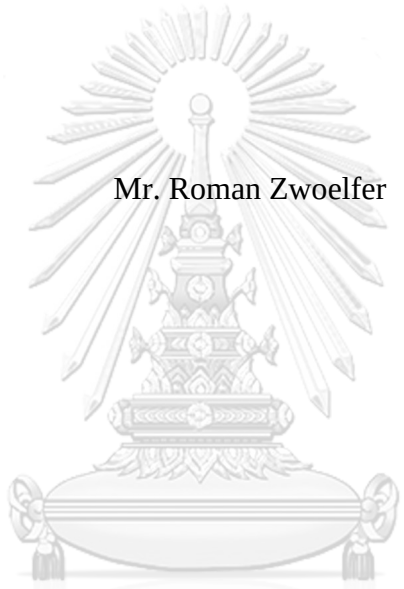
THE SOCIO-ECONOMIC IMPACT OF IUU-FISHING AND ITS COUNTERMEASURES ON SMALL SCALE FISHERMEN IN THAILAND : A CASE STUDY OF BAAN KHAN KRADAI, AO NOI, PRACHUAP KIRI KHAN

Mr. Roman Zwoelfer



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ผลกระทบทางเศรษฐกิจและสังคมของมาตรการแก้ไขการทำประมงผิดกฎหมาย ขาดการรายงาน และไร้การควบคุม ที่มีต่อประมงขนาดเล็กของประเทศไทย : กรณีศึกษาบ้านคั่นกระได อ่าวน้อย ประจวบคีรีขันธ์

นายโรมัน ซวอลเฟอร์

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรมหาบัณฑิต
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Thesis Title	THE SOCIO-ECONOMIC IMPACT OF IUU-FISHING AND ITS COUNTERMEASURES ON SMALL SCALE FISHERMEN IN THAILAND : A CASE STUDY OF BAAN KHAN KRADAI, AO NOI, PRACHUAP KIRI KHAN
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โรมัน ซวอลเฟอร์ : ผลกระทบทางเศรษฐกิจและสังคมของมาตรการแก้ไขการทำประมงผิดกฎหมาย ขาดการรายงาน และไร้การควบคุม ที่มีต่อประมงขนาดเล็กของประเทศไทย : กรณีศึกษาบ้านคั่นกระได อ่าวน้อย ประจวบคีรีขันธ์ (THE SOCIO-ECONOMIC IMPACT OF IUU-FISHING AND ITS COUNTERMEASURES ON SMALL SCALE FISHERMEN IN THAILAND : A CASE STUDY OF BAAN KHAN KRADAI, AO NOI, PRACHUAP KIRI KHAN) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: ศ. ดร.เผดิมศักดิ์ จารยะพันธุ์, อ.ที่ปรึกษาวิทยานิพนธ์ร่วม: ดร.วัชรพงศ์ รติสุขพิมล, 59 หน้า.

งานวิจัยนี้ได้ศึกษาผลกระทบทางเศรษฐกิจและสังคมจากการทำประมงที่ผิดกฎหมาย ขาดการรายงาน และไร้การควบคุม (IUU fishing) ที่มีต่อชาวประมงขนาดเล็กหรือชาวประมงพื้นบ้าน ซึ่งรายได้ส่วนใหญ่มาจากการประกอบอาชีพประมงเป็นหลัก คำถามของงานวิจัยนี้คือการทำประมงแบบ IUU และมาตรการการแก้ไขปัญหาการทำประมงแบบ IUU ของรัฐบาลมีผลกระทบทางด้านเศรษฐกิจและสังคมของหมู่บ้านชาวประมงพื้นบ้านของประเทศไทยอย่างไร โดยเฉพาะอย่างยิ่งหมู่บ้านชาวประมงพื้นบ้านทั้งก่อนและหลังปี 2558 งานวิจัยนี้ได้ใช้วิธีการวิจัยทั้งเชิงปริมาณและเชิงคุณภาพเพื่อสร้างความเข้าใจในความซับซ้อนของการเปลี่ยนแปลงของมาตรการการควบคุมการทำประมงที่มีต่อรายได้ของครัวเรือนโดยใช้พื้นที่ของหมู่บ้านชาวประมงในตำบลอ่าวน้อย อำเภอเมือง จังหวัดประจวบคีรีขันธ์ เป็นพื้นที่ในการศึกษา โดยงานวิจัยนี้ยังได้ศึกษาว่าชาวประมงพื้นบ้านได้ตระหนักถึงการทำประมงแบบ IUU และมีส่วนร่วมในการต่อต้านการทำประมงแบบ IUU หรือไม่ ผลการศึกษาพบว่าชาวประมงพื้นบ้านได้รับผลกระทบจากการทำประมงแบบ IUU และผลจากมาตรการการควบคุมการทำประมงของรัฐบาลที่มีผลบังคับใช้ในปี 2558 ทำให้ชาวประมงบางส่วนรู้สึกว่ามาตรการดังกล่าวสร้างผลกระทบในแง่บวกเพราะว่าได้ปล่อยให้ทรัพยากรประมงได้มีการเจริญเติบโตได้อย่างเต็มที่และเป็นการควบคุมเรือประมงพาณิชย์ขนาดใหญ่ แต่ว่าชาวประมงบางส่วนได้รับผลกระทบของการทำประมงแบบ IUU ในแง่รายได้ที่ลดลงเนื่องมาจากต้นทุนในการลงทุนที่สูงขึ้น ผลการศึกษาดังกล่าวจะช่วยให้ได้รับทราบข้อมูลเพื่อเป็นประโยชน์ต่อการวิจัยในอนาคตที่เกี่ยวข้องกับสถานภาพทางเศรษฐกิจและสังคมของชาวประมงพื้นบ้าน ซึ่งวิธีการศึกษาดังกล่าวอาจเป็นประโยชน์เพราะว่าเป็นแม่แบบเพื่อนำไปศึกษากับหมู่บ้านชาวประมงพื้นบ้านแห่งอื่นๆ ในประเทศไทย แต่ว่าข้อจำกัดของงานวิจัยนี้คือจำนวนกลุ่มตัวอย่างและการเลือกพื้นที่ในการศึกษาที่ยังมีจำนวนจำกัดอยู่

สาขาวิชา สิ่งแวดล้อม การพัฒนา และความยั่งยืน ลายมือชื่อนิสิต .....

ลายมือชื่อ อ.ที่ปรึกษาหลัก .....

ปีการศึกษา 2560 ลายมือชื่อ อ.ที่ปรึกษาร่วม .....

5887530820 : MAJOR ENVIRONMENT DEVELOPMENT AND SUSTAINABILITY
KEYWORDS: IUU COUNTERMEASURES IN THAILAND / IUU FISHING / SMALL SCALE FISHERMEN / SOCIO-ECNOMIC SITUATION OF FISHERMEN / GULF OF THAILAND

ROMAN ZWOELFER: THE SOCIO-ECONOMIC IMPACT OF IUU-FISHING AND ITS COUNTERMEASURES ON SMALL SCALE FISHERMEN IN THAILAND : A CASE STUDY OF BAAN KHAN KRADAI, AO NOI, PRACHUAP KIRI KHAN. ADVISOR: PROF. PADERMSAK JARAYABHAND, Ph.D., CO-ADVISOR: WATCHARAPONG RATISUKPIMOL, Ph.D., 59 pp.

This study investigates the socio-economic effects of Illegal, Unreported and Unregulated fishing (IUU-fishing) on households of small scale fishermen, whose income derives almost entirely from fishing. The research question is “What are the socio-economic impacts of IUU-fishing and government’s countermeasures on Thai fishing communities, in particular small scale fishermen’s households, before and after 2015?”. A mixed quantitative and qualitative approach was chosen to better grasp the complexity of fishing-related changes to household income and by the case study of a small scale fishing community in Ao Noi Subdistrict of Prachuap Kiri Khan Province. This resulted to a general understanding of the extent to which the community members were aware of IUU issues, as well as in their participation in related governance processes. The main results show that the small scale fishermen were impacted by those who perform IUU-fishing. Since the enforcement of the new regulation in 2014/2015, the fishermen have felt some improvement through the regrowth of fish stock and the enforcement of stricter regulation for commercial vessels. The income situation has, after initial gains, seen some losses in 2016, mainly due to higher costs or investments. The results shall provide a set of data for future research on the socio-economic situation of small scale fishermen. This approach might be useful as a template to be applied to other small scale fishing communities in Thailand or elsewhere. The limits of this work are clearly given by the sample size and the selected target community.

Field of Study:	Environment Development and Sustainability	Student's Signature	.....
		Advisor's Signature	.....
Academic Year:	2017	Co-Advisor's Signature	.....

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Last but not least I would like to extend my gratitude and to my friends Josh and Jason, as well as to my family who provided me with moral support throughout my studies and research.

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List of Abbreviations, terms and disclaimer

(R)AC(s) – (Regional) Advisory Council(s)

CCCIF – Command Center for Combating Illegal Fishing (RTN)

CCTI - Command Center for Tackling IUU – used in some translation unanimously with CCCIF

CFP - Common Fisheries Policy

CPUE – Catch per Unit Effort

DMCR - Department of Marine and Coastal Resources (MNRE)

DNP – Department of National Park, Wildlife and Plant Conservation Department (MNRE)

DOF – Department of fisheries (MOAC)

DPLW – Department of Labour Protection and Welfare (MOL)

EBFM - Ecosystem-based Fisheries Management

EC – European Commission

EEZ – Exclusive Economic Zone

FAO – Food and Agriculture Organization of the UN

FDA – Food and Drug Administration (USA)

FMP – Marine Fisheries Management Plan of Thailand

FPO – Fisheries Provincial Office

GT – Gross Tonnage

HH - Households

IOTC – Indian Ocean Tuna Commission (UN FAO)

IUU - (fishing) Illegal, Unreported and Unregulated (fishing)

KI – Key informers

MCS - Monitoring, Control, and Surveillance

MD – Marine Department (MOT)

MNRE - Ministry of Natural Resources and Environment of Thailand

MOAC - Ministry of Agriculture and Cooperatives of Thailand

MOT – Ministry of Transport of Thailand

MOL – Ministry of Labor of Thailand

MSFD - Marine Strategy Framework Directive

MSY – Maximum Sustainable Yield

NPCI – National Plan of Control and Inspection 2015 of Thailand

NPOA-IUU – National Plan of Action (to prevent, deter and eliminate illegal, unreported and unregulated fishing 2015) of Thailand

RTN – Royal Thai Navy

SEAFDEC – Southeast Asian Fisheries Development Centre

SDG – Sustainable Development Goals

Small scale fishermen – fishermen with boats below 10 tons of gross tonnage and 220 horsepower engines

Thai-MECC – Maritime Enforcement Coordination Center of Thailand (TNR)

THB – Thai Baht

UN – United Nations

UNCLOS - United Nations Convention on the Law of the Sea

USD – US Dollar

VMS – Vessel monitoring system

Chapter 1 Introduction, research question and objectives

1.1 Problem

The existence of IUU-fishing is a mix of mostly greed, unawareness of the impacts, lack of regulations or the lack of enforcements of the latter. As there might be no or not full taxes or duties on these catches being paid, it would give an unfair advantage to those who are not involved in IUU-activities. Instead the perpetrators violate the regulations on local, national and international levels, on the costs of nature, future generations and other properly operating fishermen and fishery businesses who face higher costs and lower catches due to their compliance to the law.

Some of the most affected and most vulnerable groups in the fisheries are the small scale local fishermen, as they have least means, financially and technology-wise to combat the unfair advantage taken against them. Especially the limited range and size of their vessels makes it impossible to compensate the loss caused by IUU-fishing in their close range. Often also their food supply to their families is threatened and not only their disposable income. This leaves them no other option but turn for example to piracy or other illicit activities, as seen in some coastal regions of Africa and Asia already, which causes damage to humans, countries and international trade. That is the reason why this topic and thus this paper by analyzing reasons is of such importance.

This research is about the field of the socio-economic impact to the local fishing communities, more specifically on small scale fishermen and their families because of Illegal, Unreported and Unregulated (IUU) fishing and the effects of the countermeasures to combat IUU-fishing in Thailand. The government has stepped up its measures to reduce IUU-fishing. In 2012 the total marine capture in Thai fisheries was 1,612,073 tons and the total value of exports of fish and fishery product from Thailand sum up to 8.079 billion USD. (UN FAO, 2014)
"By definition, IUU fishing is either an expressly illegal activity or, at a minimum, an activity undertaken with little regard for applicable standards. IUU fishers gain an unjust advantage over legitimate fishers; i.e. those who operate in accordance with those standards." (UN FAO, 2001) It is happening nearly everywhere in the world where capture fisheries are active. The FAO mentions as an example of a legal basis of how to identify IUU fishing the EC Regulation No. 178/2002. (UN FAO, 2014)
The issue is strongly related the Sustainable Development Goals (SDGs), especially to the goal number 14 "Conserve and sustainably use the oceans, seas and marine resources for sustainable development" – section 14.4 "to end IUU-fishing until 2020." (UN General Assembly, 2015)

1.2 Measures to combat IUU

A while ago a set of governmental measures were newly introduced like e.g. the Command Center for Tackling IUU (CCTI) Commander with absolute power over all relevant governmental agencies, the introduction of the Thai Marine Fishery Management Plan (FMP) (Ministry of Agriculture and Cooperatives of Thailand, DOF, & IOTC UN FAO, 2015) coming along with a large reduction of the number of active fishing vessels. In addition a new licensing policy, establishing of sanctuary zones and the ban on some fishing gears as defined in The Royal Ordinance on Fisheries B.E. 2558 (2015) (Thai Government, 2015) have socio-economic impacts to the local fishermen individuals and their households (HH), as well as on the commercial fisheries, who previously operated in the coastal zones relatively freely as well. The measurements to combat IUU in Thailand will be explained in more detail in chapter 4 and specifically from Chapter section 4.2 until section 4.4.

Other countries or supra-state-structures, e.g. the EU, have introduced measures to combat IUU fishing on various scales up to global levels. One such measure is for example the financing of the so called Port State Measure Agreement (PSMA) in cooperation with the UN FAO, to introduce MCS or encourage better MCS systems to countries around the world.

