

*NHTV University of Applied Sciences
Wageningen University and Research Centre*

VALUE CHAIN ANALYSIS & INTERVENTION REPORT

Seafood restaurant value chain

BTO2 IFP 2014 Koh Chang, Thailand
Supervisor: E. Cakmak
12/06/2014

Anna van Halder	(121531)
Esmée de Keijzer	(120801)
Vicky Kerckhoffs	(123869)
Thom Lubberts	(123874)
Nienke Sluimer	(122035)

Abstract

Koh Chang, a Thai island situated near the Cambodian border, has the aim to be a low carbon tourism destination in the future. Sustainability is high on the agenda, and accordingly, different sections of tourism have been indicated as areas where improvements could be made. DASTA, a governmental organisation that wants to establish a sustainable future for tourism in Thailand, requested us to come up with feasible interventions and recommendations that will support Koh Chang's future as a sustainable, low carbon destination. This research addresses a distinctive section of the tourism product in Koh Chang, namely the seafood restaurants. Elaborate review of existing literature and knowledge about the seafood restaurant value chain, made us decide to focus on waste management and energy efficiency as domains where challenges could be identified. We analysed the performance of the seafood restaurant value chain during a 16-day fieldwork period, by means of formal- and informal interviews, the distribution of surveys and participant observation. Elaborate analysis of the data revealed a list of bottlenecks; sections in the value chain where we found challenges that influence the sustainability of the value chain, in specific on energy efficiency and waste management. Accordingly, we have formulated a number of strategic interventions; a range of nine bottlenecks and solutions that stakeholders could apply and benefit from. In the end, we have selected the most feasible and critical interventions for elaborate intervention design. We came to the decision that the interventions *transport inefficiency*, *imported seafood on menus* and *awareness of the tourist* are most adequate as recommendations that support Koh Chang's future as an attractive low carbon destination.

Table of contents

General

List of figures.....	Page 5
List of tables	Page 5
List of abbreviations.....	Page 5

A. Research Design & Limitations

Introduction.....	Page 6
Research goal.....	Page 6-7
Research question.....	Page 7-8
Purpose.....	Page 8
Intended end result.....	Page 8
Outcome.....	Page 8
Beneficiaries.....	Page 9-10
Risk analysis reflection.....	Page 11-12
Internal risks.....	Page 11
External risks.....	Page 12
Ethical issues reflection.....	Page 13-14
Project planning and task division reflection.....	Page 15-16
Project planning.....	Page 15
Task division.....	Page 15-16
Research log and methodology.....	Page 17-19
Final planning.....	Page 17
Final methodology.....	Page 17-19
Stakeholder meeting reflection.....	Page 20-21
Limitations.....	Page 22-23

B. Final Value Chain Analysis

Contextual analysis.....	Page 24-28
Thailand (macro).....	Page 24
Koh Chang (meso).....	Page 25
Fishing villages on Koh Chang (micro).....	Page 25-27
Influences macro on meso/micro.....	Page 27-28
Literature review main problem and concepts.....	Page 29-36
Introduction on tourism's environmental pressure.....	Page 29
Waste management.....	Page 29-30
Energy efficiency.....	Page 30-31
Value chain analysis.....	Page 31-32
Seafood value chain literature review.....	Page 32-36
Value chain maps.....	Page 37-39
White Sand Beach.....	Page 37
Bang Bao.....	Page 38
Salak Phet.....	Page 39
Criteria and corresponding indicators.....	Page 40-45

Indicators measuring energy efficiency.....	Page 41-43
Indicators measuring waste management.....	Page 43-45
Research findings.....	Page 46-56
Findings Bang Bao.....	Page 46-47
Findings White Sand Beach.....	Page 47-50
Findings Salak Phet.....	Page 50-52
Findings Participant observation.....	Page 52-53
Comparison three case studies.....	Page 53-54
Survey findings.....	Page 54-56
Bottlenecks & solutions.....	Page 57-63
White Sand Beach.....	Page 57-59
Bang Bao.....	Page 59-60
Salak Phet.....	Page 61-63
All areas Koh Chang.....	Page 63
Bottlenecks & solutions - Selection for our intervention design.....	Page 64-66
 C. Intervention Design	
Providing and financing interventions.....	Page 67-71
Intervention 1: Raise tourist awareness of local and sustainable products...	Page 67-68
Intervention 2: Implementation of low carbon menu's.....	Page 68-70
Intervention 3: Creation of an online platform.....	Page 70-71
Obstacles.....	Page 72
Address obstacles.....	Page 73
Synopsys.....	Page 74
 References.....	 Page 75-79
 Appendixes	
Appendix I – Research log.....	Page 80-82
Appendix II – Interview questions.....	Page 83-85
Appendix III – Tourist survey.....	Page 86-87
Appendix IV – PESTEL analysis Thailand.....	Page 88-91
Appendix V – Interviews and participant observation (coding).....	Page 92-117
Appendix VI – Comparing research findings.....	Page 118

List of figures

Figure 1.	Catch per unit effort in the Gulf of Thailand	Page 20
Figure 2.	Pangasius value chain Vietnam	Page 29
Figure 3.	Pangasius value chain Cambodia	Page 30
Figure 4.	Prawn industry chain map	Page 31
Figure 5.	Value Chain Map White Sand Beach	Page 33
Figure 6.	Value Chain Map Bang Bao	Page 34
Figure 7.	Value Chain Map Salak Phet	Page 35
Figure 8.	Bottlenecks White Sand Beach	Page 54
Figure 9.	Bottlenecks Bang Bao	Page 56
Figure 10.	Bottlenecks Salak Phet	Page 58
Figure 11.	Food carbon emissions calculator	Page 65

List of tables

Table 1.	Criteria and corresponding indicators	Page 37
Table 2.	Ranking of bottlenecks + solutions	
Table 3.	Interventions	
Table 4.	Research Log	Page 75-77
Table 5.	Comparison of findings	Page 111

List of abbreviations

BB	Bang Bao
DASTA	Designated Areas for Sustainable Tourism Administration
DOF	Department of fisheries
EJF	Environmental Justice Foundation
GDP	Gross Domestic Product
KP	Klong Prao
PS	Plong Son
MPA	Marine Protected Area
NGO	Non-Governmental Organization
PESTEL	Political, Economic, Social-cultural, Technological, Environmental and legal
SP	Salak Phet
SK	Salak Kok
WSB	White Sand Beach

Introduction

It is not more than a few weeks ago that we finalised an intensive and very interesting period of fieldwork on the Thai island Koh Chang. During this period, we gained a lot of interesting information regarding the seafood restaurant value chain, and we had loads of triggering experiences. Prior to the fieldwork, we wrote the initial research plan. In this plan we provided a foundation, rationale and methodology for the research that we were planning to undertake. Now we would like to reflect on the plans we formulated beforehand, and provide an evaluation of the research process. Moreover, in this value chain analysis and intervention report, we hope to give a clear and comprehensive analysis of the data we have gathered during the fieldwork. This will help us to reach the main and final goal of our research: present strategic and feasible interventions and recommendations.

The interventions that we will design, are of specific interest for the Thai governmental organization DASTA. DASTA is short for The Designated Areas for Sustainable Tourism Administration. Their goal is to establish a sustainable future for tourism in Thailand, by managing tourism supply as well as the carrying capacity of selected tourism destination areas. On Koh Chang, DASTA focuses on developing and promoting the island as a low carbon destination. The formulated interventions should be based on an integrative analysis of the complex interrelationships between tourism and broader social, economic and environmental processes. Insights into these relationships would allow the identification of possible strategic intervention options towards developing low carbon tourism on Koh Chang.

DASTA recognises sustainable development as an ideal for the long-term future outlook of Koh Chang and states that interventions in value chains are vital in order to enhance sustainability. Sustainability is however a concept that needs to be defined as the term is highly debated. According to the widely supported Brundtland Commission, sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland, 1989). Sustainability is dependent on the interplay between social, environmental and economic aspects, and can be applied in a wide range of human contexts (Pigram & Wahab, 2005). Sustainability in the tourism sector implies meeting current uses and demands of tourism without impairing the natural and cultural heritage, or opportunities for collective enjoyment of tourists in the future (Hawkes & Williams, 1993). The nature and rate of tourism growth and the environments affected by expanding tourism activity can add to the potential for their own destruction. We will adopt this approach of sustainability, when we deal with this concept as a future outlook of the seafood restaurant value chain. The design of our research involves several other concepts, that might be unclear at first sight. An understanding of these terms will be given in the section that is called 'Context Analysis'.

Research goal

To avoid adopting a too broad interpretation of the concepts that we are applying, we have to outline the scope of the research. To define a clear focus, we formulated the following research goal:

“To analyse the performance of the seafood restaurant value chain on Koh Chang, focusing on energy efficiency, waste management and the role of stakeholders, in order to define feasible interventions.

With the aim to enhance a sustainable future of the value chain under study and to contribute to the development of Koh Chang as a low carbon destination."

Research questions

We rewrote the research goal into a general research question, this supported us in making the data collection and analysis as defined as possible. We aim that the outcome of our research will give an answer on this question:

"How is the seafood restaurant value chain on Koh Chang performing on the two DASTA domains energy efficiency and waste management, with an emphasis on the role of stakeholders, and how can be intervened in order to create an attractive low carbon destination and support a sustainable future outlook for Koh Chang?"

In order to answer this main research question we identified sub-research questions. Our first sub-research question focuses on stakeholders, as they are of vital for the performance of the value chain. We define stakeholders as all the actors in the seafood restaurant value chain, from origin to consumption.

1. Which stakeholders can be identified in the seafood restaurant value chain on Koh Chang?
 - What are the - direct and indirect - relations between the stakeholders?
 - Which stakeholders have the power to direct the value chain?
 - What are the interests of the stakeholders?
 - Which stakeholders benefit most from their role in the value chain?

Our second sub-research question is about the two domains we focus on. To give proper advice about possible interventions in the value chain, we need to get an idea of the current position of the domains efficiency and waste management.

2. What is the current situation of the domains energy efficiency and waste management in the seafood restaurant value chain on Koh Chang?
 - Are the stakeholders aware of the negative impacts of energy use and waste management for a sustainable future of the value chain?
 - Are the stakeholders in the value chain dealing with energy efficiency and appropriate waste management?
 - If so, how are the stakeholders dealing with energy efficiency and appropriate waste management?

When the data collection has provided us with a clear sketch of the current situation, we are able to focus on possible strategic interventions that aim to support a more sustainable future for Koh Chang. The last sub-research question is about interventions in the two chosen domains. We found the importance of including the stakeholders and looking at their willingness and capabilities.

3. How can be intervened in the domains energy efficiency and waste management in order to create a sustainable future for the seafood restaurant value chain on Koh Chang?

- Are the stakeholders willing to take actions that contribute to a sustainable future of the value chain?
- Are the stakeholders capable of taking actions that contribute to a sustainable future of the value chain?

Purpose

This research has an analytical purpose. With this research we aim to explain and evaluate the value chain of seafood restaurants on Koh Chang. The purpose of the study is to provide feasible interventions that support a sustainable future of the seafood restaurant value chain.

Intended end result

At the end of this research project, we will provide a report with an extensive analysis of the seafood restaurant value chain. In addition to that, potential interventions in this value chain will be suggested in order to advice different stakeholders, and support them to enhance a sustainable future for Koh Chang. We have presented parts of our findings to the stakeholders in a stakeholder meeting on Koh Chang.

Outcomes

Outcomes of this analytical research will include:

1. A map of the value chain under study and the provision of new insights
2. Raised awareness of energy efficiency and waste management
3. Facilitate an open debate between stakeholders
4. Feasible interventions in the seafood restaurant value chain

Beneficiaries

The beneficiaries of our research project are the actors within the seafood value chain that can benefit directly from the outcome of the research. We aim at contributing to the development of Koh Chang by generating an understanding and suggesting possible interventions that will increase the sustainability of the seafood restaurant value chain. New insights in the seafood restaurant value chain and the strategic interventions that we suggest will be relevant for the actors involved. This value chain analysis and intervention report gives an updated understanding of the seafood restaurant value chain. Moreover, the interventions that we provide should be directly useful for them. The intervention design is aimed to be formulated in such a way that the recommendations are beneficial, feasible and applicable for the relevant actors. In the following part, we provide an updated list of the beneficiaries we have identified. In addition, we will explain how the outcome is relevant for these actors and how strategic interventions are applicable to them.

DASTA and Thailand's government

A direct beneficiary of the outcome of the project is DASTA. Our report will help DASTA to support their general goal. This goal incorporates a sustainable future of tourism in Thailand, by managing tourism supply as well as the carrying capacity of selected tourism destination areas. DASTA is supposed to benefit directly from the strategic interventions options we formulate in this report. The seafood restaurant value chain is an important attractors for tourists, it serves as a vital part of Koh Chang's tourism sector. At the same time, this value chain is responsible for a particular amount of energy use and waste production, pointing it out as an interesting area of intervention for DASTA. The interventions we provide can serve as potential points of action, that help DASTA in their goal to promote Koh Chang as a sustainable destination. We can make DASTA aware of the current state of the seafood restaurant value chain and our suggestions for intervention, and they may be able to direct restaurants and fisheries in a desired direction. Also, the knowledge we acquired regarding stakeholder perceptions can be of great use to understand the line of thinking of the stakeholders. To make feasible changes for Koh Chang's future, the cooperation of the stakeholders is of major relevance for DASTA. Consequently, the indicators that measure awareness are vital for DASTA.

Additionally, the beneficial information for DASTA serves as a tool for Thailand's government, to support the future of Koh Chang as a sustainable and attractive tourism destination and facilitate an enjoying experience of the seafood restaurant value chain for tourists in the future. The indicators and interventions support the future of the seafood restaurant value chain. This can help Thailand's government in their efforts to assure the country as a flourishing tourist destination in the future. Furthermore, interventions on energy efficiency and waste management can be applied in seafood value chains in other areas in Thailand as well.

Local residents involved in fishing activities and seafood restaurants

The fishing and restaurant industry on Koh Chang mainly consists of small-scale enterprises and family business (Lunn & Dearden, 2006). Our research confirms that locals adopt a variety of roles in the seafood restaurant value chain, making it an essential source of income for local residents. Our findings and the suggested interventions will serve as tools to improve the future efficiency and sustainability of their business. Accordingly, the interventions that we suggest can be improvements for the methods they use and the way they manage their business, in a way that fishing and tourism

lead to a sufficient income and an improvement of the quality of life of locals. We found that a lack of awareness, knowledge and innovation is why many locals keep to old methods. We can help the locals by supporting a long-term outlook, by the detailed examination of energy efficiency and waste management in the value chain. An examination of the criteria should give them an indication of the current state of the value chain. Our findings can make them aware that a continuation of this state is not sustainable. Our recommendations show them that alternative options in the form of interventions can contribute to a sustainable future. A sustainable future of the seafood restaurant value chain could support a solid outlook for the future economic and social situation of Koh Chang's population.

NGO's

One final group of beneficiaries are the non-governmental organisations that are concerned with the environmental state and future development of the seafood restaurant value chain. Besides issues with energy efficiency and waste in general (Lunn & Dearden, 2006), these organisations are primarily interested in the management of the Marine Protected Area that surrounds the coast of Koh Chang. After representatives of NGO's read this final report, our findings will give them an update of the performance of the seafood restaurant value chain. Our findings offer an insight in different perspectives on the MPA. Measured indicators show where the issues in the value chain can be found, and thus provides the areas that can be of interest for a NGO. The interventions that we provide can serve as possible guidelines and methods to create awareness among individuals and businesses. NGO's may use our suggested interventions as tools to convince people and institutions to take sustainable actions. What makes our research useful for NGO's, is that we put environmental issues in a social context: we take in account multiple views from a variety of stakeholders and examine criteria that measure the perception of stakeholders. The outcome of the research is useful for them, because it will provide potential interventions that help to preserve seafood in the waters of Koh Chang.

Risk analysis reflection

After our research period of 16 days on Koh Chang, we can reflect on the risk analysis we made in advance. We will elaborate on the risks we had to deal with and how we dealt with them in real life.

Internal risks

The biggest internal risk we mentioned was a conflict between team members. Luckily, we did not have this problem at all. Working together went really well and no conflicts appeared during the 2.5 weeks of living and working together. We were all involved in the project and we managed to balance those five opinions properly. The most important factor was to keep communicating with each other, which became a small challenge when we split up into two groups for four nights. In the end, everything went great and we collected the data we needed for both case studies that week successfully.

Another risk was the lack of a declared strategy, so when there is no clear or feasible plan, schedule or task division. We started with the five of us in the same research area, though experienced that five persons is quite many when collecting data on one spot. When we divided our research into three case studies we were forced to split up in two groups. This turned out to be better regarding task division. We had discussed what data we wanted to collect and made a survey to hand out to the tourists. We could keep in touch by our Thai mobile phones and the Wi-Fi connection in our hostels. We were less productive during the first three days of the research period on Koh Chang, but this changed drastically when we started with the three case studies in the period after. We managed everything well and collected all the data needed in the amount of time we had. Everyone did his or her tasks, so the project did not lean on only one or two persons. We already prepared a lot within our research plan, which was very helpful during the actual field research.

We did not experience any serious illness or injuries within our group. Of course some did not feel that well for a day, which we solved by dividing his or her tasks among the other group members. We did not experience any inconvenience or delay because of this. The illness of some members took place when we were done with the three case studies, so while we were processing the data for our stakeholder meeting presentation, which is no problem to do with four instead of five.

Another risk is the loss of focus when doing research in such a nice setting. We did experience this in the first three days of the research period. We found accommodation in Lonely Beach, which is the backpacker's area of Koh Chang. In this area there is a lot to experience and therefore it is easier to get distracted from doing research. After the first weekend we moved to White Sand Beach, Bang Bao and eventually to Salak Phet. In those areas we were right next to our stakeholders and there was less distraction by other factors. This allowed us to completely focus on our research while staying there. In advance, we did agree to keep the weekends off, so we could be focussed all week and have some touristic fun in the weekends. In this way we had something to look forward to during the week, which made it less difficult to keep focus. We also had regular meetings with our supervisor, those were very helpful and gave us a reason to prepare and process some of the data we had already collected.

External risks

During the first three days of our research we found out that our value chain was shorter than we expected and prepared for in our research plan. The value chain was too short and simple to do the complete research on, so we had to make some changes regarding our research focus. That is when we came up with the three case studies; we wanted to see the differences between the seafood restaurant value chain in White Sand Beach, Bang Bao, and Salak Phet.

We did experience a great challenge regarding the English of our stakeholders, meaning that we lacked speaking Thai. Most did not speak any English and could therefore not help us with the research. We did find stakeholders that spoke a little English, which was already very helpful, but experienced that those interviews remained very basic. It was very difficult to get deeper information with an active language barrier. We could solve this during our last case study in Salak Phet, where we made friends with Mr. Fluck who was willing to help us. He took us to several fishermen, middlemen and restaurants where he translated the interviews for us. This was of great help to us, and we did overcome the language barrier in this way.

We did not have any problems with crashed phones, laptops, tablets, or other electronic devices. We did however have some problems with the Wi-Fi connection at our accommodation sometimes. This was quite a challenge when processing data: we had to find a restaurant or other Wi-Fi spot to continue our research. When finding accommodation we did try to make sure the Wi-Fi connection was working well, but this did not always work out as we expected. During our research period in Salak Phet we did not find any Wi-Fi, which we knew in advance so we were prepared. We told our supervisor only to reach us by Thai phone. For other things where internet was required, we had to wait till we were back at the West side of the island.

We did not experience extreme weather, but did have to cope with some tropical rain showers. Especially in White Sand Beach this was a problem for two mornings, as it was raining extremely hard, which made it impossible to walk around the area and visit resorts. We adapted those rain periods to process time, so we stayed at the accommodation and processed the already collected data. When the rain had stopped, we started with our visits to the resorts for that day. So eventually we did not experience real inconvenience from the rain.

Ethical issues reflection

In the research plan we wrote before hand, we stated that while doing research on Koh Chang, effective intercultural communication is needed to communicate with the local inhabitants, in order to gather important data. During our cross-cultural studies course we learned the foundations of intercultural communication. In addition, during our introduction programme in Cambodia and Thailand we learnt a lot more about the Asian culture, their habits and values. While we were there, we learned from our interactions with locals, however it can be difficult to deal with the people in certain situations. Intercultural communication is definitely not something you can fully prepare at home. There are no guidelines that tell you exactly what to do, how to react, and what to say in certain situations. From every encounter during our research process we learnt how to deal with it. Things that are very normal for us could be uncommon for another person.

The way of approaching key informants is different from how we would do it in the Netherlands. In the Netherlands we need a rather professional attitude. However on Koh Chang, we first want people to get to know us and feel comfortable with us having around. In this way, they will be more at ease in giving us insight information. The relation with the participant should be friendly, but pragmatic to gain an insider perspective. First we visited the restaurant a few times to have dinner and asked some basic questions. After that we could ask for an interview and sit down together.

In Bang Bao we experienced that, hence approaching them in a friendly way, we were not entirely welcome in their community. From outsiders we heard that the people living and having their businesses there did not like having us around. For them, it felt like we were putting our nose in other people's business. This made us wonder. Was it our attitude? Were we not friendly enough? Did we build our relations the wrong way? The people from Bang Bao do not like it when researchers come and tell them what to do. Often they are in business for over twenty years and are not willing to change anything. Therefore, they have a rather sceptical attitude towards researchers. It is possible that for them it is not normal to provide information to researchers, because they are scared or have a strong sense of pride. The difficulty in Bang Bao was that ethical issues do not only concern the individual, but also included the protection on the community level. We were open to understand communities' values and priorities when conducting research collaboratively with the people and businesses of the community.

We respected the participants' rights to privacy by honouring their decision to resign participation in the study, and by not addressing names in the research report. It is important to minimise harm; the benefits should outweigh the risks for the participants. Before their participation we explained that their involvement is completely anonymous, and that they can resign from participating whenever they do not feel comfortable. They were ensured that participating is completely voluntary. Furthermore, the first page of the questionnaire explained about the research and showed them how their participation is of important help. Almost all stakeholders were willing to cooperate, and nobody suddenly resigned to contribute.

In White Sand Beach we got rejected more often. People of resorts told us their English was not good enough, the manager was not there at the moment, or they did not have seafood on the menu. It felt

like they were trying to avoid us and did not want to talk to us. It is possible that here as well, it felt like we were intruding their businesses.

In Salak Phet we had a Thai translator for the day. We experienced that when a Thai person is around, stakeholders are more willing to talk about certain subjects. Probably because this way they feel much more comfortable and can talk much easier. As we already stated before, the problem is not that they cannot speak English, but that they do not speak Thai. With the help of a Thai translator, all the conversations went easier. This person knows the language and the right phrasing, but also the Thai customs and values. Therefore, he knows what we can ask (and what not) and how to address certain issues. In this way we did not disrespect the stakeholder, which made it easier to gain important data for our research.

Project planning and task division reflection

Project planning

In advance we had to make a planning for our research phase on Koh Chang. Because we were not very familiar with the research area yet, we had to base our planning on academic literature, blogs and websites. We decided to focus on two research areas: Bang Bao and Salak Phet, but we took into account to be flexible when arriving on Koh Chang, as things could turn out differently than expected. On Wednesday April 30th we arrived on the Westside of Koh Chang and travelled to our first research area Bang Bao (as stated in the initial planning), but when arriving at Bang Bao it turned out to be smaller than expected and we were not able to find a good accommodation. So we decided to stay the first days at Lonely Beach and travel from there to Bang Bao. Our initial idea was to start Thursday and Friday with interviewing in Bang Bao. To start with the small restaurants and later do the bigger ones, but we discovered that it took more time to explore the research area, make connections with the people and that we could not start interviewing in the very beginning of our research phase. Instead of doing formal interviews, we started with informal ones and small talks with managers and employees of the restaurants. After the first supervisor meeting, our plans changed, and instead of focusing on two research areas we included a third one (White Sand Beach), to compare different restaurants. Because of the limited time, we decided to split up in two smaller groups so we were able to work in two research areas at the same time. Esmée and Nienke went to White Sand Beach and Vicky, Thom and Anna to Bang Bao. So instead of going to Salak Phet on Monday May 5th, we first went four days to Bang Bao and White Sand Beach. Here we started to work according to our 5-step methodology: exploration of the research area, selecting important sources, verify findings by participant observation, doing surveys and thinking of and testing ways to intervene to in the end make final decisions on what interventions will be the best ones for our stakeholders. This 5-step methodology is a bit more elaborated compared to the methods we put in our initial planning. However, the number of different stakeholders became less, as we found out that the value chains of our 3 case studies were much shorter than expected. In our initial planning we scheduled to interview transporters, wholesalers/retailers, storage companies and processors, but when doing research we concluded that a lot of restaurants store and process their own fish. Transport was present, but often done by the restaurants, small companies or only consisted of a small cart moving from one end of the pier to the other. Monday May 12th, a week later than originally planned, we travelled to Salak Phet where we arranged a translator. In our initial planning these days were reserved for final interviews and preparation of the stakeholder meeting, which we expected to be at Wednesday or Thursday instead of Friday. In Salak Phet we interviewed fishermen and restaurants, but also the owner of a fish farm, a middleman and the owner of a fishing boat trip for tourists. During the last days of our research phase we prepared the stakeholder meeting by processing our data and making a presentation. Processing data is also something we did during the whole research phase, so after an interview we processed the information immediately, this we did not put in our initial planning.

Task division

In advance, we also had to make a task division for our research phase on Koh Chang. As it was not our initial idea to split up, we divided the tasks per method instead of research area. Participant

observation, interviewing and handing our surveys were the different tasks that were assigned to the group members. It was also our initial idea to rotate, so people would have done every task at least one time at the end of the research phase. During the first days of our research our plans already changed, and as mentioned above we decided to split up. This also meant that we had to change our whole task division, instead of dividing the tasks per methods we now divided them per research area. So Esmée and Nienke did all the tasks in White Sand Beach and Vicky, Thom and Anna did them in Bang Bao. In Salak Phet we were back together, but we also did not follow the initial task division. Because we went there with a translator, we decided to do everything together (the interviews and participant observation). During the interview some of us were making notes, others were asking the questions and one of us was filming or taking photos. The final few days of our research we worked all together on the presentation for the stakeholder meeting by processing the collected data.

Research log and methodology

Final planning

Wednesday April 30th we arrived at Koh Chang and went to our first research area Bang Bao. As following our 5-step methodology on which we elaborate later, we started with an exploration of the research area by walking around, having little conversations and eating in seafood restaurants. After the first supervisor meeting we changed our plans and decided to split up and continue our research in two different areas: White Sand Beach and Bang Bao. Here we continued with the next 3 steps of our 5-step methodology: selecting important sources and interviewing stakeholders, and verify findings by participant observation and thinking of ways to intervene. Also, we tested our thoughts by surveys. In the second week we all went to our third research area: Salak Phet, to do the latter 3 steps of our 5-step methodology together. Here a translator accompanied us in order to have in-depth conversations with the local fishermen. Wednesday May 14 and Thursday May 15 we conducted our final step: 'making final decisions on what interventions will be the best ones for our stakeholders' and practiced for the stakeholder meeting which took place on Friday May 16.

The elaborate schedule with the detailed project planning can be found under Appendix I.

Final methodology

Though we wrote an elaborate section on methodology in the Research Plan, we updated our initial methodology when we were operating in the field. A general sketch of our activities during the fieldwork can be read in the project planning and research log sections. The following part will include a more detailed explanation of the revised items of the methodology.

Adaptations

In general, we worked quite similar to what we proposed in the initial methodology section. However, after the first supervisor meeting we had in Koh Chang, we found out that we had to adapt our methodology according to the situation and issues that were at stake at that moment. It can be read in the project planning and log sections that we adapted our planning considering case studies and some of our methods. Instead of doing research in Bang Bao and Salak Phet only, we chose to include White Sand Beach as well, as we had the idea that this would add valuable information to our research. Besides, the reflection on the project planning describes that we had to skip some stages in the value chain, because the informal meetings and interviews showed us that these linkages were not operating in the seafood restaurant value chain. Wholesalers, retailers, and storage- processing- and large transport companies play a minor role in the seafood restaurant value chain on Koh Chang.

Structure

In the first supervisor meeting, we were encouraged to provide a line of thinking that would support us to have a more structured flow in our methodology, as we made some changes in the initial methodology section. We decided to formulate steps, that we could generally apply in any of the case studies we visited, this to make the research in the different areas as consistent as possible. The steps perfectly show how we have worked during the fieldwork, and are as follows:

Step 1 - Exploration of the research area, conversations with persons that seem to be of value within the seafood restaurant value chain. This means preferably informal meetings with restaurant

managers and employees, and other informants that accidentally crossed our path while looking for information.

Step 2 - Select the sources that are vital for the provision of valuable information, this is made possible through the conversations and meetings we had in step 1. Snowball sampling, also known as chain sampling, allows us to get an elaborate and in-depth knowledge of what the seafood value chain looks like. Informants from different stakeholder groups give insight from a variety of angles.

Step 3 - In this step we verify the findings that we found during the exploration phase. We do this by asking concrete questions to the informants we got by snowball sampling, and questioning the information we retrieved in the interviews in the earlier stage. Moreover, we do participant observation, which aims to validate the information we retrieved from informants said. This is an effective method to check information that can visibly and orally be tested by observation. A seafood restaurant is for example perfect for participant observation, because it allows making observations and at the same time being involved as a tourist in a restaurant.

Step 4 - The fourth step consist of doing 60 surveys conducted along the West-coast of Koh Chang, that ask tourists for their perception towards seafood, according to some short questions. This step is supposed to provide a more solid foundation for the feasibility of the interventions and shed light on the demand side of the seafood restaurant value chain.

Step 5 - In this phase we think of ways to intervene to make the seafood restaurant value chain more sustainable, according to the information we have received in the interviews, participant observation and surveys. Interventions can only be of value when the different stakeholders have the capacity and ability to make changes. Therefore, we will test the possible interventions by suggesting them to the stakeholders in the conversations that we have. Finally, we make a final decision on what interventions will suit the stakeholders and resources in the seafood restaurant value chain best to assure a higher sustainability in the future.

Data collection methods

Considering methods, we performed interviews, did participant observation and distributed surveys. The interviews were held according to the top-down approach we described in the research plan. We started interviewing owners or managers of seafood restaurants. They provided us with valuable information on which we could build on. In addition, our idea of finding informants than restaurants through snowball sampling worked. After we conducted these interviews, we got to know where restaurants got their seafood from and were able to detect informants of these suppliers. This allowed us to find the stakeholders that are important in the value chain. We arranged potential interviews according to two different methods. When we were aiming for an informal conversation, we tried to make ourselves comfortable, to look like tourists, and be friendly, hoping that we would have an interesting talk with any of the employees or others that were in the restaurant, company or pier that we visited. On the other hand, when we were looking for a formal interview, we introduced ourselves at the bar or reception, or to any of the employees. We requested if it would be possible to arrange a meeting with the owner or manager of the restaurant, company or institution we were interested in. If they were willing to participate, we talked right away, or made an appointment for another moment. We conducted the interviews in pairs, and divided the tasks of interviewing and

making notes. During most of the interviews, we also made a voice record, to make sure we did not miss any information.

An updated outline of interview questions can be found under Appendix II.

Participant observation was performed as a broadening of information and data-validation tool, checking the information that we acquired during conversations and interviews. The methods we used are quite the same as described in the research plan. We posed ourselves at positions that appeared to be essential for the value chain, made notes of what we saw and heard, and tried to blend in during interesting situations. We acted as tourists and made often use of the opportunity that the many restaurants and bars gave us. This allowed us to just sit, talk and look around. We posed ourselves together or apart at a few restaurants and around three piers among the island, more information can be found in the section that includes the findings.

In addition, we replaced the interviews of tourists by conducting surveys that asked tourists for their perceptions regarding seafood. We found that this was a more convenient and efficient tool to find out how tourists in general perceive the consumption of seafood, instead of a small amount of interviews. This survey consisted of ten questions, of which four asked for demographic characteristics. Of the part that asks for seafood perceptions, the first question can be answered with yes or no, the second is an open question and the other four can be answered according to a five-point Likert scale. Considering time and purpose, we chose to distribute 60 surveys on the Western part of the island, an amount that would give some useful insights but is insufficient as a foundational part of the research. We excluded the fishing logbook tool. The fishermen we interviewed did not mention anything like this, and we figured out that it would not add additional valuable information. What's more is that it would be extremely hard to translate the logbooks.

The outline of the survey can be found under Appendix III.

Data analysis methods

We considered grounded theory as the approach to analyse the data we gathered. We used coding practice as a method to analyse these data (Charmaz, 2006). This followed three phases: open coding, focused coding and theoretical coding. Open coding analysis begins at the basis by naming the notes, summarising the interesting parts of the notes. We did this through marking in a word processing program. The next step in the analysis of the notes involved a thematic distinction of the open codes we formulated before. We searched for patterns in the written interviews and participant observation notes, which we could merge and divide in themes. The last step, focused coding, involved the connection of themes and division in categories. Those categories were used to get a better understanding of the context, and to understand the stakeholders and their interactions. It drew out patterns from concepts and insights. This information can be found in the section that includes the findings. Based on the processed data we were able to formulate conclusions, which helped us in the identification of feasible interventions to support a sustainable future of the seafood restaurant value chain on Koh Chang.

