why?
4. What are the prices of foods are available in market?
5. What substitute foods can be used when food is in short supply?
6. Describes 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 to the medical center? Whether do villagers can afford the cost of treatment?
9. Have community 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 in Koh Kong city?
21. Is there any fishing community in Trapang 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 have been done in order to help villagers to solve those challenges?
25. Does the Koh Kong fishery department staff involve in assessing environmental impact of sand mining on fish communities at coastal areas?

VITA

The researcher graduated from Institute of Foreign Languages English of Royal University of Phnom Penh, and is holding a degree of bachelor degree of education. He was a teacher at A New Cambodia, an non-government organization working on providing education and accommodation to scavenger children. He had taught children at the NGO approximately three years before been selected to participate the MAIDS program at Chulalongkorn University. He interests in conducting researches relate to education and environment field. Sand mining has been occurred since five years ago, however, the operations are still happening especially in the Koh Kong city. I Thus, it is interesting to look at how much people's livelihoods who living nearby the operations affected.