“The European Commission's Directorate General Maritime Affairs and Fisheries has provided the Food and Agriculture Organization (FAO) of the United Nations with a grant of USD 1,800,000 to co-finance a USD 2,300,000 project to support the implementation of the PSMA and complementary international instruments and regional mechanisms to fight IUU fishing. “This program was developed to strengthen legislation and policies to combat IUU fishing, improve flag state performance in accordance with FAO Voluntary Guidelines and encourage MCS enforcement, as well the introduction of market access measures.” (UN FAO, 2018)

Another measure for example introduced by the EU is the warning system with the famous green, yellow, red and black card for countries who have some issues with IUU-fishing. The EU as one of the 3 major fish product importers has introduced this market measure to bar violators from exporting their produce into the EU. (European Commission, 2017). This generated a very high level of awareness in Thailand as the “yellow card” was introduced to the country. Since then measures by Thai government have been introduced and the current government’s enforcement of measures seem to have some positive effect contrary to previous attempts and led to an improvement of the latest status report of the EU commission on Thailand. The consumer market pressure is another efficient tool to reduce the practice of IUU-fishing.

1.3 Research question and hypothesis

The research question is “What are the socio-economic impacts of IUU-fishing and it's countermeasures on Thai fishing communities and specifically on small scale fishermen households, before and after 2015?”

The hypothesis is “Due to the stricter enforcement of regulation and new policies especially for commercial fisheries since 2015, there are positive effects for the small scale fisheries”

1.4 Objectives

1. The first objective of this research is aiming to analyze the effects of the socio-economic impact of the IUU issues on a local fishing community.

2. The second objective is to analyze the interest and willingness of small scale fishermen to take part in participatory governance measures in order to improve their livelihood in the target community.

3. The third objective is to assess if such measures applied successfully in other regions of the world can be applied to the Thai small scale fishermen.

1.5 Relevancy

This research is relevant to Thailand's policy makers and the affected fishing communities, as well as for countries in a similar situation. In addition it is providing a base for future researchers in social, economic or marine fields that are related to small scale fisheries.

Chapter 2 Literature review

The topic of IUU-fishing is a long discussed issue among the involved industries, regulators, administrators, scientists and NGOs. In general an understanding and initiatives for the problem were created through United Nations Convention on the Law of the Sea (UNCLOS) which would provide the legal framework for oceans.(UN UNCLOS, 1982) Another international regulation applicable specific to IUU fishing is the Code of Conduct for Responsible Fisheries in 1995. It is directed at members and non-members of the FAO, fishing entities, sub regional, regional and global organizations, whether governmental or nongovernmental, and all persons concerned with the conservation of fisheries resources and management and development of fisheries, such as fishers, those engaged in processing and marketing of fish and fishery products and other users of the aquatic environment in relation to fisheries. (Baird R. J., 2006)

The expression IUU was first mentioned to a global audience around 1992 at international conferences and the United Nations conference on environment and development, like the International Conference on Responsible Fishing that adopted the Declaration of Cancun. This led to several follow-up events that led to the before mentioned Code of Conduct for Responsible Fisheries of 1995.(Doulman D. J., 2000)

The definition of IUU-fishing as an illegal activity or at least activities that do not take international standards not seriously. This leads to an unfair advantage of the IUU fishers over the legitimate fishers, who keep to the standards. The international community has experienced a growing number of fishing activities that do not respect the relevant laws, regulations and international standards. These include reflagging of fishing vessels, unauthorized fishing in coastal states without the consent of this states, not reporting catches and other illicit practices more. This led then subsequently to the creation of the International Plan of Action against IUU-fishing (IPOA-IUU) This plan is to be enacted voluntarily and is useful in the way that it provides tools of how to deal with IUU and provide guidance to the FAO member states and others. (UN FAO, 2001)

The FAO mentions as examples of a legal basis of how to identify IUU fishing the EC Regulation No. 178/2002 by the means of creating a catch certification scheme. Importers in the United States of America need to file a notification with the Food and Drug Administration (FDA), this notes require information on the product, identification of the shipper, country of origin and the agreement of the country for the shipment. In Japan the Ordinance for Enforcement of the Food Sanitation Act from 2007 requires labeling and a traceability system for food products made available to consumers. (UN FAO, 2014)

The importance of fishing to a nations income, especially in the case of Thailand can be seen in the sheer numbers of 2012, where the total marine capture in Thai fisheries was 1,612,073 tons and the total value of exports of fish and fishery product from Thailand summed up to 8.079 billion USD (UN FAO, 2014) as mentioned previously.

This clearly shows when large parts of the fleets are grounded or limited allowed catch days are introduced, that it will have quite substantial impact on the income of fishermen, communities and businesses in the affected areas. As stated in the Marine Fisheries Management Plan (FMP) of Thailand, and as stated in The Royal Ordinance on Fisheries B.E. 2558 (2015) in an further attempt to reduce IUU-fishing, rebuild fish resources and reducing fishing capacity. It is intended to reduce the fishing efforts for demersal fishing by 40% and for pelagic fishing by 30% by 2018 in the Gulf of Thailand and respectively in the Andaman Sea by 10% and 20%. (Ministry of Agriculture and Cooperatives of Thailand, DOF, & IOTC UN FAO, 2015)

The relevant catches for small scale, also referred to sometimes as artisanal, fishermen in Thailand sum in 2014 demersal, anchovies and other pelagic fish in the Gulf Thailand for 114,207 tons compared to 818,271 tons by commercial fishery. For the Andaman Sea the artisanal fishery accounts for 25,654 tons compared to 284,972 tons by commercial fishery. In the gulf of Thailand 87.8 % of the total catch were taken by commercial fishery and only 12.2% by artisanal fishery. In the Andaman Sea 91.7% were taken by commercial fishery and only 8.3% by artisanal fishery. (Ministry of Agriculture and Cooperatives of Thailand, DOF, & IOTC UN FAO, 2015)

The types of fishing gears that are used by artisan fishermen, range from trawl, push nets, gill nets, traps, hook and lines, falling nets, others for demersal fish. For anchovies anchovy falling nets and anchovy lift nets are used. For other pelagic fish surrounding nets (including purse seine), gill nets and round nets are used. The main fishing gear used by artisanal fishery is the gill net, but they use a wide variety of gears. The main gears used by commercial fishery are trawls and purse seins. (Ministry of Agriculture and Cooperatives of Thailand, DOF, & IOTC UN FAO, 2015)

That will lead of course to a subsequent reduction of income from fisheries and especially will have widespread socio-economic impacts on fishing communities which depend strongly on this source of income, in this paper it will be focusing on small scale fishermen and their families. So therefore gaining data on the situation and the development of a quantitative research method to adequately measure HH incomes in affected areas is required. HH income is composed of earnings from productive activities and transfers. It is customary to distinguish four main components in the measurement of income: (1) wage income from labor services; (2) rental income from the supply of land, capital, or other assets; (3) self-employment income; and (4) current transfers from government or non-government agencies, or other HHs. (World Bank, 2005) This will be done via the usage of an expenditure and spending diary concept within the HH questionnaire.

As for the social impacts of the IUU-fishing and the better understanding of how to analyze them is required. Therefore it has to be looked at with a very methodical approach that covers all aspects of peoples There the people's experiences, expectations, social practices and values will be asked for. It has to be determined what qualitative research method is to be used best under the given circumstances. The choice of participants has to be continually assessed and reassessed during the

research process. The researcher might find that other participants with different experiences than planned originally have to be taken into consideration during the ongoing research process. (Moen K. & Middelthon, 2015)

In accordance to use a method to analytically assess socio-economic impact the method of a result-chain and its indicators is a good way to assess changes from previous situations, current ongoing effects and the long term perspectives. Using socio-economic impact measurement to drive more effective collaboration between business, government, and civil society. Today's global challenges affect us all, and they are too complex and systemic for any one organization or even sector – business, government, or civil society – to solve alone. Collaboration is essential. (WBCSD, 2013)

Going on the to the part of analyzing the information gained it is necessary in order to better understand the impact, to define what mode or methods of analysis can be used in order to grasp the socio-ecological aspects and compare some of the most important systems to this aspect in history. To show how the modes and methods come into existence and which are the main aspects when analyzing a complex ontologically different domains that are interconnected, is required to better understand the underlying causes. It is hinted careful selected analytical processes and modes have to be used and an openness to multiple methods of research is required. Also the ways of how what in one or another system is valuing certain factors need to be questioned and the social ecological framework prompts to a critical reevaluation about the nature of value. (Lejano R. P. & D., 2013)

In order to better understand the value systems within fisheries it is required to find out about how values, images and principles are seen by resource users and the relevant governmental decision makers and administrators and how complex the interaction between them and how the world is functioning are in reality. Also the specific information how these before mentioned factors influence the fisheries governance is an important point. A clear indication how governance challenges can be reduced if all the stakeholders' values, images and principles are made visible to the other sides, are understood there as well and can be formulated into the policy and decision making processes. (Song A. M., Chuenpagdee R., & S., 2013)

Exploring the successful cases where stakeholders feel satisfied with the facilitation of the participation process, good will toward the convening entity or governmental body can manifest as confidence in the agency's abilities to handle other policy matters and make decisions. (Halvorsen K. E., 2003)

An example of how successful the reformed RACs stakeholders work together is shown in a survey from 2010. It emphasizes on the closer contact to the c The survey data yield comparisons between the priorities and challenges of four RACs, the North Sea, North Western Waters (NWW), South Western Waters (SWW) and Pelagic RACs. Among the RACs included, the Pelagic RAC faces unique circumstances in comparison to the other three because of the migratory nature of pelagic stocks and resulting quota sharing with non-EU countries. The access to information and the

contact to decision makers as well as scientists have been mentioned as reason to participate in this RACs. According to the outcome of the survey, the RACs have proven to be an asset to stakeholders not only as advice forums, but also through the increased collection of and access to information. (Ounanian K. & Hegland T. J., 2012) It seems that RACs have claimed an important role in information sharing, as it is mentioned in the Commission's review, which encourages more development in the area.(European Commission, 2008)

To better understand what impacts or effects IUU-fishing has to fishermen, the latest report on US-fishermen is looked at. The primary findings there are that there are huge losses, because the fishermen who in compliance with anti-IUU-regulations, have to compete with the imported IUU-gained fish. The economic loss sums to as much as 1 billion US$ per year for the local fishermen. In addition to IUU harvest of targeted species, IUU activity has a huge impact on other species such as seabirds, turtles and marine mammals. As IUU fishers operate outside the law, many do not use technologies or techniques that reduce bycatch or harm to habitats. (WWF, 2016)

Within policy-making the discussions of how natural and material resources should be handled is going on for a long time, but it is hinted that one factor is left out. That would be the "behavioral capital" – as the term in this publication is called - as an additional parameter that should be taken into account. It reflects on the intention manipulation as a factor towards achieving goals as practicable instrument to reach the desired goals for the change of the stakeholders. The conclusion is that behavior influencing is a cheaper and more effective way of reaching environmental goals. Some indication why even though right technologies and processes were used and still the outcome might not be effective is an important part to be analyzed. (Beretti A., Figuières C., & G., 2013)

When looking into the part of what type of policies should be used and especially under the aspect of stakeholders' participation in the process there would be a good existing example in other regions of the world. This is to show how a successful system can work in the real world and it is worth looking into the concepts of Advisory councils (ACs), specifically to the so called Pelagic Regional Advisory Council. This has been under the desire to improve the function of the previously existing Regional Advisory Councils (RACs) under the reform of the Common Fishery Policy. It clearly shows the importance of geographically orientated stakeholder advisory bodies, just can be the right thing to in a larger complex and varying geographic when a larger ecosystem is affected. Also it is shown how the interdisciplinary cooperation can be achieved. (Coers A., Raakjær J., & C, 2012)

Here it should be also mentioned that this would relate to the SDG 2 – and here especially to the point 2.3 – which aims at doubling the agricultural production for small scale food producers and their access to knowledge and resources. (UN General Assembly, 2015) Participatory governance methods are good way to achieve this.

An interdisciplinary cooperation can be reached by the traditionally weaker stakeholder, the fishermen themselves in order to redraw the current system. Whereas

traditionally the fisheries policies have been established by the political decision makers and administrators, based on the input of the scientific community, the integration of the fishermen in the decision-making processes were rather limited, as they were seen more as the cause of the problem than as part of the solution. The knowledge of the fishermen was mostly ignored, but currently the mobilization of the smaller actors is happening and it has the effect that now also the other stakeholders start to move away from the traditional mind of how, what and when should be done in regards to marine fisheries policies. (Caitriona A. C., 2013)

It is somewhat important to analyze the existing reforms to determine if a new system from somewhere else in the World can be implemented in Thailand. For example one current strategy pursued in the EU is to have the Common Fisheries Policy (CFP) going towards an ecosystem-based management frameworks. It is found that within the reforms the social sustainability is less concerned compared to the economic and ecologic aspects of the undertaking. It shows where and how the CFP and the Marine Strategy Framework Directive (MSFD) can be considered to work towards the Ecosystem-based Fisheries Management (EBFM) and where it is not. It is found and the available useful tools to determine the sociological impacts are limited. So determining which parts of changes to an existing system can be useful and which are more harmful under the sociological point of view is vital when working towards a sustainable solution. (Prellezo R. & R., 2015) If coming to the sociological impacts also an alternative approach in defining of how the importance of political and social justice aspects can be evaluated and how knowledge in this fields is gained. The more traditional based approaches in knowledge creation are focusing too much onto the techno-scientific aspects of managing marine fisheries, via quotas, technical measures and restricted areas or seasons. It is seen that the social aspects and the knowledge creation and transfer, under alternative thinking by the idea of phronesis, which refers to intellectual virtues similar to wisdom, in the fishery sector are not represented to the extend they should. So also here usage and inclusion of the local wisdoms of the Thai fishermen should be a relevant approach when creating new kinds of solutions for participation governance forms and implementing them into reality. (Linke S., 2014)

In regards of sustainable fishing, as shown in the results, the light-luring has a very high negative impact to marine populations, be it for targeting anchovies, squids or other species. The main problem is that small mesh sized nets especially, like the ones used for anchovies are causing extreme damage to juveniles of many other species. The percentage losses from light-luring anchovy fishing reached very high levels and varied in each location, such as Songkhla area, with high losses because the of the juvenile bycatch in 1997/1998 season, where the total reached in some months up to 29.97% of the total catch. (Tokrisna R., 2000)

Chapter 3 Methodology and analytic techniques

3.1 Study area and brief introduction to research framework

The primary data collection method here was a combined quantitative and qualitative approach with a lingual interpreter via semi-structured interviews and was written down on a prepared questionnaire. The interviews were to be conducted within a community with 60 small scale fishermen HHs and additionally 4 local authorities and/or governmental officials or other key informers (KI), and their view on general communal income situation with main income based on fishery. A very extensive field survey on HHs with some larger share of fishermen was performed on the population in two villages in Ranong Province and Phuket Province, where 79 and respectively 94 surveyed HHs were surveyed. That was out of a total number HHs 144 and respectively 116. (UN FAO, 2000).