Stakeholder meeting reflection

In the final week of our research, a stakeholder meeting took place at the Kacha hotel on Koh Chang. We were supposed to present our findings of our data-gathering phase to peer students, teachers and multiple stakeholders that are involved in the tourism industry on Koh Chang. We also had to come up with interventions that could take place in order to make Koh Chang a more sustainable and low-carbon tourism destination. Finally, we had to ask a question to the audience, which could lead to some discussion. Before the actual meeting on Friday, a trial meeting took place the day before. We presented our goals, methodology, our value chain and three potential interventions. The interventions included:

1. *Take imported food off the menu*
2. *Raise tourists awareness by fishing trips*
3. *Online platform for ordering seafood*

Our trial did not go very well. The presentation was a bit messy and incoherent. We also got some criticism and useful feedback from the Thai translator. With reference to our first intervention, he said that it is quite difficult to remove important seafood from the menu. From a business perspective, it could be costly to import but as long as the customer is willing to pay, it would be beneficial for the restaurant. He also provided us with a useful suggestion for a possible intervention. He suggested a cooking class within restaurants to raise awareness among tourists about local food products. When tourists have knowledge about these things, they might order more local products. The results of our survey show that 78% of the respondents are willing to pay more if they knew that their food was caught and processed in a sustainable way. That is why this could be a good recommendation to the restaurants. It could be beneficial on the short (income cooking class) and long (more local food ordered) term. We considered this as very useful information and included this recommendation in our actual presentation the next day. Our questions for the audience were also a bit vague and might be a bit offensive. They were stated as: "What stops you as a tourism business from adopting sustainable business practices? What would be the reason for you to act more energy efficient and manage your waste in an appropriate way?"

For the actual stakeholder meeting on Friday, we improved our presentation based on the feedback we got. We included more pictures in the methodology section in order to give a clearer visualisation of the work we had done. We also reduced our three interventions into one 'main' intervention, which included raising tourist's awareness about local products. In order to reach this objective, we recommended cooking classes and fishing trips. We stated the question for the audience as: "Do you think that using low carbon menus will be effective for changing the consumption of seafood on Koh Chang?" With this question, we referred to Koh Mak as being a low carbon destination. On this Island, such menus already exist in restaurants.

The presentation went much better than the trial one. The stakeholders responded positive to our question. DASTA stated that the low carbon menus give Koh Mak a good image and that this brings an opportunity for tour operators to promote the island as a tourism destination. She said that this should also be implemented on Koh Chang. Another stakeholder said that he invites businesses and tourists to his organic orchard. In this way he tries to make people aware of organic, local products

and hopes to change their consumption pattern in this way. A third stakeholder mentioned that a low carbon menu could add value in a way that people think that they are acting responsible for the earth. He also mentioned that tourists not just want to feel responsible, but that they also want to feel the local lifestyle and taste the fresh food. Tourists want to bring back unique experiences. Those things should be promoted on the menu as well, to make eating low-carbon more appealing to the tourist.

Limitations

For our research we made use of participant observation as a data collection method. A limitation of this method is interpretation. When doing observations you are easily inclined to interpret things, it is very difficult to stay value free. During participant observation we can be biased to look at 'things we want to see', this can have an influence on our data collection. We used the participant observation method to see if the data collected during interviews could be confirmed by our observations. Of course we then searched unconsciously for the information we had received instead of a total unbiased observation without any foreknowledge. We did it this way, because we had talked to several stakeholders who told us about the places where the seafood arrives. We then figured to go there and see this ourselves to make sure they were speaking the truth. Another way to handle this is to only ask where those places are and not talk about what it exact is that is happening and what this looks like. We already had conversations about how the seafood is transported and in what sort of transport before going to the harbour.

Another limitation came up while doing research, we were there during low season. This we did encounter in our research plan, but it was far more quite on the island than expected. Observations are snapshots and therefore can be very different one day or the other, especially with the big differences during high season and low season on the island. We only have participant observation data from the low season, which is therefore a limitation. During the interviews we had we did ask for the situation during low season, so we could get an image about the differences. The best for the research would be to go there in both low and high season, but this was out of our league for this research. So therefore it is important to try and get an image of high season through other sources, such as the interviews and conversations with the locals and stakeholders.

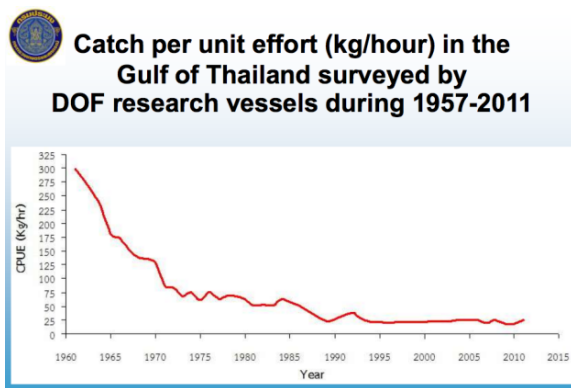
The other data collection method we made use of were semi-structured interviews. As mentioned in Diefenbach (2008), qualitative empirical research and case studies have, like any other scientific method, their strengths and weaknesses. He states that one of the most fundamental criticisms of qualitative research is that the entire qualitative research process is biased by implicit assumptions, interests, worldviews, prejudices, and one-sidedness of the researcher. This we experienced a lot due to the language barrier with our interviewees. It is very tempting to help guess words when someone is struggling to tell you something in English. We did this sometimes as well, which limits our research. Another limitation of using semi-structured interviews is the reliability of the interviewees. Interviewees are not always a reliable source for information because of the conscious and deliberate attempts to mislead the interviewer (Diefenbach, 2008). As we have interviewed restaurant employees, fishermen and middlemen in the seafood restaurant value chain, they might have spoken in favour of their company in order to promote it or for the fear of ruining their image. We experienced this in the beginning of the research, when we spoke to some seafood restaurants in Ban Bao who said that all the seafood is caught by a local fisherman who brings it in his boat to the restaurant every morning. After some more research we knew this was not true, because there was a middlemen involved in Ban Bao. We tried to overcome this by talking to as many people as possible, so not only the restaurants. We talked to several locals who worked in the accommodation industry, they could tell us a lot about the seafood value chain from their perspective. Secondly, we did participant observations to see with our own eyes what was happening exactly with the seafood on the island and where it was coming from.

The language barrier, as mentioned in the risk analysis, became a limitation for our research. Most people we wanted to speak to on Koh Chang did not speak any or very limited English. We therefore were not able to interview all the people we wanted, so we had to be flexible. The language barrier caused misinterpretations. People might have misunderstood the questions we asked and we might have done the same with their answers. Especially sustainability was a difficult topic for discussion as the concept was unknown to most stakeholders. Therefore the answers we got to those questions have a high limitation factor; we were unable to use the answer to some of those questions in our actual analysis. During our research in Salak Phet we made local friends who were willing to translate for us. They took us to many different actors in the value chain and helped to translate all our questions and their answers. As advice we can say to make use of a translator in an earlier stage of the research, to be ahead of those misinterpretations from both sides.

Contextual analysis

Thailand (Macro)

Thailand is located in the centre of South-East Asia and is a Constitutional Monarchy presided over by the King of Thailand (Tourism Authority of Thailand, n.d.). A major source which contributes to Thailand's GDP is the seafood export. Thailand's seafood export is the third most valuable in the world, supplying markets in the US, Europe and Asia. As a result of the pressures imposed by over-fishing, the use of destructive fishing practices, and the lack of adequate management, the Southeast Asian seas have faced extensive reductions in the quantity and quality of once productive and valued habitats, including coral reefs, mangroves, and sea grasses (Talaue-McManus, 2000). Official statistics for Thailand reveal that 2.6 million tonnes of marine fisheries products were landed in 2003 (Lunn & Dearden, 2006). Since many small-scale fishers sell their products locally and/or consume their catches themselves, their landings are often under-represented in official statistics (Seilert & Sangchan, 2001). Thai government records characteristically under-report (or even ignore) small-scale fishers' landings (Masae & Bussabong, 2001), suggesting that total landings could in fact be much higher than FAO's estimates for the country. The Environmental Justice Foundation (2011) reports that Thailand yielded 7,3 billion USD export revenue. The image below is a graphical representation of fish catches per unit in the Gulf of Thailand. The decline in catches is a result of



overfishing. The amount of catch units remained relatively stable over the last thirty years. This as a consequence of technological innovations in the fishing industry that function as a balancing factor for the decline of the fish population in the Gulf of Thailand.

Figure 1 - Catch per unit effort in the Gulf of Thailand (Source: The Environmental Justice Foundation)

Human trafficking

An important issue of the fishing industry involves human trafficking. Migrants from Myanmar, Cambodia and Laos are conscripted into its seafood industry. A report from the Environmental Justice Foundation suggests that, despite increasing international pressure and Thai government attention it is still happening. Cheap untrained foreign fishermen work under exploitive circumstances and sometimes even get abused or murdered. They often have never been on a ship before. Fishing boat owners do this illegally to minimize costs and maximize profits. For three consecutive years, The US Government's trafficking in persons (TIP) report that assesses government efforts to combat human trafficking has identified Thailand as failing to comply with minimum standards. Willingness of Thai government to combat human trafficking by fishing boats has been questioned and EJF wants more transparency in the fishing industry. According to EJF, All trade partners must investigate their Thai supply chains to ensure trafficked labour has played no part in the production of their goods.

A PESTEL-analysis of relevant issues in Thailand can be found in appendix IV.

Koh Chang (Meso)

Fishing gear

Legislation forbids fishing in the park of Koh Chang, but restrictions to small-scale fisheries have never been enforced (Lunn & Dearden, 2006). Residents are involved in many types of small-scale fishing activities, including the coastal gill net, crab trap, hook-and-line, krill scoop net, reef fish trap, shellfish gleaning, shrimp trammel net, small trawl net, and squid trap fisheries (Lunn & Dearden, 2006). Large-scale fishing vessels using anchovy purse seines and squid cast nets also operate within the protected area, despite being more closely monitored by local authorities.

Small-scale fisheries

Lunn & Dearden conducted research in 2003 on Koh Chang. They wanted to provide insight into small-scale fisheries. They noted that fishers used small-motorised boats and various combinations of nets, traps, and hook-and-line to gather fish. Fishers worked alone or in groups up to five people per boat. Small-scale fishers appeared to be most active in the rainy season and fishers were most commonly involved in the shrimp trammel net fishery. According to the fishers, their investment in small-scale fishing activities changed with the lunar phase and with local weather patterns, two factors linked to their catch volumes. Almost all types of fisherman were concerned about decreasing catches. They reported that their catches had decreased substantially in the last 10 years, blaming the decline on increased participation in the fishery and more efficient gear (Lunn & Dearden, 2006). According to Lunn & Dearden (2006), fishers used relatively non-destructive gear to collect target species, suggesting that small-scale fisheries cause minimal threat to the area's physical habitats. None of the respondents in the live reef fish industry mentioned the use of any chemicals to collect groupers and snappers from nearby reefs, nor did any respondent note the presence of blast fishing activities in the area. Lunn & Dearden (2006) also noted that further research has been needed to assess the ecological impacts of small-scale fisheries employing so-called "non-destructive" techniques. Our research will make an effort to fill this gap of knowledge.

Government

During the research, we faced another issue that influences the fishing industry on the island. From several sources (owner restaurant happy turtle, receptionist Paradise Cottage), we heard that the government of the island is corrupt. They told us that restaurants on the island actually pay the government to be able to throw garbage in the ocean. In some way, the restaurants are destroying their own business with this because their selling products are actually swimming in that (spoiled) ocean. These restaurants, which are situated in the sea (!), are even winning "environmental" awards. However, the government is the distributor of these awards... This governmental corruption has consequences for small-scale fisheries as well. As mentioned before, Koh Chang is surrounded by a three kilometre wide protected marine zone. Within this zone, large fishing vessels are not allowed to catch seafood. However, this law is not implemented very well. The border is barely secured and small vessels have to compete more often with the larger ones. The Koh Chang government owns some of these large vessels. That might be the reason why the border of the protected marine zone is barely secured.

Fishing villages on Koh Chang (micro)

In the mid-1970s, when the island was still undeveloped, the first foreign backpackers started arriving using local fishing boats. Nowadays, Koh Chang is home to a number of small fishing villages,

which you can visit. We divided our research over three research spots; White Sand Beach, Bang Bao and Salak phet. Bang Bao and Salakphet are known as fishing villages.

Bang Bao

Bang Bao is probably the best known and the main point to leave for the islands in the south (PGS Hotels South-East Asia, n.d.). This fishery village is very interesting for tourists because residents in the area build up their houses with poles pitched into the sea and bridges reaching to every house to link the community together. Most of the action is on the long pier and also fishermen and fishing boats can be found here. The place is described as a seafood paradise where you can choose your own fish from the restaurants' live tanks. However, it is also noted that it is not an authentic village where fishing is the main source of income. Tourism has replaced fishing as the village's main industry (Koh Chang 2 Thailand, n.d.). A major issue which we faced during our research, was the enormous amount of waste in the water around Bang Bao pier. Most restaurants and shops on the pier throw all types of garbage in the water. Some sinks are directly "connected" to the sea. This could influence the image of Bang Bao as a tourism attraction. Some tourists we spoke to were already complaining about the waste in the water. Again, the souvenir shops and the restaurants are destroying their own business if fewer tourists come because of the dirty water.

Salak Phet

For more authenticity you will have to make the effort to go around to Salak Phet in the far south east of the island. In Salak Phet you will see a more authentic way of life for Koh Chang natives. The villagers are mostly fishermen and there are many piers that serve fishing boats as well as boats to neighbouring islands. When you wander along the jetty no-one will try to sell you any souvenirs, some people will smile and say 'Sawadee' and most will ignore you and get on with drying fish, fixing nets, sorting crabs or whatever they are doing (Ian, 2011). This is very different compared to Bang Bao where the vast majority of fishermen are now running tour boat businesses, working for dive schools or lazing around while other family members sell trips, tours and souvenirs to tourists (Ian, 2011). In Salak Kok, which is located on the east coast of the island, is a pint-sized fishing village that screams authenticity (Koh Chang 2 Thailand, n.d.). The locals who form a self-sustaining organization that run a restaurant to serve visitors at a reasonable price prepare fresh seafood from daily catches.

Accessibility

The major issue of Salak Phet is its accessibility, as the road is not constructed fully around the island. The village is quiet isolated from the more developed west coast and transport is relatively expensive. From different perspectives, the consequences for the village are both positive and negative. From a business perspective, the isolation of Salak Phet can be seen as a negative thing from a business perspective. It is hard for potential customers to reach Salak phet and this might prevent them from coming there. However, they are now able to focus and specialize on a particular type of tourist. From a sustainable perspective, the isolation of Salak Phet can be seen as a positive thing because it makes it a less interesting location for (seafood) restaurants and hotels to establish their business there. However, the transport that still goes there has to travel a longer distance than necessary. At the moment, there are rumours stating that the government has plans to extent the road and construct it all around the Island. This will make Salak Phet more accessible and tourism development more attractive to implement. And it will have major consequences for Salak Phet as a tourism site.

White Sand Beach

White Sand Beach is far more touristic and luxurious than the previous discussed places. It is not a fishing village but has a focus on (mass) tourism. Much hotels and resorts are constructed here and it is still growing fast. Within these hotels and resorts, restaurants are situated that serve seafood that meet the needs of the tourists. Lots of imported seafood can be found on the menus here.

English level

The low English level was an issue that we had to deal with in all three research spots. Even many receptionists of big hotels/resorts were not able to speak proper English. As long as we kept it simple, the interviewees were able to respond. But when questions about sustainability related topics were asked, mutual understanding was hard to achieve. Question remains: 'Was this because of a language barrier or was the topic too sensitive?'

Influences macro on meso/micro

Legislation

As mentioned in the PESTEL-analysis, the current political crisis is unlikely to influence Koh Chang when it comes to risky situations. Most protests are held in the capital city Bangkok. Legally fisheries and fish farms on Koh Chang should follow some rules and laws e.g. the Fishery act. Fish farms for example are not allowed to import live aquatic or introduce exotic species on Koh Chang. In addition to that, fish farms have to meet up with certain conditions to control the quality of waste effluent from shrimp farms. The fishery act also includes restrictions for fisheries that determine where they are allowed to fish. Koh Chang fisheries also have to pay attention to the food act. This act is aimed at protecting and preventing consumers from health hazards occurring from food consumption. Fisheries should meet up the minimal standards of quality stated in the act.

Big industry

The seafood sector plays a major role in Thailand. According to the FAO, it generates employment for around 662 000 people both directly in the fisheries enterprises and indirectly in the related industries. This fact could have severe consequences for the fishing industry on Koh Chang. Because many fishing boats are active in the Thai Gulf, the fishing area becomes depleted. Fishing boats have to spend more time at sea in order to have the same yields.

One other issue that came up during the data-gathering phase of our research was related to the Thai economy. This economy is not as developed and prosperous as western economies. Many businesses on Koh Chang have to work very hard to outweigh the costs and feed their families. This is why it is hard to implement more sustainable instruments. Most methods would be way too costly for them and would not be part of their major priorities.

Transport

Technology also plays a major role in fisheries on Koh Chang. Think of development of fishing gear and boats that make fishing more efficient. The seafood value chain stakeholders could also suffer from breaks in the cool chain. Breaks in the cool chain can result in irreversible damage to the quality of fish. With transport of perishable products into remote regions, ideal procedures may not always be possible and so, in these instances, early planning by transporters, processors and storage companies will allow products to be delivered as efficiently and cool as possible. The continued growth and competitive position of the Thai aquaculture industry in a global marketplace will be

directly related to the resources invested in research and technology development. An expanded research and technology development program for aquaculture will offer significant benefits to both producers and consumers of aquatic products by enhancing the production efficiency and quality of aquatic organisms cultivated for both food and non-food purposes like tourism.

Environment

Looking at the environment, the rapid expansion of fisheries causes environmental problems and shortage of seafood. This has an effect on Koh Chang and its fishing villages, because a shortage of seafood means less is available for export (income) and consumption. As a result of the overfishing, the government can set new restrictions for maximizing caught seafood or fishing spots. Water pollution on the macro level will also cause water pollution in the waters surrounding Koh Chang, which can influence seafood quality on the Island.

Social

The social-cultural factors, the hierarchical society and the importance of family value (which is very dominant in Thailand) are also happening on meso and micro level. On Koh Chang, a lot of family owned businesses are situated or family members work together in different levels of the value chain.

Literature review main problem and concepts

In order to gain an understanding of the current knowledge of the seafood restaurant value chain and the concepts and issues involved, we performed a literature review. This literature review served as a tool to narrow down from a broad perspective of potential issues involved with the seafood restaurant value chain, to a more specific framework of information that is relevant for our research. To understand our findings, we need to be aware of the existing concepts associated with the seafood restaurant value chain, together with an understanding of value chain analysis itself.

To identify Koh Chang's current situation and improve its future outlook, we were provided with the four domains energy efficiency, waste management, water saving and self sufficiency business concepts. However, to examine the sustainable performance of the seafood restaurant value chain, not all these domains seem to be appropriate. In our research, we merely addressed the domains energy efficiency and waste management. We found that water saving as well as self sufficiency business concepts are of inferior relevance relative to energy efficiency and waste management, and would merely be confusing for a comprehensive and transparent assessment of the value chain. This decision is argued in the Research plan. To provide a solid background for our findings, we will give an overview of the existing knowledge of and issues involved with waste management and energy efficiency. The final part of the literature review provides an understanding of value chain analysis and gives an overview of three other value chains in the field of seafood.

Introduction on tourism's environmental pressure

DASTA aims to assure a sustainable future for Koh Chang by reducing carbon emissions regarding the previously mentioned domains. More generally, the sheer size of the tourism industry makes it important to consider its environmental impacts (Kuo & Chen, 2009). To assess the impact that people, institutions and chains have on the environment and how they affect sustainability as a whole, the terms carbon footprint and ecological footprint can be applied. The carbon footprint can be formulated as the certain amount of gaseous emissions that are associated with human production or consumption activities (Wiedmann & Minx, 2007). Ecological footprint implies a broader perspective on the impact an individual or a group has on the environment (Gössling et al., 2002). The tourism industry in the Koh Chang area is responsible for 47,835 tons of carbon emissions per year, which is about 0.2 % of Thailand's total emissions. The average tourist in the Koh Chang area emits a total of 19.74 kilogram of carbon per day, while the average of carbon emissions per day for a tourist in Thailand is about 11 kilogram (Henzler et al., 2010). This stresses the need for more elaborate inspection on the possibilities to reduce human pressure on Koh Chang's environment.

Waste management

The web of systems, the highly populated areas we live in, and our changing attitude towards consumption make waste management a highly complex activity. The mass of waste produced in the world has been growing significantly for many decades (Giusti, 2009). Wills (1995) defines waste management as the opposite of waste disposal. Mohanty and Deshmuck (1999) address waste management within the production process as an attempt towards green productivity. Their study is however mainly focused on manufacturing, and does not include seafood or food production in general.

Food waste occurs at different points in the food supply chain, though it is most readily defined at the retail and consumer stages (Parfitt et al., 2010). According to Lundqvist et al. (2008), as much as half of all food grown is lost or wasted before and after it reaches the consumer. Food can also be wasted before it reaches the consumer, it is then called food loss, which refers to the decrease in food quantity or quality, which makes it unfit for human feeding (Grolleaud, 2002).

Within the seafood restaurant value chain, waste is produced at different levels. Fishing is an enormous source of waste: more than 50% of the remaining material from total fish capture is not used as food, resulting in almost 32 million tonnes of waste (Kristinsson & Rasco, 2000). Overfishing is a major issue within the seafood sector, it is estimated that about a quarter of the world's fish resources are over-exploited and in decline and half are totally exploited (FAO, 2007; Ayer et al., 2009). This by-catch makes species extinct; moreover, it is often just dumped in the ocean (Hall et al., 2000). Secondly, fish farming is an aspect of major concern, as it involves the supply of artificial feeds and medication with consequent impacts on the environment (Arvanitoyannis & Kassaveti, 2008; Cho et al., 1994). According to Cho and Bureau (1997), waste of dietary origin makes up the largest part of the waste output in aquaculture operation. Finally, processing of fish and shellfish is inefficient and results in large quantities of solid and liquid wastes, which are simply sent for disposal in landfills. However, other types of processing can generate valuable by-products such as oils, fish meals, and pharmaceuticals (Read & Fernandes, 2003). Treated fish waste can be used for a range of activities, for instance animal consumption, biodiesel and biogas, food industry and cosmetics (Arvanitoyannis & Kassaveti, 2008).

It is estimated that tourists generate twice as much solid waste per capita as local residents (Adelphi Consult, 2010). Within the Koh Chang area, 20% to 57% of the produced waste is food. Food waste constitutes the maximum waste (about 65%) from hotels and restaurants at Koh Chang. There is essentially no literature or information to be found on the management of waste within the fisheries and seafood restaurants of Koh Chang (Henzler et al., 2010b), we aim to partially fill this gap.

Energy efficiency

Energy use has a wide range of environmental consequences. This is mainly due to the fact that 85% of global energy use is based on the consumption of fossil fuels (Biesiot and Noorman, 1999). The issue of energy efficiency is of major relevance for tourism, because of the high amount of consumptive use (Gössling et al., 2005). The use of energy within tourism activities can be divided in transport-related purposes, implying travel to, from and at the destination, and destination-related purposes excluding transports, for example accommodation, food and leisure activities. Transport is by far the most important factor contributing to leisure-related energy use and emissions of greenhouse gases (Gössling, 2002).

Food production and consumption have a range of energy-use implications, including their contribution to emissions of greenhouse gases (Gössling et al., 2011). Study revealed that food consumption accounts for more than 20% of Norway's total greenhouse gas emissions, a figure that may be considered representative for a large number of industrialised countries (Hille et al., 2008). Important for the study of energy use in the food sector, are the concepts of food miles and local food, implying the importance of distance and the production process for the energy efficiency of food (Lang & Heasman, 2004).

The food sector in tourism is seen as a potential area in which food service providers could contribute to a more sustainable system of food production and consumption by different use of energy (Gössling et al., 2011). This study suggests five areas of intervention for food providers: the choice of raw materials, transport, seasonality, preparation and presentation. In these areas, not only emissions are taken in account; it is also argued that other measures are possible as well, for example storage and the amount of pre-orders (Gössling et al., 2011). Though in literature on energy efficiency within the food sector the emphasis is on emissions, this broader view is also widely supported (Leach, 1995; Ayer et al., 2009; Pauly et al., 2003; Tyedmers et al., 2005).

The assessment of energy within fisheries is indicated as very relevant. Besides the obvious direct effects commercial seafood production has, the consumption of fossil energy as the indirect but real ecological importance for marine ecosystems is emphasized (Tyedmers, 2001). In another study of Tyedmers (2004), he measures the energy performance of fisheries merely on its fuel use intensity. His idea is supported and a method that is very much applied to quantify the resource use and emissions is Life Cycle Assessment (Ellingsen & Aanonsen, 2006; Pelletier et al., 2009; Thrane et al., 2009). For instance, using this model, Norwegian research found that increasing the proportion of frozen seafood to fresh, can decrease the need for airfreight and other resource intensive means of transport, lowering energy and emissions. Increasing the edible yield and use of by-products would similarly lead to lower emissions (Winther et al., 2009). Though reducing carbon emissions is high on the agenda for Koh Chang and is in certain ways assessed in the accommodation sector, a lot is there to be examined and considered in the seafood restaurant sector. Later in this report, you can read our recommendations regarding energy use.

Value chain analysis

The value chain describes the full range of activities that are required to bring a product or service from conception, through the intermediary phases of production, delivery to final consumers, and final disposal after use (Kaplinsky, 2004). Tourism value chains are quite different from manufacturing or agricultural value chains, because of the nature of the product. Tourism consists of a complex set of services including accommodation, transport, food and so on. These services cannot be stored and therefore production and consumption of services are usually simultaneous and take place at the tourist destination. Another difference is that in tourism, the tourists (consumers) move to the product (destination) – while in product value chains, the products move through different stages from primary production to final consumption (Ashley & Mitchell, 2008). According to FIAS (2000), understanding the nature of constraints confronting the tourism industry itself, requires a rigorous assessment of the role of each value chain component in the overall tourism experience, the linkages to other agents, and the performance of the service providers, industries and institutions. According to Steck, Wood & Bishop (2010), value chain analysis was traditionally used by industries to maximize profit through strengthening stages in the supply chain. But they also state that the use of value chain analysis and development as a tool for poverty reduction has grown in recent years in line with the introduction of more market based approaches and strategies and is being increasingly used for identification of focus. Of course a value chain analysis can be used for various reasons. Kaplinsky & Morris (2001) state that a value chain analysis can be used to determine whose behaviour plays an important role in its success and according to Elloumni (2004) it helps to determine which type of competitive advantage to pursue and how to pursue it. As mentioned in FIAS (2008), value chain analysis enables a strategic way of identifying and prioritizing critical issues along the chain, and developing targeted solution interventions to achieve maximum impact.

But how is a value chain analysis conducted? First, it is important to know that there is not one, but several ways to do a value chain analysis, which can consist of qualitative and/or quantitative tools. However, there are some steps that appear in most of the value chain analysis. One of the first steps is to identify the activities that add value to the product or service and see how they are related to each other. According to Faße et al. (2009), in this stage it is important to define the boundaries to other chains. When the actors are identified, the idea is to 'map' the traced product or service flows and relationships within the chain and to give an illustrative representation of the identified value chain actors and flows (Faße et al., 2009). Examples of techniques to 'map' value chains are cross-functional maps, value stream maps or computer simulations (Donaldson, Ishii & Sheppard, 2006). Different steps can follow. Often the next step is to identify the ways in which clients may perceive a higher value in the products or services, or looking at chain-level issues (Arbulu et al., 2003). When this is identified, the next step is to look for opportunities to increase value and evaluate whether or where in the value chain it is worth making changes. These previous steps are important to one of the last steps: developing a plan for change. Because knowing the way the value chain operates will lead to more appropriate interventions (Schmitz, 2005).

As mentioned in FIAS (2008), value chain analysis enables a strategic way of identifying and prioritizing critical issues along the chain, and developing targeted solution interventions to achieve maximum impact. Value chain analysis can inform many different kinds of intervention whether or not their overall aim is to enhance performance of the chain (Ashley & Mitchell, 2008). Kaplinsky & Morris (2001) note some possible interventions in the value chain such as: firms can shift into other sectors/value chains as a result of the acquisition of new competencies or firms can train their employees in order to upgrade the knowledge within the firm.

Ashley & Mitchell (2008) highlight that it is important to not only look at the short-term impact, but also at the long-term impacts of the interventions in the value chain. These long-term impacts can be quite different. Further thinking and alliances are necessary to measure dynamic effects, but the first priority is to – at least – identify and categorise the main types of dynamic impacts relevant to the value chain.

Seafood value chain literature review

In order to develop an understanding of the seafood restaurant value chain of Koh Chang, other similar value chains have been analysed. These reports of value chain analyses address some relevant information, including characteristics, stakeholders and relations to describe the seafood restaurant value chain of Koh Chang.

Vietnam and Cambodia

Loc et al. (2009) states that the fisheries sector in Cambodia and Vietnam is undergoing a period of rapid internationalisation, which has led to national economic growth and rural development. At the moment this is also happening on Koh Chang. As it is in the same area and same context it is interesting to see in what way the map is developing in that area. However, the expansion has also revealed a number of constraints limiting the efficiency of fishers, fish farmers, processors and traders alike. Also due to the explosive and spontaneous expansion of the aquaculture in the Mekong Delta without long-term development plans and control of the government it can have serious negative environmental impacts. This report elaborates on these concerns by investigating the

structure and function of the value chain of *Pangasius hypothalamus*, an aquaculture species in the Mekong Delta.

Six distinct functions were found including input suppliers consisting of feed, hatchery farmers and veterinary supplies; traders such as collectors, wholesalers and retailers; processing actors who are responsible for processing fish into marketable products and trading them to retail markets.

The chain in Vietnam is predominantly export oriented; this is in contrast to the Cambodian chain, which has a big domestic market. As a result the chain is more streamlined and dominated by processing companies. The first channel in Vietnam is a vertically integrated international chain, which extends from producers to processors and export markets. Nearly all producers selling seafood to export markets have a direct contract with processing companies, thereby avoiding the extra costs incurred by collectors. There is a tendency towards vertical integration by processing companies in order to maintain greater control over farming practices. Overall vertical diversification appears to be a relatively successful strategy. The second channel is a small, domestic flow of seafood passing from producers to collectors, who then sell to wholesalers, retailers or processing companies and finally consumers in major urban centres such as Ho Chi Minh City. The domestic chain is also a secondary market for those farmers who do not meet the quality or safety requirements of the processing markets for export markets. The *Pangasius* chain in Cambodia is made up of a series of collectors, wholesalers, processors and retailers. Due to the relative geographic isolation, high degree of seasonality and large volumes of many fisheries in the country, which is also the case of the touristy island of Koh Chang, collectors play an important role in transferring seafood from fishers and farmers to processing companies. Processors are small, household scale operations or medium scale private businesses, none of which meet international standards. Only a relatively small amount of seafood is sold directly by farmers to domestic markets.

Loc et al. (2009) states that because of the absence of a strong government presence most of the support provided to producers is through NGOs such as Oxfam, the FAO and JICA.

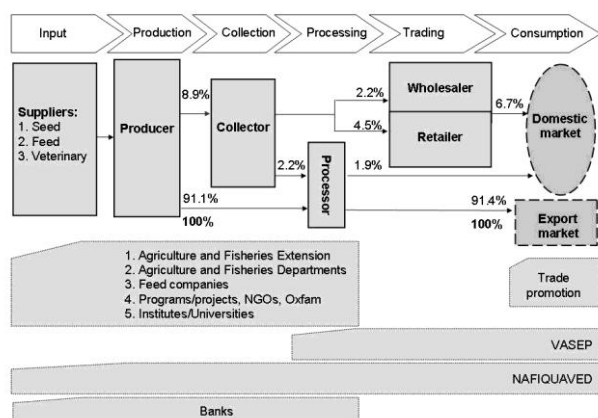


Figure 2 - Pangasius value chain Vietnam

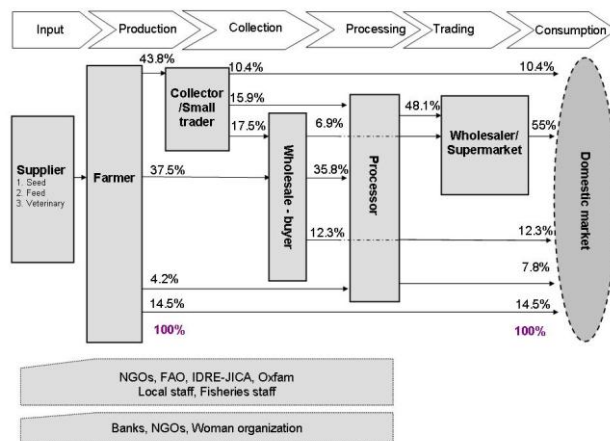


Figure 3 - Pangasius value chain in Cambodia

After an economic analysis of the two chains Johna et al. (2010) found that traders have the lowest net added value. Producers and retailers/processors in both import and export channels have a similar net added value. Surprisingly there is only a small difference between the net-added value of farmers and processing companies. In Cambodia, the Pangasius chain remains relatively non-industrial with more limited processing activities. Nevertheless, processors still dominate in the Pangasius chain. The farmers account for the lowest gross added value. Do the stakeholders with the highest net-added value also have the highest power?

Australia

However South Australia is a completely different destination than Koh Chang the value chain analysis of the Spencer Gulf prawn fishery gives a clear overview of the value chain map of seafood from a restaurant perspective, which can have relevant characteristics for the seafood value chain map of Koh Chang.

It starts at the Hilton Hotel who purchases Spencer Gulf and West Coast fishery prawns from a number of wholesalers, who are supplied from the portside buyers in the fishery. Approximately 8% of the prawns caught in the Spencer Gulf and West Coast prawn fisheries were being sold through restaurants. The prawns are caught and all the grading, packing and freezing of the prawns for the Hilton Hotel is done on board of the vessels and the primary quality attributes of whole prawns, consistent size, good colour and being free from defects is then further checked by the port side buyer. The Hilton purchases prawns from both Adelaide and Port Lincoln based wholesalers. Prawns will usually reach the Hilton within 3 – 5 days of ordering from Port Lincoln and within 24 hours of ordering from Adelaide. The Hilton is usually aware of its events well in advance, so forecasting is not much of an issue. They buy some cooked prawns but the majority is purchased raw. Once the prawns reach the Hilton they are thawed in the fridge for 2 days before being cooked and placed on the Buffet or peeled and deveined ready for use in the Brasserie. The Hilton's preference is to do the value adding themselves, so they can control the process and alter their recipes as they see fit. The prawns are used in a number of areas, Buffet, the Brasserie Restaurant and in special occasion banquets.

The outstanding quality attributes of the king prawn caught in their fisheries lent itself to being a menu feature, rather than a commodity product. It caters to both locals and travellers and prides itself on a theme of sourcing local South Australian products with a story to tell.

The biggest difference with Thailand is that the value chain of Australia is a short and well-organized product value chain. The excellent management of the fishery ensures that the prawns are available and of sufficient size while the well-equipped fishing vessels make sure the prawns are caught in an effective and efficient manner. Thai governance is much less organised and inefficiently managed.

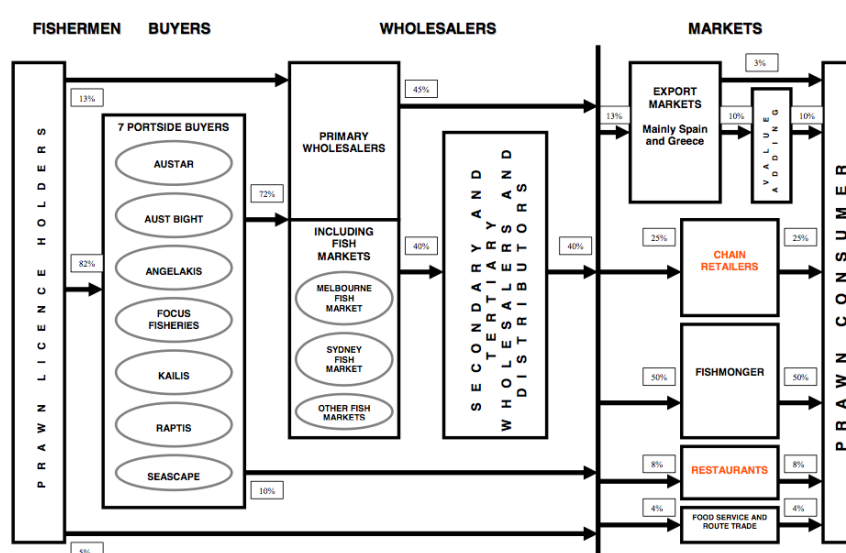


Figure 4 - Prawn industry chain map

Haiti

Although Haiti and Koh Chang are on different continents and have major differences as countries; the supply chain analysis does have relevant information for the value chain analysis of Koh Chang. The fishing equipment that is used, what is done with the captured seafood, and how the different stakeholders benefit within the supply chain are most relevant and useful factors for the analysis on Koh Chang.

According to Christophe (2000) the introduction of the outboard motors and FADs in 2004 brought significant changes to the marine fisheries in terms of production, the fish production increased gradually since 2005. On Koh Chang the introduction of motorboats made a big difference as well within the fishing sector. The motorboat is one of the most important parts of the equipment needed for small-scale marine fisheries on Koh Chang.

The fish captured in Haiti is generally for local demand except for larger pelagic, such as marlin and tuna those are exported. But to supplement local production about 15.000 tons of frozen fish (mackerel), salted herring (5.000 tons) and smoked herring (1.000 ton) is imported mainly from Canada, these frozen fish are popularly consumed as fried fish (Felix, 2012).

The marketing activity of the fish in the province Southeast has seen a great change over the past 20 years, due to the development of seafood export and the arrival of middlemen. The middlemen are the first link in the marketing, after them come the fish retailers. The middlemen buy the crustaceans and some pelagic species to sell to intermediary, who then sell to wholesalers, exporters and market

in Port-au-Prince. The middlemen also supply equipment, including boats, engines, and fishing gears or give loans to fishermen, in return they reserve the exclusive fishermen's catches or purchase it with discount. Many fishermen lack the means to rent equipment. This results in a high cost of operation for the fishermen, taking into account the calculation of wages after deduction of shares covered by fishing equipment. The middlemen are the main beneficiaries of the sharing system.

Favrelière (2008) wrote in his study of fisheries in the Southeast Department: "The opening of external markets for seafood, has led to an unprecedented development of fisheries in the Southeast. However, this development is carried out without any consideration for fishermen. The level of poverty in fishing communities is generally very high, and fishermen most often marginalized live in the greatest vulnerability. The lack of services specific to their profession and the severe lack of technical support made the fishermen, poorly organised, are not in a strong position, and then they maintain inequitable relationships with other actors in the chain fishing.

Value chain maps

White Sand Beach

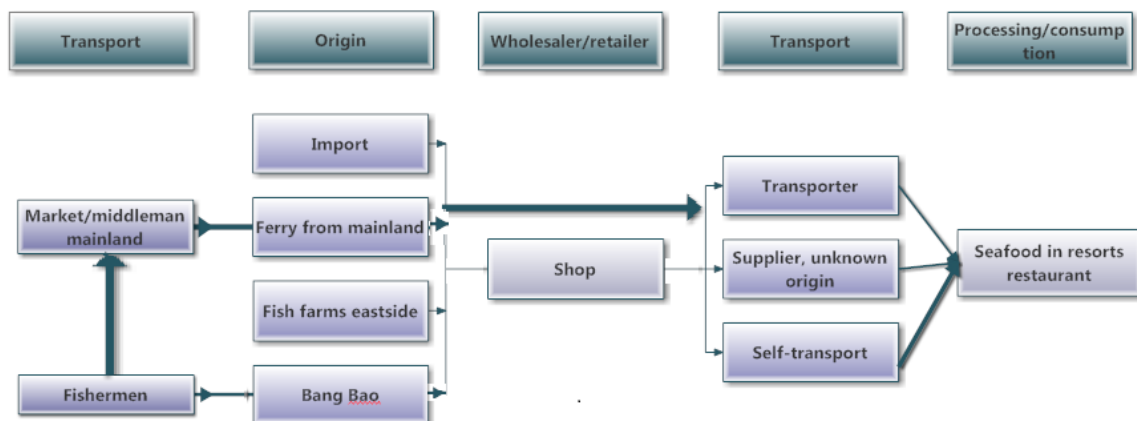


Figure 5 – Value chain White Sand Beach

This value chain follows the flow of seafood from its origin, to its final consumption in restaurants in resorts in the White Sand Beach area. We discovered that the resort value chain involves two important stages of the transport, as well as the stages origin, wholesaler/retailer and processing/consumption. We found that the seafood that is consumed in the resorts, has in essence four different origins. Seafood can come from the fishing village Bang Bao, the ferry from the mainland, from fish farms on the Eastside of Koh Chang, or it can be imported from foreign countries. In general, resort restaurants prefer their fish from the mainland, or locally caught. When the seafood is from Bang Bao or the ferry, it is originally from fishermen who are fishing in the waters of Koh Chang and Thailand in general. For the fish to arrive at the ferry from the mainland, it needs to be transferred via a middlemen or fish market.

From its origin, the fish is probable to be directly transported to the restaurant, or first be regulated through a shop. This shop acts as a middlemen on the island, managing supply and demand by orders from restaurants. Transport on the island can be operated by three different institutions. These channels are transport companies, self-sufficient transport, or a supplier that gets the seafood from different sources that are unknown for the restaurant. Of these three, self-transport is the transport channels that is most common. An effect of this characteristic is the inefficient transportation on the island, caused by restaurants that are individually transporting the fish they have ordered. In the end, the seafood arrives unprocessed at the seafood restaurants in the resorts. Restaurants process the seafood themselves, in their kitchen or own butchery, to make sure the fish is as fresh as possible at consumption. Storing is an activity that is practised as little as possible along the value chain, to assure fresh seafood. Only the restaurants are concerned with multiple day storing, which is practised according to several techniques.

Bang Bao

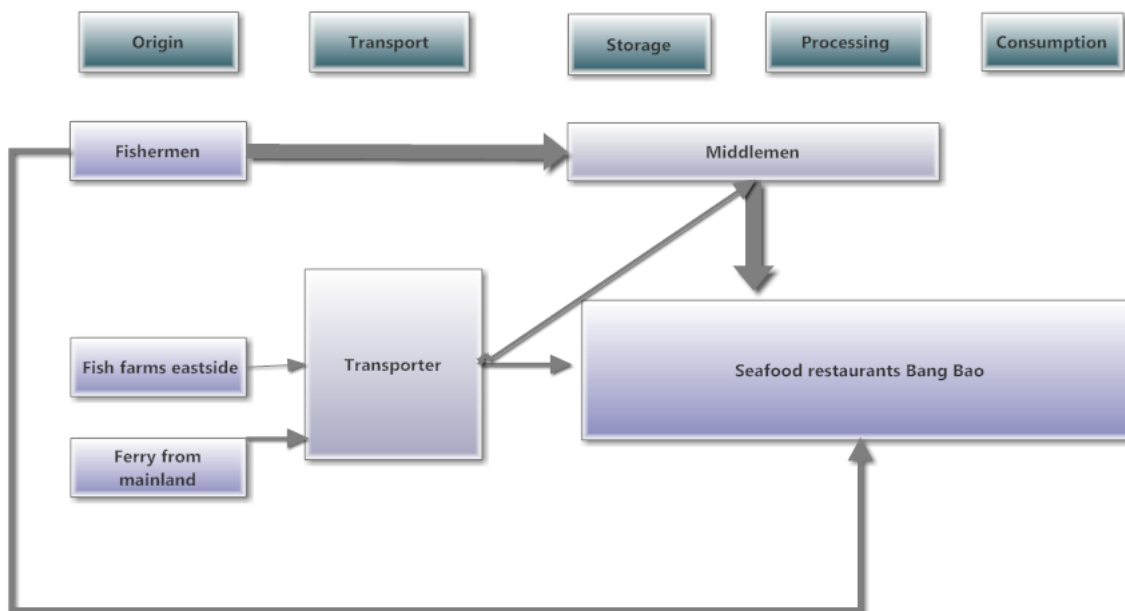


Figure 6 – value chain map Bang Bao

This value chain follows the flow of seafood restaurants from origin to final consumption in the seafood restaurants in Bang Bao. Here, the following three origins are indicated: fishermen, fish farm eastside and the ferry from the mainland. The thickness of the lines indicates the share this stakeholder has in the value chain. In the figure you can see that the majority of the fish has as origin local fishermen followed by ferry from mainland and fish farms eastside (*an elaborated explanation can be found in the research findings*) The transport phase of the value chain is arranged in various ways. Some restaurants travel to the Koh-Chang-Ferry-Pier or fish farms to get their fish, sometimes the fish is brought by the fish farms on the eastside, in other cases the middleman is responsible for the transport of the fish, and rarely there is a third-party involved. Because of the short distance, the fish that arrives directly at Bang Bao pier is transported by carts to the middlemen or restaurants. When the fish arrives at the middleman, they store it before it is transferred to the seafood restaurants. The middlemen are also active in the processing phase of the value chain, because sometimes they are responsible for cleaning and processing the fish. When this is not the case, the fish is processed in the seafood restaurants where it is also consumed afterwards.

Salak Phet

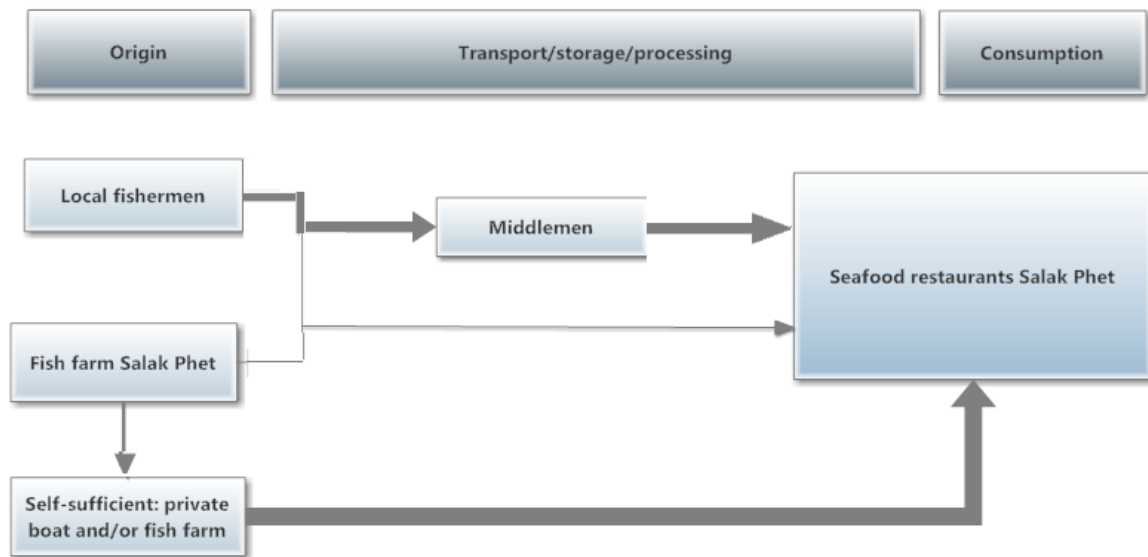


Figure 7 – Value chain map Salak Phet

This value chain follows the flow of seafood from its origin, to its final consumption in the seafood restaurants in Salak Phet. We discovered that the fish has three different origins: the local fishermen, the local fish farm or the restaurants have their own private boat and/or fish farm. The middleman is involved in the transport, storage and/or processing phase. When there is no middleman involved, the fish is brought directly by the fishermen to the restaurants. A lot of the restaurants have their own pier where the fishermen can moor and unload their caught fish. When the fish comes from their private boat or fish farm there is no middleman and transport involved. As you can see figure 7, not only the middleman is involved in the transport, process and storage phase. There are also restaurants that store and process their own fish when they get it from the fishermen or middleman.

Criteria and corresponding indicators

The following part contains the initial definitions of the criteria and corresponding indicators that we used in the field to assess the seafood restaurant value chain. The criteria and indicators are formulated with the aim understand how the two domains energy efficiency and waste management perform in the value chain. The criteria are classified according to what aspect of the value chain they aim to measure: restaurant characteristics, fishery characteristics, collecting characteristics and processing characteristics. Moreover, we created a criteria with three corresponding indicators that measure stakeholder perceptions. We designed the indicators based on the scientific knowledge and existing methods to test the criteria under study. We start with a graphical representation of the criteria and corresponding indicators, followed by an explanation and argumentation of all the criteria and indicators.

	Indicators measuring energy efficiency	Indicators measuring waste management
Criteria on restaurant characteristics	Criteria 1: Restaurant menus <i>Indicator:</i> -Is there imported seafood on the menu -Is the imported seafood often ordered -Is the tourist aware where the seafood comes from, and what impacts imported fish has on the environment	Criteria 7: edible yield and use of by-products <i>Indicator:</i> - The use of by-products within the restaurants Criteria 8: Waste management <i>Indicator:</i> - Collection of waste - Waste separation
Criteria on fishery characteristics	Criteria 2: fishery trip <i>Indicator:</i> - length of the fishing trip: short day trips, or multiple day trips - distance of fishing trip - fishing spot Criteria 5: Benefits of local fishermen <i>Indicator:</i> -Are local fishermen able to sell their fish on the island -Can local fishermen live from their fishing job (all year) -Is the marine protected area beneficial for local fishermen	Criteria 9: value of diet <i>Indicators:</i> - use of chemicals
Criteria on Collecting characteristics	Transport: Criteria 3: origin of seafood <i>Indicator:</i> - locally caught, from a fishing farm or imported	Not applicable

	<p>Criteria 4: transport of seafood on island Indicator: - the state of the provided seafood - the frequency of the delivery of seafood</p> <p>Storage: Criteria 6: storage of seafood Indicator: - length of storage - amount of seafood that is stored</p>	
Criteria on processing characteristics	Not applicable	<p>Criteria 10: edible yield and use of by-products Indicator: - the use of by-products within the processing companies</p>
Criteria on stakeholder perceptions	<p>Criteria 11: perception of stakeholders towards energy efficiency and waste in seafood restaurants Indicators: - awareness of impacts of energy use and waste management - willingness to pay for a sustainable seafood restaurant value chain - seafood preferences of tourists</p>	

Table 1 – Criteria and corresponding indicators

Indicators measuring energy efficiency

Criteria on restaurant characteristics

Criteria 1: Restaurant menus

Indicator: Is there imported seafood or seafood close to extinction on the menu

Is imported/extinct seafood often ordered

Is the tourist aware of the origin of the seafood, and the effect of imported/extinct seafood on the environment

This indicator is about the menu's in the seafood restaurants, what do they offer to the consumer, where does the seafood come from, and is the consumer aware of the origin of the seafood. Human consumption of fish has doubled over the last 30 years, which resulted in overfishing, the collapse of some species and destruction of ocean habitat (Jacquet & Pauly, 2006). Therefore it is important to know whether the tourist is aware of the origin of seafood offered on restaurant menus. This indicator can help us by reducing the fishing on extinct species and decrease the import of seafood to Koh Chang, by telling us what is offered, what is consumed and what is known.

Criteria on fishery characteristics

Criteria 2: fishery trip

Indicator: length of the fishing trip: short day trips, or multiple day trips

 distance of fishing trip

 fishing spot

According to The New Zealand Seafood Industry Council (2010), in some cases fuel could be saved by staying longer at the fishing grounds. “If trips could be made in two days instead of one, the catch over those two days would be made at the cost of the fuel for one return journey rather than two.” Therefore the length of the fishing trip is an indicator for the energy efficiency of the seafood restaurant value chain. The spot of the fishing also has an effect on the amount of fossil fuel used to catch the seafood. According to the North Sea Foundation (n.d.), fuel use varies considerably depending on the fishery. Fishing on depleted fish stocks requires more fuel per kilo landed fish than fishing on abundant fish stocks, because low fish abundance focuses fishers to search longer and use heavier gear to catch the fish. So when all the fishers catch their fish at the same place, the fish will get depleted and less fish will be caught for the same amount of fossil fuels.

Criteria on collecting characteristics

Criteria 3: origin of seafood

Indicator: locally caught, from a fishing farm or imported

This indicator measures the amount of energy used to bring the seafood from the place where they are caught to the place of consumption. The energy efficiency of seafood is highly dependent on its carbon emissions, which can be assessed by the carbon or ecological footprint of seafood (Tyedmers et al., 2005; Winther et al., 2009). It is assumed that consuming local products is inherently less wasteful in terms of fuel use than importing it from elsewhere, which represents the concept of foodmiles (Kemp et al., 2010). It would be thus very useful to know whether or not the seafood consumed in seafood restaurants in Koh Chang is locally caught or not.

Criteria 4: transport of seafood on island

Indicator: the state of the provided seafood

 the frequency of the delivery of seafood

The state of the provided seafood has an influence on the carbon emissions. As stated in Winther et al. (2009), increasing the proportion of frozen seafood to fresh, can decrease the need for air freight and other resource intensive means of transport, lowering energy and emissions. Besides is the frequency of the delivery of seafood of influence on the carbon emission (Winther et al., 2009). When the trips are took more frequently for small amounts of seafood, it can be stated that transport is less efficiently, more energy is used. This relates to the issue of foodmiles as well (Weber & Matthews, 2008).

Criteria 5: Benefits of local community

Indicator: Are local fishermen able to sell their fish on the island

Can local fishermen live from their fishing job (all year)

Is the marine protected area beneficial for local fishermen

This indicator measures the extent to which local fishermen benefit from the seafood consumption on Koh Chang. According to Lunn & Dearden (2006) many marine protected areas worldwide failed to achieve their management objectives. With this indicator we want to measure how the local fishermen on Koh Chang experience the impact of the marine protected area, and find out whether they can sell their seafood to the seafood restaurants on the islands as a living and if seasonality has an effect on their business.

Criteria 6: storage of seafood

Indicator: length of storage

amount of seafood that is stored

According to AIT (2007), seafood processing industries consumes large quantities of electrical energy. Most of the power is used for magnetic induction equipment, such as electric motors (compressors for freezers, cold stores, ice-making machines, water pumps, etc.). Energy use for storage was reported as 0.438 KJ/kg*day for cold storage and 2.6 KJ/kg*day for frozen storage (Winther et al., 2009). Therefore indicating the length of storage and the amount of seafood that is stored is an important indicator when looking at carbon emissions in the seafood restaurant value chain.

Indicators measuring waste management

Criteria on restaurant characteristics

Criteria 7: edible yield and use of by-products

Indicator: the use of by-products within the restaurants

The edible yield of seafood indicates the amount of the seafood that can be used for human consumption and increases when the waste is low (Winther et al., 2009). By-products can be separated before processing, but often the restaurants are the stakeholders in charge of processing the by-products. Related to waste management, naturally the lower the by-products, the better (Read & Fernandes, 2003). Moreover, Winther et al. state that the by-products from processing are higher in energy content and consequently should carry more environmental burden than the main edible products (2009). Accordingly, we think that assessing the use of by-products is essential in the examination of the environmental performance of the seafood restaurants.

Criteria 8: waste management of restaurants

Indicators: waste collection

waste separation

Restaurants generate a tremendous amount of solid wastes, not only food wastes but also paper, plastics, glass, metals, hazardous wastes etc. The average restaurant tosses eight gallons of garbage every hour (Chow, 2014). The disposal of these volumes of waste is unanimously regarded as unsustainable. The producers of goods and materials also have a role to play in reducing waste. The general public, in the way that we consume and utilize products, have a key role in delivering sustainable waste management (Bar, 2004). Now a lot of waste is thrown away in the water or on the streets damaging the environment. To examine the waste management of restaurants we can help them to reduce, reuse and recycle waste, which allow for a sustainable environment.

Criteria on fishery characteristics

Criteria 9: value of diet

Indicator: use of chemicals

Fish farming involves the supply of artificial feeds and medication with consequent impacts on the environment (Arvanitoyannis & Kassaveti, 2008, Cho et al., 1994). According to Cho and Bureau, wastes of dietary origin make up the largest part of the waste output in aquaculture operation (1997). Nutrition often deals with over-feeding, moreover, pollution occurs through the use of chemicals (therapeutants, vitamins and antifoulants) and the introduction of pathogens and new genetic strains have also raised environmental concerns (Wu, 1995). We are interested in the extent to which fish farm owners apply chemicals in their feeding and how they assess the amount of necessary for feeding, to find out how their attitude towards waste.

Criteria on processing characteristics

Criteria 10: edible yield and use of by-products

Indicator: the use of by-products within the processing companies

The edible yield of seafood indicates the amount of the seafood that can be used for human consumption and increases when the waste is low (Winther et al., 2009). More than 50% of the remaining material from total seafood capture is not used as food, resulting in almost 32 million tonnes of waste (Kristinsson & Rasco, 2000). Processing is a major concern. Processing of fish and shellfish is inefficient and results in large quantities of solid and liquid wastes, which are simply sent for disposal in landfills. However, other types of processing can generate valuable by-products such as oils, fishmeals, and pharmaceuticals (Read & Fernandes, 2003). Treated seafood waste can be used for a range of activities, for instance animal consumption, biodiesel and biogas, food industry and cosmetics (Arvanitoyannis & Kassaveti, 2008). During the processing phase a lot of waste is produced, although there is much evidence that a lot of waste can be reused and therefore it is interesting to investigate this part of the value chain.

Indicators measuring stakeholders perceptions

Criteria 11: perception of stakeholders towards energy efficiency and waste in seafood restaurants

Indicators: awareness of impacts of energy use and waste management

willingness to pay for a sustainable seafood restaurant value chain

seafood preferences of tourists

We need to know the perceptions of the stakeholders in the value chain to be able to make feasible interventions. It should be tested if stakeholders are aware or not of the impacts of waste and energy use. We also want to investigate if the stakeholders are willing pay for a more sustainable future of the seafood restaurant value chain. According to Bonney et al. (2009), a critical aspect of sustainable value chain analysis is whether consumer value underpins decision-making. Failure to identify what value means to the final consumer results in the misallocation of resources to activities that do not add value, and should only be targeted to improve efficiency. Through this indicator we want to 'measure' the preferences of tourists regarding the seafood. Are people satisfied with local seafood, or do they expect seafood they are familiar with? This can have an effect on the origin of the seafood (local vs. import) which has an effect on the carbon emissions.

Research findings

Findings Bang Bao

Origin of the consumed fish

According to the restaurants, middlemen and fishermen we interviewed, approximately 70% of the consumed seafood in the seafood restaurants in Bang Bao has as origin the local fishermen. The other 30% of the consumed seafood came from the mainland and the fish farms. Those amounts are heavily influenced by factors such as the weather, the season, the amount of seafood that is caught by the fishermen and the quality of the caught fish. However, it is certain that the mainland has a larger share in this 30%, as the restaurant owners do not like to get the fish from the fish farm. The following reasons are mentioned: fish from fish farms does not have a good quality, fish from fish farm has less taste, and often chemicals are used in fish farms.

In the majority of the cases, a middleman was involved in the value chain of the seafood restaurants. This middleman acted as a mediator between local fishermen and the seafood restaurants, where the fish could be stored and/or processed before it was brought to the seafood restaurants. In 80% of the cases, the middleman ordered the fish from the fishermen, but there were also restaurants that made use of a middleman, but claimed to have direct contracts with the fishermen (20%)

Environmental awareness and waste management

According to all the interviewed restaurant managers in Bang Bao, the waste is separated, collected in bins and brought away. However, they do not know where the separated waste goes to and they are not really aware of the waste in the water. The fishermen and middleman state that the water quality is not really deteriorated the last ten years. When talking about waste, they often connected the production of waste with the presence of tourists (70%) and a few times they mentioned the snorkelling and diving boats with their gasoline and oil (10%). The people and the businesses on the pier cause the other 20%. One out of three restaurants managers mentioned a septic tank when talking about environmental friendliness, but a lot of the sink water went directly into the water. According to all the restaurants managers, the by-products were often used to make food for the employees and that they did not throw away a lot of food.

Among the tourists and the local community there was more awareness of the waste in the water. One third of the interviewed local community was originally from a Western country and they noticed a lack of environmental awareness. According to them, a difference between Western and Asian countries regarding environmental friendliness is noticeable. As they state that environment comes with the economy and people in Asia often need all their profit to survive, so a large group is not willing to make changes without short-term benefits.

Cleanings are mentioned, but according to some interviewed locals there is not much interest in these activities. Fishermen and locals also mention that divers sometimes go into the sea to do a clean up.

Extinction in the sea around Koh Chang

Regarding to extinction, all interviewed fishermen had noticed a decline of species and a decline of the amount of fish that they catch nowadays. They also noticed more competition between the local fishermen and the bigger boats around the 3 km zone (for more on this see *regulation and power*).

Restaurant managers and middlemen did not notice any decline of fish only differences during low and high season.

The influence of seasonality on the value chain

During high and low season there are different species caught and there is also a difference in the amount of fish that is caught by the fishermen. As during high season there are more tourists, it is also more common that the restaurants do not have enough seafood and in this case they contact the mainland. During low season there is more than enough seafood, which causes a decline in the price. Differences in the value chain are noticeable during low and high season. In low season not all the seafood is sold, so a place to store it is more often needed. That is why it happens more often that a middleman is involved in the process during low season than during high season.

Regulations and power

Regarding regulations the fishermen mentioned the 3 km zone around Koh Chang. No big boats are allowed in this 3 km zone because it is a Marine Protected Area. However, all the interviewed fishermen mentioned that these marine fisheries regularly pass this 3 km zone and that they got a lot of competition with these big boats. They would like to see the implementation of stricter regulations to keep the boats away from this zone. Three out of five members of the local community mentioned that they would like to get more help from the government regarding cleaning and recycling. There are meetings, but not a lot of progress, while they state that the government has the power, knowledge and the money to do something.

The government has a lot of power, but regarding to members of the local community, this power is not always used in the right way. They have the feeling that rules are not followed and that there is a lack of control. This would probably also mean that new rules would not work if there is no control from the governments side.

Development on Koh Chang

All the stakeholders noticed that certain developments such as building new resorts, expanding villages and the emergence of more tourist facilities have taken place in the last ten years. Especially the local community talked about the negative impacts of this developments such as more noise, more waste and the transformation of the village from fishermen village into a village with businesses which are dependent on the arrival of tourists. The restaurant managers mostly worry about a more recent development, which is the decline of tourists in the last 2-3 years. The local community also notices the decline and they both mentioned the political situation in Bangkok as the main reason.

Findings White Sand Beach

Origin of the consumed fish

The resort restaurant managers and owners we spoke to mainly mentioned the mainland as their main source for seafood. As can be found in the value chain map that we have designed for the White Sand Beach area, seafood is brought on the island with the ferry that leaves from Ao Sapparot in Trat, and arrives at the Koh Chang ferry pier. Middlemen from the mainland bring their seafood from the fishermen on the mainland through the ferry to Koh Chang. Another possibility is that the

market on the mainland is involved, as a link between the fishermen and the ferry. The second origin of seafood is the fishing village Bang Bao. As our findings for Bang Bao show, most fishermen that originate there are local, and just some come from the mainland. Seafood rarely has the local fishermen from the Eastside as origin. When the demand of seafood is high and local seafood and seafood from the mainland is not sufficient, some restaurants choose to buy seafood from one of the two fish farms on the Eastside of Koh Chang. However, this source is one of the last options, as our informants mentioned that the quality of seafood from the farms is significantly less.

Though most restaurants merely prepare seafood from the region in their dishes, as their specialty is often Thai food, some resort restaurants also import seafood from Europe or China. When imported seafood is on the menu, this is often salmon. Imported seafood is often provided to give the restaurant an international image. One Italian-oriented restaurant owner we spoke to imported tuna, mackerel, and salmon, because these species are distinctive for the Italian kitchen. Imported seafood arrives in Koh Chang via a middleman on the mainland that arranges import to Thailand.

On a small scale, we have also heard about suppliers of seafood that do not make their customers aware of the origin of the seafood they provide them with. The seafood can have several origins, which is dependent on where supply is available. A result of this form of supply is that the restaurant does not have any influence in the origin of the seafood that is on the menu.

Environmental awareness and waste management

The restaurant owners and managers we spoke to were not very much aware of sustainability issues. Most of them had no idea what we were talking about, when we asked questions regarding energy efficiency and other options that are concerned with the environment. It turned out that environmental problems are not very much included in the way the owners and managers lead their business. It is often not that they do not care, but just that they do not have the knowledge. The interviewees reacted differently when we explained what we meant with the terms that we were using in our questioning. Most of them had an open attitude towards the concepts and ideas that go together with sustainability and environmental friendliness; they were interested in the goal of our research, and made suggestions when requested. However, one also told us that she does not see how seafood restaurants can make real changes.

The resort restaurant owners and managers we spoke to, all had a clear opinion on throwing away food. This should be as much avoided as possible. They manage their waste in inventive ways, to reduce the throwing away of leftovers. Most of our informants told us that fish that is still edible, but qualitatively unable to be consumed by customers, is shared among the employees of the restaurant. These resorts maintain a high standard of quality for the food that they provide, but also acknowledge that seafood is much longer edible than is prescribed. Another solution for leftovers that is practiced by some restaurants is the processing of these leftovers for next day's breakfast. Soup is a much consumed dish for breakfast in Thailand, and ideal for adding a variety of leftover ingredients.

The influence of seasonality on the value chain

Restaurant owners and managers experience major differences between high and low season. Most importantly, they have extremely less customers in low season compared to the crowds of tourists

that come visit the island in the high season. We were already aware of the seasonality on the island, but we have never thought of it having such impacts. Most of our informants mentioned that they certainly make different orders in low season compared to high season. The consumption of seafood is much lower in low season as well, and restaurants manage supply and demand quite fine. They order smaller amounts of seafood, but also mention that they do not serve less sorts of seafood. In high season on the contrary, the resort restaurants sometimes have to get their seafood from other sources than they are used to. Generally, shellfish and coquilles are locally available all year long, but for certain kinds of seafood, other origins should be found. Restaurants that are normally used to local seafood have to get it from the mainland when demand is too high. Restaurants that already get their seafood from the mainland are sometimes forced to order fish from fish farms, to keep up with the demand.

Some of the restaurants also had some knowledge about the means of fishing of the local fishermen. They told us that local fishermen make good amounts of profit in high season, but sometimes have no work in low season. Some fishermen have multiple jobs to secure their income in times of low demand. What can also cause a drop in income for fishermen, is the weather. Fishing can be very dangerous when the water is rough, and storms in rainy season make it sometimes too dangerous to go on the water. The weather and demand along the year is unpredictable, and make it sometimes hard for fishermen to assure a stable income.

Regulations and power

According to the restaurants owners and managers, the middlemen are the actors with the strongest position in the value chain. They have the power to control supply and demand, because in many cases, the seafood has to cross their business before it ends up in the restaurant. They can choose who to buy from and who to sell to, and have the power to raise prices, according to their own wishes. Some informants also mentioned the fishermen as the ones that have much power in the value chain, because without them, there will not be seafood anyway. However, others responded on this statement, with the notion that in that case, restaurants will get their seafood from other sources. Most also shared that they think that fishermen benefit enough from their business. When demand is low, or fishing is hard, most fishermen have the ability to manage other sources of income. All agreed that the demand eventually is the driver of the price. This is what makes prices vary in low and high season.

The restaurant owners and managers confirmed what we had already heard about regulations in the seafood chain. They state that there is actually no control for fishing in the Koh Chang area. Moreover, they think that the Marine Protected Area is of no use at the moment. They agree that it is a good idea and initiative, but without proper control and strict rules, its implementation will not make any difference.