After reviewing the size and the available target populations, time and resources for this paper, in accordance with the academic committee and advisors, it was decided to go for a small scale fishermen community, in the area of Khan Kradai in Ao Noi in Prachuap Kiri Khan province, with 60 HHs. The community and their fishing area is located around the bays next to Wat Ao Noi with its temples and mountain cave. The bays and the waters around them have been used by local fishermen to catch pelagic, demersal fish and other marine species home at the Gulf of Thailand. Infrastructures in the area include 2 train stations, the Khan Kradai class 3 station and the Prachuap Kiri Khan City station, the small commercial sea port of Ao Noi as well as a Royal Thai Airforce base next to Prachuap Kiri Khan City.

Picture 1 Fishing harbor of small scale fishermen – source: rzwoelfer 2017

Based on average HH numbers, that should be representing a typical fishing community in this area for this research, a community was selected. By applying Yamane's formula (Yamane T., 1967), with a mathematical population of 60, and a precision of +/-10%:

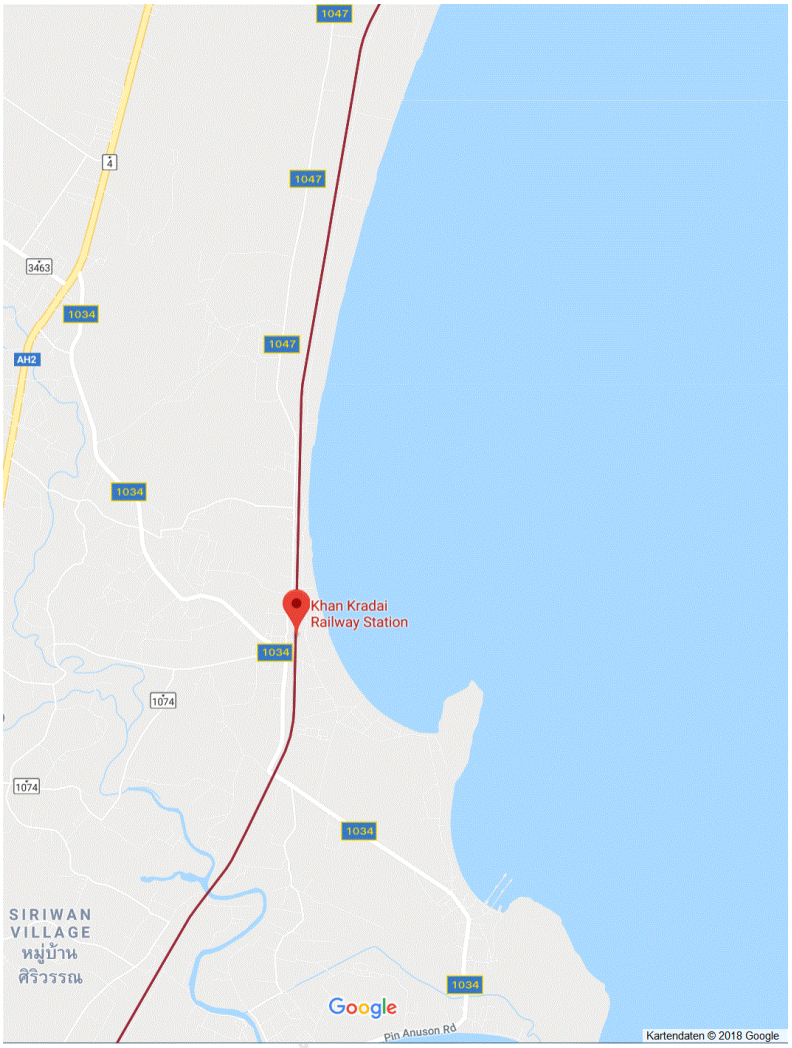
$N / (1+N(e)^2) = n$
N=number of households
e=precision of sample
n=the relevant sample size of households

$$\frac{60}{1+60(0.1)^2} = 37.5 \approx 38$$

The sample size should be 38. The actual number of participating HHs and KIs was 39.

The larger part of the surveyed HHs were either depending on fishery income only or as a secondary income source. So given the experiences and results of the previous survey, at average the half of the common HHs would participate, so 30 HH would be a reasonable target number of participants for this study. In the field research this target was surpassed by 16.66%, resulting in 35 participating common HHs and an additional 4 KIs (KI). In Chapter 5 the HH and KI statistics have been combined due

to the small sample size and only for some specific questions separated when it seemed relevant.



Picture 2 Map of the main area of fishing of Khan Kradai

The question route or items for the HHs were including a) income / expenditure b) social and livelihood c) questions specific to fishery d) IUU and sustainability awareness and experiences and e) their awareness and experiences about participatory governance in case the HHs are actively involved in fisheries. The question route or items for authorities, KIs or government officials included similar items, but focus on the communal level of socially relevant, fishery-wise relevant, IUU-awareness and participatory relevant aspects.

The time range of the income and expenditure relevant parts of the questionnaire are ranging from the year 2014, 2015 to 2016. The incomes and expenditures were asked on the average monthly income for the afore mentioned years, as the effects of the enforced countermeasures are rather new. As the experience has shown the common HHs in the relevant communities do not keep records of their incomes and spending in fixed financial figures, so it was decided to use average monthly income and expenditure ranges of money, to make it easier for the participants to provide accurate

information. The focus was on how available income has developed in the village in general and for HHs involved in fisheries in more detail even.

The second part of the questionnaire was related to find out if any social changes have been felt by the fishermen's HHs in their community since 2014. The third part of the questionnaire included a module asking about fishery specific issues and the development of felt effects in that regards. The fourth part was to probe if and how IUU-awareness is existing and if participants have any experience with it and or did feel any effects of IUU-related countermeasures in recent years.

The final part was about some questions about their participation in fishery related decision making processes. This part was naturally only applied to HHs involved in fishery and will be limited to the interest to participate in decision making processes and the willingness to provide data for science and other entities, similar to the reformed ACs.

The methodology used here to understand and analyze socio-economic impacts are based on the World Businesses Council for Sustainable Development (WBCSD) – so the primary result chain of how to measure uses inputs in case of IUU-fishing. It would be IUU-fishing effects and effects of countermeasures to fishermen's HHs and communities going to activities indicators about what and if is done differently previously or after IUU-issue got taken more seriously. The outputs in the next step will show the results of the activities, in if and what effects of activities has on the fishing community. After this it goes on to with the next step, the outcomes indicators, that would be changes to lives of the target population, including adopting behaviors or obtaining opportunities. The next step would then be the impacts, as goal level changes in the lives of target population, like in the long run, including e.g. education, health status and income levels (WBCSD, 2013)

3.2 Primary quantitative data collection

The research used in this thesis is a mixed quantitative and qualitative research approach via semi-structured questionnaires used in interviews, and more in depth information in Chapter section 5.3 as some information that was relevant and noteworthy was given in conversations, especially with the fishing HHs of the record of the actual questionnaire. Here the quantitative driven approach was used, as the collected quantitative primary data on income, IUU-awareness and willingness to participate in decision making processes are seen as the main driving forces behind the socio-economic change of the livelihood of the fishermen and their communities.(Christensen L. B., Johnson R. B., & A., 2014). The results of primary data analyses were put in tables created in the Chapter 5, all graphics are listed in the list of tables .

3.2.1 Definition of households and incomes / expenditures

The data was taken from the first part of the interviews filled in the first quantitative part of the questionnaire and was supposed to be compared with available official

governmental sources about income in small scale fishing communities. As it was found during the field research no specific income or tax records to the target fishing communities were established by the authorities, so an indicator to general income levels in Thailand via the GDP per capita was created and a comparison with the average monthly wages in Thailand was made.

Based on so called HHs roster names (just for administrative use, not being shown in research paper), members age, members gender, members marital status; (World Bank, 2000) and in addition educational levels were recorded. Research specific fields are used to identify if a HH has income from fishery, fishery business or other income fields. It was also recorded if there was any fishery related income, if it was in form of full-time, part-time or processing/sales of fish products. To make it easier for the participants to remember their average monthly income for the period a system of income categorization was used as well as detailed real live examples of what the certain income or expense would consist of. Due to observations made by the interviewers during the field research, the target population would usually a tendency to report lower figures, both in expenses and income, and only after further inquiries would remember smaller things relevant for the categories, so it was decided to base the average values of calculations on the maximum value each category.

HH income is composed of earnings from productive activities and transfers. It is customary to distinguish four main components in the measurement of income: (1) wage income from labor services; (2) rental income from the supply of land, capital, or other assets; (3) self-employment income; and (4) current transfers from government or non-government agencies, or other HHs. (World Bank, 2005). This will be done via the usage of an expenditure and spending diary concept within the HH questionnaire in regards of fishing expenses and income as well as net income from non-fishing activities. As it was found during the interviews apart from a few retired former government employees, who receive a state pension who then were counted as non-fishing income together other sources non-fishing incomes, and not counted separately as transfers from government, due to the extreme low numbers. Else there were no government transfers received reported nor did any transfer to the government happen, e.g. in the form of taxes.
This was the base for the analysis of the economic impacts.

3.2.2 Definition of small scale fishermen

To specify what definition is seen here as small scale fishermen, which is used in this paper synonymously with the expression artisanal especially in Thai documents sometimes, it refers to fishermen that would use vessels with the following definitions to be included in the scope of this paper a) small artisanal fishing vessels with engine power less than 180 horsepower (hp) and vessel capacity less than 5 GT and b) large artisanal fishing vessels are fishing vessels with engine power between 180 and 220 horsepower and vessel capacity between 5 and less than 10 GT. The definition of small and large artisanal fishing vessels is used for this paper is based on the Appendix A of the Marine Fisheries Management Plan of Thailand (Ministry of Agriculture and Cooperatives of Thailand, DOF, & IOTC UN FAO, 2015)

3.3 Primary qualitative data collection

The second part of the interview is a qualitative one looking into socio-ecological aspects of the ongoing changes. There the people's experiences, expectations, social practices and values will be asked for. (Moen K. & Middelthon, 2015)

This part will be used to collect the less quantifiable portions of the social change within the HHs and find out what changes to their personal or communal life style they have experienced previous and since measures to combat the IUU-fishing have been implemented in Thailand fishing communities. The data asked for from the participants includes such as questions about the felt effects to their lifestyle and social activities, and to find out if they are familiar with the concept of participatory governance, if and to what extend the currently use an approach like this, willingness to take an active part in the process.

In addition to the HHs also relevant local governmental administration officials were interviewed with a similar set of questions, just based on the view by officials instead of HH to include their experiences and points of view as well.

3.4 Analytical techniques

In a first step the quantifiable variables observed in the data sets gained from field research via the semi-structured questionnaires will be analyzed by using the descriptive statistical method, mainly to determine the basic sets of data. This is aiming at gaining some insight of the socio-economic structure of the target population, in regards of income and communal social situation via its variables' distribution. The fishermen's means of income variables would be then also compared with other local and national income means. In a second step it was looked into if the income and the qualitative social data can be related to IUU-fishing specific data gained via the questionnaires, in order to identify possible correlation or to rule out such connection of issues. In addition to explore any temporal correlation of variables of the year of 2014 – with a lower level of anti-IUU measures - will be compared with 2015, 2016/2017 when measures against IUU-fishing have been stepped up.

3.5 Secondary data collection

The secondary data was collected through a meeting with DOF officials, to provide a better insight of the relevant Thai structures of how the governmental agencies on at all levels cooperate and measures are taken so far and a to gain a brief outlook to future planned activities to reduce IUU-fishing as shown in Chapter 4.

In addition a comparative literature approach of analyzing participatory governance research in a state-superstructure with the various marine regions with the Thai

specifics of fisheries in Chapter 2, while incorporating the results of the survey in regards of fishing aspects in Chapter 5 as well.

The comparative literature review is dealing with the study of literature and cultural expressions, crossing boundaries of linguistic, national and disciplinary borders. The greatly interdisciplinary approach is useful to this research, as it tries to interlink between different cultures and nations, including various dimensions, e.g. economy, political dynamics, cultural aspects, history, international relations and others. (Lubrich O., 2006)

Based on this, affected communities by IUU fishing, its countermeasures will be looked upon to find out what recommendation in regards of participatory governance for Thailand can be given. The focus will on briefly analyzing the suitability for Thailand of using a concept similar to the one of the AC concept.