Many transport routes on the island

Our informants from the resort restaurants made us aware of the several options they can choose regarding the transportation of their seafood orders from across the island. Through coding, we have identified three different means by which the seafood arrives at the restaurant. These are: self-sufficient transport, transport by an independent company and transport directly from fishermen. However, the last one of these options does not apply for the White Sand Beach area. The first

method is the one that is most applied: 70% of resort restaurants transport the seafood from the ferry or Bang Bao's pier with a private car or motorcycle. For them, it seems logical to do it this way, because it is clear, simple, and it is how they have always done it. The other possibility, that the seafood is transported by means of an independent company, often occurs when the a shop is involved as a middleman. This shop acts as a retailer or wholesaler, and manages demand and supply. They make sure that the seafood arrives at the right restaurants or other institutions, and their customers pay them for this activity. One restaurant owner mentioned that their choice of transport, and that of some other restaurants as well, is dependent on the size of their order. Small orders are often picked up themselves, and bigger ones are more likely to be transported by a company. These different options result in a major network of transportation around the island.

Findings Salak Phet

Origin of the consumed fish

The majority of the seafood restaurants in Salak Phet have their own fish farm. Depending on the carrying capacity of the farms, the restaurants supplement it with seafood from the local fishermen or local fish farms. Besides this way of being partly self-sufficient, there are also restaurants that have their own fishing boats. The seafood from the fishermen goes directly to the seafood restaurants, as half of them are in the possession of a private pier, or it is first stored and processed by a middleman.

The local fish farm owner mentioned that they import their baby seafood from Bangkok, because it is hard for new seafood to be born here. The fish farm is located in the sea and according to the owner, the water is not fresh enough to procreate fish. The seafood is brought once a year to the restaurants, where they will be kept alive until consumption. These restaurants are the one with a private fish farm.

According to the middleman, not all caught seafood in Salak Phet goes to the local restaurants. The seafood is also sold to tourists, locals and restaurants or resorts on the west side of the island. There are no strict collaborations between the middleman and the restaurants, as the restaurants call one day before and order the seafood they need. The wanted amount and species that are ordered can differ per day.

Environmental awareness & waste management

Regarding waste, the restaurants stated that their garbage and septic tanks are picked up by government trucks. The leftovers are eaten by the staff or brought to other restaurants or families who are living in the neighbourhood. The local community and the fisherman are blaming the tourists when talking about the creation of waste. Feeding fish and throwing away garbage in the sea or on the land are examples of this creation of waste they mentioned.

It are often the small fishing boats that operate in this area, and according to the fishermen and local community these boats produce less waste. Their fishing trip only takes one day or night, so they do not have to produce much waste (e.g. a meal). Fishermen who are going on a long trip consume meals on board and the leftover are often thrown overboard. During these long trips there is also much more waste water from the fish that is kept alive in tanks. These tanks often contain chemicals such as Formaline to keep the seafood fresh and beautiful. When fishermen only go on a one-day

trip, these chemicals are not needed because the seafood can be consumed or stored directly when they are back.

Regarding to environmental awareness, almost all interviewed stakeholders claimed to be aware of environmental issues and stated that they think about ways to be more environmental friendly. The fishermen in Salak Phet acknowledge that there is overfishing in the sea around Koh Chang. This is one of the reasons why some of them think about changing their occupation to giving fishing trips for tourists. This was also mentioned by other fishermen we spoke to in Salak Phet and Bang Bao (for elaboration see *benefits*). Regarding environmental friendliness, stakeholders are mentioning different ways in which they are acting to protect the nature such as: nets that do not destroy coral, natural feeding and lure, only buying seafood that is caught by a rod and using environmental friendly fishing techniques. In the local fish farm no chemicals are used, as the farm is located in the sea and using chemicals would cause pollution in the sea. Also natural feeding, such as baby fish is used to breed the fish.

Extinction in the sea around Koh Chang

Stakeholders in Salak Phet are aware of a decline of fish in the waters around Koh Chang. It is mentioned that the fishermen now only catch ten or twenty per cent of what they used to catch ten years ago. The gear they use still has the capability to catch the same amount, but there are just less fish to be found. According to approximately 80% of the stakeholders, the boats from the bigger companies who are using big nets to catch the fish are the reason for this decline. They are catching the small fish, which are supposed to be food for the bigger ones, so they are affecting the seafood value chain. The other 20% stated that the extinction of fish has to do with the quality of the water.

Storage

The seafood in Salak phet is stored alive or dead. Because of the private fish farm, more species than only crab and lobster can be kept alive until consumption. But in the restaurants there are also freezers present where the dead fish can be stored. The restaurants without private fish farm store some species in aquaria, but most of the seafood is stored in a freezer. Frozen seafood is not stored longer than 1 week and the maximum length of storing living crab is 2-3 days due to the change of taste. The middleman does not have the means to keep the seafood alive, so they store it in plastic bags in the freezer. According to them, and restaurant owners the seafood is not stored longer than 1 week.

Regulation and power

The problem of big boats entering the 3 km zone is also mentioned in Salak Phet. Stricter rules need to be implemented, because the local fishermen now have to compete with the marine fisheries in the 3 km zone. But the fishermen are not only annoyed by the competition, but also about the big boats that stay on the 3 km zone line with their big nets. This makes it harder for fish to swim into the 3 km zone, as the nets are working as some kind of blockade. Two out of four fishermen stated that they had to sell their bigger boats to tour touristic companies (e.g. diving or snorkelling companies), because they could not compete any longer with the marine fisheries. Smaller boats also meant less costs (e.g. labor and fuel) and shorter trips.

Regarding power, the fishermen and tourists are seen as the most powerful stakeholders in the value chain. They are the ones controlling this chain, because they are responsible for the supply and

demand. Middleman is seen as a vulnerable position, because when they try to set price, the fishermen could choose to skip this stakeholder and sell directly to the restaurants.

Benefits

Half of the fishermen we spoke to in Salak Phet talked about changing their occupation to giving fishing trips for tourists. One of them already did it and he mentioned several benefits of changing to this occupation. First of all, it gives a more stable income, as he is not dependent anymore on the amount of fish he catches. Secondly, it is better for the environment because less fish is caught. Thirdly, tourists get more information about the origin of the fish and the way it is caught. And last, as he also provides snorkelling trips, being a former fisherman and knowing the sea gives him the benefit that he knows the most beautiful snorkelling spots.

Regarding benefits, the stakeholders agree that there is a balance of income along the value chain. The fishermen earn enough to make a living, but they will never be the rich men. The fishermen have more benefits when they own a boat. Not having their own boat means that they earn approximately 50% less.

Development of Koh Chang

In Salak Phet the decrease of tourists due to the political situation in Bangkok is also mentioned when talking about development. However, a development that is discussed more often is the one about the new road that will connect the west side directly with the south and east side of the island. Most of the stakeholders in the seafood restaurant value chain see the potential benefits of this road. According to them, the development of the road will mean more tourists and this will increase their incomes. However, there are also members of the local community that are less positive about the development of the new road. Arguments against it are that: they do not want to be as touristic as the west side of the island, they are afraid that tourists will only come one day instead of more and they have the feeling that it will be the businessmen from the mainland or other countries that will benefit most.

Fishing trip

Most fishing trips are not longer than 1 day, as it are mainly small boats without a kitchen on board. The fishermen stated that they have multiple fishing spots, but that they often do not go further than 10 km. The cages they use are made from natural material just like the lure they use for fishing.

Findings participant observation

Origin of the consumed fish

Observation validated the transportation from seafood from the mainland to Koh Chang. The ferry brings seafood from Ao Sapparot, in Trat, to the Koh Chang ferry pier. Though on small scale, we observed small trucks and pickups driving with tanks for seafood on and off the ferry. There are some small piers for local fishermen in the North of the island as well. One of them, near to the ferry pier hosts four fishing boats, and one boat for tourist tours. During participant observation in Bang Bao, we understood that the boats that arrive at the Bang Bao pier are from local fishermen or fishermen that fish in the waters of the mainland. In Salak Phet, observations showed the importance of private fish farms. Almost every restaurant we visited had a very small fish farm, for consumption of seafood

in the restaurant. A restaurant employee told us in broken English, that their fish is from local waters and their own fish farm.

Transportation

At the main pier in the North, we saw trucks and pickups driving on and off the ferry, for the transportation of seafood. Some of them had a logo of a restaurant or accommodation on them. In the White Sand Beach area, we noticed some cars with seafood tanks driving around in the morning. From the small pier in the North, only one pick up was leaving, though fully loaded with tanks of seafood. We noticed crab in one of the tanks, which was already dead.

Our observations in Bang Bao and Salak Phet showed that not much transportation is involved there. Fishermen and restaurants are closely situated, and many locals are in some way related to both parts of the value chain. Regarding Bang Bao in specific, the fishing boats from local fishermen or the mainland as origin, are mooring on the Bang Bao pier, where after the seafood is transported with a trolley along the pier. Sometimes, employees of the restaurant did these small transportations, though a few times we saw that the man who took the trolley was different from the fishermen or restaurant employees. What is more is that we saw that sometimes the seafood was put in tanks along the way. These signs are marking the involvement of a middleman.

What stroke us during our observations on the Bang Bao pier, was the enormous amount of waste in the water and on the pier itself. This is something we did not experience in White Sand Beach and Salak Phet. We saw people throwing not only things like cigarettes and sweet-papers away, also edible leftovers of fish and other seafood was thrown directly in the water. Moreover, we observed that waste- and sink water from restaurants that are located along the Bang Bao pier flows directly into the ocean.

Seasonality

Our experience during lunch and dinnertime in the two and a half weeks that we were staying on Koh Chang, confirmed the notions of informants about seasonality. There was a significantly small amount of tourists around the island; restaurants were not fully occupied at all. Even at dinnertime, many restaurant only had a few customers.

See appendix V for all the interview and participant observation notes.

Comparisons three case studies

We noticed some differences and similarities while comparing the seafood restaurant value chains in the 3 different areas. Regarding environmental awareness and origin of the seafood there is a very clear difference between on the one hand Bang Bao and White Sand Beach and on the other hand Salak Phet. In Salak Phet, the interviewed stakeholders seemed to be more aware of the environment and they made use of environmental fishing techniques and natural materials. Regarding origin, a lot of the seafood in Salak Phet comes from the local fishermen and the local or private fish farms. This also means that a lot of the seafood is stored alive. In Bang Bao and White Sand Beach there are no fish farms present and the seafood is mainly stored dead or some species

are kept alive in aquaria. White Sand Beach is very different regarding transport. Because there is no pier present and they get a lot of their seafood from the mainland, there is way more transport involved compared to the other two areas. Regarding regulation, stakeholders in all research areas mentioned the 3 km zone and the lack of regulation by the government. They would like to see enhanced regulation by the government or new rules regarding this area.

Another similarity, not addressed by the interviewed stakeholders, but observed by us, was the English level of the local community and the people working in the tourism sector. We noticed that it was often very hard to communicate with them and this was not only the case when we wanted to interview them, but also when ordering food, buying things in shops or asking for (tourist-related) information.

See appendix VI for a table with the comparisons

Survey findings

The sample population of our survey consists of 60 participants, who are all tourists visiting Koh Chang. The participants range in age from 18 to 56 years and older, whereof most participants are between 26 and 35 years old. Within the sample population there is a balance in gender (55% *male*). Also the various nationalities contribute to a wide variety of socio-demographic criteria. The two nationalities with the highest percentages are: 31.7% *United Kingdom* and 13.2% *Dutch*. The next sections give the results of the survey.

First the survey addressed the question: *“Are you aware of the origin of the seafood you consume on Koh Chang?”* The majority (66.7%) of the participants do not know the origin of the seafood they consume. This indicates that the tourist has limited knowledge about the seafood value chain in which they participate on Koh Chang.

Almost half of the respondents (48.3%) answered no to the question: *“Would you order your preferred seafood if you knew it was close to extinction?”* Another 30% answered probably no and only a few respondents would still order the seafood. This could mean that the tourists care about the biodiversity of the environment and know about the negative impact on ecological cycles. This can be a sign for the fishermen to stop fishing for fish that is close extinction.

The responses to the question: *“Would you order your preferred seafood if you knew it was not locally caught but imported from another area?”* are more spread. The majority (38.3%) responded with probably yes. While the second biggest group (25%) responded with probably no. 16.7% responded yes, another 15% is neutral about the statement, and 5% says no. More than half (55%) of all participants answered yes, or probably yes. This means that the tourists do not know about the negative impact that comes with imported seafood. They are not aware that locally caught seafood uses much less carbon emissions than food that has to travel a long way. The tourists have to be made aware about the fact that their food choices can have serious consequences.

Then we asked the respondents: *“Are you willing to pay more if you knew the seafood was caught and processed in a sustainable, so environmental friendly, way?”* One did not answer the question but the vast majority is willing (33.3%) or is probably willing (45%) to pay more for sustainably caught and processed seafood. 13.3% does not know, 5% says probably not, and 1.7% responded with no.

Here you can see that sustainability is on the mind of people. Although we did not ask how much more, it is clear that tourists find it important to treat the environment in a sustainable way.

The next question asked is: *“Are you willing to pay more if you knew that the local community and fishermen can benefit from your consumption of seafood?”* Also here is a dominance in yes (43.3%) and probably yes (36.7%). 11.7% does not know, only 8.3% responded with probably no and nobody responded no. From this we can conclude that people are not only concerned about environmental sustainability issues but social sustainability is important as well.

Respondents were also asked to write down their first choice preference of seafood. Most answered the question with shrimp or other local seafood. Only 5 out of 60 prefer a non-Thai specie, mostly salmon. These answers suggest that locally caught seafood is not an issue for the respondents and that most tourists visiting Koh Chang do want to eat local seafood, and hence imported seafood will not be missed. But, in contrast 55% of all participants answered yes, or probably yes to the question *“Would you order your preferred seafood if you knew it was not locally caught, but imported from another area”*. The tourists like that they have the option that they can also choose seafood they know from their own countries.

Correlation tests were used to test the relationship between all the variables of the survey. Pearson correlation and the significance level give information about the relationship between the variables. The results are discussed below.

There is a statistically significant correlation between the awareness of the origin of the seafood the respondents consume on Koh Chang and the ordering of the preferred seafood if they knew it was close extinction. The significance level is 0.018 (below the 5% significance level), meaning that the people who are aware of the origin of the seafood they consume will not consume their preferred seafood if they knew it was close to extinction. We can conclude that it has a major influence if tourists are aware of the seafood they consume on the extinction of marine life.

The awareness of the origin of the seafood the respondents consume on Koh Chang also significantly correlates with the ordering of preferred seafood if they knew it was not locally caught but imported from another area, with a significant level of 0.043 (below the 5% significance level). The people who are aware of the origin of the seafood they consume will not consume their preferred seafood if they knew it was not locally caught but imported from another area. Here you can see that it is important that tourists are aware of the origin of seafood for the dish they choose. People who are aware will think before they choose a dish and go for local food.

The responses to the question: *“Would you order your preferred seafood if you knew it was close to extinction?”* are dependent ($p = 0.050$) to the responses of the question: *“Are you willing to pay more if you knew the seafood was caught and processed in a sustainable, so environmental friendly, way?”* This means that the people who responded with no to the first question responded with yes to the second question. These people are probably aware of and concerned about the sustainability of the aquaculture.

There is a significant relationship between the questions *“Are you willing to pay more if you knew the seafood was caught and processed in a sustainable, so environmental friendly, way?”* and *“Are you willing to pay more if you knew that the local community and fisherman can benefit from your*

consumption of seafood?” The people who are willing to pay more for a sustainable catch are also willing to pay more for a higher benefit for the local community. The significance level is .000 (below the 1% significance level); from this we can conclude that there is a statistically significant correlation between these two variables. The respondents do not value environmental sustainability over social sustainability. This relationship is not totally unexpected. If tourists care about sustainability issues and are willing to and able to pay for it they do not prefer one to another and will pay for all sustainability issues.

Bottlenecks & Solutions

White Sand Beach

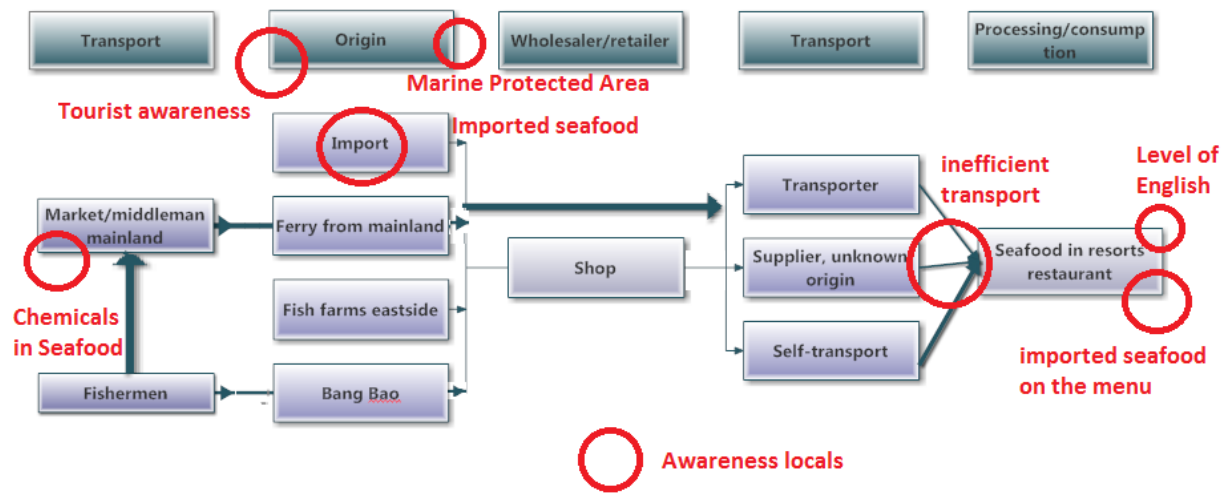


Figure 8 – Bottlenecks White Sand Beach

White Sand Beach: Transport inefficiency

This transport inefficiency bottleneck appeared after multiple conversations with resort restaurants in White Sand Beach. There are three different ways of transporting the seafood to their restaurant. In the first case it is done by the transporter. The transporter brings the seafood to the restaurant by pickup truck, sometimes this transporter is the supplier and sometimes this is a third party. In the second case a supplier of unknown origin arranges the transport. The restaurants order the seafood from the supplier and they make sure the restaurants get their ordered seafood. The supplier gets the seafood from the mainland, Bang Bao or Salak Phet, but the restaurants do not know the exact origin of the seafood. The restaurants itself arrange transport, which is the third case. Each restaurant goes to the pick-up their own seafood, some from the ferry and other from Bang Bao or Salak Phet. When became clear that about 70% of the restaurants pick-up their own seafood, we started thinking that this was an inefficient part of the value chain. Because especially in low season the restaurants do not need that much seafood from the mainland, therefore their trucks are close to empty when getting back from the ferry after picking up their order, which we have seen during our observations. Because many restaurants do this, much fuel is unnecessarily used. The lack of efficient transport in the value chain raises the use of carbon emissions, makes the already busy Koh Chang roads more busy, and it raises costs for each restaurant. Therefore we think this part of the value chain is handled inefficiently and can be changed to make the seafood value chain of Koh Chang more sustainable.

Solution

Our idea to intervene is to create an online platform for those restaurants where they can say with which ferry their seafood will arrive, and they can see which other restaurants have orders from the mainland that will arrive with the same ferry. They can contact each other via the online platform and decide which restaurant will pick up the seafood and transport it to all the restaurants. In this way they can divide the transport of the seafood without including another actor in the value chain,

so it will be done in a more efficient and sustainable way for the seafood value chain in WSB and it will reduce costs for the restaurants as well.

White Sand Beach: Imported seafood on menus

White Sand Beach is more commercial than other parts of Koh Chang and touristic in a very different way. When staying in White Sand Beach we observed that on more than half of the menus you could find seafood that is not to be found in Thailand and therefore is imported from another country and mostly another continent. Most of the time this is salmon, for example smoked salmon as a starter, which has to be imported from Europe. This imported seafood makes the seafood value chain in WSB a lot longer and less sustainable. When talking to the restaurants about those imports they told us that as long as there is a demand from the tourist they would offer those species on their menu. The tourist is the driving factor of the value chain, so what they demand will be supplied. Imported seafood comes with many extras compared to locally caught seafood. The seafood has to be transported a long way and has to be kept cool or frozen for a longer period of time. This all includes many extra carbon emissions that make the seafood restaurant value chain of Koh Chang less sustainable.

Solution

To decrease to amount of imports within the value chain we need the tourist. As said before, the tourist has a lot of power within the value chain. When there is no longer a demand for imported seafood, there will not be imported seafood on the menu. According to all stakeholders we spoke to imported species will never be completely erased from the menus on Koh Chang, but there can be a decrease in species and amount. Therefore it is important to raise the awareness of the tourist regarding their seafood consumption during their time on Koh Chang. As seen on Koh Mak we think it is a good idea to implement the low-carbon menus as well on Koh Chang. In these menus, next to each meal, the amount of carbon used until consumption is mentioned. This is for example much more for a salmon fillet compared to a locally caught squid. Those low-carbon menus must give the tourist a better idea about what their choice of a meal can mean for the environment, as most tourist have no clue regarding those issues. The awareness of the tourist regarding seafood consumption will raise and hopefully they will think twice before ordering a salmon fillet for dinner.

White Sand Beach: Chemicals used on seafood from the mainland

During our time in Salak Phet we found that seafood imported from the mainland is implemented with formalin, a chemical to keep the seafood fresh for a longer period of time. Most restaurants in White Sand Beach mainly get their seafood from the mainland market. The restaurants have suppliers on the mainland by whom they place their orders. This supplier then makes sure that what they order will be sent to Koh Chang. When going to fishermen in Bang Bao they can only get what is caught, therefore restaurants order seafood from the mainland. Another reason is the use of formalin, because this makes the seafood look nicer and they can keep it fresh for a longer period of time compared to non-chemical seafood. This use of chemicals in the seafood is not good for the consumer and the environment.

Solution

A solution to this bottleneck is very difficult to find. Of course we can say that all seafood in the restaurants should come from the island itself, so from Bang Bao or Salak Phet. Unfortunately the demand is bigger than the supply on the island; therefore it is necessary to get seafood from the

mainland. We did mention an option in the solution of the bottleneck *awareness of the tourist*, which will solve a part of the problem but never the whole. Chemicals are used in food everywhere around the world and this is very difficult to stop especially with a good that comes with such a short expiration date.

Bang Bao

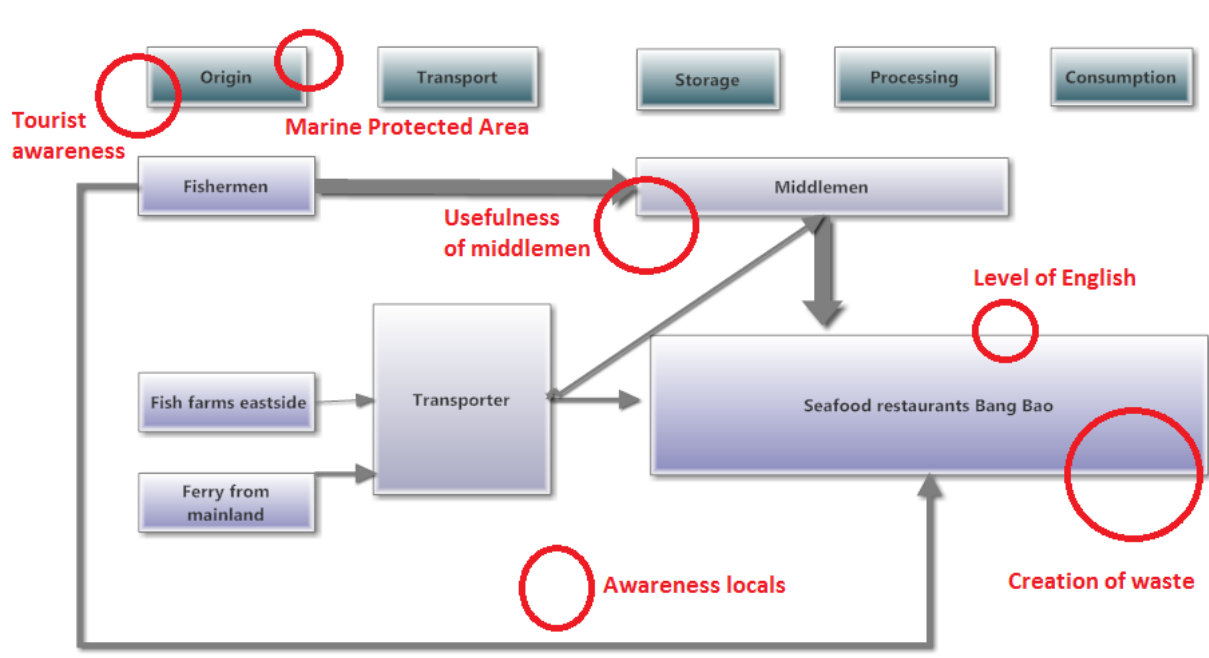


Figure 9 – Bottlenecks Bang Bao

Bang Bao: Creation of waste (in seafood restaurants)

Bang Bao is a pier and harbour where a lot of activities take place. There are fishing boats, snorkelling boats, souvenir shops, and seafood restaurants. All of them generate waste during the whole year. A lot of solid waste, like plastic bottles, is just thrown away in the water by tourists and locals just like the natural waste from seafood after processing, the sewage of restaurants and other businesses on the pier also end up in the sea. Because there are no adequate facilities for collection, treatment and disposal systems, the waste will grow and pollute the waters around Koh Chang. The waste has negative consequences to the ecology, human health and aesthetics.

The waste can lead to diminish natural ecosystems and the services they provide (Lipinski et al., 2013). This means that there will be less fish to catch, this will make the seafood more expensive and this way it eventually it affects the restaurants themselves. If the garbage is left in the open air it can cause infections and serious illnesses. The waste can contaminate the environment that will be spread out by the flow of wind and enters the body through breathing (source). Besides that the garbage attracts pests, flies and domestic animals, which in turn infect humans. Tourists will stop coming as they will not feel safe and do not want to get ill on their holiday trip. Thirdly, the floating waste will have an impact on the aesthetics of the area. The waste remains in the environment but the environment's ability to deal with waste is limited. It will stay there and tourists will notice, and are already noticing, it.

Solution

Despite the initiatives like a monthly cleaning day and programs that encourage waste separation it is

still affecting/damaging Koh Chang's environment. Proper methods of waste disposal have to be undertaken to ensure that it does not affect the environment around the area or cause health hazards to the people living there.

At the household-level proper segregation of waste has to be done and it should be ensured that all organic matter is kept aside for composting, which is undoubtedly the best method for the correct disposal of this segment of the waste. In fact, the organic part of the waste that is generated decomposes more easily, attracts insects and causes disease. Organic waste can be composted and then used as a fertilizer. The government can encourage this by giving a reward for waste separation, for example in the form of a subsidy.

Preventive measures regarding waste management are very important as well. Teach the children how important waste management is for their future and their health, so they learn from a young age to separate their waste and teach their parents to do the same instead of copying their parents waste behaviour.

Bang Bao & White Sand Beach: Awareness of the locals about sustainability

During the interviews and observations we did on Koh Chang we experienced that about 75% of the stakeholders in Bang Bao and White Sand Beach do not know the concept of sustainability. The stakeholders do not think about sustainability within the value chain, so they did not take any measures regarding environmental preservation. The few people that knew the concept (the other 25%) were positive about it, but did not think the seafood value chain could make a difference in this.

Solution

To make the seafood value chain, or the whole island a more sustainable place it is important that the local community is aware of the environmental issues that address Koh Chang. To raise the awareness of the locals we want to start a campaign about Sustainable Koh Chang. There are already some environmental parties involved that organise a monthly cleaning day and the local community in Salak Phet is more involved in sustainable measures as well. With this campaign we want to reach the local community of the west side of Koh Chang. When they become more aware they will be more open to sustainable interventions within the value chain and see the importance of this for the future of Koh Chang.

Salak Phet

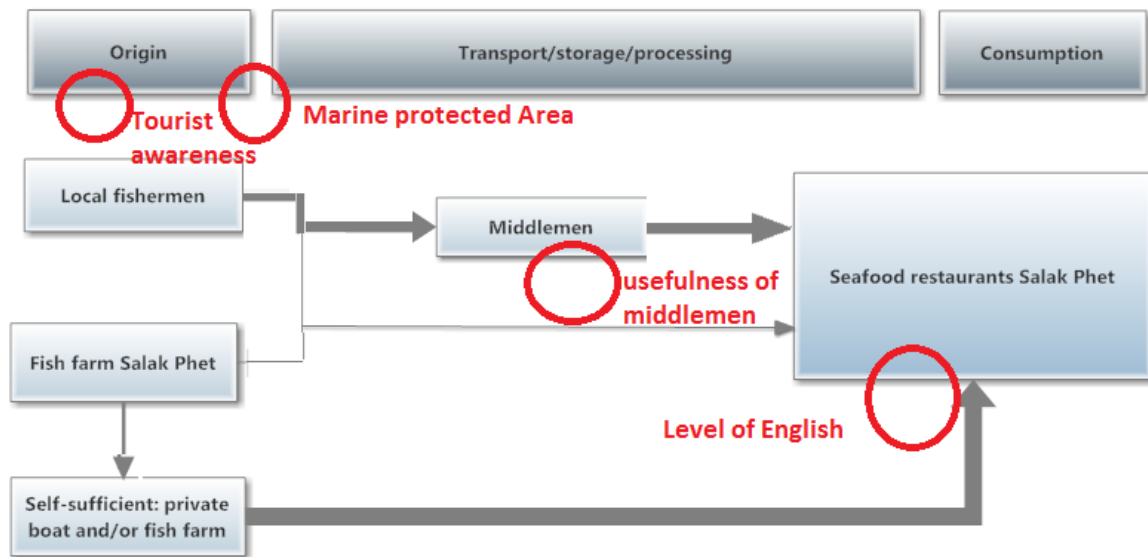


Figure 10 – Bottlenecks Salak Phet

Salak Phet and Bang Bao: Usefulness of middleman

In Bang Bao the seafood restaurant value chain is quite short. The seafood arrives at the pier, then it goes to a middleman who is also located on the pier, and he distributes it to a few restaurants on the pier. Everything happens on the pier, so the distance is not longer than hundred meters. The actors are located only a few meters away from each other. The middleman is located in the middle, between the arriving spot of the fishermen and the restaurants. He processes the fish, divides it, stores it and brings it to the restaurants. But restaurants also have deals with fishermen and have the ability to process and store the fish in their restaurants. The middleman has no added value and without him the value chain would be more efficient. This is the same for the middlemen located in Salak Phet. Reducing the number of businesses involved in a supply chain between the producer of a raw material and the final customer can increase the share of the final price received by those involved. In the end fewer links can also provide cost savings for customers. The seafood will be cheaper without the middlemen involved, this is an important factor in the business. Another advantage of a short value chain is that it is easier for everyone, including the tourists, to know where the food is coming from. People will know if the seafood is locally caught or not.

Solution

So the idea is that a shorter value chain is better for the sustainability of a value chain. Therefore we think it is important to make the value chain as short as possible. The value chain can be made shorter by erasing the middleman. The middleman's job is unnecessary as the restaurants can process the seafood themselves, which reduces costs and therefore the price of the seafood will decrease.

All areas Koh Chang

All areas: Awareness of the tourist

When comparing all three value chains with each other and thinking about power relations within those value chains we came to the conclusion that the tourists have a lot of power. They drive the

value chain, the restaurants listen to their demands and their suppliers listen to what restaurants order, etc. We did a survey among 60 tourist regarding their seafood consumption on Koh Chang and found that 67% of the tourists answered no to the question “*Are you aware of the origin of the seafood you consume on Koh Chang?*”. This indicates that the tourist has limited knowledge about the seafood value chain in which they play such a big role. Raising awareness among tourists is very important if we want to create a more sustainable seafood value chain for Koh Chang. A lack of awareness can cause that the tourist choose the most unsustainable sort of seafood, without knowing the consequences.

Solution

To make the tourist more aware we thought of two methods. The first is based on what we have seen in Salak Phet; the promotion of fishing tours for the tourist. By promoting the option of starting fishing tours to the fishermen they can give the tourist a better understanding of the seafood value chain and make them more aware about their consumption and role within the value chain. The tourist get to see how the local fishermen work, what fish is locally caught and how this benefits the local fishermen. When the tourist becomes more aware about those options and those actors within the value chain this will be seen in their favour. Secondly, The fishing tours will make the tourist more aware about waste management. Especially in Bang Bao there is a lot of waste to be found in the fishing waters, when the tourists become more aware about the importance of clean fishing waters they will put more effort in their personal waste management. Thirdly, the local fishermen will earn a more stable income by organising those fishing tours as those are possible all year long and the tourist will pay a standard price regardless of the amount of caught fish.

The second method is the promotion of Thai cooking classes among the restaurants and the tourists. During those Thai cooking classes the tourist can learn about the local cuisine and it gives the restaurant the opportunity to promote the local dishes among the tourists. Those classes will hopefully lead to a bigger demand for the local food instead of the imported food on the menu and an awareness regarding the health of locally caught fresh seafood in comparison with imported seafood or even seafood from the mainland. The restaurants will earn some extra income from the cooking classes and have the opportunity to share the Thai cuisine – which they are very proud of - with the tourist and make them just as enthusiastic about it as they are themselves.

Next to all this the fishing tours and cooking classes will give the tourist a unique and local experience that will add something extra to their trip on Koh Chang.

All areas: Level of English

While doing our data collection on Koh Chang we had a lot of difficulties with the level of English many restaurants, for example in WSB only 15% of the resort restaurants spoke enough English to understand us. Of course the real problem was the fact that we do not speak any Thai, but when working in the tourist branch it is imported to communicate with the tourist and therefore a certain level of English is necessary. When eating in a restaurant or even talking to a receptionist we had to explain ourselves with hand gestures or other methods. The tourists and the locals are both important actors in the value chain and therefore it is important that they can communicate with each other. A waiter with a certain level of English can recommend certain (local) dishes and explain to the tourist what is in the dishes, what can make a big difference to the tourist and their consumption patron. The restaurant will benefit by getting a better image about the tourist, who is the one driving the whole restaurant business in the first place.

Solution

Offer study materials to restaurants for a small price, so the employees can practice at home. Then organise weekly meetings with everyone where they can practice making conversations with each other, of course the most useful practice is while working and talking to the tourist. When the employees have the opportunity to get a basic knowledge of the language they can learn it very easily as they can practice with each other and the tourist every day.

All areas: Marine Protected Area

The marine protected area of Koh Chang is a 3 km protected zone around the coast of Koh Chang; within this zone large marine fisheries cannot fish. This area must assure that the small fisheries do not disappear due to competition of the large marine fisheries by giving them a marine fishery free area.

When talking to local fishermen on Koh Chang we could soon conclude that this Marine Protected Area is a great idea that is poorly implemented, as they all had negative experiences with the area. The government does not have any control over the area and therefore the large marine fisheries can still go over the 3 km border without any consequences. Another effect of the Marine Protected Area is overfishing. The large marine fisheries overfish the seas around Koh Chang, which leaves less seafood for the small fisheries within the area. All fishermen we spoke to noticed a decline in the amount of seafood they caught over the years. Which is partly caused by the large marine fisheries that with their trolling nets catch as much seafood (and many other things) as they can. Those trolling nets are very bad for the environment as they destroy coral reefs and catch garbage together with the seafood.

Solution

The main solution to this problem is government attention. There has to be supervision over the Marine Protected Area by a third party. This party has to make sure the large marine fisheries do not go inside the 3 km zone of the Marine Protected Area. There also have to be made some changes prevent extinction of several species, because of overfishing.

Bottlenecks & solutions - Selection for our intervention design

When comparing all bottlenecks and their solutions with each other there are three that seem most adequate to elaborate on in the intervention design.

Table 2 shows the ranking of the bottlenecks and solutions with the most important and feasible ones on top.

Bottleneck + Solution	
1.	Awareness of the tourist
2.	Transport inefficiency
3.	Imported seafood on menus
4.	Creation of waste (in seafood restaurants)
5.	Awareness of the locals about sustainability
6.	Usefulness of middlemen in Bang Bao
7.	Marine protected area
8.	Level of English
9.	Chemicals used for seafood on mainland

Table 2 - Ranking of Bottlenecks + Solutions

We chose the three bottlenecks and the solutions for *transport inefficiency*, *imported seafood on menus* and *awareness of the tourist*.

The problem and solution for *transport inefficiency* are very realistic for the coming future. As the solution of an online platform for the transport inefficiency bottleneck is very easy to implement, we also spoke to some stakeholders and showed them our ideas on which they reacted very positive and open-minded. The solution has benefits for both the stakeholders involved as the sustainability of the value chain. After some interviews and conversations we had with locals and stakeholders we soon knew that the most important factor for them is money. When we want an intervention to work out well there has to be a benefit – next to a more sustainable Koh Chang – that involves cost reduction or an increase in income for the stakeholders involved. This solution we have for the bottleneck will reduce transport costs for the stakeholders that cooperate, as they will share those costs with other stakeholders from then on. Setting up an online platform is not very difficult and can be done in a short amount of time. The most challenging part is to inform all stakeholders and get them to participate; they do not all have to participate as long as more than 50% of the stakeholders works together through the online platform there will be benefits. Hopefully the rest will follow as they see the benefits in timesaving and cost reduction that the online platform creates. For the sustainability of the value chain this will be of great profit, as driving with only one or two cars instead of all restaurants for themselves will reduce fuels.

Imported seafood on menus in White Sand Beach and its solution we chose, because we have seen it working well on the island Koh Mak. During our presentation for the stakeholder meeting we asked the stakeholders whether or not they think this will be feasible on Koh Chang, and all the reactions we got were positive. The implementation of low-carbon menus will be beneficial for both stakeholders and the sustainability of the value chain. The restaurants promote the local food in this way on which they have more margin than in imported dishes. The tourist will become more aware of the importance of his choice of meal and what this can mean for the environment. To make it even more attractive for the tourist is to explain on the menus what difference his/her choice can

make, so to give direct examples of the effects on the environment. Those low-carbon menus can make the demand for local seafood increase as the demand for imported seafood decreases. This means that seafood does not have to travel overseas and has to be kept cool or frozen for a shorter period, which means less use of fuels and energy will be handled in a more efficient way.

The third bottleneck *awareness of the tourist* is a very important one for the seafood restaurant value chain on Koh Chang. When getting to know the value chains of our three case studies and thinking about power relations between the different actors we found that the tourist has a majority of the power within the value chain. The restaurant supplies as the tourist demands, which continues through the rest of the value chain. To make the value chain more sustainable we need to tourist to act more sustainable and think about this while on vacation. By promoting cooking classes and tourist fishing trips we want to raise the awareness of the tourist about seafood on Koh Chang. During cooking classes the tourists learn about the local food, healthy food and get an idea about the value chain they are actors in. The restaurants can earn some extra money by offering those cooking classes to the tourists and have the opportunity to teach them about Thai culture and promote their local cuisine. During the tourist fishing trips tourist get to see the importance of waste management, the fact that local fishermen get to benefit from the value chain, about the origin and extinction of seafood species. The fishermen can benefit from offering those fishing trips as they bring in money all year long and give a more stable income than being a fisherman. For the tourists those are nice trips to get to know the locals and learn more about the culture of Koh Chang. We have seen those fishing tours worked out in the value chain of Salak Phet and want to promote them more on the west – and more touristic – side of the island.

The bottleneck *chemicals used for seafood from the mainland* has no clear solution that could be implemented right away. It is a problem that is faced in many places and something that is impossible to prevent. Therefore this bottleneck and the solution are not realistic enough to implement as an intervention for the seafood restaurant value chain of Koh Chang. The three solutions we chose for our intervention design have more benefits for the locals and stakeholders that participate in the solution, which makes it more feasible and appealing for the stakeholders to participate. The *creation of waste* in Bang Bao is an important bottleneck, but the solution is not feasible enough. The government has to get involved and give out subsidies to stimulate waste separation; this is at the moment an unrealistic goal for Koh Chang. It is very easy to say the government has to get involved, but there is not enough power from our side to get it actually done. This also applies to the bottleneck *marine protected area* and associated solution. Some clear rules have to be made and supervision from the government's part is needed, but we do not have the power to make that happen. For the bottleneck and solution of *usefulness of middlemen* in Bang Bao we do not think this intervention will be of great use, because the middlemen is situated a few meters from both the arrival of the fishing boats as the seafood restaurants, so there are no transport costs involved and no use of fuels. The middlemen has done his job there for almost thirty years and therefore it might be cruel to take his job away, when there will be so little impact for the sustainability of the value chain. The *awareness of locals about sustainability* and *the level of English* both involve education in the solution. We think it is very important to give good education, but it is not a very feasible intervention for now. It is very difficult to change the education system of a country or region and although this is to our opinion a very important and useful solution for the

creation of a more sustainable and environmental friendly Koh Chang we cannot use it as an intervention as it is not a realistic solution on short term.

The most important factor to make those interventions work is collaboration – as seen on Koh Mak – between the stakeholders of the value chain. When they will work together to create the low-carbon destination Koh Chang, they can implement those interventions in the best ways. The three bottlenecks chosen for our intervention design have most appealing benefits for the stakeholders and therefore are a good start for cooperation between locals and stakeholders within the seafood value chain.

Providing and financing interventions

Intervention	Fishing trips	Cooking classes	Low-carbon menu	Online transport platform
Bottleneck	Gap in awareness of the tourist		Imported seafood on the menu	Inefficient organisation of transport
Actors	Fishermen	Restaurant owners	Restaurant owners	Restaurant owners
	Tourists	Tourists	Tourists	Suppliers
				Transport companies
Benefits	Additional income	Additional income	Saving costs	Reduced costs in fuel and time
		Raised awareness of the Thai food culture	Reduced co2 emissions	Reduced co2 emissions
	Stable income		Demand for local food is raised	Improved collaboration between actors in the value chain
	Raised awareness in local food		More local sourcing	
	Promotion as fishing island			
	Cleaner waters			

Table 3 – Interventions

Intervention 1: Raise tourist's awareness of local and sustainable products

Sustainability is a difficult topic on Koh Chang like it is in many countries where the economy is not as developed as it is in the western countries. Most businesses on Koh Chang are family owned. These businesses have 'taking care of their families' as a major priority. Besides this, not much money is left for sustainability related implementations like solar panels and/or septic tanks. That is why our interviewee suggested to start with the tourists by teaching them about local and sustainable products. We took his advice into account and elaborated more on this. We identified two ways in which we can 'teach' tourists more about local food including cooking schools in seafood restaurants and fishing trips.

Cooking School

The idea is to set up cooking schools within seafood restaurants. As tourists are often willing to bring something from the foreign culture back to their home country, it could be a good idea to learn them how Thai people cook, and which local products they use in their dishes. There seems to be enough capacity for this intervention. The seafood restaurants on Koh Chang have large kitchens. It would not be complicated to install a cooking class friendly environment. Most devices are already present in the restaurant, which makes it financially interesting. Not much additional costs need to be made and the restaurant can derive additional income from selling the cooking classes. During our observations, we noticed that the restaurants are not very busy during daytime. Cooking classes can take place when restaurants do not have many customers. Again, this intervention provides an extra source of income, which could be of large value for the restaurants, especially during low season.

When it comes to the cooking classes, restaurants could have doubts about which dishes to select that are suitable for tourists to cook. DASTA could provide people that have knowhow of cooking local dishes and knowledge of tourism. People that already have a cooking school, could advice restaurants how to implement a cooking class effectively. A woman we met on Koh Mak has a cooking school on the Island and goes to conferences to spread her knowledge of Thai Cooking. DASTA could contact such people and ask them to help restaurants start a cooking school and select proper dishes for the menu.

Fishing trips

By encouraging fishermen to start organising fishing tours, another way to raise tourist awareness is found. Fishermen could give the tourist a better understanding of the seafood value chain and make them more aware about their consumption and role within the value chain. The tourist gets to see how the local fishermen work, which fish is locally caught and how this benefits the local fishermen. Besides the sustainability factor, it is also beneficial from a financial perspective. The local fishermen will earn a more stable income by organising those fishing tours as fishing trips can be organized all year long and the tourist will pay a standard price regardless of the amount of caught fish. As a fisherman they are dependent on the amount they catch. In Salak Phet, we noticed that all the fisherman we spoke perceive a decline in the amount of fish they catch. The fishing trips give them the opportunity to diversify their income by offering fishing trips in the high season for example. There is enough capacity for this initiative available on Koh Chang as it is a fishermen island. This initiative could become really interesting for those fishermen that notice declines in their catches, and have a hard time to make enough money to feed their families.

Fishermen are people that have not much experience with tourists. They catch their seafood, sell it to the restaurant or processor and catch seafood again. We noticed during our fieldwork that not many fishermen speak English. In the beginning it could be difficult for them to interact with - foreign - tourists properly. DASTA could provide people that help fishermen learn basic English. They could also provide advice including 'how to start a business' and tourist's behavioural characteristics. They also have the power to promote the fishing tours among both the fishermen and the tourists. So give the fishermen the knowledge to be a fishing tour and help them to start the business.

Intervention 2: Implementation of low-carbon menus

Issues as 'sustainability' and 'going green' are very hot topics at the moment. They are discussed everywhere in newspapers, television and also in the business sector. More and more businesses are 'going green' and receiving eco-labels. All of this is driven by the growing public awareness. It is high on the agenda of many people. Also tourists think this is an important issue and this is what they want. The interest of tourism businesses, like the seafood restaurants on Koh Chang, is to satisfy the tourists. By incorporating ways to be more environmental responsible they can attract a lot of customers.

This intervention is about the implementation of low-carbon menus, which we have seen on the island Koh Mak. Those menus show the amount of carbon used per meal and will involve the tourist in the seafood value chain of Koh Chang. They will see the importance of their choice of meal for the

environment; they get to see their power within the value chain. The stakeholders involved are the resort restaurants situated in White Sand Beach and the area till Klong Prao, DASTA and the tourists. The first step is to give out information to the restaurants about the menus and importance of implementation; this has to be printed out in a folder that will be delivered to the restaurants. Then the menus have to be designed, so there has to be calculated per meal the amount of carbon emissions that is used and there has to be a clear explanation in it for the tourist.

The implementation of low-carbon menus has many benefits. The most important one is the reducing of carbon emissions by a decrease in the order of imported seafood. The Thai food culture is promoted as tourist will see the carbon emissions for local meals will be less than for imported meals. Food is very important in Thai culture, they are very proud of it so they will see this promotion as a benefit. The margin on local food is bigger than on imported food, so they will earn more money with it. The local community of Koh Chang and other parts of Thailand benefits, as more food will be ordered from those sources instead of foreign sources.

Besides the benefits there are also some challenges that have to be overcome when implementing the menus. Restaurant managers do not want to take anything off the menu. They want to satisfy the tourists and as long as there is a demand from the tourist they will offer those species on their menu. By implementing a low-carbon-menu they do not have to change anything in what they offer. Only the amount of carbon used from catch until consumption will be stated next to the meal on the menu. From there it is up to the tourists to choose a high- or low-carbon dish, while the manager does not have to change a thing.

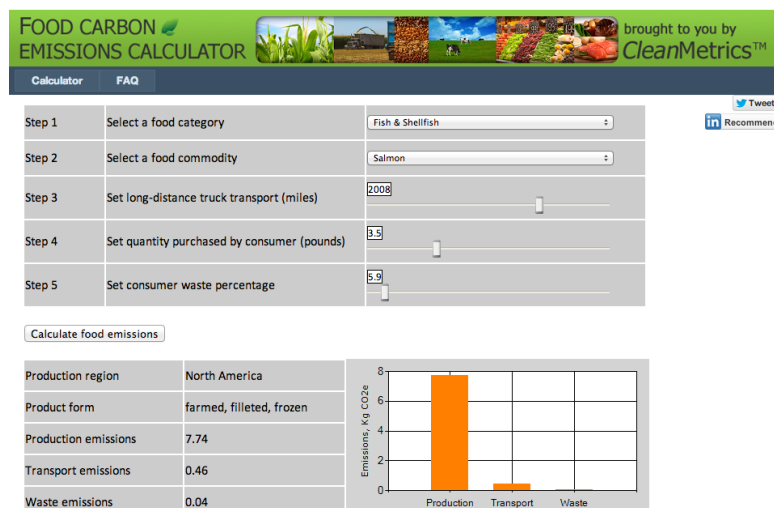
A key challenge to overcome to implement these menus is that a lot of people, including the restaurant managers and tourists, do not know what it means to eat low-carbon.

Most tourists know what sustainability means and that carbon emissions are having a big impact on our environment but are not aware of the role food is playing in this issue.

The results of the survey question: *"Would you order your preferred seafood if you knew it was not locally caught, but imported from another area"* show that 53% of all participants answered yes, or probably yes. This means that the tourists are not aware of the high amount of carbon emissions that comes with imported seafood. They should learn about the negative environmental impacts of some food processes. Food that comes from out of the country has to travel long distances, which means a lot of fossil fuels is used by means of transportation. In order to preserve the food on the long trip, they need to be cooled and also are more likely to be treated with pesticides and other chemicals. The tourists have to be made aware that by consuming local food they are preventing carbon emissions that would have been released into the atmosphere by transport. The awareness of the tourist regarding seafood consumption will rise by stating the amount of carbon emissions on the menu. By choosing their food wisely they can reduce the amount of carbon emissions. By eating local it will also contribute to the local and authentic experience what tourists are looking for in a destination.

The tourists will choose low-carbon dishes, as it will give them a good feeling. It gives them the feeling of doing something good and gives them the feeling they give something back to the environment. On the menus there will be an explanation of the purpose of the carbon menu and an elaboration on carbon-emissions and their meaning.

There is one difficulty that comes with low-carbon-menus. The amount of emissions is difficult to calculate. What kind of energy consuming activities will be included? And for every food, every transport mode, distance, quantity and season the amount will be different. DASTA has the means and knowledge to make an online food carbon emissions calculator for Koh Chang. This way the restaurants can calculate the carbon emissions themselves. After selecting the sort of seafood,



transport mode, quantity ordered, distance and date, the online calculator can determine the amount of carbon emissions used during this process. In Figure 11 you can see an example of a food carbon emission calculator.

The restaurants can use the low-carbon-menus as a marketing tool to attract eco-tourists. They can promote their restaurant by looking at the carbon footprint, while keeping their prices low, and it

Figure 11 – Food carbon emission calculator

improves the quality of the restaurant. DASTA could make a label for restaurants that implemented the low-carbon-menus. DASTA first has to check if the restaurant is really committed to be a low-carbon restaurant and should do a yearly check-up to investigate if the restaurant can keep the label. DASTA can also start a campaign with information about what it means to eat low-carbon and promote the best food options to the tourists visiting Koh Chang. They can make posters with ‘best options’, ‘good alternatives’, and ‘avoid’. This way they can encourage tourists to make environmental friendly food decisions.

Intervention 3: The Creation of an Online Platform

This intervention is designed to implement within the seafood restaurant value chain of White Sand Beach on Koh Chang. While we got an image of the value chain in White Sand Beach the main consideration regarding energy efficiency was the inefficient organisation of transport. As mentioned in the explanation of the bottleneck *transport inefficiency*, the transport from the ferry, Bang Bao and Salak Phet to the restaurants is for organised by each restaurant itself, by an unknown supplier or by a transport company. The majority of restaurants (70%) organises transport themselves, so they use their own car to pick up the seafood from those three places every day or every two days. We came up with the idea of an online platform to make transport more efficient and create a more sustainable value chain. The stakeholders involved are the resort restaurants that are situated in White Sand Beach and the area till the village Klong Prao and DASTA. It is important to first get an idea of the willingness of the stakeholders to participate this can be done by an opinion poll, the online platform will only be beneficial as a majority will participate.

The idea is to hire a local that can set up the online platform and print information folders to hand out to the stakeholders, those are the only two parts related to financing. The information folders have to be brought to the stakeholders personally as they can immediately get a clear explanation

about the idea and its benefits and ask questions that rise with the explanation. DASTA has the ability to attract a budget for the intervention and set up a board that is in charge of the online platform. From then on it is up to the stakeholders to let the idea work. They can put online at what time and place their seafood arrives and this will give a match with the restaurants that have the same arrival time and place of their seafood. Then one of the restaurants will do the transport one day and the next restaurant the other they and so on.

The intervention is attractive for both DASTA to finance and the stakeholders to participate, as fuel costs, times and carbon emission will be reduced. The collaboration of the resort restaurants on the transport bottleneck will reduce the use of cars on Koh Chang, which decreases the carbon emissions caused by fuels. This will make a big difference for the environment on Koh Chang, especially on long term. Another benefit is the less crowded roads, as Koh Chang has only one road that goes between Salak Phet and Bang Bao and copes with many traffic jams this can be very beneficiary during the busy moments of the day. For the restaurants the intervention will be attractive as they do not have to drive around the island to pick up their seafood every day, which will costs less time and reduces fuel costs.

The intervention is attractive for both DASTA to finance and the stakeholders to participate, as fuel costs, times and carbon emission will be reduced. The collaboration of the resort restaurants on the transport bottleneck will reduce the use of cars on Koh Chang, which decreases the carbon emissions caused by fuels. This will make a big difference for the environment on Koh Chang, especially on long term. Another benefit is the less crowded roads, as Koh Chang has only one road that goes between Salak Phet and Bang Bao and copes with many traffic jams this can be very beneficiary during the busy moments of the day. For the restaurants the intervention will be attractive as they do not have to drive around the island to pick up their seafood every day, which will costs less time and reduces fuel costs.

Obstacles

There are some obstacles that prevent the actors that are involved in these bottlenecks to take action. Actors that are involved in these bottlenecks and solutions as a business, this includes the seafood restaurants and fishermen, face difficulties in implementing the solutions. These obstacles are mostly related to money and knowledge. Though we have selected the three bottlenecks and solutions for intervention design that don not need loads of money, a small capital is needed for implementation. Even if DASTA has the ability to provide a budget for the implementation of solutions, businesses also have to bring in some starting money by themselves. Fishermen on Koh Chang, but also restaurant owners, are most likely not in the position to invest huge amounts of money, they just don't have it. They may have the feeling that these solutions will cost them too much, and think they won't be able to make a sufficient investment.

This relates to the second obstacle, which is one that involves the risk businesses have to take when they implement our recommendations. For each of the solutions changes in the business have to be made. Restaurant owners and fishermen may have doubts about how beneficial the solutions could be in the future. However, these actors have to make investments for the implementation of our designed solutions. In particular the intervention that addresses the awareness of tourists requires some new business strategies. The fishing trip and cooking school are predominantly new business concepts for the restaurant owners and fishermen. These businesses are not very much used to changes. Most of them can't imagine having a different job, in particular fishing is a profession that belongs to a family over years. Same methods are practiced for years and making adjustment in business concepts are quite unlikely. The fear of failure may keep them from investing money in the implementation.

Thirdly and maybe most importantly, is the lack of knowledge that causes that actors are unaware of the sustainable potential that their business has. These actors are unaware of environmental concepts. Moreover, when they are familiar with the term sustainability, they are likely to have no knowledge on how they can make implementations to improve their own business. Without this information, it is a major challenge for them to visualise potential benefits. The lack of practical knowledge that allows to adapt strategies, makes it impossible to implement the solutions.

Address obstacles

To support the actors in the implementation of the formulated solutions, some challenges should be overcome and obstacles should be addressed. DASTA can make an effort in the obstacle that regards money. DASTA is in the position to make budget requests at the Cabinet, which supports sustainable tourism development and administration. In this way, restaurants and fishermen might benefit from subsidies or other fundraising initiatives. Some extra capital could support businesses when implementing new business strategies.

Moreover, this will decrease the second obstacle, which is the risk that this implementation could give. Subsidies or other money-providing activities will not directly reduce risks of failure, but it decreases the impact of implementing this solution. The challenge is, that the actors are not aware of the benefits, and without proper argumentation they are afraid that the operation will give too much risk. Restaurant owners and fishermen have to be convinced that the benefits of the implementation outweigh the risk that they will have to take. We have already elaborated on the many benefits that these interventions and its solutions have for the actors involved. Our research shows that the actors involved in the bottlenecks in the value chain, will have certain benefits that will make the investment and effort put in the implementation of the solution valuable. In the section that elaborates on DASTA's recommendations, it can be found how these benefits should be communicated to the actors.

The obstacle involving the lack of knowledge is also part of the communication with the actors. The unawareness of the actors is of crucial meaning for the implementation of the solutions. Better provision of information and communication of relevant concepts and practical knowledge from the DASTA and the government in general would be of much support. This is actually very much involved in one of the other interventions that we have designed; it addresses the awareness of locals. This intervention and the solution that involves campaigns and sustainable activities could be of great use to overcome this obstacle of lack of knowledge. When actors are getting interested in the options they have, DASTA could send experts or provide guidebooks that give practical information on the measures that should be made and the activities that are involved with this implementation.

Synopsis

In this report, our aim was to provide an extensive knowledge of the current performance of the seafood restaurant value chain, focussing on the DASTA domains energy efficiency and waste management, and emphasising the role of stakeholders. Secondly, we aimed for an elaborate formulation of feasible interventions that can serve as sustainable implementations for stakeholders. We did this to serve DASTA's request that involves the goal to define Koh Chang's future outlook as a low carbon destination.

To define the scope of the research and to gain the most valuable information when working in the field, we started the process by writing a Research plan. Sections of the Research plan are incorporated in this report, leaving out information that turns out to be irrelevant and showing the exact context of the research that we have conducted. In addition, we reflected on parts of the plan, and made adjustments on several parts of the plan that we have done differently than described at first. This allows the reader to gain insight in the research process and all the activities and challenges that we have been through. We made our descriptions and reflections as precise as possible, to offer the best understanding of our methods and performance. We started with the formulation of a goal and research questions. Afterwards, we continued with a presentation of insights in the following parts of our research: beneficiaries, risk analysis, ethical issues, project planning and task division, research log and methodology, stakeholder meeting and reflection and an extensive context analysis.

With the data we have gathered during the fieldwork as primary information, we designed three different value chains for the three case studies White Sand Beach, Bang Bao and Salak Phet. These value chains and an extensive analysis of the findings that result from the interviews, participant observation and surveys, helped us to identify a list of bottlenecks in the value chain. In these bottlenecks, we found challenges for which we have designed solutions and possible interventions to help overcome the issues that are at stake. These interventions are formulated for a specific case studie, or as a broader solution for the entire island. The interventions range from concrete solutions for managing waste, to solutions that address the more general issues, including for example tourist awareness.

The final section of the report involved a selection of the three most feasible and critical interventions, on which we provided a more intensive understanding. Despite the excellent suitability of the interventions, not all the interventions are adequate for direct implementation. The three interventions that we found most valuable are *transport inefficiency*, *imported seafood on menus* and *awareness of the tourist*. We have chosen these three interventions in specific, because of their realistic outlook for the future, their rather practical implementation and the number of benefits for several stakeholders. These stakeholders can benefit from implementation of these interventions in terms of time, money, differentiation and reputation. The three interventions involve practical methods that can be applied easily and rather directly. Moreover, we have already received positive feedback on these interventions during interviews with stakeholders and the stakeholder meeting. The implementation of these interventions will be beneficial for a number of stakeholders and no potential drawbacks can be identified. Most importantly, those interventions will support DASTA in pursuing their goal to promote Koh Chang as a low carbon destination. Our interventions will help to chase the ideal of a sustainable future for Koh Chang.

References

- Adelphi Consult. (2010). Carbon Footprint Tourism Industry Moo Koh Chang Cluster: Documentation of the Baseline. *GIZ/DASTA Program for Climate Protection in Tourism*.
- Arbulu, R., Tommelein, I., Walsh, K., & Hershauer, J. (2003). Value stream analysis of a re-engineered construction supply chain. *Building Research & Information*, 31(2), 161-171.
- Arvanitoyannis, I. S., & Kassaveti, A. (2008). Fish industry waste: treatments, environmental impacts, current and potential uses. *International Journal of Food Science & Technology*, 43(4), 726-745.
- Ashley, C., & Mitchell, J. (2008). Doing the right thing approximately not the wrong thing precisely: Challenges of monitoring impacts of pro-poor interventions in tourism value chains. *Overseas Development Institute*.
- Asian Institute of Technology (AIT). (2007). *Seafood processing*. Retrieved from: <http://www.fpeac.org/seafood/IndustrialWasteAbatement-Seafood.pdf>
- Ayer, N., Côté, R. P., Tyedmers, P. H., & Martin Willison, J. H. (2009). Sustainability of seafood production and consumption: an introduction to the special issue. *Journal of Cleaner Production*, 17(3), 321-324.
- Bar, S. (2004) What we buy, what we throw away and how we use our voice. Sustainable household waste management in the UK. *Sustainable development*, 12(1), 32-44.
- Biesiot, W., Noorman, K.J., 1999. Energy requirements of household consumption: a case study of The Netherlands. *Ecological Economics* 28, 367–383.
- Bonney, L., Clark, R., Collins, R., Dent, B., & Fearn, A. (2009). Sustainable value chain analysis: An agri-food chain diagnostic.
- Brundtland, G. H. (1989). Sustainable development: An overview. *Development*, 2(3), 13-14.
- Charmaz, K. (2006). Constructing grounded theory: A practical guide through qualitative analysis. London: Sage.
- Cho, C. Y., & Bureau, D. P. (1997). Reduction of waste output from salmonid aquaculture through feeds and feeding. *The Progressive Fish-Culturist*, 59(2), 155-160.
- Christopher, M. (2000). Logistic and supply chain management 4th Edition. New Jersey: Financial Times / Prentice Hall.
- Chow, L. (2014) This Sandwich Shop's Ridiculously Small Amount of Waste Will Shock You. Environment. Retrieved at 03-06 from <http://www.nationswell.com/sandwich-shops-ridiculously-low-amount-waste-will-blow-mind/#ixzz33ZlgDiw4>
- Diefenbach, T. (2009). Are case studies more than sophisticated storytelling?: Methodological problems of qualitative empirical research mainly based on semi-structured interviews. *Quality & Quantity*, 43(6), 875-894.

- Donaldson, K. M., Ishii, K., & Sheppard, S. D. (2006). Customer value chain analysis. *Research in Engineering Design*, 16(4), 174-183.
- Ellingsen, H., & Aanonsen, S. A. (2006). Environmental Impacts of Wild Caught Cod and Farmed Salmon-A Comparison with Chicken (7 pp). *The international journal of life cycle assessment*, 11(1), 60-65.
- Elloumni, F. (2004) 'Value chain analysis: A strategic approach to online learning. Theory and practice of online learning, 61.
- EMR Reports. (2012). PESTLE Analysis of Thailand 2012. Retrieved from: http://www.emrreports.com/europe/Reports/PESTLE_Analysis_of_Thailand_2012.html
- Faße, A., Grote, U. & Winter, E. (2009) *Value chain analysis methodologies in the context of environment and trade research (No. 429)*. Discussion papers/School of Economics and Management of the Hanover Leibniz University.
- Favrelière, P. (2008). Diagnostique du secteur de la peche en Haiti. Unpublished. Ministry of Agriculture, Natural Resources and Rural Development.
- Felix, M. (2012) "Supply Chain Analysis for Fresh Seafood in Haïti", United Nations University, Fisheries training program.
- FIAS (World Bank Group). (2000). *The Tourism Sector in Mozambique: A Value Chain Analysis*. Retrieved from: <http://www.tourisminvest.org/Mozambique/downloads/tourism%20sector%20background/Poverty%20reduction%20and%20economic%20impact/Tourism%20Value%20Chain%20Analysis%20Vol%20II%20final%20.pdf>
- Food and Agriculture Organization of the United Nations (FAO). Food and Agriculture Organization. The state of the world's fisheries and aquaculture 2006. Rome: FAO; 2007.
- Giusti, L. (2009) A review of waste management practices and their impact on human health *Waste Management* 29, 2227–2239
- Gössling, S. (2002). Glocal environmental consequences of tourism. *Global Environmental change*, 12, 283-302.
- Gössling, S., Garrod, B., Aall, C., Hille, J., & Peeters, P. (2011). Food management in tourism: Reducing tourism's carbon 'foodprint'. *Tourism Management*, 32(3), 534-543.
- Gössling, S., Hansson, C. B., Hörstmeier, O., & Saggel, S. (2002). Ecological footprint analysis as a tool to assess tourism sustainability. *Ecological economics*, 43(2), 199-211.
- Gössling, S., Peeters, P., Ceron, J. P., Dubois, G., Patterson, T., & Richardson, R. B. (2005). The eco-efficiency of tourism. *Ecological economics*, 54(4), 417-434.
- Grolleaud, M. 2002 Post-harvest losses: discovering the full story. Overview of the phenomenon of losses during the post-harvest system. Rome, Italy: FAO, Agro Industries and Post-Harvest Management Service.

- Hall, M. A., Alverson, D. L., & Metuzals, K. I. (2000). By-catch: problems and solutions. *Marine Pollution Bulletin*, 41(1), 204-219.
- Hawkes, S., and P. Williams (eds.). 1993. The greening of tourism from principles to practice: A casebook of best environmental practice in tourism. Centre for Tourism Policy and Research, Simon Fraser University, Burnaby, British Columbia.
- Henzler, M., Kabisch, S., Schürmann, S. & Mahida, N. (2010). Climate protection in tourism: a practical guide for Moh Koh Chang designated area. Deutsche Gesellschaft für Internationale Zusammenarbeit, June.
- Hille, J., Sataøen, H. L., Aall, C., & Storm, H. N. (2008). Miljøbelastningen av norsk forbruk og produksjon 1987e2007. Sogndal: Vestlandsforskning.
- Ian. (2011). Salakphey Fishing Village. Retrieved from: <http://iamkohchang.com/photos/nature-photos/salakphet-fishing-village.html>
- Jacquet, J.L. & Pauly, D. (2006). The Rise of Seafood Awareness Campaigns in an Era of Collapsing Fisheries. *Marine Policy*, 31, 308–313
- Johns, C., Kimber, N., Hollamby, k. (2010). Commercial Value Chain Analysis of the Spencer Gulf and West Coast Prawn Fisheries – Domestic Retail and Restaurants *Australian seafood cooperative research centre*.
- Kaplinsky, R. (2004). Spreading the gains from globalization: What can be learned from value-chain analysis?. *Problems of Economic Transition*, 47(2), 74-115.
- Kaplinsky, R., & Morris, M. (2001). *A handbook for value chain research* (Vol. 113). Ottawa: IDRC.
- Kemp, K., Insch, A., Holdsworth, D. K., & Knight, J. G. (2010). Food miles: do UK consumers actually care?. *Food Policy*, 35(6), 504-513.
- Koh Chang 2 Thailand. (n.d.) Koh Chang information. Retrieved from: http://www.kohchang2.com/koh_chang_information.html
- Kristinsson, H.G. & Rasco, B.A. (2000). Fish protein hydrolysates: production, biochemical, and functional properties. *Critical Reviews in Food Science and Nutrition*, 40, 43–81.
- Kuo, N. W., & Chen, P. H. (2009). Quantifying energy use, carbon dioxide emission, and other environmental loads from island tourism based on a life cycle assessment approach. *Journal of cleaner production*, 17(15), 1324-1330.
- Lang, T., Heasman, M., 2004. Food Wars. Earthscan, London.
- Leach, G. (1975). Energy and food production. *Food Policy*, 1(1), 62-73.
- Lipinsky et al., (2003) Reducing Food and Waste, *World resources institute*
- Loc, V. T. T., Bush, S., Sinh, L. X., Navy, H., Khiem, N. T. (2009). Value chains for sustainable Mekong fisheries: the case of *Pangasius hypophthalmus* and *Henicorhynchus/Labiobarbus* spp. in Vietnam and Cambodia. *The sustainable Mekong research network*.