3.6 Operational outline of proceedings during thesis creation process

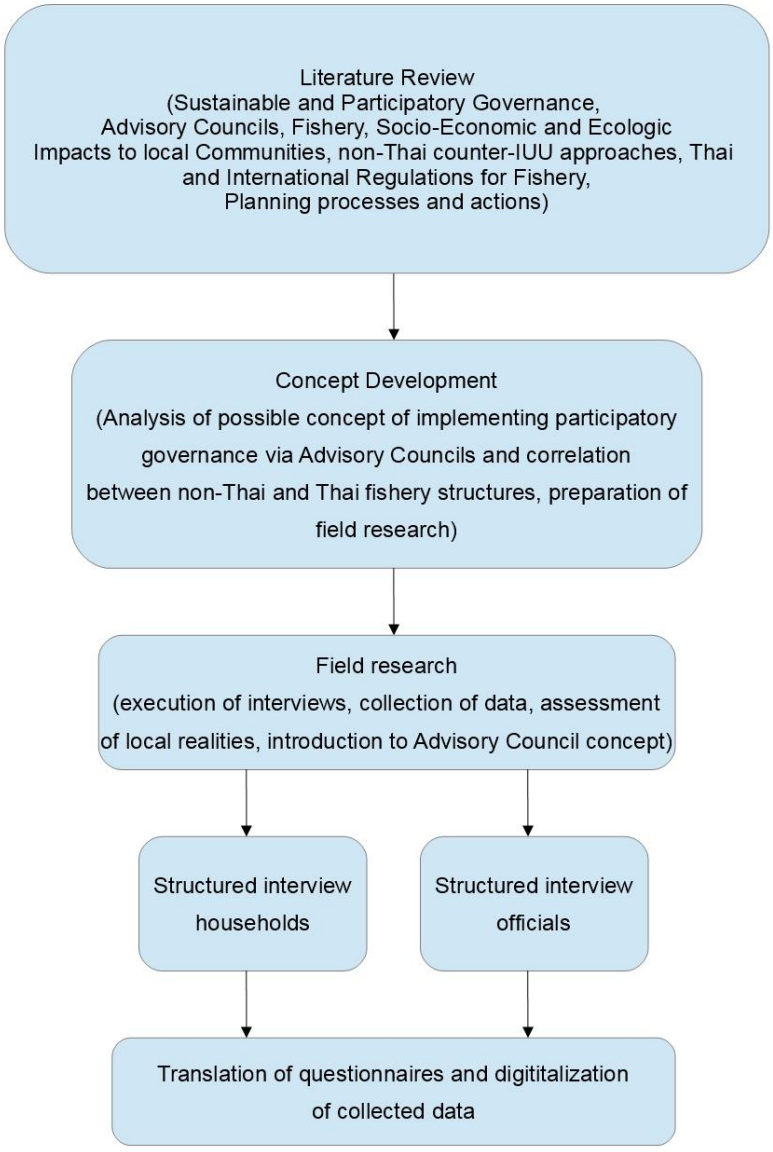


Figure 1 Research process and data collection sequence

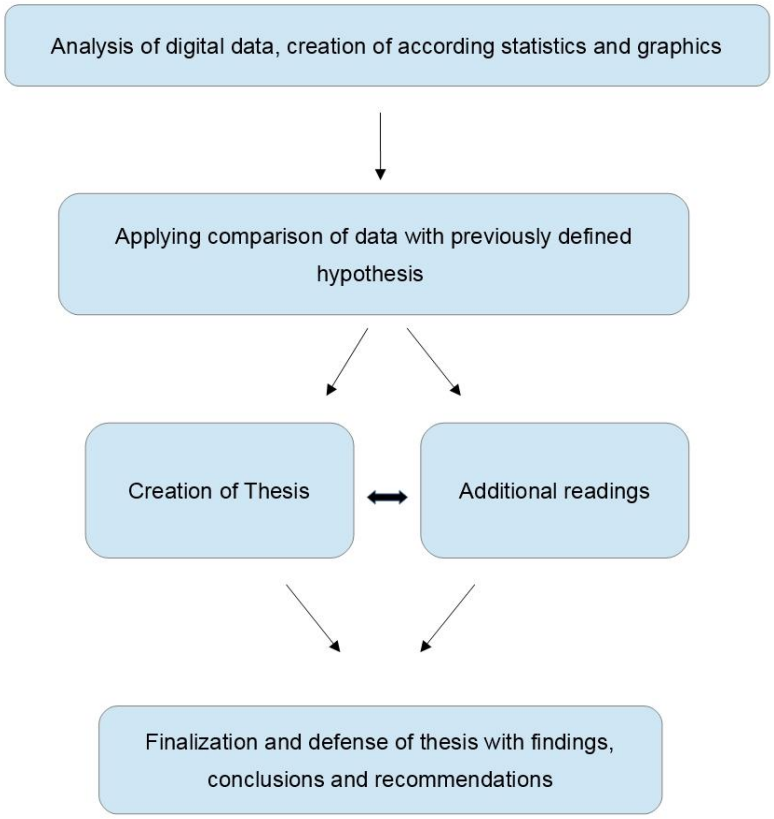


Figure 2 Analysis and finalization process

Chapter 4 General information about fishery and IUU related Thai specifics

4.1 Brief historical background of marine fisheries in Thailand

Before the 1930 decade no motorized vessels were used in Thai waters. In the 1960 decade the first larger commercial trawlers were introduced to Thailand, and it rapidly gained in popularity because of its efficiency and the capability to fish basically day and night. Bigger vessels with higher horse power engines, better communication and sonar technology followed, which allowed to fish further offshore and for longer durations, which were also capable to fish in the waters of Vietnam and Cambodia. With the announcement of Exclusive Economic Zones (EEZ) in Asia, ranging from 12 nautical miles to 200 nautical miles from the shores, in the second half of the decade of 1970 and Thailand's announcement of its EEZ in 1981, the before available fishing grounds for Thai fishermen drastically reduced, leading to a backflow of mainly smaller vessels to Thai waters.

In the following years starting in the decade of 1990 countries in the region revoked previously granted fishing permissions to Thai medium and larger vessels. In order to continue fishing in another countries waters business partnerships and or reflagging of vessels were required. From the late decade of 2000 on this type of agreements were limited as well by countries in the region and more fishing was conducted in the international waters. At this time Thailand had become a global top industrial seafood producer already and most of the raw material was supplied from non-Thai seas. (Ministry of Agriculture and Cooperatives of Thailand, DOF, & CCCIF, 2015)

4.2 Fisheries management structures established and planned

In the first quarter of 2018 a meeting with a director of the DOF was held in order to better understand how the relevant bodies within the Thai official structures interact. In addition a brief outlook on currently planned future activities was gained. Based on the

information gained an overview of the involved main entities was created as shown below. The figures, referring to all graphics in this chapter, will be listed after the references.

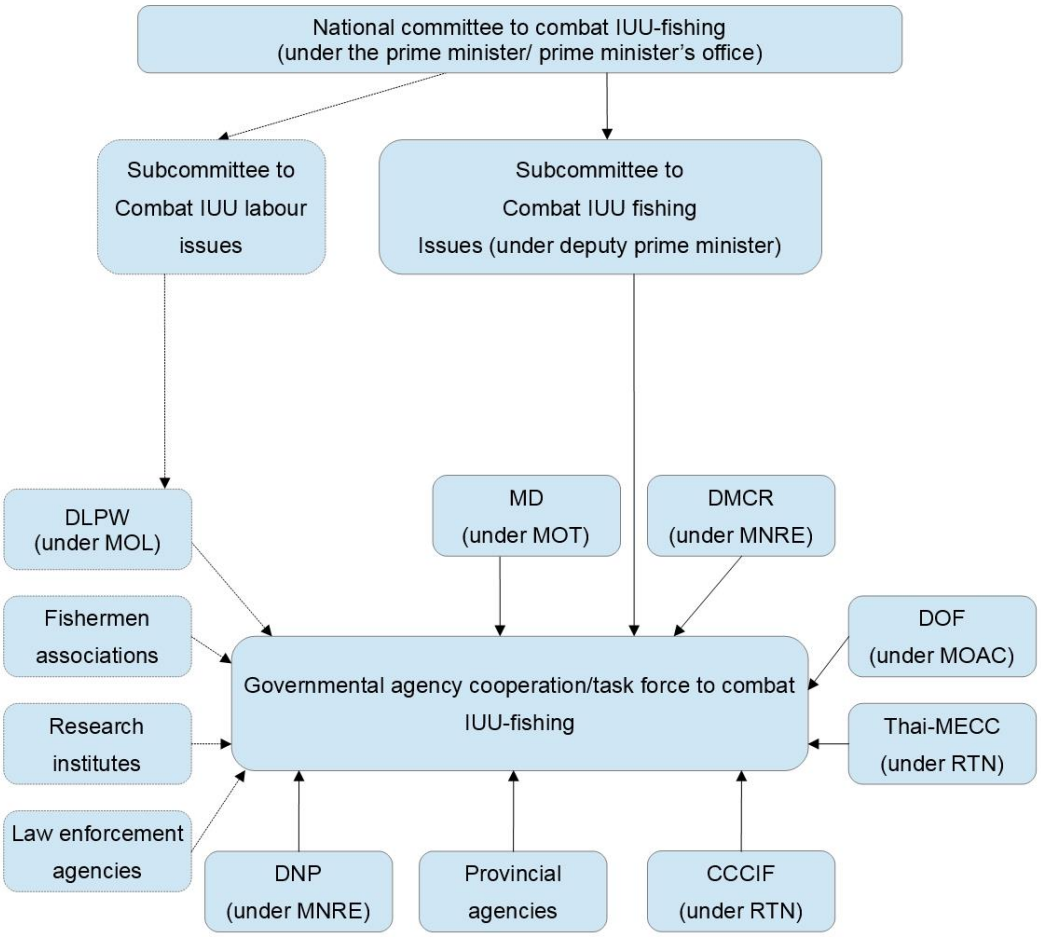


Figure 3 Structure of involved main entities to combat IUU-fishing

4.3 Established measures to combat IUU fishing since 2014

For the inspections with Port-in and Port-out authorities (PIPO) 32 control centers have been established around the Andaman Sea and the Gulf of Thailand. Port-out control checks the documentation/ licenses of the vessels and gives clearance before fishing trips as well as checking on the signal of the Vessel Monitoring System (VMS) which is used to control movement/ behaviors and status at sea on all larger/commercial vessel above 10 GT and engines with a horsepower of over 220.

Inspections at the sea are happening with the patrol vessels of the 3 fishing zones control centers for the Thai waters and these are supported by the Royal Thai Navy (RTN) if required.

Upon the landing of the boats the catch is monitored as well as the relevant documentation and log books, in addition to checking the tracking signal and movement history data of the trip recorded by the VMS.

After the landing the catch is inspected and the details are recorded by the authorities and the catch certificates are issues. In case the final products are going to be exported the catch certificates are inspected for validity.

In the graphic shown below an overview of how the Monitoring, Controlling and Surveillance (MCS) process in Thailand is working.

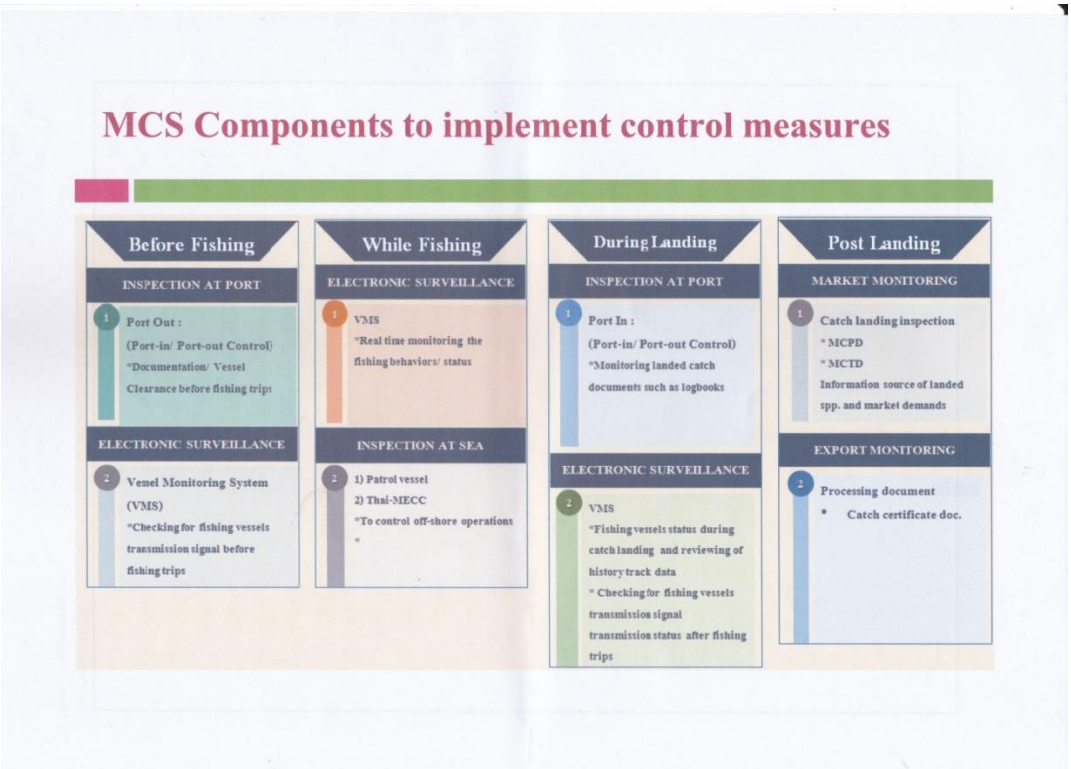


Figure 4: MCS Thailand – source DOF (2018)

In the next graphic it is shown how the Thai waters are divided into 3 inspection zones, in the gulf of Thailand there are the Rayong and Songhkhla patrol centers and in the Andaman Sea there is the Krabi patrol center.

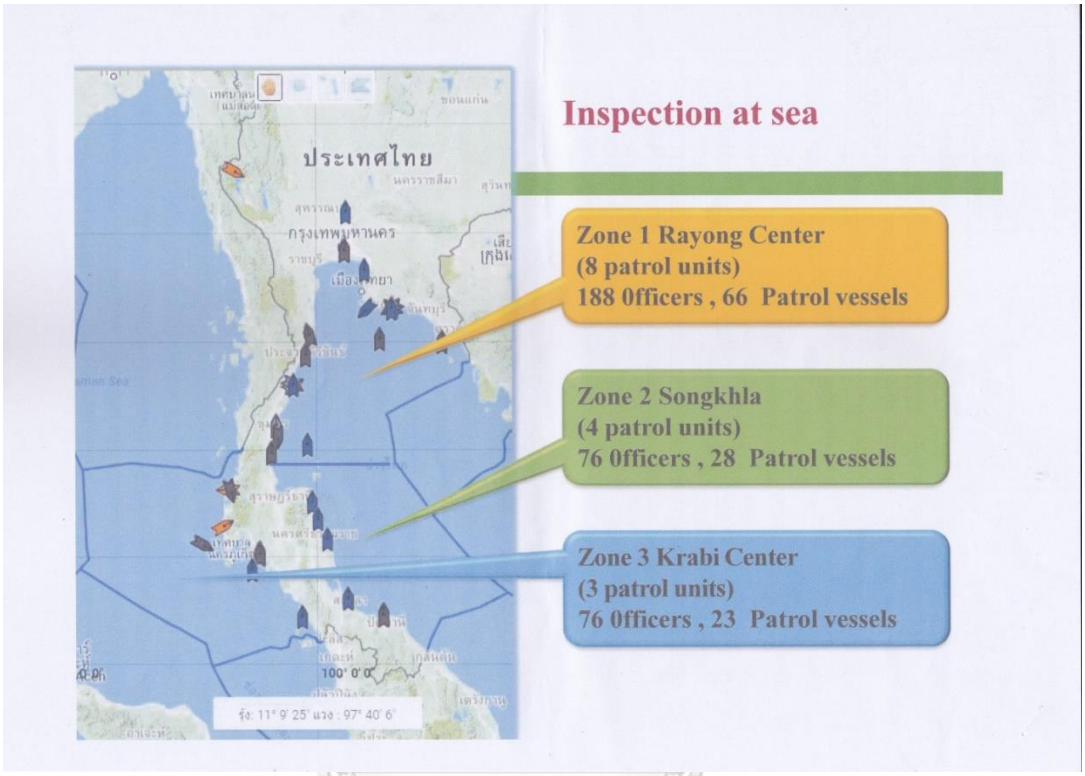


Figure 5: Inspection zones and patrol centers in Thailand – source DOF (2018)

4.4 Ongoing and future plans relevant to the small scale fishermen

Currently ongoing, according to the DOF, is the registration of the small scale fishermen which are undergoing the process of getting non-commercial licenses as well and ID-cards for fishermen are issued. The registration itself is undertaken by the Fisheries Provincial Organizations (FPO), and a central nationwide registration system is to be established in 2018.