Lundqvist, J., de Fraiture, C. & Molden, D. (2008). Saving water: from field to fork—curbing losses and wastage in the food chain. In SIWI Policy Brief. Stockholm, Sweden: SIWI.

Lunn, K. E., & Dearden, P. (2006). Monitoring small-scale marine fisheries: An example from Thailand's Ko Chang archipelago. *Fisheries Research*, 77(1), 60-71.

Lunn, K.E. & Dearden, P. (2006). Fishers' Needs in Marine Protected Area Zoning: A Case Study from Thailand. *Coastal management*, 34, 183-198

Masae, A., Bussabong. (2001) "Institutional and legal aspects of fisheries and resource management and implications at local level in Thailand", *Sixth Asian Fisheries Forum, Kaohsiung*, 168–169.

Mohanty, R. P., & Deshmukh, S. G. (1999). Managing green productivity: a case study. *Work study*, 48(5), 165-169.

Parfitt, J., Barthel, M., & Macnaughton, S. (2010). Food waste within food supply chains: quantification and potential for change to 2050. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 365(1554), 3065-3081.

Pauly, D., Alder, J., Bennett, E., Christensen, V., Tyedmers, P., & Watson, R. (2003). The future for fisheries. *Science*, 302(5649), 1359-1361.

Pelletier, N., Tyedmers, P., Sonesson, U., Scholz, A., Ziegler, F., Flysjo, A., ... & Silverman, H. (2009). Not all salmon are created equal: Life cycle assessment (LCA) of global salmon farming systems. *Environmental science & technology*, 43(23), 8730-8736.

Pigram, J. J., & Wahab, S. (Eds.). (2005). *Tourism, development and growth: the challenge of sustainability*. Routledge.

Read, P., Fernandes, F. (2003). Management of environmental impacts of marine aquaculture in Europe. *Aquaculture*, 226, 139–63.

Schmitz, H. (2005). *Value chain analysis for policy-makers and practitioners*. International Labour Organization.

Seilert, H., Sangchan, S. (2001) "Small-Scale Fishery in Southeast Asia: A Case Study in Southern Thailand", *Food and Agriculture Organization of the United Nations*, Rome

Steck, B., Wood, K., & Bishop, J. (2010). Tourism more value for Zanzibar: Value chain analysis—final report. *Zanzibar: VSO, SNV and ZATI*.

Talaue-McManus, L. (2000), "Transboundary Diagnostic Analysis for the South China Sea", UNEP, Bangkok.

The New Zealand Seafood Industry Council. (2010). *Energy Efficiency Handbook for Inshore Vessels: A Resource for Inshore Vessel Operators*. New Zealand: The New Zealand Seafood Council in conjunction with EECA.

The North Sea Foundation. (n.d.) *Climate and the Oceans: The carbon footprint of fisheries*. Retrieved from: <http://www.seas-at-risk.org/1images/Carbon%20footprint%20brochure%20final%20final.pdf>

Thrane, M., Ziegler, F., & Sonesson, U. (2009). Eco-labelling of wild-caught seafood products. *Journal of Cleaner Production*, 17(3), 416-423.

Tyedmers, P. (2001). Energy consumed by North Atlantic fisheries. *Fisheries Impacts on North Atlantic Ecosystems: Catch, Effort, and National/Regional Data Sets*, 9, 12-34.

Tyedmers, P. (2004). Fisheries and energy use.

Tyedmers, P. H., Watson, R., & Pauly, D. (2005). Fueling global fishing fleets. *AMBIO: a Journal of the Human Environment*, 34(8), 635-638.

Weber, C. L., & Matthews, H. S. (2008). Food-miles and the relative climate impacts of food choices in the United States. *Environmental science & technology*, 42(10), 3508-3513.

Wiedmann, T., & Minx, J. (2007). A definition of 'carbon footprint'. *Ecological economics research trends*, 2, 55-65.

Winther, U., Ziegler, F., Hognes, E. S., Emanuelsson, A., Sund, V., & Ellingsen, H. (2009). Carbon footprint and energy use of Norwegian seafood products. SINTEF Fisheries and aquaculture.

Wu, R. S. S. (1995). The environmental impact of marine fish culture: towards a sustainable future. *Marine pollution bulletin*, 31(4-12), 159-166.

Appendix I – Research Log

Date	Time	Activity	Place	Persons
Wednesday 30/04/2014	Morning	Exploring research area	BB	All
	Afternoon	Lunch at Ruan Thai Seafood restaurant	BB	All
		Moving to lonely beach	LB	All
Thursday 01/05/2014	Morning	Exploring research area	BB	All
	Afternoon	Lunch at Nok Noi seafood restaurant	BB	All
		Informal interview Nok noi seafood restaurant	BB	All
		Informal interview Ruan Thai Seafood restaurant	BB	All
Friday 02/05/2014	Morning	Meeting Harald & Peter	LB	All
	Afternoon	Adapting research plan	LB	All
		Adapting questionnaire and interview questions	LB	All
Saturday 03/05/2014	Afternoon	Making questionnaires	LB	E&N&T
		Giving list with questions to resort owner (had connections with fisher men)	LB	E&N&T
Sunday 04/05/2014	Morning	Weekend	LB	All
	Afternoon	Weekend	LB	All
	Evening	Weekend	LB	All
Monday 05/05/2014	Morning	Moving to WSB	WSB	N & E
	Afternoon	Moving to BB	BB	V&A&T
		Visiting resorts restaurants	WSB	N & E
		Informal interview owner Puzi Remark Bungalow	BB	A&T
	Evening	Getting to know people in Bang Bao	BB	V&A&T
		Informal interview with MAC resort/restaurant	WSB	N & E
		Information meeting stakeholder presentation	LB	V
		Processing data	BB	T
Tuesday 06/05/2014	Morning	6 a.m.: observations at WSB	WSB	N & E
	Afternoon	5:30 a.m.: observation at BB	BB	V&A&T
		Handing out surveys	BB	V&A&T
		Visiting resorts restaurants – informal interview with manager KC Grand Resort	WSB	N & E
		Informal interview tourists while handing out surveys	BB	V&A&T
		Supervisor meeting	LB	All
Wednesday 07/05/2014	Morning	Processing collected data & making the VCM	WSB	N & E
		Interview manager Ruan Thai Seafood restaurant	BB	V&A&T
		Interview manager Nok Noi Seafood restaurant	BB	V&A&T
		Informal interview local	BB	A
	Afternoon	Handing out surveys	BB	V & T
		Interview local doctor	BB	V & T
		Visiting resorts restaurants – informal	BB	A & V
			BB	A & V

	Evening	interview with manager I-Talay Interview with manager Invito el Cibo	KP WSB	N & E N & E
Thursday 08/05/2014	Morning	6 a.m.: observations at Plong Son and Koh Chang ferry	KS	N & E
	Afternoon	Handing out surveys	BB	V&A&T
		Processing collected data & Visiting resorts restaurants	WSB KP	N & E N & E
		Interview owner Happy Turtle Restaurant Handing out surveys	BB WSB	V&A&T N & E
Friday 09/05/2014	Morning	Moving to LB Interview middleman + translator	LB BB	N & E V&A&T
	Afternoon	Handing out surveys	LB	All
		Supervisor meeting & group reflection	LB	All
Saturday 10/05/2014	Morning	Weekend	LB	All
	Afternoon	Weekend	LB	All
	Evening	Weekend	LB	All
Sunday 11/05/2014	Morning	Weekend	LB	All
	Afternoon	Working on value chain maps 2 BB & WSB	LB	All
		Entering data questionnaire	LB	All
		Looking at results data questionnaires	LB	All
Monday 12/05/2014	Evening	Working on possible interventions	LB	All
	Morning	Moving to SP Interview Owner Flukie's House	SP SP	All All
	Afternoon	Participant observation Fish Farm & Seafood Restaurant	SP	All
		Participant observation local community	SP	All
Tuesday 13/05/2014	Morning	Processing collected data	SP	N & A
		Dinner and participant observation at seafood restaurant	SP	All
			SP	
	Evening		SP	
Wednesday 14/05/2014	Morning	Interview middle man + translator	SP	All
	Afternoon	Interview fisher man (1) + translator	SP	All
		Interview fisher man (2) + translator	SP	All
		Interview owner fish farm + translator	SP	All
		Interview fisher man (3) + translator	SP	All
		Interview owner fishing boat trips for tourists + translator	SP	All
		Interview Seafood restaurant owner + translator	SK	All
	Evening	Processing interviews	SP	A & N
Thursday 15/05/2014	Morning	Moving to WSB	WSB	All
	Afternoon	Processing data	WSB	All
		Making value chain map Salak Phet	WSB	All
		Working on presentation	WSB	All
		Writing text presentation	WSB	E & N
	Evening	Practising presentation	WSB	E & N
Friday 16/05/2014	Morning			
	Afternoon	Official practice presentation stakeholder meeting	WSB	All
	Evening			

Friday 16/05/2014	Morning	Stakeholder meeting	WSB	All
		Presentation at stakeholder meeting	WSB	N & E
		Filming presentation	WSB	A
		Making notes at stakeholder meeting	WSB	V
		Time keeper	WSB	T

Table 4 – Research Log

WSB – White Sand Beach
LB – Lonely Beach
KP – Klong Prao
PS – Plong Son
BB – Bang Bao
SP – Salak Phet
SK – Salak Kok

A – Anna
E – Esmée
N – Nienke
T – Thom
V – Vicky

Appendix II - Interview questions

Interview questions that apply for all informants

1. Local community

- Is the local community involved in the fish supply?
- Do they benefit?
- Do they suffer from extinction of species?
- Do they suffer of waste around Koh Chang?

2. Extinction

- Are you aware of species that are close to extinction around Koh Chang?
- Are there any policies to avoid this extinction?

3. Development

- What kind of developments have you noticed regarding seafood during the last 20 years?
- How has tourism on Koh Chang developed over the years?
- Do you notice negative impacts regarding seafood and/or fishery?

4. Waste management

- What do you do regarding waste management?
- What do you do with your by-products?
- What do you do with your waste water?
- When waste is managed, how is it collected and monitored? (how, by whom, how frequently)

5. Energy efficiency

- What do you do regarding energy efficiency?
- What do you do regarding cooling/storage?
- What do you do regarding usage of lights?

6. Improvement

- Do you find it important to become more sustainable/ environmental friendly in order to improve the quality of life on Koh Chang?
- Did you already made implementations to be more sustainable?
- What are the key issues / opportunities you would like to address in your own operation? Or within the chain?

7. Regulation

- Can you say something about the regulation and policies regarding environmental issues that rule on Koh Chang?
- If the government would give subsidies in order to make your company more sustainable, would you implement such policies?
- Do you know something about the Marine Protected Area and its regulation?

8. Power

- Who, do you think, has the power to make changes? Who in the chain has the best position to make encouragements?
- Do you know the other links in the chain from the fishermen through to final consumption?

9. Seasonality

- Do you experience differences between high and low season?
- Are there differences in demand?
- Are there difficulties in any of the seasons?

Specific questions for fishermen

1. General

- To whom do you sell the seafood?
- What sorts of fish do you catch?
- How do you store your seafood?

2. Fishing trip

- How far do you sail to catch your seafood? (distance of fishing trip)
- Do you have the same fishing spot, multiple or every time a different one?
- What is the length of your fishing trip? (short day trip or multiple day trip?)
- How many boats are there approximately on the spot you fish?

3. Equipment

- What kind of boats do you have?
- What kind of gear do you use? (traditional/modern, damaging the environment)

4. Amount

- How much seafood do you approximately catch(KG)?
- Do you catch more than you sell? (over-harvesting) What do you do with what is left?
- How much is this different during the high season? Is there the problem of seasonality?
- How much fuel do you use per trip?

Specific questions for fish farm owners

1. General and amount

- What kind of seafood do you produce?
- How much seafood do you approximately farm (kg)?
- Do you catch more than you sell? (over-production) What do you do with what is left?

2. Feeding

- What kind of feeds do you use for the fish?
- Are chemicals involved in the feeding?

Specific questions restaurant owners and managers

1. Origin

- What is the origin of the fish that you have on your menu? Why?
- Do you have one or more suppliers? Or do you have your own boat?
- Are there different suppliers for different fish?

2. Transport

- Who is responsible for the transport of seafood and deliverance at the restaurant?
- How often are you provided with (fresh) seafood?
- Does this vary per week/season/year?

3. Storage

- What is the state of the provided seafood? Is it alive or dead? Raw, cooked, fresh, cooled, frozen?
- How many days do you store your seafood?
- How do you store your seafood?

4. Demand

- How do you know what your customers want?
- Do you think the tourist expects that you offer all kinds of seafood and sorts of fish(imported) or just what the local market has to offer?
- How flexible are you if demand changes?

Specific interview questions doctor Bang Bao

- How long are you working here?
- What kind of developments have you noticed on Koh Chang and particular in Bang Bao?
- Are you aware of the negative environmental impacts of the practices around here?
- Do you find it important that people here become more sustainable/environmental friendly in order to improve quality of life on Koh Chang?
- What do you think about the way waste is managed over here?
- What could be changed? Are there already initiatives?
- Who could potentially have the power to change this?
- Any other interventions/implementations you would like to see here to make it more environmental friendly?

Appendix III – Tourist survey

Survey tourists attitudes towards the consumption of seafood on Koh Chang

This survey is part of a research project proceeded by 2nd-year students in the Bachelor of Science in Tourism, of the NHTV University and Wageningen University in The Netherlands. We are a group of five students, examining the seafood restaurant value chain on Koh Chang. We do this in order to provide information and interventions for some organisations that are concerned with the future state of Koh Chang as a sustainable tourism destination. To make the outcome of our research as valuable as possible, we need to create a general image of the preferences and attitudes of tourists towards seafood. This survey will ask you for your personal perceptions regarding the consumption of seafood. We would like to point out that your participation is completely voluntary and anonymous. The data we will retrieve will only be used with an academic purpose and will merely be included in only our research.

1. Are you aware of the origin of the seafood you consume on Koh Chang?

- ☐ Yes
☐ No

2. What is your preferred sort of seafood? Multiple answers are possible.

For the following questions, please tick the box that resembles most to your behaviour and perception.

	Yes	Probably yes	Neutral/don't know	Probably no	No
3. Would you order your preferred seafood if you knew it was close to extinction?					
4. Would you order your preferred seafood if you knew it was not locally caught but imported from another area?					
5. Are you willing to pay more if you knew the seafood was caught and processed in a sustainable, so environmental friendly, way?					
6. Are you willing to pay more if you knew that the local community and fisherman can benefit from your consumption of seafood?					

1. What is your gender?

- ☐ Male
- ☐ Female

2. What is your age?

- ☐ 18-25
- ☐ 26-35
- ☐ 36-45
- ☐ 46-55
- ☐ 56 and older

3. What is your country of origin?

4. Are you travelling with accompanied by others? If yes, with whom?

- ☐ No
- ☐ Yes, with family
- ☐ Yes, with friends
- ☐ Yes, with partner
- ☐ Yes, _____

Thank you for your participation!

If you would like to know more about what we are doing, please check:

www.facebook.com/bsctourism

Appendix IV – PESTEL analysis Thailand

Political

Current situation

At the moment, Thailand is suffering from a political crisis. As with previous protests, the country is largely divided between a younger, educated urban middle-class and a conservative class of poor rural voters, largely from the north of the country. It is the former group who have taken to the streets and are currently battling the police after months of deepening political division (Mckirdy, 2014). The country has had a restive history since the dissolution of its absolute monarchy in 1932. There have been a dozen military coups d'état over the years. The most recent military coup was in 2006, which led to the ouster of Thaksin. These riots could be of influence for the tourism industry. However, these riots are not likely to have major influence because they mostly take place in Bangkok.

International arrangements

Thailand is a member of the World Trade Organization (WTO) and the Network of Aquaculture Centres in Asia and the Pacific (NACA). Thailand is a party of the Convention on Biological Diversity (CBD), but not of the Biosafety Protocol. Thailand is also a party of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The country is as well a member of the Association of Southeast Asian Nations (ASEAN) and maintains a close relationship with the ASEAN countries (EMR Reports, 2012).

Import restrictions

Thailand's food industry is governed by the Food Act of B.E. 2522 (1979) and subsequent laws stipulated by the Ministry of Public Health. In general, imports of food for sale in the Kingdom require an import license and standard labelling according to domestic regulations. (Preechajarn & Sirikeratikul, 2009).

Economic

International trade

High priority is placed on economic expansion in the Thai economic system, which results in a dependence on international trade. Thailand is heavily depending on export, as the export industry makes up for 74.9% of the total GDP in 2012 (World Bank, 2012).

Thailand's most important import-partners are Japan (20%), China (14,9%), UAE(6,3%), Malaysia (5,3%) and the US(5,3%) (Indexmundi, 2012).

Employment

The fisheries sector plays an important role in the country. According to the FAO, it generates employment for around 662 000 people both directly in the fisheries enterprises and indirectly in the related industries. In freshwater aquaculture alone, approximately 400 000 people are involved in fish farms and related industries such as feed suppliers, distributors, fish traders etc. 78 000 people are involved in brackish water aquaculture and 184 000 people in processing plants and related industries. Those involved in aquaculture are from varied backgrounds and different educational levels.

Socio-cultural

Culture

Buddhism is the by far the most supported culture in Thailand. Around 92% of the Thai people are Buddhists, and the other 8 % is divided over Muslim, Christian and Chinese (OMF, 2006). Buddhists believe that compassion and love for others bring happiness and well being, while egocentricity results in suffering. The country counts more than 30,000 Buddhist temples and around 250,000 monks. These Buddhist monks are deemed to live a sober life.

Hierarchical society

In Thailand they respect the hierarchical relationship, which is defined as one person being superior to the other. This can be for example found in relationships between parents and their children, bosses and their employees and teachers and students.

Family values

Family relationships are very important for Thai people and can be seen as the cornerstone of the Thai society. Family members look after each other and they are often together in a family business. Within families there is also a hierarchical structure with parents at the top.

Technological

Research

Thailand has constantly been making scientific and technological advances. The main goals of development are to create valuable knowledge bases that can be adapted and that can extend Thai local wisdom into commercial benefits, and to raise the level of research and development activities as mechanisms to drive forward economic and social development, through an efficient use of resources and research networks.

Supply chain management

The supply chain for seafood and fishery products can involve a large number of stakeholders between the fisherman/fish farmer and the final consumer. Most seafood is traded internationally, particularly the high-valued species most commonly associated with IUU fishing (e.g. tuna, tooth fish, cod, abalone) (Roheim, 2008). There are four possible routes through which fish caught by a foreign fleet may make its way to the consuming nation: 1) it may be exported directly after harvest; 2) it may be exported after only primary processing occurs within the foreign harvesting nation; 3) it may be exported after both primary and secondary processing occur within the foreign harvesting nation; or, 4) it may be exported after harvest to a third country processor which will then re-export the product to the consuming nation (Roheim,2008). A relatively new feature of the global supply chain is the emergence of a third country processor – a country to which nations export unprocessed products simply to become processed, only to have those products re-exported (Roheim, 2008) . The nations serving this role are China and Thailand.

Transport and handling advances

Reliable temperature maintenance is the key important feature in fish and fishery product transport. All people involved in the handling and transporting of perishable commodities are responsible for

their part in the cool chain. Breaks in the cool chain can result in irreversible damage to the quality of fish. In the transport of perishable products into remote regions ideal procedures may not always be possible and so in these instances early planning will allow products to be delivered as efficiently as possible. Many developing countries are lacking facilities and post harvest losses are very high. A large portion of the harvest is discarding without marketing. In one hand this is threat to the resources base and on the other hand leading to poverty. This means important decisions relating to storage facilities, truck design and capacity as well as supply patterns will be required to meet food safety regulations. Maintaining the cool chain is essential to minimise product deterioration and achieve maximum shelf life for the product. Many potential problems in the supply chain can be avoided or effectively managed by understanding the critical handling issues and carefully planning each load.

Environmental

Climate

Thailand has a moist, tropical climate influenced by monsoon winds. During the hot season (February-May) the temperatures can reach 40° and during the wet season (June-November) temperatures are a bit lower.

Overfishing

The rapid expansion of fisheries in (the Gulf of) Thailand has raised considerable environmental concerns about its management. An increasing proportion of undersized fish and decreasing volume of commercially important species in the composition of fish catch in recent year suggest symptoms of biological overfishing and biologically overfished resource stocks, threatening the fisheries in Thailand (Ahmed et al., 2007.) According to the World Bank (n.d.), in the fisheries sector, over-harvesting of marine fisheries has reduced fishing yields by 90%, and coastal areas have been seriously degraded by expansion of capture fishing, shrimp aquaculture, industry and tourism.

Pollution: Rapid industrial expansion and population growth have outpaced environmental management, resulting in sharply increased pollution levels (e.g. solid and hazardous waste, air, noise, and water). Overall, it is estimated that air and water pollution costs in the country 1.6 – 2.6 of percent of GDP per year (World Bank,n.d.)

Sustaining Natural Resources

Land conversion, slash-and-burn agriculture, and intense exploitation of water have led to rapid deterioration of natural resources. There is a tremendous pressure on Thailand's water resources, as the country ranks the lowest in Asia for annual per capita water availability, but it tanks 14th in the world in industrial organic water pollution (World Bank, n.d.).

Legal

Fish movement

The Fisheries Act prohibits the import of live aquatic animals and the introduction of exotic species, as specified by the Department of fisheries (DOF). However, the act does not regulate the export of live aquatic animals. In addition, the Wildlife Conservation and Protection Act, which places aquatic animals under the jurisdiction of DOF, prohibits the trade, import and export of certain listed

endangered species.

Food safety

The Food Act (1979) is the major law aimed at protecting and preventing consumers from health hazards occurring from food consumption. The responsibility for food safety is shared between different agencies and ministries, including the Food and Drug Administration (FDA) in the Ministry of Public Health. With regard to fish and fishery products, the Fish Inspection and Quality Control Division within the DOF is responsible for quality control, post-harvest handling and processing development. DOF operates a HACCP-based fish inspection and control program involving control from raw materials to end products. The Fish Inspection and Quality Control Division issues certificates to approved processors whose facilities and products meet international safety and quality requirements.

Shrimp farms

The notification requiring the registration of shrimp farmers and shrimp hatchery operators imposes conditions on shrimp farmers to control the quality of waste effluent from shrimp farms. Another provision controlling wastewater discharge which may be relevant can be found in the Navigation in Thai Waters Act (1913, as amended). The act, which is executed by the Harbour Department under the Ministry of Transportation and Communication (MTC), prohibits the discharge of chemical substances, petroleum substances, sludge, rock, mud, etc. into any watercourse, lake, reservoir or marine waters.

Categorization

The Fisheries Act classifies fisheries into four categories, i.e. preservation fisheries, leasable fisheries, reserved fisheries and public fisheries. No person may fish or cultivate aquatic animals in the preservation fisheries unless permission has been obtained from the Director-General for Fisheries. Leasable fisheries are fisheries in which an exclusive right to fish or to cultivate aquatic animals may be granted to a person by means of tendering. No person other than a licensee may fish for, or cultivate, aquatic animals in a leasable fishery. Similarly, reserved fisheries are fisheries in which a person has been permitted to fish for, or cultivate, aquatic animals, and no person other than the licensee may fish for aquatic animals other than the licensee. Again, the licensee must comply with any conditions imposed by the Director-General of DOF. Waters not designated as preservation, leasable or reserved are public. Every person has the right to fish and cultivate aquatic animals in public waters. However, any person fishing or cultivating aquatic animals in public waters must comply with ministerial "conditions". Such conditions have been set in the Regulation of the Department of Fisheries on the Application and Permission for Aquaculture in Public Fishing Grounds (1990). The district shall grant permission for aquaculture in public fishing grounds or provincial authority only to aquaculture conducted in cages or pens and may not obstruct navigational routes of ships and rafts and create any hindrance to the public, among others. The person permitted to conduct aquaculture in public fishing grounds shall comply with the "conditions" of DOF.

Appendix V - Interviews and participant observation

White Sand Beach

Interview - owner of Flora i talay resort and restaurant

07-05-2014 afternoon – Klong Prao

- He orders his seafood from a certain company, **most seafood comes from the mainland.**
- He transports the seafood himself from the ferry/Bang Bao to his restaurant.
- He rarely gets any seafood from fish farms, he thinks this fish is less of quality
- He orders every morning fresh fish, which arrives around noon from the mainland.
- **Left over fish is eaten by the staff**, they don't throw any food away.
- Fish arrives cooled, it's never frozen, and sometimes it's still alive.
- The seafood is processed within the restaurant itself
- In low season the fishermen cannot fish, because of the bad weather (too dangerous). In high season they profit from seafood consumption on the island, but not a lot not even every month.
- In low season the fishermen cannot fish for three months, but they do have other jobs in that period.
- **Seafood in the sea around Koh Chang is getting less**, but you cannot predict the future. When there is a big storm many fish can appear again, sometimes even other sorts of fish than before.
- Value chain map was correct for his restaurant, he transports the seafood himself on the island, but has a middlemen at the mainland where he orders his seafood.
- He was very positive about our intervention of the efficiency in transport, to let a certain company get all the fish from the ferry and bring it at the restaurants, instead of everyone getting it themselves. He was very open towards sustainability and environmental friendly development of Koh Chang.
- He blames the fishermen (not the diving companies) of the extinction of fish around Koh Chang. They destroy coral etc. with their fishing nets. There are no laws on fishing (what gear etc.) for Thailand, which causes this problem in the first place.
- His clients preferred shrimps and fish.

→ Interested in attending the stakeholder meeting

Opmerking [NJ1]: Most seafood from mainland ORIGIN MAINLAND

Opmerking [NJ2]: Transport form ferry/Bang Bao self TRANSPORT SELF-SUFFICIENT

Opmerking [NJ3]: Rarely from fish farm ORIGIN LOCAL FISH FARM
Fish fish farm less quality ORIGIN LOCAL FISH FARM

Opmerking [NJ4]: Fresh fish every day, arrives at noon TRANSPORT FREQUENCY

Opmerking [NJ5]: Waste is eaten, don't throw away WASTE MANAGED

Opmerking [NJ6]: Cooled or alive, not frozen STORAGE STATE

Opmerking [NJ7]: Processed in restaurant PROCESSING SELF-SUFFICIENT

Opmerking [NJ8]: Low season too dangerous SEASONALITY

Opmerking [NJ9]: High season more profitable SEASONALITY

Opmerking [NJ10]: Low season fishermen have other jobs SEASONALITY

Opmerking [NJ11]: Seafood is getting less in Koh Chang's ocean, but unpredictable EXTINCTION

Opmerking [NJ12]: Transports own seafood TRANSPORT SELF-SUFFICIENT

Opmerking [NJ13]: Order seafood at middleman on mainland MIDDLEMAN

Opmerking [NJ14]: Online platform nice idea TRANSPORT SELF-SUFFICIENT

Opmerking [NJ15]: Open attitude towards sustainability AWARENESS

Opmerking [NJ16]: Fishermen responsible for extinction of fish EXTINCTION

Opmerking [NJ17]: No laws for fishing in Koh Chang REGULATION

Opmerking [NJ18]: Clients prefer shrimp and fish PREFERENCE

Interview - restaurant manager mr. Chain of Invito al Cibo

07-05-2014 evening – White Sand Beach

Chain is the manager of the restaurant; he is a Cambodian but works for 15 years on Koh Chang.

- For the Italian dishes (it's an Italian/Thai restaurant) they have three sorts of fish: salmon, sea bass, and tuna. These species are not found in the Thai seas, so they have to be imported from Europe (salmon is imported from The Netherlands).
- For the Thai dishes they have many sorts of fish, which they buy from seafood shops on Koh Chang.
- With large orders the shops deliver the seafood, but with small orders they have to pick it up themselves.
- The European imported fish he orders from a company at the mainland, which imports fish from Europe. They bring it with the ferry to Koh Chang.
- Imported fish is frozen. Seafood from the shops is alive and kept in tanks for a week maximum. Left over fish is given to the staff, so no waste.
- He gets fresh fish every day.
- During low season he orders less fish, but not less sorts of fish.
- It's unpredictable how the seafood will be around Koh Chang seas next year.
- This years low season is even more quite than last years, because of the protests in Bangkok.
- Prices depend on the amount of seafood caught, and are determined by the fishermen. The more stakeholders within a value chain, the higher the price will be for the end consumer, because every other middlemen raises the price a bit.
- The locals do benefit from his seafood orders, because the seafood at the shops is from the local fishermen.

→ Did not understand questions about sustainability, did not know the concept (in English). So we could not get a clear view from him on this concept.

Opmerking [NJ19]: Imported fish is needed for the dishes ORIGIN IMPORTED

Opmerking [NJ20]: Also local fish is used ORIGIN LOCAL FISHERMEN

Opmerking [NJ21]: Large orders delivered TRANSPORT BY COMPANY

Opmerking [NJ22]: Small orders are picked up themselves TRANSPORT SELF-SUFFICIENT

Opmerking [NJ23]: Imported fish is from a company on the mainland, they bring it to ferry ORIGIN IMPORTED, MIDDLEMAN

Opmerking [NJ24]: Imported fish is frozen, from shops is alive STORAGE STATE

Opmerking [NJ25]: Storage is maximum one week STORAGE LENGHT

Opmerking [NJ26]: Left over fish to staff WASTE MANAGED

Opmerking [NJ27]: Fresh fish everyday TRANSPORT FREQUENCY

Opmerking [NJ28]: Less fish during low season, but not less sorts SEASONALITY

Opmerking [NJ29]: Extinction is unpredictable EXTINCTION

Opmerking [NJ30]: Less people during low season SEASONALITY

Opmerking [NJ31]: Middlemen have the power in pricing POWER

Opmerking [NJ32]: Locals do benefit, because he also orders from the shop BENEFIT

Opmerking [NJ33]: Different origins of seafood ORIGIN

Opmerking [NJ34]: Seafood origin and order dependent on demand ORIGIN

Opmerking [NJ35]: Several sources ORIGIN MAINLAND, LOCAL, IMPORTED

Opmerking [NJ36]: Seafood is cooled or frozen STORAGE STATE

Opmerking [NJ37]: Store fish for 2 days STORAGE LENGHT

Opmerking [NJ38]: New seafood every 2 days TRANSPORT FREQUENCY

Opmerking [NJ39]: Fish that is left is used in breakfast WASTE MANAGED

Opmerking [NJ40]: Process fish in own butchery PROCESSING SELF-SUFFICIENT

Interview - Restaurant manager of KC Grand Resort and Spa

06-05-2014 afternoon – White Sand Beach

- They get their fish from several resources, this depends on where their supplier gets it from
- For the manager it doesn't really matter where the fish comes from, they just need to have what is demand from the tourists.
- The supplier gets the seafood from the mainland, several sources on the island and import from outside of Thailand (Bang Bao, fish farms – where the supply is that meets the demand)
- Seafood is already dead and cooled, sometimes even frozen.
- They keep the fish for 2 days and every 2 days new fish arrives/is ordered
- Waste is not applicable, because left over fish goes through breakfast (soup f.e.)
- They have their own butchery where they process the fish, so this is done by the restaurant/resort itself

- Seasonality makes a difference in what they offer, but they still want to make sure the clients/customers get what they want. But in low season they have less to offer than in high season
- In low season fishing cannot be done because of the island, so they have to get fish from other sources.
- The price of the fish changes continuously, this doesn't have to be because of the season, it's about the weather. So it is possible that in high season fish is cheaper than in low season and visa versa
- She said that she join energy efficiency projects, but could not give any specific examples. It seems like she doesn't think that seafood can make a big difference in sustainability on Koh Chang
- Power is with the fishermen, because they are the first that ask a certain price for the fish. The middlemen than go beyond this price etc. (gets higher with every next factor in the value chain)
- Middlemen has power in the way that they choose where to get the fish and to whom to sell it.
- Thai government is promoting Koh Chang as a holiday destination national. And in the last couple of years the number of thai tourists has therefore increased.
- They order seafood based on the demand of the tourist/consumer

Interview - Restaurant manager of MAC resort/restaurant

05-05-2014 evening – White Sand Beach

- They get their seafood from the ferry from the mainland and from Ban Boa, matters whether or not he has enough from one or the other. (where the supply is)
- Seafood comes mostly from the big fishing boats, because small scale fishermen cannot fish in low season because of the weather, it's too dangerous.
- In high season they also get more seafood from the fish farms on the eastside of Koh Chang too get enough for the demand, now in low season he had Ruby, which came from a fish farm.
- Seafood from fish farms remains alive until it is in the restaurant, while other seafood is already dead when it gets to the restaurant
- All the fish is processed in the kitchen/ in the restaurant (so cleaned etc.)
- They keep the fish cooled for 2 days, not sure what happens with waste because he did not understand the question and it seemed like all the fish was consumed after 2 days.
- In high season they have way more choice in seafood than in low season.
- In most cases he goes to Ban Boa and the ferry himself to pick up the fish, sometimes it is brought to him (fish from fish farms is always brought) – it differs
- Seafood in the sea around Koh Chang is not enough, it's necessary to import from the mainland. He never imports from other countries, that's why he doesn't have salmon. (so salmon must be imported from other countries)
- Prices in low season are lower than in high season, they change with the demand for the seafood.