The regulation allows each small scale fishermen to register only 1 single vessel under his direct ownership. In addition a check on the engine power is performed, to ensure

that the allowed maximum horsepower is not surpassed. The fishing gear for the small vessels is also to be checked, if it is in line with the regulations.

The plan is to provide a cheaper electronic monitoring system for the small vessels too, compared to the relatively expensive VMS of the commercial boats. It is supposed to be functioning on a similar approach as the SIM-cards of mobile-phones.

Chapter 5 Results of the research and analysis of data gained

5.1 Situation previous to field research and data analysis

As there were no detailed data sets previous to this field research in that specific community, a goal was to establish a viable data-base to analyze the socio-economic impacts to affected fishery communities, here of the small scale fishermen, their HHs and communities in the gulf of Thailand. This data should contain economic impact in regards to income of the affected populations and business in the relevant region, as well provide an overview of fishing related issues relevant to the local population.

The analysis of this data builds a foundation for recommending appropriate measures to affected communities, local, provincial and national governmental organizations as well as to show where other organizations such as NGOs and the scientific community can contribute to improve the situation. The significance of the first part here can be clearly seen in gaining more data as currently very limited data is available on the socio-economic impacts to affected communities, due to the fact that major reduction of active fishing vessels is only effectively enacted since the last year 2015, and thus provide valuable data for decision makers and future research.

The second part would focus on researching the awareness about IUU-fishing and the awareness of how to participate in fishing community related governance processes. The impacts to small scale fishermen of a possible implementation of a similar system of central organized and combined regional and local operated organizations similar to ACs as in other parts of the world would be looked upon. The concept ACs were originally designed as representative organizations for fishermen and their industry to allow them to have their opinion heard in the relevant governing bodies. Later this ACs or later RACs in other parts of the world had undergone some complicated learning processes over the decades in many cases changed their role to more being a vital exchange of thoughts, data and advices to and from fishermen themselves, scientists, NGOs and policy makers.

The expected results here should show if reforms to the (regional) fishery representing bodies of Thailand in similar ways would be a way in helping with the problem of IUU-Fishing.

5.2 Actual results of the field research and data analysis

5.2.1 Demographics of the relevant target population

All percentages values in the chapter are rounded figures.

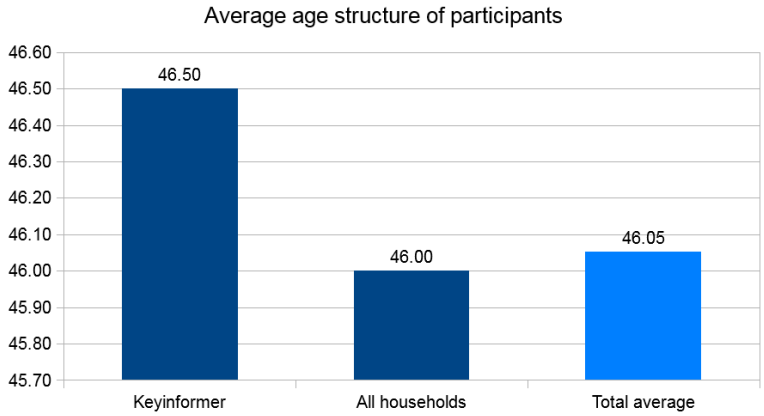


Figure 6 Average age structure of participants

The chart shows that the participating HH interviewees are around 46 years of age and there is little age difference between the KIs average age. The participants ages all ranged from 18 to 80 years old.

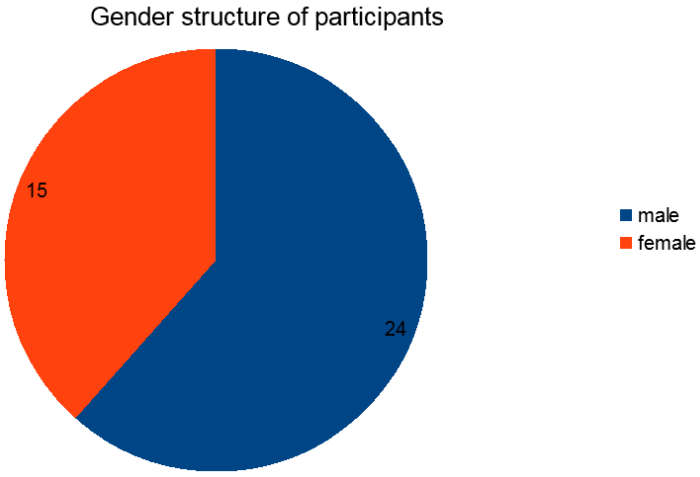


Figure 7 Gender structure of participants

In regards of gender of all participants, the actual hard manual work on boats is done nearly solely by male population, in production/processing and sales of fish and fish products females are stronger represented. The share of females was 32% compared to 68% males representing their HH, so gender seems not solely to define who represents the HH in the community.

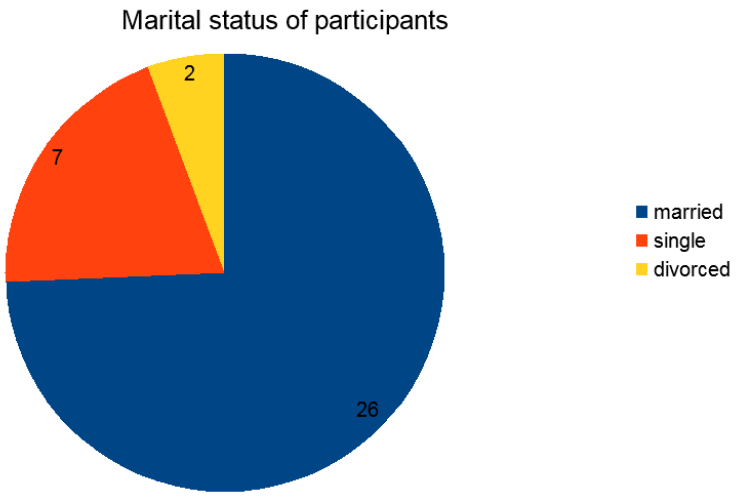


Figure 8 Marital status of participants

Nearly 3 quarters of the interviewed HH members were married, the divorce rate is with less than 6% rather low.

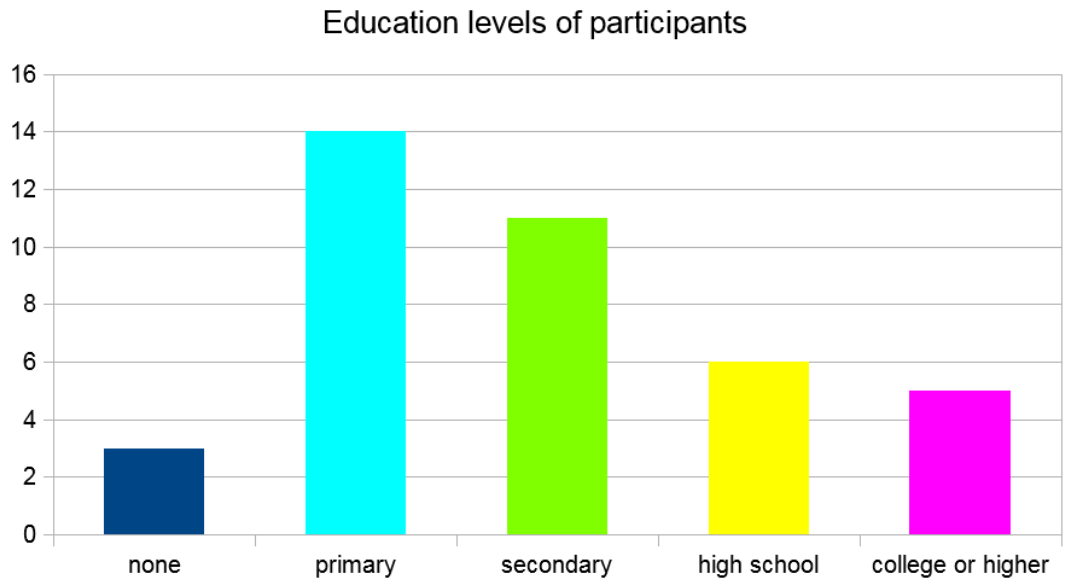


Figure 9 Education levels of participants

The education levels of all participants show that only very few have no education, only 8 %, mostly very senior members of the community in regards of age, did not visit schools. Primary school attendees were the largest single group with 35%, but the combined high school and college or higher groups equals the number of secondary school attendees with 28% each – leading to 56% of the population with completing secondary or higher education.

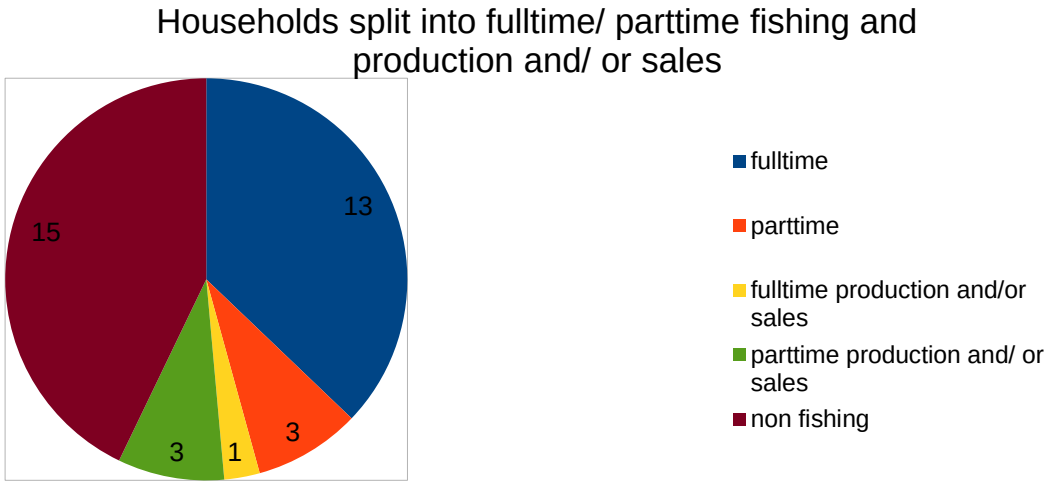


Figure 10 HHs numbers full-time/ part-time fishing and production and/ or sales
The HH representatives participating in the interview, were 37% full-time fishermen, 9% part-time fishermen, 9% part-time production/processing or sales of fish or fish products, 4% in full-time prod production/processing or sales of fish or fish products, 42% of the villagers were not involved in any way with fisheries.

5.2.2 Results of the sociological research of the survey

All percentages values in the chapter are rounded figures. Here in this chapter the results of KIs and HHs have been separated to analyze if there is any bigger discrepancy between individual HHs' and KIs' perception of the situation in comparing 2014 (before implementing stricter rules on IUU-fishing) and in 2017 (after roughly 2 years after the implementation of stricter rules)

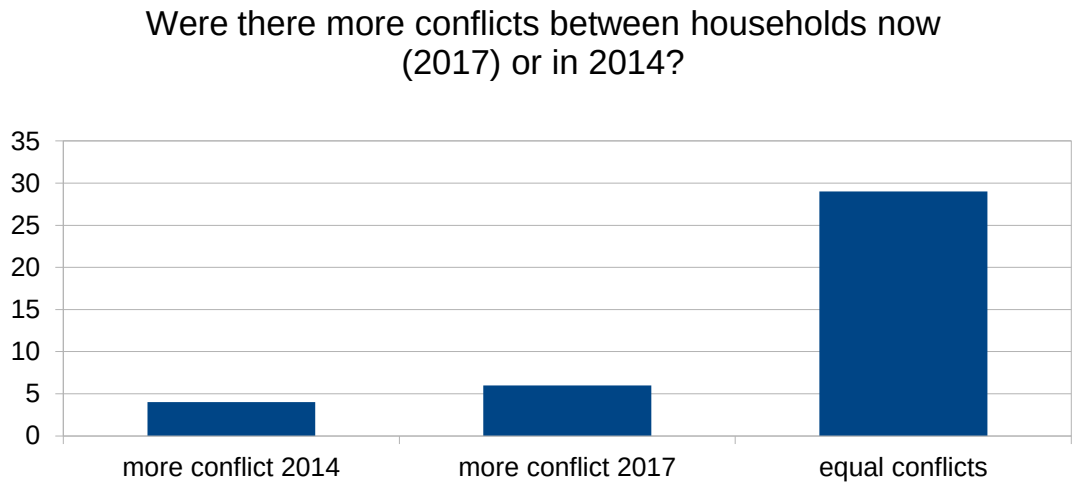


Figure 11 household conflicts

So as clearly shown here the conflicts between HHs are seen equal by the majority of participants, with 10% seeing an decrease and 15% seeing a increase and the majority seeing it stable at equal levels with 75%.

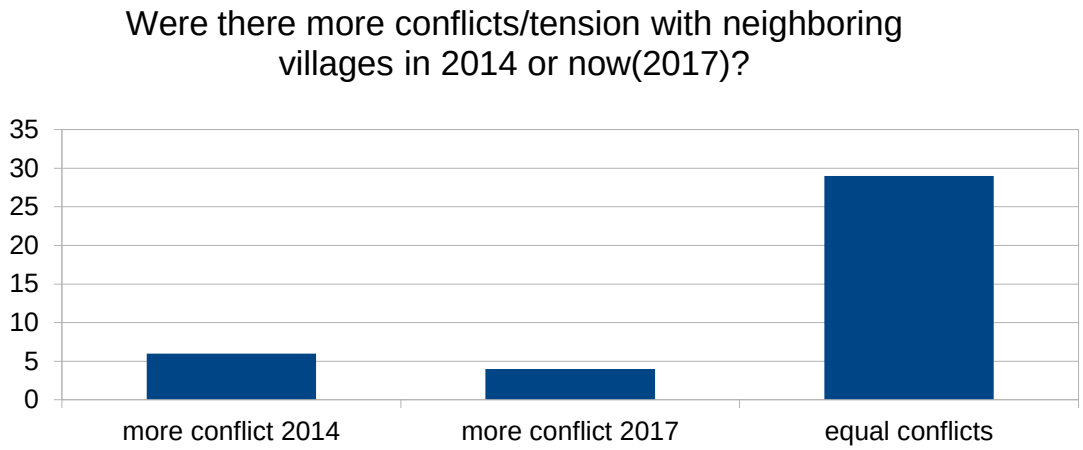


Figure 12 neighbor conflicts

The participants show a majority seeing the situation of conflicts and tensions with other neighboring villages on equal levels (75%), some seeing more conflicts in 2014 (15%), and 10% seeing more conflicts in the year 2017.