Opmerking [NJ41]: In low season less to offer than in high, still offer what the client wants SEASONALITY

Opmerking [NJ42]: Less fish in low season, so not only local SEASONALITY, ORIGIN LOCAL FISHERMEN

Opmerking [NJ43]: Price varies according to whether SEASONALITY

Opmerking [NJ44]: Does not think seafood can make changes in environment AWARENESS

Opmerking [NJ45]: The fishermen have the power, and middlemen can high the prices POWER, BENEFIT

Opmerking [NJ46]: Middlemen have the power of choosing who to sell to POWER

Opmerking [NJ47]: Promotion of Koh Chang in the last few years REGULATION

Opmerking [NJ48]: Seafood is ordered according to demand SEASONALITY, ORIGIN

Opmerking [NJ49]: Seafood from mainland ORIGIN MAINLAND

Opmerking [NJ50]: Also seafood from local fishermen, Bang Bao. Depends on supply ORIGIN LOCAL FISHERMEN

Opmerking [NJ51]: Due to seasonality and weather, small fishermen can't always fish SEASONALITY, ORIGIN LOCAL FISHERMEN

Opmerking [NJ52]: In high season there is not enough supply from the fishermen, then they use the fish farm SEASONALITY, LOCAL FISH FARM

Opmerking [NJ53]: Seafood from fish farms is alive LOCAL FISH FARM, STORAGE STATE

Opmerking [NJ54]: Other seafood is already dead STORAGE STATE

Opmerking [NJ55]: Processing is in the kitchen of the restaurant PROCESSING SELF-SUFFICIENT

Opmerking [NJ56]: Fish is stored for 2 days STORAGE LENGHT

Opmerking [NJ57]: Did not understand the question on waste AWARENESS

Opmerking [NJ58]: More choice of fish in high season SEASONALITY

Opmerking [NJ59]: Transportation differs, sometimes self, sometimes ..

Opmerking [NJ60]: Not enough seafood in Koh Chang's sea, must come ..

Opmerking [NJ61]: Never imported fish ORIGIN IMPORTED

Opmerking [NJ62]: Demand in seasons sets price SEASONALITY

- So not that many middlemen, only one is the one that brings the seafood to Koh Chang from the mainland.

Opmerking [NJ63]: No middlemen on island, only from mainland MIDDLEMEN

Observations:

- The seafood is shown in boats in front of most restaurants, already dead.
- Some restaurants also have tanks, but they mostly contain crab or lobster.
- It is really really quite in the restaurants at the moment, that's why there is not that many seafood ordered by the restaurants.

Opmerking [NJ64]: Seafood, mostly fish, you can order is already dead STORAGE STATE

Opmerking [NJ65]: Crab and lobster in tanks STORAGE STATE

Opmerking [NJ66]: Not much customers, so demand, so seafood SEASONALITY

Participant observation - 08-05-2014 - Ao Satarot Ferry

To test whether the stories we heard of seafood coming with the ferry from the mainland in the morning were true, we decided to have a look ourselves and verify what we heard by participant observation. We wanted to combine what we heard from trade in Plong Son, and after that go to the pier where the car ferry arrives.

Opmerking [NJ67]: ORIGIN MAINLAND

6.15 We first had a look in the Plong Son village, as we heard that the fish is provided here early in the morning. However, we did not find any sign of fish being sold, dealt or transported. There was no clear access to the water or a pier or harbour, this has maybe also caused that we did not find signs of seafood trading.

Opmerking [NJ68]: In Plong Son we did not find signs of any seafood trading ORIGIN, TRANSPORT

6.45 We decided to travel further to the car ferry, as our informants told us that the first ferry would bring fish from the mainland to the island in cars and tanks and that the fish is traded on the pier.

Opmerking [NJ69]: Had a look at the ferry from the mainland ORIGIN MAINLAND

When we arrived there, the first ferry had just arrived, but we did not see any sign of people trading directly on the pier. We did see however that some pick-ups had tanks with them, tanks that we understood are normally used for transporting fish. We were not able to see some cars with tanks have the logo of restaurants on it. We saw a Thai seafood restaurant and a grill and steakhouse.

Shortly after the ferry had arrived, it was already leaving to go back to the mainland. We also saw some (around 4) pick-ups with tanks that entered the ferry that was heading back. We observed the coming and leaving of the ferries for around an hour, in which 5 ferries came and returned. The last ones of these 5 did not or almost not loaded any cars with tanks. That was the point where we decided to switch positions and have a look another place.

Opmerking [NJ70]: On the ferry, we saw some trucks and pickups with tanks for seafood ORIGIN MAINLAND, TRANSPORT

8.00 After this, we found a smaller pier on the side of the main pier. There were 4 small (smaller than 15 meter in length) fishing boats along the side of the pier and the pier incorporated two seafood restaurants. This seemed interesting, so we went there and had a look, as we heard that some restaurants also get their fish from smaller piers in the north (like the one in Plong Son that was unable to find). When we walked closer, we saw that there were two normal, small fishing boats, one boat for squid (and another squid-boat in deeper water, not near the pier), and a fishing boat that seemed to be used for tourist trips. We recognised the boats that fish for squid on the lights that the boats have on top.

Opmerking [NJ71]: Observed a small pier, some restaurants get their seafood from these piers ORIGIN LOCAL FISHERMEN

We sat there for 1,5 hour, and during that time we only saw one pick-up truck that drove from the small pier, though this one was fully loaded. We saw that the pick-up had a lot of crab on the tanks, maybe there was more in the other tanks, but we were not able to see that. The crab was already dead and not transported in water. We noticed that there was no interaction

Opmerking [NJ72]: Small boats, one for trips ORIGIN LOCAL FISHERMEN

Opmerking [NJ73]: One pickup transport the seafood TRANSPORT

between the restaurants and the fisherman. We did our best to make contact with the fisherman on the boats, as two boats contained 4 people in total. Unfortunately, there was no interaction possible

Opmerking [NJ74]: Crab already dead when transported (not in water) STORAGE STATE

as the fisherman did not speak a word English. We also tried in the restaurant we had a drink, but the girl that was serving us was not even able to understand the word 'tea', so we had a very hard time to explain what we wanted and ask something. After some effort we gave up and paid for our coffees. Around 9.30 we went back to White Sand Beach, as 45 minutes had passed in which noting had happened and it was too late for new fish to arrive.

Participant observation – 06-05-2014 – White Sand Beach

6.45 To test stories of the supply of seafood early in the morning, we posted ourselves at a coffee house in the centre of White Sand Beach. We heard some restaurants saying that they get their seafood early in the morning, when the fisherman had caught the fish that night. We hoped to see some signs of this supply. We saw one restaurant that was cleaning their fish tanks and the plates on which the fish is presented. It was unclear if there was new fish provided. However, we sat at our positions for longer than 1,5 hours, and only 3 cars had driven by with tanks in their trucks, that are very likely to have fish in it. So we saw that seafood was indeed transported early in the morning, though not on large scale. After one and a half hour we were fed up with it, as we did not see any interaction with hotels or restaurants. After some more walking around and changing positions, we decided that we would not be able to see more, as fish provision is primarily in the early morning.

Opmerking [NJ75]: We saw some cars that transported seafood, not that much TRANSPORT

Participant observation restaurants – 06-05-2014

- Thai food is only heated for a short period, so not much gas is used. Moreover, much meat and fish as well is prepared on a barbecue.

Interview - Owner Remark Cottages - 06-05-2014

We approached someone at the reception of Remark Cottages. She was not able to speak very good English, however she was very friendly. She called someone for us, who turned out to be the manager and owner of the resort and restaurant. He was not there at the moment, and said that he would not be able to help us with information. However, I kept trying for him to tell something, he just seemed insecure. That helped.

- He confirmed what we had already heard. His fish was transported from the ferry from the mainland, and Bang Bao. He just got it from where they would be able to provide him with the fish that he wanted.
- He did not get fish from the fishing farm, that was not of good quality.
- He did not transport the fish himself, as he was the owner of more accommodations.

Opmerking [NJ76]: Seafood comes from where he can get it most easily, mainland and Bang Bao ORIGIN MAINLAND, LOCAL FISHERMEN

Opmerking [NJ77]: Quality of fish farm low, so never get it from there ORIGIN LOCAL FISH FARM

Opmerking [NJ78]: Owns more accommodations, so no transport himself TRANSPORT BY COMPANY

Interview - 04-05-2014 - Manager Paradise Cottage

We had a short but very interesting conversation with the manager of our resort. We will talk with her more formally next weekend. Her information:

- Most fish comes from the mainland, there is not enough fish in the near sea of Koh Chang for the requested demand
- On Koh Chang are enough shellfish and coquilles though
- The middleman have the most power, they buy the fish from the fisherman and sell it to the restaurants on the island. This fish is ordered and then shipped on the ferry to Koh Chang. This one arrives at 6.30 in the morning, and the restaurants buy their fish on the pier
- Transport from the pier to the restaurants is also very important, the seafood needs to arrive in the restaurant that has requested. There are pickups and scooters driving across the island to make sure that the fish arrives
- There is a Thai famous restaurant in Klong Prao, Jae Ew Seafood
- The restaurants lie on the origin of their fish, because it is of course better that the tourists hear that the fish is fresh and locally caught
- The local community hardly benefits
- Sometimes fish is bought from fisheries and the fishing farm in Salak Phet

Opmerking [NJ79]: Most fish is from mainland, not enough in the near sea
ORIGIN MAINLAND, EXTINCTION

Opmerking [NJ80]: For shellfish and coquilles, Koh Chang is good
ORIGIN LOCAL FISHERMEN

Opmerking [NJ81]: The middlemen have the most power
POWER, MIDDLEMEN

Opmerking [NJ82]: Fish from the mainland arrives by ferry
ORIGIN MAINLAND

Opmerking [NJ83]: The transport from the pier to restaurant is important, many transporters
TRANSPORT

Opmerking [NJ84]: Restaurants are lying about the origin of the fish
ORIGIN LOCAL

Opmerking [NJ85]: The locals are hardly benefitting
POWER, BENEFIT

Opmerking [NJ86]: Sometimes, the fish is from local sources in Salak Phet, fishermen and farm
ORIGIN LOCAL FISHERMEN, LOCAL FISH FARM

Bang Bao

Interview - Health centre – women involved in community - 07-05-2014

Changes in Bang Bao:

- there was not much – only 25 houses, now 100
- only fishermen
- no power
- beautiful colourful sea, no noise
- government invested money so that tourists come -> changed everything
- businesses destroyed the fishermen
- in high season a lot of Cambodians working here because they are cheaper (60%)
- but they have no passport, diseases, pregnancy -> cost a lot of money
- it is better that Thai work, but very expensive

Opmerking [A87]: First Bang Bao very small 25 houses – now 100
DEVELOPMENT

Opmerking [A88]: First fishermen village
DEVELOPMENT

Opmerking [A89]: Sea first more beautiful colours
DEVELOPMENT

Opmerking [A90]: Now more noise
DEVELOPMENT

Opmerking [A91]: Government invested money so tourists can come
DEVELOPMENT

Opmerking [A92]: Businesses destroyed fishermen
DEVELOPMENT

Opmerking [A93]: During high season more Cambodian workers(Cheaper)
SEASONALITY

Opmerking [A94]: Cambodian workers during high season cost a lot of money (no passport, insurance, pregnant)
SEASONALITY

Nature:

- people + tourists throw a lot in the water
- not healthy
- bread to give the fish is not good, the fish will die
- sometimes there is a cleaning in the sea
- every month the community has a meeting
- talk about waste in the sea
- learning about not throwing it in the sea
- fight about it
- try to/ want to that the government(of Koh Chang) helps. Must be together with the people
- they give the knowledge, space for recycle, money for recycle
- Her idea → People's fault. They have to clean up their own mess during low season.
- Fisherman → In low season fisherman. In high season renting their boats (change occupation)
- Because of the weather in low season, boats are sometimes not able to reach bang boe but go to ferry.
- Local people like living here, business is good!
- 16 years ago, everything was beautiful. Now is okay.
- Policy → no more houses built.
- There are cleaning days → boats on sea to clean

Opmerking [A95]: People + tourists throw a lot in water
WASTE NOT MANAGED

Opmerking [A96]: Sometimes cleaning in the sea
AWARENESS

Opmerking [A97]: Every month community has meeting about waste/development
AWARENESS

Opmerking [A98]: Waste in sea
WASTE NOT MANAGED

Opmerking [A99]: They learn about not throwing in the sea
AWARENESS

Opmerking [A100]: Want help of government
POWER, REGULATION

Opmerking [A101]: Government can give knowledge and money
POWER, REGULATION

Interview - Happy Turtle (owner restaurant and involved in cleaning program) - 08-05-2014

- Environment comes with economy → Integrate → benefits
- Have the numbers! Use it to make a statement
- Government is corrupt. That is why he does it his own way. Begin small and try to make a statement when you have the numbers.
- Everything is tourism on Koh Chang.
- It took 2 years to get bins.
- Better to clean in a small area and then spread out.
- No time for this during high season → environment is time consuming.
- Two governments → North/South
- Doesn't know where garbage goes after pick up. → mainland?
- Restaurants do not care at all → just want to make money. They even pay the government to throw garbage in the sea
- Government just cleans because they have to but according to this man, you need people that want to clean.

Opmerking [A102]: Government corrupt
POWER

Opmerking [A103]: Two governments south & north
POWER

Opmerking [A104]: Restaurants do not care about environment
AWARENESS

Opmerking [A105]: Restaurants just want to make money
AWARENESS

Interventions

- Meetings have no effect
- Need numbers
- Sponsored bins?
- Teach the tourists! They are producers of lots of waste. Leaflet from airline company? They are the ones that bring in the money and buy from the fishermen.

Opmerking [A106]: Meetings about cleaning have no effect
POWER, AWARENESS

Opmerking [A107]: Teach tourists, producers of waste
AWARENESS

- Start teaching the fisherman kids.
- If stakeholders can get money from it, they will work with you.
- Cotton bags → shops can sell them.
- Keep Koh Chang clean can make a logo for restaurants if it grows

- He uses led lights and Sojabean oil to be more environmental friendly.
- Environment is complex because we have to live in it.
- Fish is mainly from mainland → not always good to catch local → what gear do they use? Destroy coral?
- Doesn't work to make rules. Eco labels won't work. Who will check it? Government is corrupt.

Opmerking [A108]: Fish mainly from mainland
ORIGIN MAINLAND

Opmerking [A109]: Does not work to make rules
POWER

Opmerking [A110]: Eco labels do not work
POWER

Opmerking [A111]: No control; government corrupt
POWER

Interview - Middleman Bang Bao -09-05-2014

- 27 years in business
- Located at the Bang Bao pier
- Family who owns a lot of land in Bang Bao

Where is the seafood from?

Most of the time the fish is bought from fishermen, because this is fresh.. They call everyday at which pier they will arrive that day. This depends on the weather. They can arrive at Bang Bao pier but also at the Ferry. When they run out they buy it somewhere else. We mainly buy from big boats, but also sometimes from small boats – because of long-time contracts.

Opmerking [A112]: Fish bought from local fishermen
ORIGIN FISHERMEN

Opmerking [A113]: Fish from fishermen because it is fresh
ORIGIN FISHERMEN

Opmerking [A114]: Call everyday where they arrive

Opmerking [A115]: Buy mainly from big boats

Opmerking [A116]: Lot of fish stored frozen or alive
STORAGE STATE

Opmerking [A117]: Restaurants can order 1x a day, otherwise need to pick it up themselves
TRANSPORT

How do you know how many kilo to order?

Everyday we take orders from restaurants and resorts, but the fishermen do not come every day, so buy a lot and freeze it + oxygen tanks(restaurants). The restaurants can only order one time a day and otherwise they need to come and get it themselves. Also Thai people and tourists can buy fish from them.

Opmerking [A118]: Thai people and tourists buy

Do you notice any changes in amount?

I do not know. Everything seems the same all the time. The fishermen go very far to catch the fish. There are different fish all the times.

Opmerking [A119]: No changes in amount
EXTINCTION

What do you do as middleman?

Here we process the fish, store it and bring it to the restaurants or resorts. So we buy a lot of fish and sell it to different places. The fish is mostly bought from bigger boats.

Opmerking [A120]: Fish processed here
PROCESSING SELF-SUFFICIENT, MIDDLEMAN

Which seafood is caught around Koh Chang?

squid, shrimp, fish – close to Koh Chang. Other not easy to find. Do you also sell lobster? No we do not sell lobster. Chow Ley seafood restaurant has it on its menu, but it is from a farm.

Opmerking [A121]: Buy fish from different places

Opmerking [A122]: Squid, shrimp, fish caught here

Opmerking [A123]: Lobster from farm
ORIGIN FISH FARM

Do you think the waters around Koh Chang are dirty?

No, the water is not very dirty. You can still find small fish. This is not really a problem for me, more a

Opmerking [A124]: Water not very dirty
AWARENESS

problem for the fishermen. Because of the diving boats that use gasoline and oil, the fishermen have to go further.

Opmerking [A125]: Water not really problem
AWARENESS

Do you have a fixed price for the fish?

No we do not have a fixed price, it changes all the time. It can even change during the day.

Opmerking [A126]: Diving boats use gasoline and oil
AWARENESS

Opmerking [A127]: No fixed price
POWER, BENEFIT

Do you have competition from big boats who fish for export.

No because export is not easy. This can only be done by big dealers. Because first the fish has to go to the dealer to check it before export.

Opmerking [A128]: Export not easy-
of checking

Are you aware of the impacts on the environment.

(answered by translator)

No, in Thailand they are not aware of sustainability, only want to make profit.

Opmerking [A129]: Thai not aware of sustainability, only want to make profit
AWARENESS

Who benefits the most?

Fishermen because they only cater the fish and sell everything they caught, then they are done.

Dealer has more risk because when he cannot sell he has a problem.

Opmerking [A130]: Fishermen benefit most, dealer more risks
BENEFITS

Do the fishermen have one fishing spot or different spots?

The fishermen have different fishing spots. Some boats(the bigger ones) stay longer compared to other boats. The small boats do not have the equipment to stay long, so they only fish for one day or one night. And the bigger boats can be on sea for around 1 month.

Opmerking [A131]: Fishermen have different spots
FISHING TRIP SPOTS

Opmerking [A132]: Small boats not enough equipment to stay long
FISHING TRIP LENGHT

Interview Ruan Thai Seafood Restaurant Bang Bao- 07-05-2014

- 15 years in business
- change? – rain/high season
- -problems Bangkok
 - less tourists than two years ago
- where do you order? – mainland.
 - fish from fishermen-contract
- work together with middleman, but orders at fishermen
- farm – they bring it here in oxygen tanks in trucks
- high season – not enough + too expensive
- rainy season – a lot + cheap -> keep cold in fridge
- quality, kitchen, toilet checked every month
- he separates waste, brings it away. Doesn't know where it goes
- whole fish can keep for 15 days
- alive in the tanks – can keep for very long time
- not aware of environment
- aware of clean kitchen etc.
- no extinction because no fishing in the low season

Chow Lay restaurant, interview manager -07-05-2014

What kind of developments have you noticed the last years?

- 12 years in the business
- developments – a lot of new buildings
- 2 seasons – not always same amount of tourists e.g. political situation Bangkok
- Differences low and high season value chain
- During high season – a lot of food ordered from main land.
- fishermen a contract – bring all food and we will take it all, sometimes not enough
- processor/middle man – work together, middle man buys orders from fishermen.
- Fish farm – shrimps

Opmerking [A133]: Problems Bangkok DEVELOPMENT

Opmerking [A134]: Less tourists than 2 years ago DEVELOPMENT

Opmerking [A135]: Fish from mainland ORIGIN MAINLAND

Opmerking [A136]: Contract with fishermen ORIGIN FISHERMEN

Opmerking [A137]: Works together with middleman MIDDLEMAN

Opmerking [A138]: Orders from fisherman ORIGIN FISHERMEN, MIDDLEMAN

Opmerking [A139]: Fish from farm ORIGIN FISH FARM

Opmerking [A140]: Fish from fish farm transported in oxygen tanks ORIGIN FISH FARM, TRANSPORT BY COMPANY

Opmerking [A141]: High season not enough fish SEASONALITY

Opmerking [A142]: Low season a lot of fish, cheap SEASONALITY

Opmerking [A143]: Waste separated and he brings it away WASTE MANAGED

Opmerking [A144]: Does not know where separated waste goes to AWARENESS

Opmerking [A145]: Whole fish kept for max 15 days STORAGE LENGTH

Opmerking [A146]: Some fish kept alive in tanks(very long) STORAGE LENGTH, STORAGE STATE

Opmerking [A147]: Not aware of environment AWARENESS

Opmerking [A148]: No extinction because no fishing in low season EXTINCTION

Opmerking [A149]: A lot of new buildings DEVELOPMENT

Opmerking [A150]: Change in amount of tourists, due to demonstrations in Bangkok DEVELOPMENT

Opmerking [A151]: Differences in value chain in different seasons SEASONALITY

Opmerking [A152]: High season: food ordered from mainland SEASONALITY, ORIGIN MAINLAND

Opmerking [A153]: Middleman involved who orders from fishermen ORIGIN FISHERMEN, MIDDLEMAN

Conversation - 01-05-2014 - Lunch at Nok Noi Restaurant

We have a small conversation with the waiter, when we ask where the fish comes from. He tells us that the fish comes directly from the local sea. In the morning the fisherman come to the restaurant to deliver the fresh fish that they have caught that night. They can only offer the customers the fish that the fisherman has caught. This morning these were four kinds of fish. Which included barracuda and red snapper. The price for what the fish is sold to the customer that day is dependent on what the fisherman have to offer to the restaurant.

Observations on the restaurant:

- Shrimps are cleaned directly in the restaurants
- Fish is kept alive in aquaria, these aquaria must be kept at a certain temperature and require light and oxygen
- Crabs are in the aquaria for 7 days, after this period they are not fresh anymore and then most are consumed
- The employees that work in the restaurants are with quite some people, half of them doing nothing, others doing administrative jobs just on a table in the restaurant

Interview - Manager Nok Noi Restaurant - 07-05-2014

What kind of developments have you seen the last years?

I am in business for around 2 years. I have seen a change in tourist numbers the last years. They are decreasing. Last year the seafood was not so expensive, but now the price is around 10/15% higher.

How does your value chain look like?

We only have fishermen from this island. They go fishing in the night. We buy from big and small boats. The big ones spend a lot of time on the sea. Then we also have a middle man. This is a place where the fish can be stocked and when we do not have enough we can take it from here. Only when we do not have enough from the fishermen or mainland we buy fish from the fish farm in the east. But this fish is not good, has less taste, and often there are chemicals used. so we do not like it to get it from here.

What do you do with you waste?

We collect our waste and put it into bins. The by-products of the fish are used to make food for employees.

What do you do to make your restaurant more environmental friendly?

Our staff is very friendly. We also want to make our restaurant a bit longer in the future.

Have you noticed any extinction – less of certain species?

Not really, in high season there is less fish.

Do you know the preference of the customers, or you just put the things you can get on the menu?

We ask the guests, because we want to meet their needs.

Tourists small interviews

Opmerking [A154]: Shrimps cleaned directly in restaurant
PROCESSING SELF-SUFFICIENT

Opmerking [A155]: Fish kept alive in aquaria.
STORAGE STATE

Opmerking [A156]: Aquaria kept at certain temperature, require light and oxygen
STORAGE STATE

Opmerking [A157]: Crabs in aquarium for max 7 days
STORAGE LENGTH

Opmerking [A158]: Change in tourist numbers last years
DEVELOPMENT

Opmerking [A159]: Tourist numbers decreasing
DEVELOPMENT

Opmerking [A160]: Price seafood is increasing (10/15%)
DEVELOPMENT

Opmerking [A161]: Fish from local fishermen
ORIGIN FISHERMEN

Opmerking [A162]: We have middleman
MIDDLEMAN

Opmerking [A163]: Middleman is place where fish can be stocked
MIDDLEMAN

Opmerking [A164]: Order fish from mainland
ORIGIN MAINLAND

Opmerking [A165]: When not enough buy from fish farm
ORIGIN FISH FARM

Opmerking [A166]: Fish fish farm not good
ORIGIN FISH FARM

Opmerking [A167]: Fish fish farm less taste
ORIGIN FISH FARM

Opmerking [A168]: Often chemicals used in fish farm
ORIGIN FISH FARM

Opmerking [A169]: Waste collected in bins
WASTE MANAGED

Opmerking [A170]: Waste used for food employees
WASTE MANAGED

Opmerking [A171]: No extinction
EXTINCTION

Opmerking [A172]: In high season less fish
SEASONALITY

Couple from UK 06-05-2014

- Used to the waste in Thailand
- They noticed it
- Vicious circle: more tourists, more meals, more waste, but they think people just want more tourists
- Notice a lot of waste on the way – plastic bottles etc. Not only in water but also in the nature/next to the rotes

Opmerking [A173]: Used to waste in Thailand
AWARENESS

Opmerking [A174]: Vicious circle – more tourists more waste
AWARENESS

Opmerking [A175]: Notice a lot of waste
AWARENESS

Australian woman, lives in Bang Bao 06-05-2014

- Visit doctors -> new perspective on waste ->health
- People do not care – some initiatives – waste management – couple who started to put bins & clean, but people did not react. So they gave up.
- It all starts with education, children are smart, but copy paste behaviour of their parents.
- People have different ideas – like animals, so keep them on the street/pier, even when they poop everywhere and sometimes bite.
- Last year tourism is going down, partly because of government, corruption – Bangkok instable.

Opmerking [A176]: People do not care about waste
AWARENESS

Opmerking [A177]: All starts with education
AWARENESS

Opmerking [A178]: People have different ideas (waste, animals)
AWARENESS

Opmerking [A179]: Tourism going down, because of Bangkok situation
DEVELOPMENT

Interview - Resort Remark Puzi, reception - 05-05-2014

- Local community benefits from renting fishing boats to big companies during high season (for snorkelling, fishing etc.)
- Boats have to go further because tourist boats scare all the fish away □ but then they suffer from bigger boats from other regions (fishing boats for export)
- Local community (small-scale fisheries) only sell their fish at markets or for own use. Not for restaurants because they have deals with companies that sell fish for often a fixed price.
- He thinks that restaurants are not aware of sustainability issues. Lot of plastic is used.
- People/restaurants are not aware that they actually destroy their own business with throwing garbage in the water.
- Waste is collected every evening. They have containers (but don't use them well enough) a Possible intervention could be a collecting point on the pier.

Opmerking [A180]: Local community rents boat to bigger companies during high season
BENEFIT

Opmerking [A181]: Boats have to go further, but then competition from big companies
POWER

Opmerking [A182]: Local community sells fish to market or own use
ORIGIN LOCAL

Opmerking [A183]: Do not sell to restaurants

Opmerking [A184]: Restaurants not aware of sustainability issues
AWARENESS

Opmerking [A185]: Not aware that they destroy own business
AWARENESS

Opmerking [A186]: Waste collected every evening in containers
WASTE MANAGED

Opmerking [A187]: Lot of waste around pier
WASTE NOT MANAGED

Opmerking [A188]: Diving & snorkelling boats collecting waste
WASTE MANAGED

Participant observation - Bang Bao pier - 06-05-2014

05:30

restaurants are closed

some shops are opening

a lot of waste in the water around the pier

No fishing boats arriving

big dive and snorkelling boats are collecting waste on their boat

6:40

first fishing boat(1) is arriving

a lot of lights, boat(1) is going very slow
 the boat visits two houses in the bay of Bang Bao before arriving on the pier
 slowly there are more people on the pier (locals)
 really small fishing boat is fishing? around Bang Bao
 boat (1) arriving on the pier. a man on scooter passes by, and he is talking with the fisher man
 Boat(1) is throwing away water from tanks, putting new water in it.
 More people are now passing by on scooters

pier inside:

someone throws cigarette in the water

Opmerking [A189]: Throws cigarette in the water
WASTE NOT MANAGED

outside: 7:50

Boat(2) fisher man giving fish to men with 'trolley' - big and small fish and squids.

Same men are going to another boat to get more fish there.

Fisher man boat (2) takes fish and brings it to scuba diving boat

Opmerking [A190]: Fish collected with trolley

Men with trolley are taking the fish to another man, with a lot of cool boxes and freezers

They start weighing the fish. The men are screaming and laughing.

Man starts putting water on the fish, and cleaning it. He puts it in boxes with ice.

Preparing fish (squids).

He throws the waste of the squid in the water

Later a woman takes plastic bags and puts ice and fish in it.

Opmerking [A191]: Fish taken to middleman
MIDDLEMAN

Opmerking [A192]: Weighing fish

Opmerking [A193]: Processing fish
PROCESSING

Opmerking [A194]: Throws waste in water
WASTE NOT MANAGED

Opmerking [A195]: Putting fish in plastic bags

Still weighting fish

Man takes some fish and brings it to scuba dive boat

some men are walking to woman and buy fish from her. These men have fishing gear and they take the fish with them - to boats on pier

Another man passes by and goes to tank, chooses crab from tank and some other fish and buys it.

Opmerking [A196]: Chooses crab from tank

09:30 restaurants start preparing, some customers. Fish is brought to restaurants, men

take it to the back of the restaurant

Some men are cleaning the tanks with living fish

Shrimps brought to the restaurant

Opmerking [A197]: Fish brought to restaurants
TRANSPORTATION

Opmerking [A198]: Cleaning tanks

Opmerking [A199]: Shrimps brought to restaurant

Chow Lay restaurant - lights are on, while it is morning and there is enough light.

- taking big fish from freezer - brings it to kitchen

fish delivered at restaurant - brought by own people - taking it to the back

- sink water goes directly in sea

Opmerking [A200]: Fish taken from freezer
STORAGE STATE

Opmerking [A201]: Fish delivered by own people
TRANSPORT SELF-SUFFICIENT

Opmerking [A202]: Sink water directly into the sea
WASTE NOT MANAGED

Interview - fisherman Bang Bao - 08-05-2014

- Fishing not the only source of income, also taxi driver
- Low season mainly fishing shrimps
- Ca. 40 min to fishing spot (e.g. wrecking)

Opmerking [A203]: Fishing not only source of income
BENEFIT

Opmerking [A204]: Circa 40 min to fishing spot
FISHING TRIP SPOT

- Last years no different fishing behaviour because of tourism
- Fishing trip takes 6-7 hours: barracuda + shrimp
- Amount of fish depends on season + day, sometimes much sometimes not much or nothing
- Sell mostly direct to restaurants in Bang Bao, especially the big fish, he fishes also for his Family
- Competition: 10 years ago: more fish, now less fish
- Too many fishing boats also from other cities around Koh Chang with big boats (he has a small boat)
- High season: more fish because of better weather + he can sell the fish more expensive
- Low season: only shrimp price difference per kilo +200 to 300 baht (= around 50% difference to high season)
- 10 years ago: water quality much better
 - More clean
 - Now much plastic
 - Waste come mostly from visitors
- Fees for national park is good, gives something back
 - Should be used for : doesn't know
 - Nothing has changed?

Opmerking [A205]: Last years no changes in fishing behaviour
DEVELOPMENT, EXTINCTOIN

Opmerking [A206]: Fishing trip around 7,8 hours
FISHING TRIP LENGHT

Opmerking [A207]: Amount of fish depends on season
SEASONALITY

Opmerking [A208]: Sells mostly direct to restaurants
ORIGIN FISHERMEN, MIDDLEMAN

Opmerking [A209]: More competition because less fish
EXTINCTION

Opmerking [A210]: 10 years ago water quality much better
DEVELOPMENT

Opmerking [A211]: Now more garbage, mostly from visitors
WASTE NOT MANAGED

Interview - Rodjanaphan, Fisherman and fishing tour - 08-05-2014

- High season: he focuses on tourists and tours. Low season: focuses on fishing to sell it
- He has a small boat for catching fish to sell it (private boat), and a bigger boat to provide tours to tourists
 - 40/50 KM:
 - 4/5 KM:
- Shrimps are mostly fished
- 10 years ago: everyone focused only on fishing. People go to the same fishing spots as 10 years ago, however, there is less fish now because there are too much fishermen that come from other places to their spots
- He uses fishing nets
- He uses diesel for his boat
- Fishing happens at different places every time
- In Bang Bao: there are about 50 persons fishing. The interviewee sometimes catches around 20-30 KG fish, however, sometimes he fishes almost nothing
- The fish that has been caught is directly sold to a restaurant. The restaurant buys the whole fishing 'package'. A few times fish is sold to intermediaries as well. In low season there are tourists, but not that much. Most of them come from China
- The prices for fish, consisting of mainly shrimps, are often up to 50% lower than during the high season
- The water quality is still the same compared to 10 years ago, but it got a bit more dirty
- In the period around December/January there is an increasing water level. This period is used to clean the water
- During the whole year there is waste coming from tourists, despite the low and high season

Opmerking [A212]: High season tourism/tours low season fishing
SEASONALITY

Opmerking [A213]: Has small and big boat

Opmerking [A214]: Before people only focused on fishing(same spots)
DEVELOPMENT

Opmerking [A215]: Less fish because too much fishermen
EXTINCTION

Opmerking [A216]: Uses fishing nets

Opmerking [A217]: Uses diesel

Opmerking [A218]: Fishing at different places
FISHING TRIP SPOT

Opmerking [A219]: Amount of fish caught is all the time different

Opmerking [A220]: Sells directly to restaurant
MIDDLE MAN, ORIGIN FISHERMEN

Opmerking [A221]: Low season often also middleman
MIDDLE MAN, SEASONALITY

Opmerking [A222]: Prices lower in low season
SEASONALITY

Opmerking [A223]: Water quality still the same, but more dirty
AWARENESS, DEVELOPMENT

Opmerking [A224]: Dec/jan increasing water level – water is cleaned
AWARENESS, WASTE MANAGED

Opmerking [A225]: Whole year waste from tourists
WASTE NOT MANAGED, AWARENESS

- Fishermen decide beforehand where they go to fish
- He does not worry about snorkelling and diving, because fishermen go to other places than they go
- There are also no problems within the fishermen community because they use smaller boats
- He makes and repairs his own boat
- In the future: he thinks he will probably only focus on the fishing tours for tourists, so he will not work as a fisherman that sells his caught fish anymore. The reason for this is because he thinks that he will not earn enough money with it
- He likes all tourists coming from different countries. Although he experiences that Chinese people are cheating with money (they say for example that they already paid it)

Opmerking [A226]: Fishermen decide beforehand where to fish
FISHING TRIP SPOT

Opmerking [A227]: Does not worry about diving/snorkelling boats

Opmerking [A228]: Makes and repairs own boat

Opmerking [A229]: Thinks about focussing on fishing trips for tourists
BENEFIT

Opmerking [A230]: Reason: Stable income
BENEFIT

Salak Phet

Interview - Salak Phet fishing village tour - 30-04-2014

During the group tour we had at the end of the introduction programme, we heard some interesting things of fishing in Salak Phet. The guide gave us this information:

- Small fish are crucial for the seafood value chain, as they are the start of the consumption of seafood. Big fish are dependent on these small fish to live, disappearance of the small would be a disaster for the big fish.
- Large fishing boats are not allowed to fish within 3 km from Koh Chang, we guess that this has to deal with the Marine Protected Area. The large boats are constantly at the 3 km boarder.
- Most of the fisherman go on fishing trips for longer than one day, some do day trips.
- The lure that the fisherman use is natural (small fish, light for the squids), cages are as well made from natural material
- The gear of the fisherman is capable of 1000 crabs, though they only catch around 200 at a time. This suggests that there is not that much crab in the sea.

Interview - 13-05-2015 – 14.15 – Salak Kok Seafood

We got to talk to the owner of the Salak Kok seafood restaurant. He told us his ways and opinions on seafood.

History

The restaurant is 8 years old, and the owner is still the same one as at the beginning

- He thinks that the restaurant has not really changed, but the number of people has decreased the last time, because of the riots in Bangkok
- The amount of fish in the ocean has declined

Origin

- The seafood the restaurant offers is from the fishermen in Salak Kok and from the own fishing boat the owner has. He does not buy fish from the mainland.

Storage

- Fish and shrimp are delivered dead and will be stored in a freezer, crab is delivered alive and kept alive till consumption
- Fish is not stored longer than a week
- Crab is no longer fresh than 2-3 days – otherwise change is taste
- When the seafood is not fresh anymore it is consumed by the employees
- When fish is left over in the low season, he sells it to other restaurants that are interested or let families buy it
- Do not throw fish away, only when lobster or crab die.

Opmerking [A231]: Big fish dependent on small fish (consumption)
EXTINCTION

Opmerking [A232]: Large boats not allowed in 3 km zone
REGULATION

Opmerking [A233]: Large boats at 3km zone
REGULATION

Opmerking [A234]: Most fishing trips longer than 1 day
FISHING TRIP LENGHT

Opmerking [A235]: Some do day trips
FISHING TRIP LENGHT

Opmerking [A236]: Natural lure
FISHING TRIP GEAR

Opmerking [A237]: Cages from natural material
FISHING TRIP GEAR

Opmerking [A238]: 200 fish caught with gear capable for 1000
FISHING TRIP GEAR

Opmerking [A239]: Less tourists due riots in Bangkok
DEVELOPMENT

Opmerking [A240]: Amount of fish declined
EXTINCTION

Opmerking [A241]: Fish from fishermen
ORIGIN FISHERMEN

Opmerking [A242]: Has own fishing boat
POWER, BENEFIT

Opmerking [A243]: Does not buy from mainland
ORIGIN MAINLAND

Opmerking [A244]: Dead fish in freezer
STORAGE STATE

Opmerking [A245]: Crab alive until consumption
STORAGE STATE

Opmerking [A246]: Fish not longer than 1 week stored
STORAGE LENGHT

Opmerking [A247]: Alive crab max stored 2-3 days due to change of taste
STORAGE LENGHT

Opmerking [A248]: Leftovers eaten by staff
WASTE MANAGED

Opmerking [A249]: Leftovers to other restaurants or families
WASTE MANAGED

Opmerking [A250]: Only lobster or crab thrown away when dead
WASTE NOT MANAGED?

Seasonality

- There is not much seasonality in the demand that he gets from customers, this is all year long the same. It is though very different during the weeks,
- Tourists are visiting mainly in the weekends, so then it is busier. Still not that much, but it is okay to handle
- During high season he sometimes does not have enough fish.

Opmerking [A251]: Not much seasonality
SEASONALITY

Opmerking [A252]: Tourists mainly come in weekends
SEASONALITY

Opmerking [A253]: Not always enough fish during high season
SEASONALITY

Processing

- Crab and shrimp is from outside the bay, this means that it is already fairly clean, but it is still sorted by the fishermen
- The fish is mainly already cleaned by the fishermen and sold in packages to the restaurant

Opmerking [A254]: Crabs & shrimps from outside bay; clean

Opmerking [A255]: Fish processed by fishermen
PROCESSING CARRIED OUT

Opmerking [A256]: Fish often cleaned and sold in packages by fishermen
PROCESSING CARRIED OUT

Why own boat?

- The man was a fisherman before, that is why he has his own boat. Now he goes fishing himself when there is not enough for the restaurant sometimes, but mainly when there is not much tourist in the restaurant, to do more to earn more money
- Everybody in the village is direct or indirect family
- There is no middleman or dealer involved, seafood is sold directly from the fishermen to the restaurant
- It is maybe good that the new road comes. There will be more tourists visiting Salak Phet and Salak Kok then. However, more restaurant and more hotels also means more competition. He acknowledges that as well

Opmerking [A257]: has own boat, fishing when not enough for restaurant

Opmerking [A258]: No middleman involved
MIDDLEMAN

Opmerking [A259]: Road means more tourists but also more competition
DEVELOPMENT

Power

- The middleman have the power to make changes and set the price, but the price is also very dependent on the number of fish that can be found in the sea
- This means that the price is good for fisherman in high season when there is much demand, but bad in low season when not much seafood is requested
- Fisherman are doing okay, but they will never be 'the rich men'
- It makes a huge difference when a fisherman has his own boat, this is good. When they don't have an own boat they will have to share their earnings or be just an employee on a boat

Opmerking [A260]: Middleman has power to change/set price
POWER, MIDDLEMAN

Opmerking [A261]: Price dependent on number of fish
POWER

Opmerking [A262]: Price good when a lot of demand
POWER

Opmerking [A263]: Fishermen ok when owning own boat
POWER, BENEFIT

MPA's, government

- The government only does a little, because they can set the rule and without rules everybody can just do what he or she wants
- Not everybody follows that rule, but it helps
- Government has to set stricter rules for the 3 km zone.

Opmerking [A264]: Government does little
POWER, REGULATION

Opmerking [A265]: No one follows the rules
REGULATION

Opmerking [A266]: Stricter rules needed for 3km zone by government
REGULATION

Environment

- He is already pretty sustainable and cares about it a little
- He and all the other local fishermen don't use nets and destroying techniques
- He thinks about what his actions do to the nature when he is fishing, that is why he don't want to participate in major fishing activities
- He uses a septic tank to get rid of waste water
- His garbage is collected by the government by trucks that pick up the waste, as well as the septic tank

Opmerking [A267]: Cares about sustainability
AWARENESS

Opmerking [A268]: Do not use destroying nets
AWARENESS

Opmerking [A269]: Thinks about what actions do to nature
AWARENESS

Opmerking [A270]: Do not participate in major fishing activities
AWARENESS

Opmerking [A271]: Uses septic tank
AWARENESS

Opmerking [A272]: Garbage and septic tank picked up by government truck
WASTE MANAGED

Interview - 13-05-2014 – 12.15 – Fishing farm in sea

We went to talk to the owner of one of the two fishing farms in Salak Phet. The women of the family is the one who takes care of the fishing farm and the man is a part-time fisherman and gardener.

- The fish of the farm is sold to local restaurants, not restaurants outside Salak Phet
- Actually they mainly supply to Salak Phet Seafood (the restaurant on the pier)

Opmerking [A273]: Fish from farms
ORIGIN FISH FARMS

Opmerking [A274]: Mainly supply Salak Phet Seafood

Storage

- Salak Phet seafood calls the farm when they need fish, and they bring it to them alive. At the restaurant, the fish is kept in their own nets to keep them alive and still swimming in the sea
- Only once a year the fish is brought by boat from the farm to the restaurant. When fish is needed in between, they also call and give them fish that are not totally grown
- The fish is grown from very small to large fish ready to be sold and eaten
- The fish are imported as babies from another farm near Bangkok. When the farm needs fish they call them and make an order. Here it is hard for new fish to be born, because they prefer water that is sweet/salt [brak]

Opmerking [A275]: Restaurants calls, they bring alive fish to them
STORAGE STATE, ORIGIN FISH FARM

Opmerking [A276]: At restaurant fish kept alive
STORAGE STATE

Opmerking [A277]: Fish bought once a year
ORIGIN FISH FARM

Opmerking [A278]: Fish grows in farm

Opmerking [A279]: Baby fish imported from Bangkok

Opmerking [A280]: Here hard for new fish to be born

Opmerking [A281]: Only natural feeding
AWARENESS

Opmerking [A282]: Feeding composes of small fish
AWARENESS

Opmerking [A283]: In open ocean so no chemicals used
AWARENESS

Opmerking [A284]: Shrimp farm uses chemicals
AWARENESS

Opmerking [A285]: Two fish farms on the island

Opmerking [A286]: Less fish farms due to dirty water
DEVELOPMENT

Opmerking [A287]: Hard for Young fish to grow due to dirty water
EXTINCTION, AWARENESS, WASTE NOT MANAGED

Feeding

- Only natural feeding is used
- Feeding composes of many small fish, which they buy from large fishing boats
- No chemicals are used. This is because the fish is actually in open ocean, so it would be bad for the sea
- The shrimp farm near to Salak Phet uses chemicals, it is operated by a foreign owner and delivers only shrimp for the mainland. They don't allow outsiders to have a look at the farm

History

- Now only two fish farms in Salak Phet and actually on the whole island
- Used to be more, 10 years ago, but probably because of the water that is not as clean anymore as it was, they have closed
- In water that is not clear, it is hard for young fish to be born and grown

Fisherman (husband)

- When the man was younger, he went fishing very often, everyday. No he is older so he is going less often, they don't need to live from that in total, he also has a garden
- He only sells his fish to Salak Phet Seafood. He does this because this is the most easy way to sell his fish. The restaurant is always in need for much fish, so he can provide it all in once. Local resorts etc don't need that much so provision would be inefficient
- This brings a risk: when the restaurant is not anymore in need of his fish, he has no one to sell his seafood to
- Of course, he is not the only provider for Salak Phet seafood, because he does not have enough fish
- He is fishing because in the fish farm they can only grow one kind of fish and the sea provides many sorts
- The fish that he provides to the restaurant can be alive or dead
- He would like to have a bigger farm

Opmerking [A288]: Fish less often now, also garden

Opmerking [A289]: Sells fish directly to restaurant
ORIGIN FISH FARM, MIDDLEMAN

Opmerking [A290]: Provide restaurants, because they need more fish than restaurants
ORIGIN FISHERMEN

Opmerking [A291]: Risk: when restaurant do not need his fish, no one to sell
ORIGIN FISHERMEN

Opmerking [A292]: Not only provider for restaurant

Opmerking [A293]: Fish farm can only grow one kind of fish, sea many sorts
ORIGIN FISHERMEN, ORIGIN FISH FARM

Opmerking [A294]: Fish alive or dead
STORAGE STATE

Interview - 13-05-2014 – 11.45 – Tourist Fishing Boat

We had a talk with the owner of the only boat that provides fishing trips for tourists in Salak Phet.

What do you exactly do?

We 'sell' fishing trips to tourists. The tourists catch fish and they can take it with them.

Opmerking [A295]: Sells fishing trips
BENEFIT

Why did you choose for this job and not only fishing?

Before this job I was a fishermen, but the amount of fish is decreasing and I was not ok with the money. People already asked me for fishing trips, so I saw there was a demand. Now I can control the money. I know the amount of money I will get instead of going to the sea, not sure what kind of amount fish I will catch, so not knowing how much money I will get.

Opmerking [A296]: Became fishing trip owner because stable income
BENEFIT

Are there more fishing trips for tourists in Salak Phet?

No I am the only one. There are some former fishing boats that are now snorkelling boats.

Opmerking [A297]: Former fishing boats are now snorkeling boats

Do you see a change in the amount of fish?

The amount of fish is decreasing. Because of the big boats, that also catch the small fish. These small fish are crucial for the seafood value chain, as they are the start of the consumption of seafood. Big fish are dependent on these small fish to live, disappearance of the small would be a disaster for the big fish.

Opmerking [A298]: Big boats catch also small fish which are crucial for seafood value chain
EXTINCTION

What do you think of the marine protected area?

Large fishing boats are not allowed to fish within 3 km from Koh Chang, we guess that this has to deal with the Marine Protected Area. The large boats are constantly at the 3 km boarder.

Opmerking [A299]: Larger boats constantly in 3 km zone
REGULATION

- The company is active 8 months a year, because they cannot operate in the rainy season
- The owner is not only dependent from income from the fishing trips, he also operates a homestay
- He takes tourists on multiple day fishing trips on the ocean

Opmerking [A300]: Also other job: homestay
BENEFIT

Opmerking [A301]: Multiple day fishing trip

- He has two employees that accompany him when going on longer than one day trips, one is the cook and the other helps him
- The only other tourist boat at the pier in Salak Phet is for snorkelling
- He also provides snorkelling during his trips, his experience as a fisherman helps him to find the best spots for both fishing and snorkelling, these are not the same spots
- When people in a company don't want to go fishing, they can stay in the homestay
- He never goes fishing alone, does not enjoy or have benefits

Opmerking [A302]: Two employees on fishing trip: cook&helping

Opmerking [A303]: Other tourist boats pier are snorkeling boats

Opmerking [A304]: Provides also snorkeling trips-has knowledge about spots
BENEFIT

Opmerking [A305]: Never goes fishing alone

Waste

- Fish that is caught is taken home with the tourists

Opmerking [A306]: Fish caught and taken home by tourist
WASTE MANAGED

Extinction

- The fish has been declining in the last years he thinks
- It is probably because of the big boats that fish for small fish or unpurposely fish small fish in their nets. The small fish is then sold to factories to make fish oil
- When there are not enough small fish anymore, bigger fish also disappear because they don't have any food

Opmerking [A307]: Fish declining
EXTINCTION

Opmerking [A308]: Big boats fish small fish
EXTINCTION

Opmerking [A309]: Not enough food for bigger fish (small fish)
EXTINCTION

History

- Before he was a fisherman selling fish to resorts, but he noticed that fish was going down. He thought that this was a bad development and he was not ok with the money that he was earning
- A fisherman can never be sure of how much money he will make, because the prices are always different and the demand and supply is never the same
- Now he always knows how much he will earn as he charges a certain amount of money for the trips
- No more 'bet on the sea'

Opmerking [A310]: Noticed fish was going down
EXTINCTION

Opmerking [A311]: Fishermen do not have stable income
BENEFIT

Opmerking [A312]: Now more stable income
BENEFIT

Environment

- He thinks about environmental issues
- He is not using nets or other gear that might destroy the ocean
- He is not fishing much fish out of the ocean
- Feels good that he is doing good for the nature

Opmerking [A313]: Things about environmental issues
AWARENESS

Opmerking [A314]: Do not use destroying gear
AWARENESS

Opmerking [A315]: Not fishing much fish
AWARENESS

Opmerking [A316]: Feels good about being environmental friendly
AWARENESS

Benefits

- He earns much more money by having a much more relaxed way of living
- He enjoys his occupation
- Good for the environment

Opmerking [A317]: Earns more now
BENEFIT

Opmerking [A318]: Good for environment
AWARENESS

Interview - 13-05-2014 – 9.45 – Middleman Salak Phet

- This women started 10 years ago with her business as a middleman for seafood
- She gets the fish from the fisherman in Salak Phet and sells it to restaurant all over Koh Chang, she also sells for tourists that come specially to her from the mainland
- She sells squid, shrimp and other fish as well
- She only gets het fish from small boats in the village. These small boats only go fishing one day, use not more than 2 liter gasoline and they don't have to pay for labour because the fishermen operate alone
- Different fisherman provide the fish to her, she has no strict deals
- She has a vulnerable position: when the hotels give a nice price for the seafood, the fishermen skip the middlemen and go directly to the tourists

History

- She notices that the number of animals in the sea has declined over the last few years
- The last years the prices for seafood went up, because of the demand by the tourists

Processing

- The middleman is the one who cleans the fish, and she sells it in packages of 1 kilo

Seasonality

- Seasonality is no problem, but it is not predictable over the whole year. Though for her there is never too less fish.
- But it can be a problem, it can change in the coming 20 years. There are now a lot of fishermen (around 200)
- When there is not that much demand in the low season, she looks for alternative options and sells the seafood to the mainland

Storage

- She receives new seafood everyday
- It is stored in freezer and cooler
- Squid and fish is stored in plastic bags, because of the certain amounts that she sells
- Seafood is stored a few days and not longer than a week, this is also dependent on seasonality

Transport

Opmerking [A319]: Gets fish from fishermen
ORIGIN FISHERMEN, MIDDLEMAN

Opmerking [A320]: Sells fish to restaurants
MIDDLEMAN

Opmerking [A321]: Also sells to tourists
MIDDLEMAN

Opmerking [A322]: Small boats only fish 1 day – less gasoline & no labor costs
FISHING TRIP LENGHT

Opmerking [A323]: Fish from different fishermen
ORIGIN FISHERMEN

Opmerking [A324]: Vulnerable position, fishermen can skip her
POWER

Opmerking [A325]: Notice decline of fish
EXTINCTION

Opmerking [A326]: Price seafood went up last years
POWER

Opmerking [A327]: Middleman cleans fish, sells in packages
PROCESSING SELF-SUFFICIENT

Opmerking [A328]: Seasonality no problem, never too less fish
SEASONALITY

Opmerking [A329]: Fish amount can become problem in future
EXTINCTION

Opmerking [A330]: Low season: alternative options, sell fish to mainland
SEASONALITY

Opmerking [A331]: Receives seafood everyday
STORAGE LENGHT

Opmerking [A332]: Stores seafood in freezer
STORAGE STATE

Opmerking [A333]: Fish stored in cooler
STORAGE STATE

Opmerking [A334]: Fish stored in plastic bags – amount
STORAGE STATE

Opmerking [A335]: Seafood not longer than 1 week stored
STORAGE LENGHT

- The restaurants come to the middleman to pick up the seafood, mostly they come just to pick the seafood only for themselves, sometimes by two
- She has no strict orders and collaborations with restaurants
- They only come to pick up small amounts of fish, especially in low season
- Not a very big business

Opmerking [A336]: Restaurants pick up seafood
TRANSPORT SELF-SUFFICIENT

Opmerking [A337]: No strict orders & collaborations with restaurant
ORIGIN MIDDLEMAN

Opmerking [A338]: Only pick up small amounts
TRANSPORT SELF-SUFFICIENT

Gear

- She only buys seafood from fishermen that catch the fish with lines, not with nets. This is because the fish is more beautiful then, the resorts and restaurants only want good fish.
- Nets are bad because they take garbage with them and fishing with nets is bad for the sea

Opmerking [A339]: Buys only fish caught with Lines
AWARENESS

Opmerking [A340]: Fish is more beautiful – for restaurants and resorts
BENEFIT

Opmerking [A341]: Nets bad because they take garbage with them
AWARENESS

Extinction

- In the winter, the fish come nearby. However in general, the fisherman have to go further away the last years
- In the rainy season, there are a lot of little shrimp. These shrimps are good for shrimp paste. When the shrimps are dried and mixed with salt. It is good for 3 years and is a good souvenir

Opmerking [A342]: Winter: fish comes nearby
SEASONALITY

Opmerking [A343]: Rainy season lot of little shrimps – good for shrimp paste
SEASONALITY

Benefits

- The benefits are balanced along the value chain according to the middleman. All have relatively the same share: costs and earnings
- The local community benefits enough to live from fishing, all year long according to her
- Though more tourists are welcome, then she will sell more
- The fishermen and tourists can control the price. If she decreases the price, fishermen will directly sell to restaurants, so she does not have that much power.

Opmerking [A344]: Benefit balanced along value chain
BENEFIT

Opmerking [A345]: Local community benefits enough
BENEFIT

Opmerking [A346]: More tourists are welcome –sell more
DEVELOPMENT

Opmerking [A347]: Fishermen and tourists can control the price
POWER

Environment

- She does not know what can be improved to make the value chain better for the environment
- This issue is much bigger than what we can change, she does not think that she has the power to make changes
- She thinks that fisherman change by their supply and tourists can change by their demand
- She can't set the price for example, because then they will skip the middleman, demand sets the price
- Hotels etc on the mainland ask for orders, but she only delivers to restaurants on the island. She thinks fish from the mainland is not good

Opmerking [A348]: Do not know improvements

Opmerking [A349]: Does not have power to change things
POWER

Opmerking [A350]: Fishermen can change by supply and tourists by their demand
POWER

Opmerking [A351]: She cannot set price, otherwise skipped by fishermen
POWER

Opmerking [A352]: Only delivers to restaurants – not to mainland
ORIGIN FISHERMAN, MIDDLEMAN

Interview - 13-05-2014 – 11.30 – Fisherman Salak Phet

Storage

- He stores the fish himself. A few years ago he noticed that it would be a good idea to have fish in stock that he can sell directly to tourists
- The seafood is frozen
- Storage is in low season longer than in high season
- Fresh fish is not longer than 2-3 days in stock, in the freezer fish can be stored for a longer time because of the added salt
- When he has too much fish, he sells the fresh fish cheaper for resorts, and the dried fish cheaper for tourists
- His sister is the middleman, when she does not have enough to sell to the restaurants, he sells his fish also to restaurants, but that does not happen often
- So his customers are tourists, hotels and resorts. He never sells to the mainland

Opmerking [A353]: Stores fish himself
STORAGE

Opmerking [A354]: Sells fish to tourists

Opmerking [A355]: Seafood frozen
STORAGE STATE

Opmerking [A356]: Storage low season longer than high season
STORAGE LENGHT

Opmerking [A357]: Fresh fish max 2-3 days stored
STORAGE LENGHT

Opmerking [A358]: In freezer fish stored long (salt added)
STORAGE STATE , STRAGE LENGHTS

Opmerking [A359]: When too much fish, sold to resorts

Opmerking [A360]: Dried fish cheaper for tourists

Opmerking [A361]: Sells to restaurant when middleman does not have enough
MIDDLEMAN

Opmerking [A362]: Customers: tourists, hotels and resorts

Opmerking [A363]: Does not sell to mainland

Seasonality

- Demand is different in high and low season

Opmerking [A364]: High/low season different demand
SEASONLITY

Length of trip

- One day, sometimes longer but no more than two
- Mainly because there is no kitchen on the boat

Opmerking [A365]: Most of the trip one day, sometimes two
FISHING TRIP LENGHT

Spot

- He has multiple spot, but always goes only to one of these

Opmerking [A366]: No kitchen on board
FISHING TRIP LENGHT

History

- 25 years ago there was more fish in the ocean, he is already fisherman for 30 years
- Earlier he caught 1000 kilo in one night, now he catches not more than 100 kilo
- He started with a big boat, but some years ago he changed this for a smaller one. This was because gasoline was getting more expensive and on a small boat he was able to change what fish he catches every season, a big boat can only catch one sort

Opmerking [A367]: Has multiple spots
FISHING TRIP SPOT

Opmerking [A368]: 25 years ago more fish in ocean
EXTINCTION, DEVELOPMENT

Opmerking [A369]: First caught 1000 now 100 KG
EXTINCTION

Transport

- When the fish is caught, he calls to restaurants and resorts he has a deal with, he asks them how much they want and for what price he is going to sell
- Transportation is always different, sometimes by resort and sometimes he brings himself

Opmerking [A370]: Changed big boat for small boat due to price gasoline and diversity fish
FISHING TRIP GEAR

Environment

- He is thinking about organising fishing trips for tourists, because this better to earn money. He thinks that the fish are slowly disappearing in the near waters. So this is a more sustainable way to earn money and the fish can swim around
- Big boats are catching too much fish and from the mainland they are catching too often
- The government doesn't do much, the mpa is not of much use
- Diving or snorkelling is not a problem, they operate in different areas
- Not much snorkelling boats from Salak Phet
- He thinks that there is not much garbage in the water. The water is pretty clear, this is not an issue in the area where he operates. He understands that it can give troubles to the coral reef area
- Fishing is different in low and high season. Shrimp is caught in the rainy season and fish are caught in summer. After the rainy season they catch fish with lines

Opmerking [A371]: Thinks about organizing fishing trip – more sustainable AWARENESS

Opmerking [A372]: Boat are catching too much fish AWARENESS

Opmerking [A373]: Government does not do much REGULATION

Opmerking [A374]: Diving/snorkeling no problem – operate in different areas

Opmerking [A375]: Not much diving boats in Salak Phet

Opmerking [A376]: Thinks not much garbage in water AWARENESS

Opmerking [A377]: Fishing different in low/high season SEASONALITY

Interview - Mr. Fluck, resort owner and born in Salak Phet - 05-05-2014

- The fishermen only go one day
- Only small boats
- Not further than 10 km, go in morning and back before dark or go in evening and back in morning
- Low sea – many people sell to middle man, because they have freezer to store it. And then it goes to the restaurants (Bang Bao, white sand, lonely beach – they come here to get it)
- In high season, more likely to sell direct to restaurants and tourists.
- Now less seafood -> price higher. Everybody understands why
- Fish farm – only for Salek Phet
- Go to mainland + west side. Order there because they always have enough. Locally not always enough
- Long time ago (10 years), more fish farms
- High season – nets – only fish
- Low season – everything
- Every time different fish
- East side always has enough for the tourists
- For shrimps bigger waves are better to catch them – also more dangerous
- Diving boats do NOT scare fish away. Fishermen know where they have to go
- Pollution from tourists – food for fish
- Big boats cannot catch in 3km zone -> all at the border or come inside (illegal) but government doesn't do anything about it because they also have boats who do that.
- Small boats cannot go far – have nothing
- Everybody wants money -> price up up up. Fishermen benefit, earn enough
- Many locals fish in low season, but also need to have another job.
- Almost always not only fisherman, but they also have an orchard or tourism business
- Development? – a lot has changes. Land is sold. Have to go to mainland. Expensive
- Fluck likes that the road in not round-> more tourists will come and will use all the water
- Fluck wants to be the example for the west side
- Local people no benefits – businessmen are in mainland + other countries

Opmerking [A378]: Fishermen only go one day FISHING TRIP LENGHT

Opmerking [A379]: Only small boats FISHING TRIP GEAR

Opmerking [A380]: Not further than 10 km FISHING TRIP LENGHT, FISHING TRIP SPOT

Opmerking [A381]: Low season – sell to middleman(has freezer to store) high season- sell directly to restaurants or tourists

Opmerking [A382]: Less seafood, higher price

Opmerking [A383]: Fish farm only for Salak Phet

Opmerking [A384]: Order at mainland or west side ORIGIN MAINLAND

Opmerking [A385]: Long time ago, more fish farms DEVELOPMENT

Opmerking [A386]: High season only nets, low season everything SEASONALITY

Opmerking [A387]: East side always enough for tourists

Opmerking [A388]: Pollution from tourists(feed fish) WASTE NOT MANAGED

Opmerking [A389]: Government does nothing then big boats go into 3 km zon

Opmerking [A390]: Many fisherman(locals) also have other job

Opmerking [A391]: A lot changed, land sold

Opmerking [A392]: Does not like idea of new road-more tourists-use water

Opmerking [A393]: Wants to be example for west side

Opmerking [A394]: Most of businessmen (who benefit) from mainla

- Fishermen get more money if they bring tourists -> they want the road go round
- A lot of fishermen sold their boat to snorkelling companies, because they did not have enough money to keep the big boat – could not compete with big boats from big companies.
- A lot of pollution because of the tourists – feeding the fish.
- Waste: small boats only eat one day, big boats – throw their food in the sea.
- Power: Middle men do not have that much power. When there are more tourists, the price goes up. Everyone want to benefit.
- Fishermen earn enough, but cannot be rich man.
- Tourists now stay more than one night, because it is difficult to travel, but when the road is finished it is possible that they only stay one day.
- Government thinks more people more money. But when there are more people, do they really benefit from it? Or only the rich people (who own the land)
- In Salak Phet the fish is really fresh, in other places the fish is kept alive or stored for a longer time. Then sometimes chemicals are used to keep it fresh (Formaline??)
- Main fish caught here is: barracuda, sniper, king mackerel
- In October tourists come to fish.
- In mainland is cheaper. Why? – in high season not enough + more expensive
 - here it is fresh, mainland not
 - tourists want beautiful fish, locals don't mind

Opmerking [A395]: Fishermen want road - more tourists
DEVELOPMENT

Opmerking [A396]: Low of fishermen sold big boat - could not compete with companies
POWER

Opmerking [A397]: Lot of pollution due to tourists
WASTE NOT MANAGED

Opmerking [A398]: Small boats only eat one day
WASTE MANAGED

Opmerking [A399]: Big boats throw food in sea
WASTE NOT MANAGED

Opmerking [A400]: Middleman not much power
MIDDLEMAN, POWER

Opmerking [A401]: When road finished tourists maybe stay one day instead of more
DEVELOPMENT

Opmerking [A402]: Government things more people more money
POWER, AWARENESS, DEVELOPMENT

Opmerking [A403]: Caught fish: barracuda, sniper, king mackerel

Opmerking [A404]: Other places formaline used to keep fish fresh
STORAGE STATE

Opmerking [A405]: Mainland cheaper, not fresh
ORIGIN MAINLAND

Participant observation - Salak Phet - 12-05-2014

Today in the afternoon, we drove around in Salak Phet and stopped at the restaurant pier and the fishing village.

14.00 First we went to Salak Phet seafood, at the restaurant pier. It was busy at the time we arrived, the restaurant was full with Asian tourists, that were brought there with minivans. It immediately smelled like fish when we walked around. We just walked around and made some pictures of the restaurant and the resort. At the end of the restaurant, towards the water, we saw a fish farm. It consisted of different nets and within every net different fishes were kept. We walked around and saw a man that took some fish out of the open water with a rod, around 5 of the same sort. Then he walked towards a net and threw the fish in the water. Some tourists walked around making pictures, and some local people were holding some baskets and nets, they did not speak English, no interaction was possible. There were some boats next to the farm, but they all looked like not fishing boats, but boats used for tourists to go on to the ocean. When we walked back to the resort, a small motorbike with tanks arrived. We saw two man who picked some fairly big fish out of the tank, they were frozen. They loaded them over in a tank of the restaurant. There were more tanks and nets at the restaurant pier, but we did not saw any more activities or processing of seafood. We decided to come back for dinner tonight, at this would create a open atmosphere to talk with people from the restaurant and it was pretty busy at that time.

We walked to the left, to look what if there were any more interesting places at the pier, as we saw some restaurants when we arrived here in Koh Chang. We walked across some houses and arrived at Island View Restaurant and Resort, this looked interesting as they promote them self as a fresh seafood restaurant. We walked to the entrance and reception, but no one was present. We ringed

Opmerking [A406]: Fish farm with different nets and different fish
ORIGIN FISH FARM

Opmerking [A407]: Took fish with rod from water
ORIGIN FISH FARM

Opmerking [A408]: Threw fish into nets fish farm
ORIGIN FISH FARM

Opmerking [A409]: Boats next to the farm
ORIGIN FISH FARM

Opmerking [A410]: Man picked big fish from tank

Opmerking [A411]: Did not saw processing of seafood

Opmerking [A412]: Restaurants at pier

the bell, as was requested when no one was present, but unfortunately we got no reaction. We will probably send them an email. What we did saw, was that the resort had, as almost all of the houses that were on the pier, a very small own 'fish farm'. Nets were in front in the water.

Opmerking [A413]: Resort had small fish farm
ORIGIN FISH FARM

We walked back towards the main entrance and approached a women of the only other restaurant at the pier, also a seafood restaurant. She was not able to speak very good English, but she gave us some information. The seafood is from the near sea, and most of it is from their own small fish farm in front of the restaurant, as we also saw at the other places. Shrimps were from the sea of course. The small farm looked the same as at the other places. A net and some wood to hold the nets. We saw that the water here seemed pretty clean, there was not much waste in the water.

Opmerking [A414]: Most seafood from small fish farm
ORIGIN FISH FARM

15.00 Our driver brought us to the real village of Salak Phet. This looked very authentic and seemed not a place where tourists would go. We noticed that all the signs that showed in which district of Salak Phet we were, had a DASTA logo on top of it. The water here looked somewhat more dirty than on the pier we were first. We saw a lot of signs that showed that the people are very active in fishing. Almost all of the houses had nets hanging or tanks in front that are meant to store fish. The houses all were next to water or were build in the water as a whole. The people we saw did not speak English, but most looked very friendly. It would be nice to talk with some people over here accompanied by Mr. Fluck. There were a lot of small fishing boats in the water.

Opmerking [A415]: Salak Phet looked very authentic

Opmerking [A416]: DASTA logo on signs Salak Phet

Opmerking [A417]: Signs that showed that the people are very active in fishing

Opmerking [A418]: Houses are built in the water

Appendix VI - Comparing findings

	White Sand Beach	Bang Bao	Salak Phet
Origin	Mainland(main source), local, imported & farm.	Local, mainland & fish farm.	Local, own fish farm.
Environ-mental awareness	Restaurants & fishermen not aware. Local community a bit aware.	Not really aware, but open attitude towards concept .	Aware, use environmental techniques and materials.
Waste management	Claim that waste is managed.	Claim that waste is managed. Blame tourists	Claim that waste is managed. Blame tourists
Seasonality	Major differences demand & supply	Major differences demand & supply. More often middleman involved in low season.	Notice less differences due to seasonality.
Extinction		Only fishermen notice extinction. Blame big boats	All stakeholders notice extinction. Blame big boats and accidently fishing of small fish(seafood value chain).
Regulation & power	Marine Protected Area does not work. Rules implemented by government does not work.	Marine Protected Area, 3 km zone does not work. Notions of corruption	Marine Protected Area, 3 km zone does not work. Fishermen gave up big boats due to competition in 3 km zone.
Storage	Most of the fish stored in freezers	Fish stored in freezer or kept alive in tanks.	A lot of the fish is kept alive (fish farms).
Transport	Many transport routes.	Transport routes shorter.	Restaurants have adjacent farms or private piers.

Table 5 – Comparison of findings