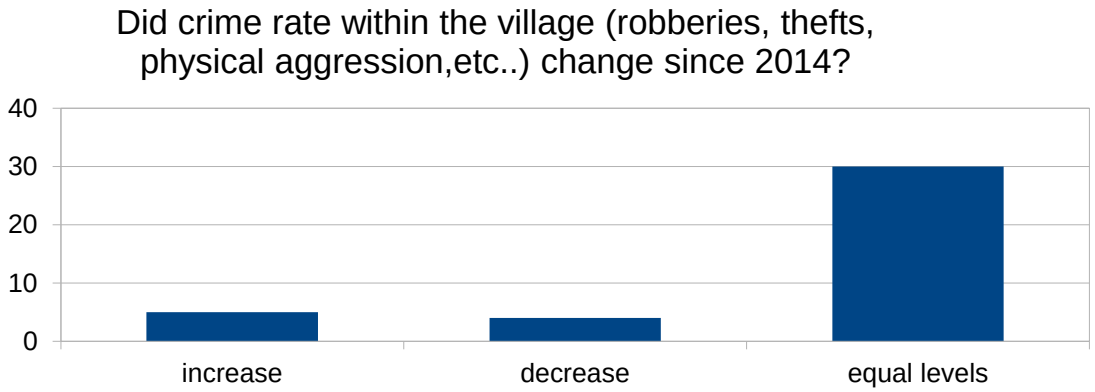


Figure 13 crime rates

The crime rate in the relevant period has been seen by the participating HHs' vast majority as remaining the same since 2014 (77%) and nearly equal levels of some seeing increasing and decreasing crime rates.

5.2.3 Results of the economic research of the participating households

All percentages and figures in this chapter and its subsequent subchapters are rounded if not stated otherwise. Currency for text and figures, if not stated otherwise, is the THB.

The income and expenses situation was assesed as detailed as possible. The lack of financial records keeping by the fishermen and non-fishermen HHs, made it difficult

to remember exact monthly averages by the participants. To make it easier for the participants to establish somewhat accurate numbers incomes and expenses were put into 10 categories in THB as following: 1 – less than 1,000THB, 2 – less than 2,500THB, 3 – less than 5,000THB, 4 – less than 1,0000THB, 5 – less than 15,000THB, 6 – less than 20,000THB, 7 - less than 30,000THB, 8 - less than 40,000THB, 9 - less than 50,000THB and 10 – more than 50,000THB. This was done for the years 2014, 2015 and 2016 to compare income levels previous to the fishery policy reforms and after to analyze if there were any immediate effects to incomes.

In additon the it was planned to compare the survey data with the offical income tax records of the relvant population, but it was found that no income tax records were established, mainly due to the fact that countryside population of Thailand is largely considering itself of too low income to report any income to tax services and the large informal workforce sector takes them in often lifetime long, without ever requiring any tax documentation. Thus no such records exists and the local authorities seem to accept the presented fact that the incomes of most people are low.

To provide additional aide to the participants to enable them to tell income and expense figures real life examples of what a certain category consists were given. Here shown by the example of fishing expenses and fishing income:

Expenses related to fishing like: new boat, renting boat, repairs of boat, new engines, renting engines, repairs of engines, fishing nets, fishing lines & hooks, fuel for boats, fees for harbor, other fees, cooling material, storage material, transport on land – in THB. Income related to fishing like: sales of fish harbor/market, sales of fish to wholesale / factory, employed fishing income, sales of fishing equipment – in THB.

5.2.3.1 Fishing households income development

In the target area 54.3% of the participating HHs were involved in either full-time fishing, part-time fishing plus other income, part-time processing/production and or sales of fish plus other income or in one case in full-time processing/production and sales of products.

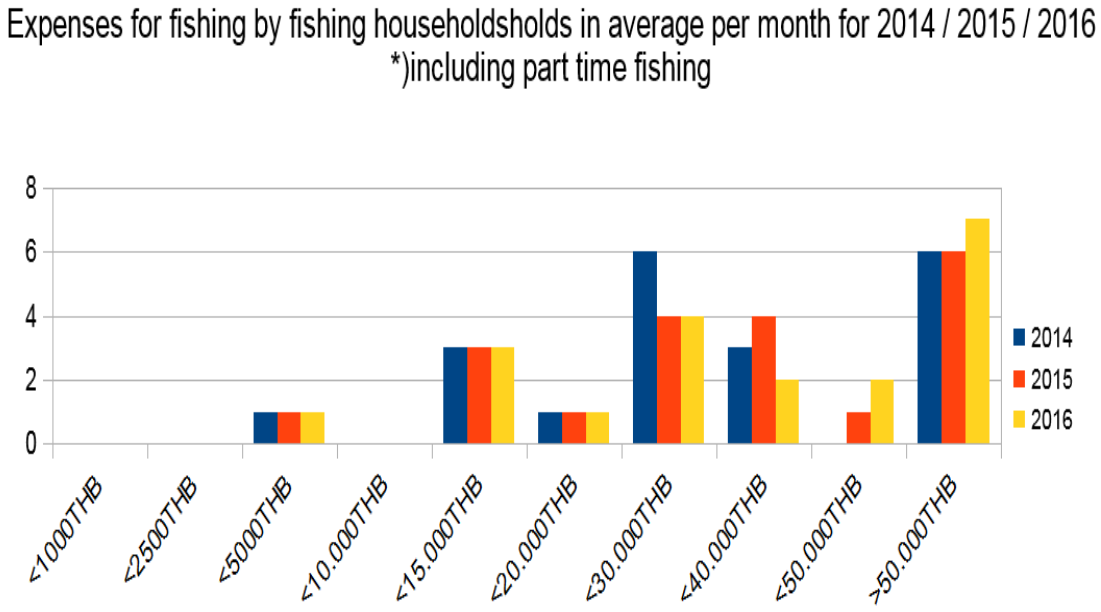


Figure 14 Expenses for fishing

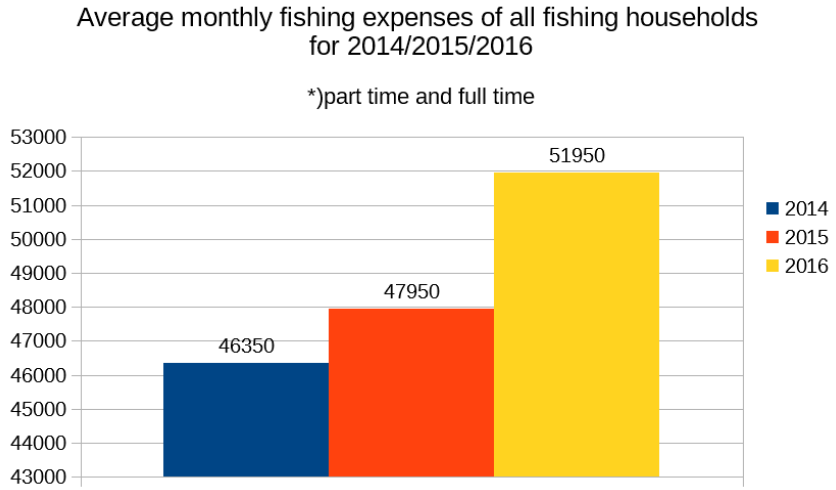


Figure 15 Average expenses for fishing

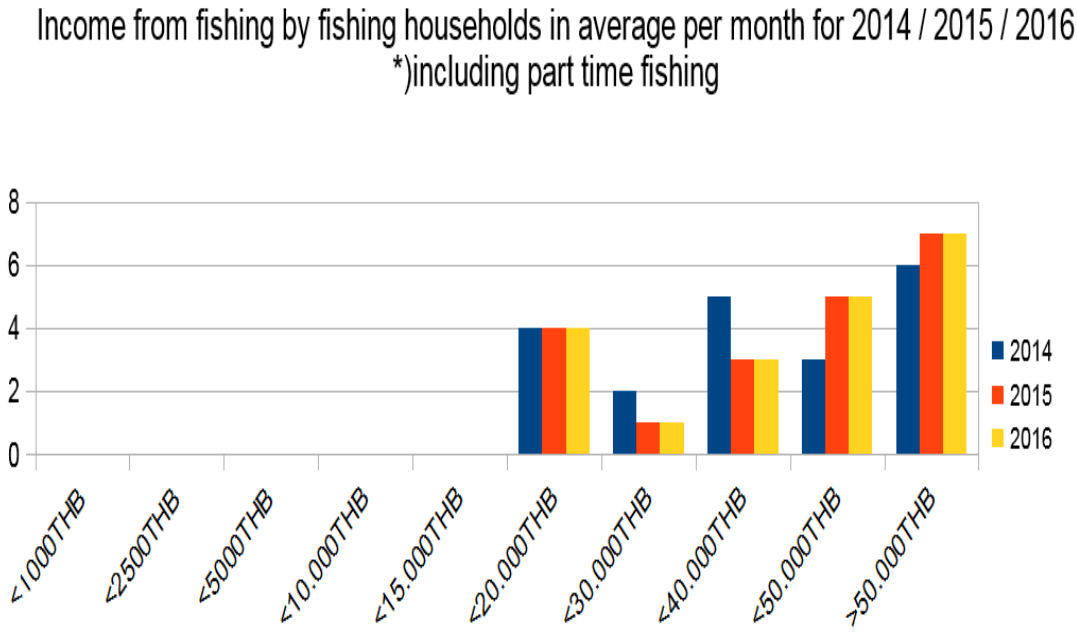


Figure 16 Income from fishing

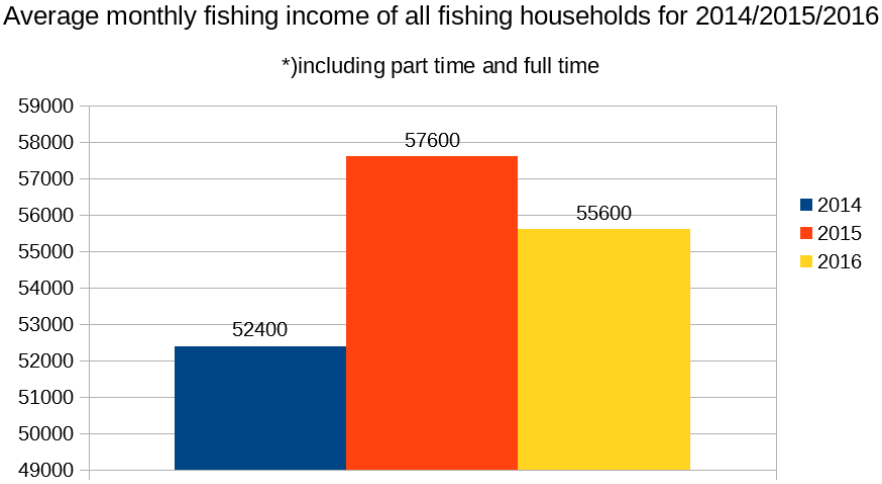


Figure 17 Average income from fishing activities

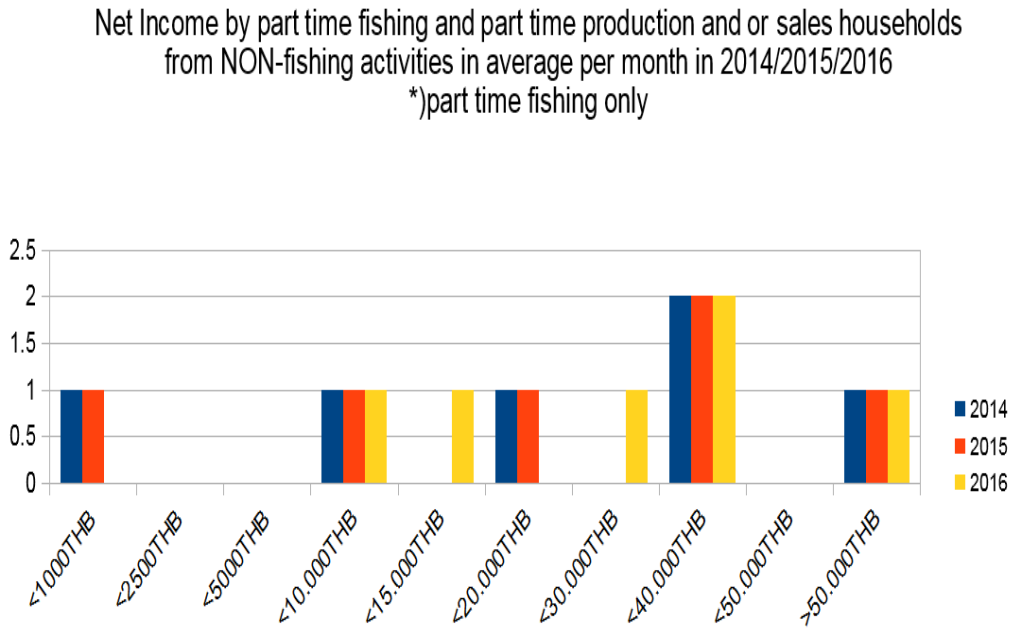


Figure 18 Net income from non-fishing activities

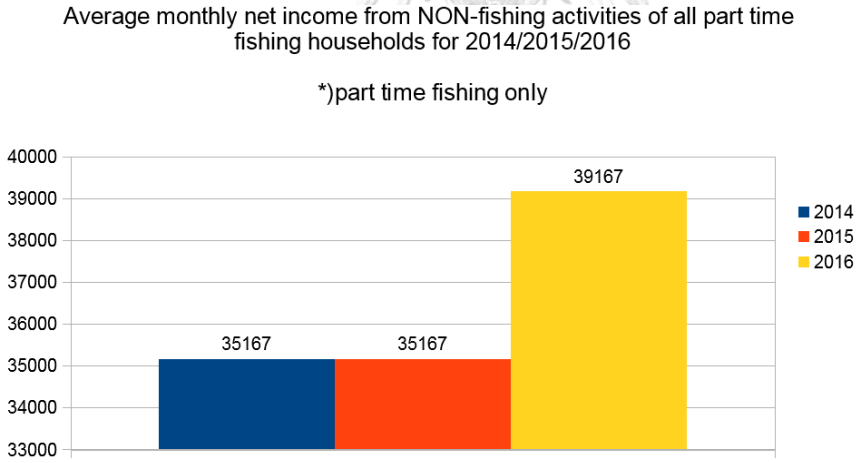


Figure 19 Average net income from non-fishing activities

Total Income of all part-time fishing, part-time and production and or sales, and fulltime fishing HHs in average per month:

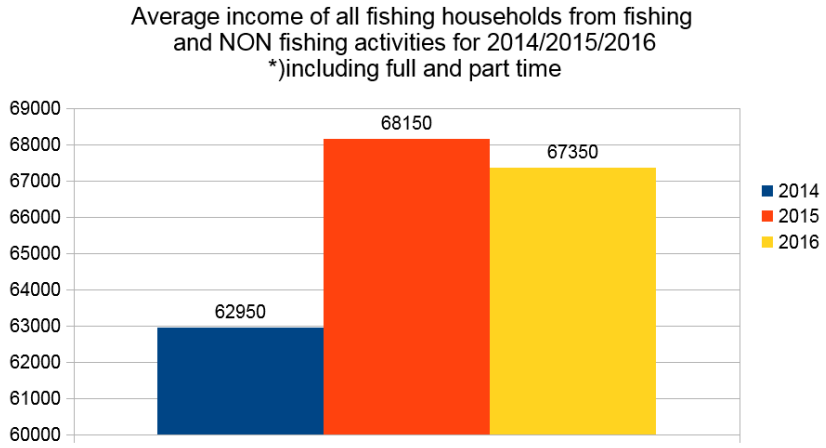


Figure 20 Average income fishing and non-fishing activities

So the average available net income per month of all full and part-time fishing HHs from fishing and non-fishing activities and after fishing expenses would result to this:

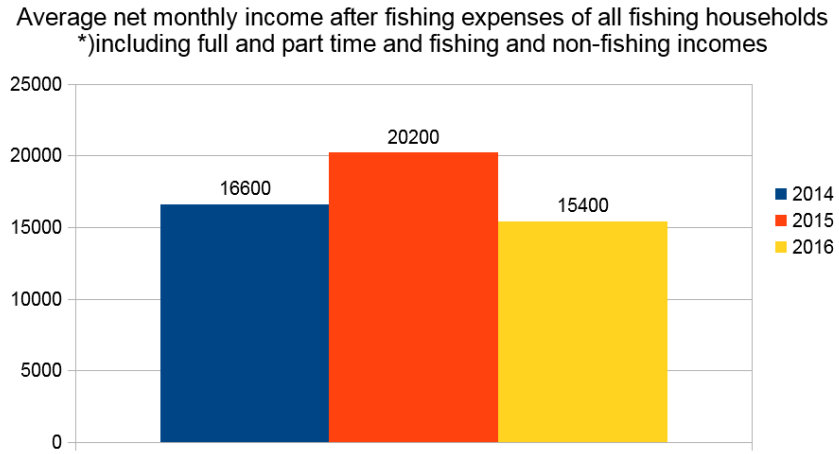


Figure 21 Average income fishing and non-fishing activities after fishing expenses

That results show that the available net income seemed to have grown from 2014 to 2015 by 21.7% and from that a drop was seen to 2016 by 23.4%. It is not related so much to lower incomes from lower catch sizes in general, were the drop of only 3.5%, which can be considered very small, given the fact that more restrictions to regrow fish stocks were in place and also year on year seasonal factors can explain the drop. A sharp increase in expenses for fishing in the remarks made by the fishermen, specifically fuel-costs and the higher prices for fishing-gears (especially nets were mentioned) are the main drivers of costs and to a lesser extent higher labor costs. The expenses for fishing were rising 3.5% from 2014 to 2015 and rose by 8.3% in 2016.

5.2.3.2 Non-fishing households income development

In the relevant target area about 45.7% of the population in 2016 were not generating their income from any fishing related business or employment in that field. The majority of the non-fishing villagers were generating their income from small scale businesses, like little grocery stalls and food stores, restaurants, convince stores and a lower extend of the population by working for government agencies or receiving pensions from previous engagements in that field.

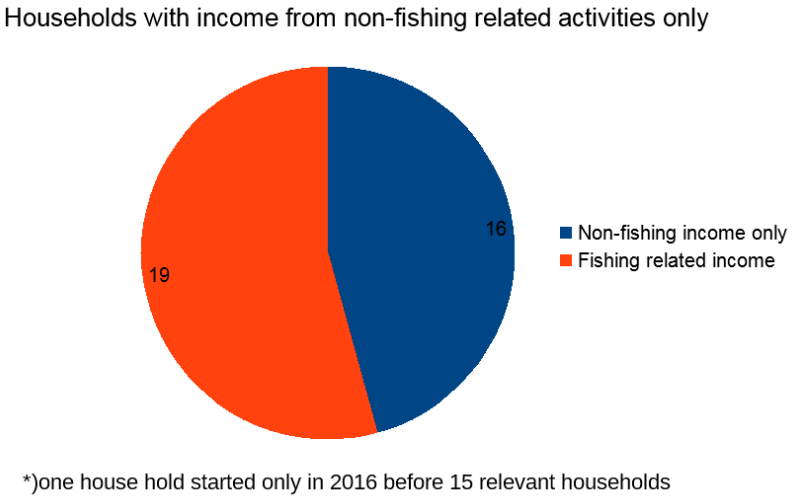


Figure 22 Households numbers non fishing income only

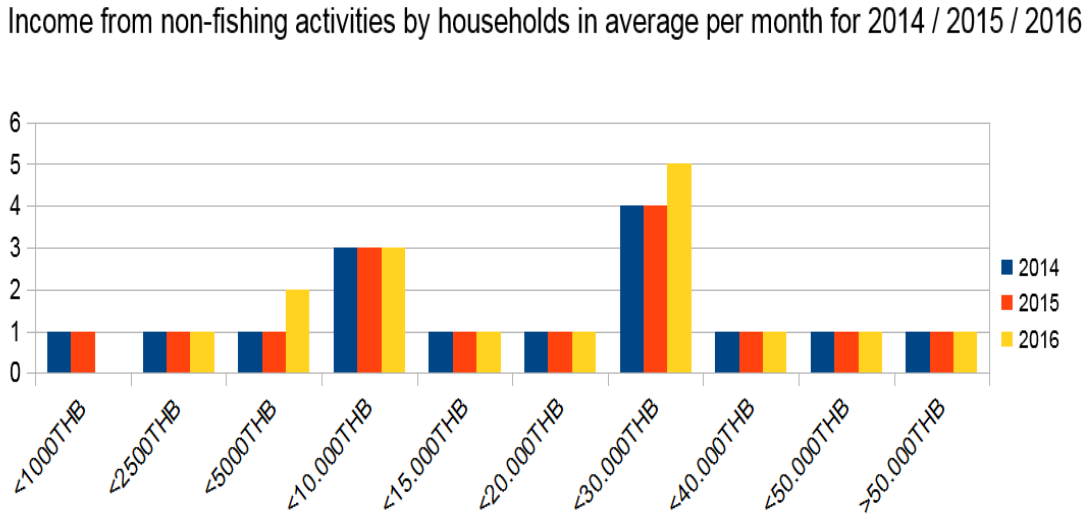


Figure 23 Income from non-fishing activities

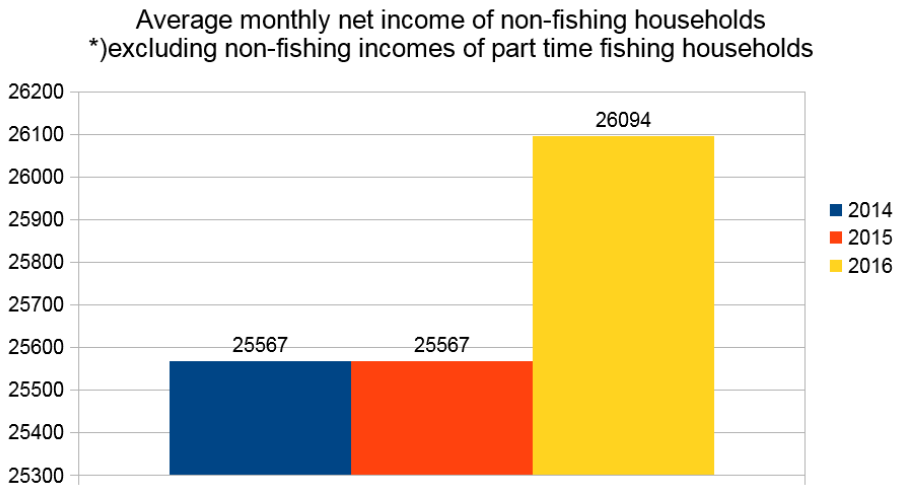


Figure 24 Average income from non-fishing activities

This shows that while the average reported income by non-fishing HHs in the relevant community has been remaining stable in 2014 and 2015, but has seen a rise of 2% in.

5.2.3.3 Comparison between fishing, non-fishing households and national averages

Here the author would like to show how the incomes of fishing HHs and non-fishing HHs differ in the relevant periods. In addition it will be shown how the communal incomes relate to the national average incomes.

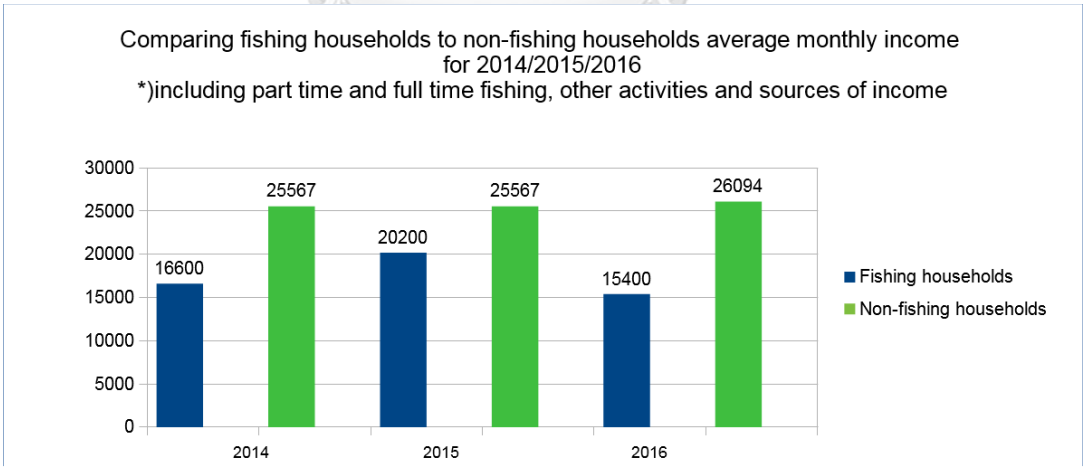


Figure 25 Comparison fishing and non-fishing households income

It clearly shows that fishermen HHs have a lower average monthly net income compared to other villagers who are not involved in fishing, and due to their relation to natural causes that influence their income, more fluctuating compared to non-fishing villagers.

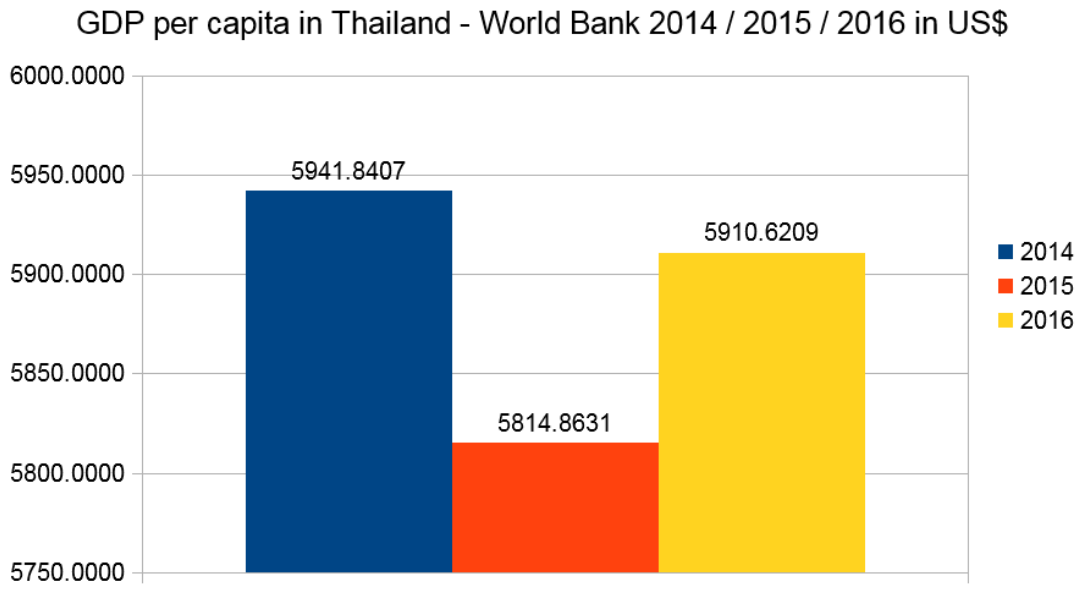


Figure 26 data source: World Bank - GDP per capita (currency US$) (World Bank, 2018b)

Applying the average annual exchange rate of the relevant years, which were 32.4798 (2014 rounded), 34.2477 (2015 rounded) and 35.2964 (2016 rounded) (World Bank, 2018a). This then was divided by 12 month giving the following result in THB per month.

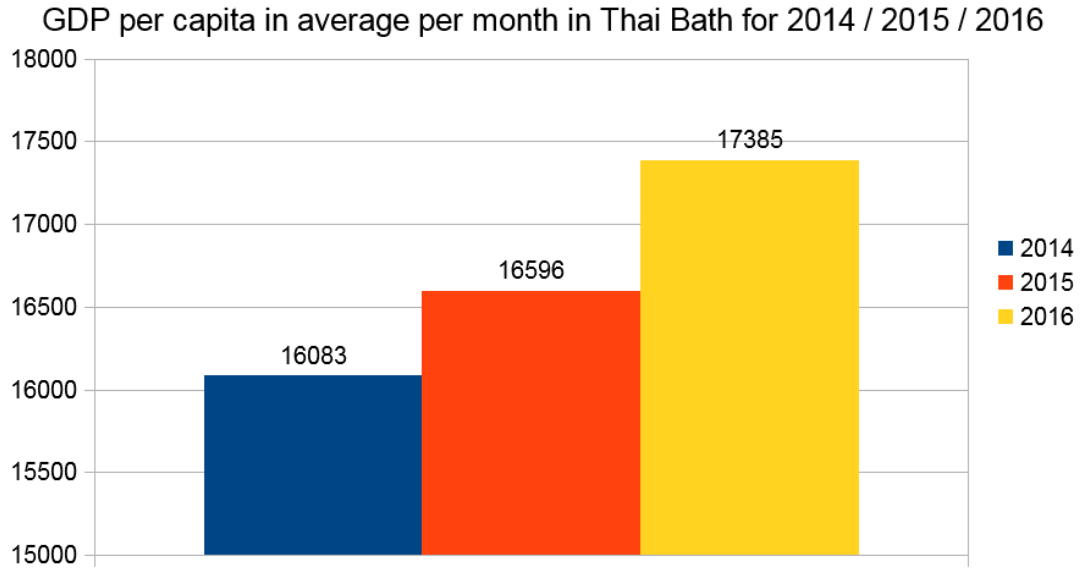


Figure 27 GDP per capita Thailand in THB

This is just to give an indicator of the GDP generation ranges as the average HH in the target community consist usually of 1 to 4 people, which makes it not directly comparable to per capita figures.

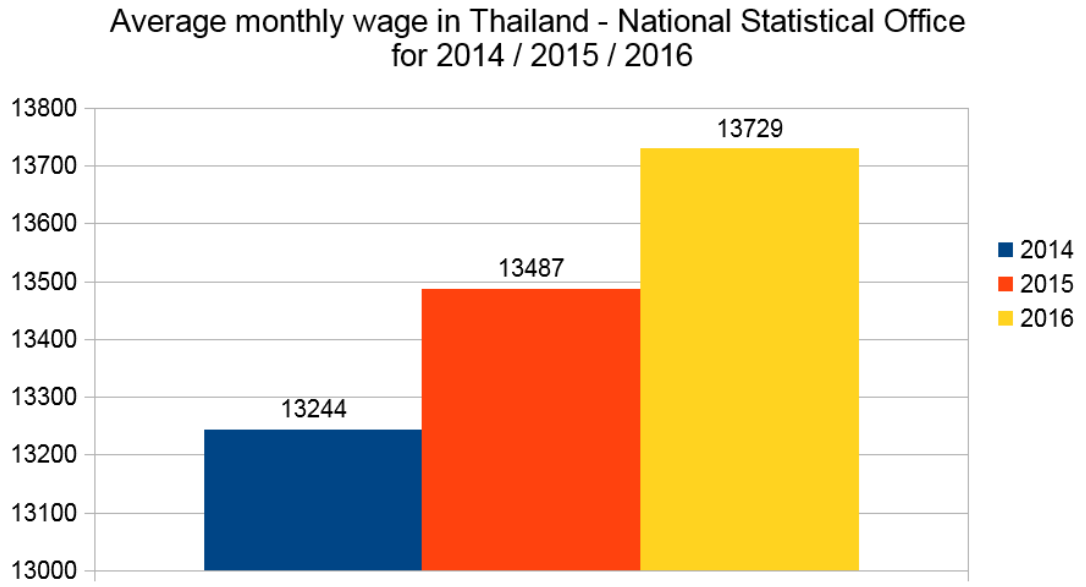


Figure 28 data source: Bank of Thailand - National Statistical Office Average monthly wage (Bank of Thailand, 2018)

In comparing the average wages per month in the relevant periods in Thailand with the usually 1 to 2 income earners in the average target HH in the target community, by assuming 1.5 wage earners for the average Thai HH as well, this leads to the result as shown in the table below.

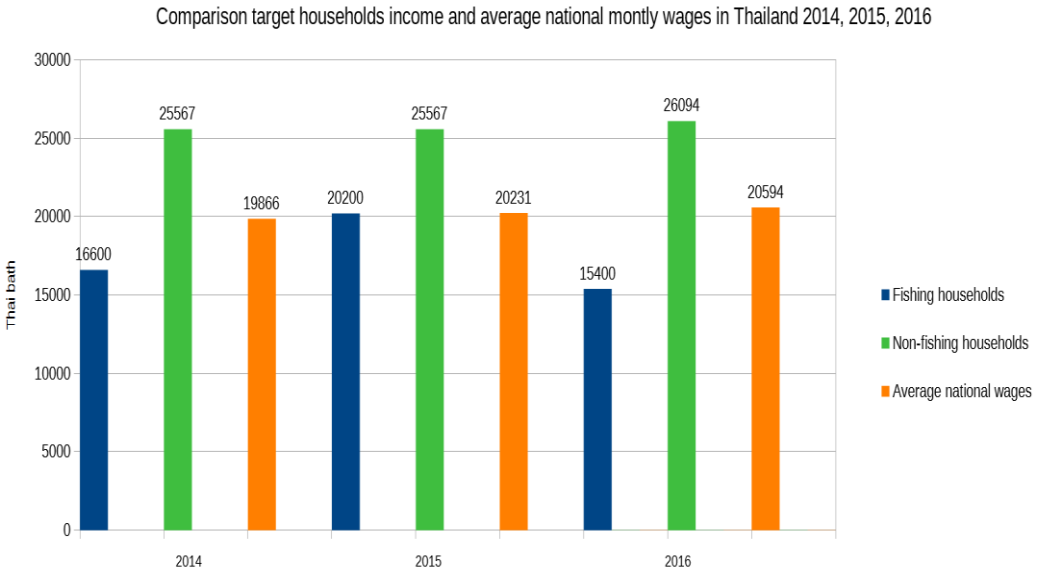


Figure 29 Comparison target and national household income

This shows that the fishing HHs incomes are usually lower or around than the average Thai wage earning HH with 1.5 wage earners, whereas the non-fishing HHs in the target community seem around 25% above the average wage earning HH.

5.2.4 Results of the research in regards of general fishery related findings

Here it is shown how the participants perceive the situation about fishing related issues and what is relevant to them in these regards.

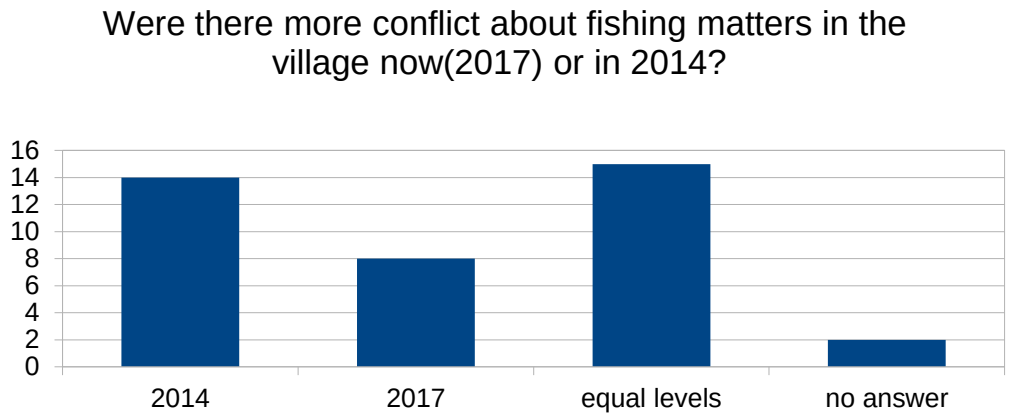


Figure 30 Conflict fishing matters

This shows that the majority of the participants, 38% sees equal levels of conflicts within HHs of their community in regards of fishing issues, but with a tendency towards a reduction of conflicts in 2017, seen by 35% of the participants.

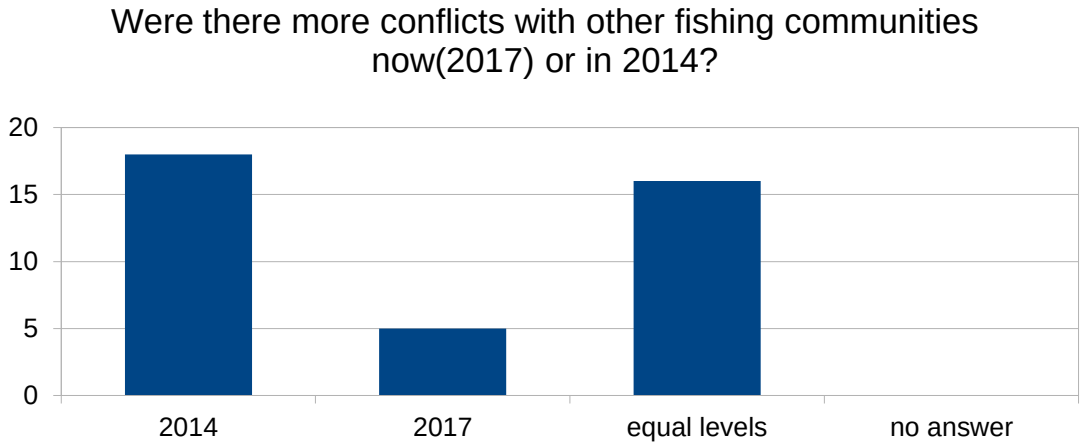


Figure 31 Conflict other fishing community

The number of conflicts with other fishing communities has been declining since the introduction of the current government's anti IUU-fishing policies since 2014, according to the majority of the participants' opinion, 46%, followed by seeing it remaining on the same level, 41% and only 13% see an more conflicts in 2017.

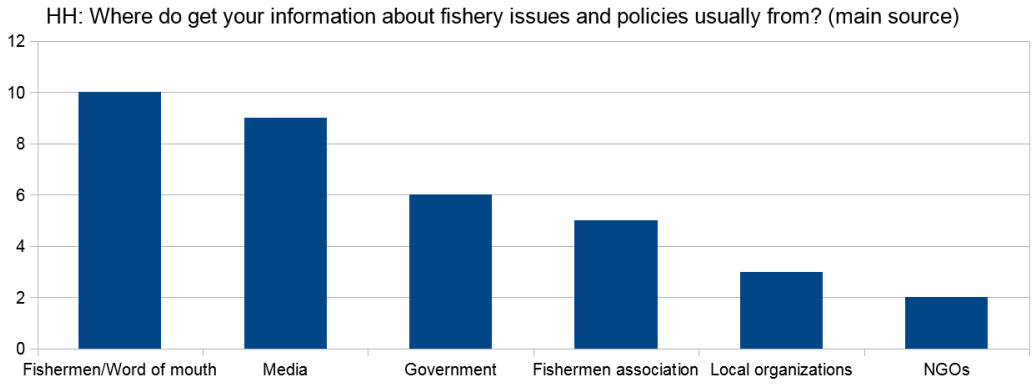


Figure 32 HH: Main information source about fishing

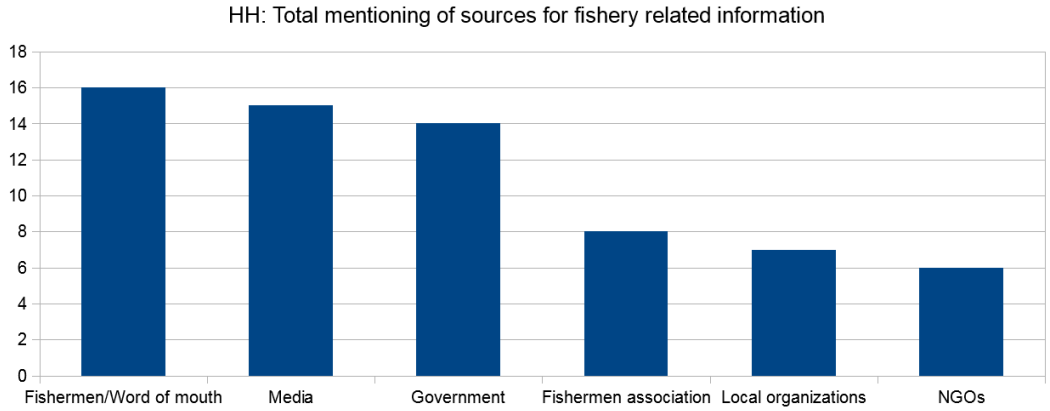


Figure 33 HH: Overall information sources about fishing

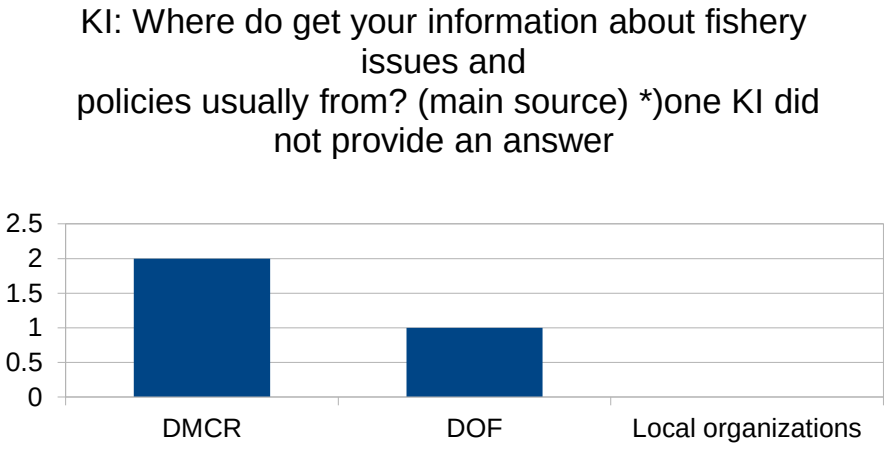


Figure 34 KI: Main information source about fishing

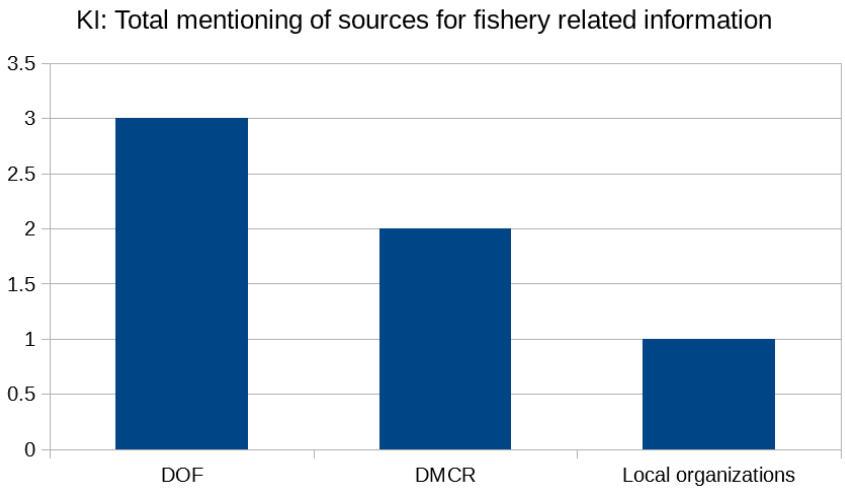


Figure 35 KI: Overall information sources about fishing

The main source of information about fishery issues for the HHs are other fishermen/word of mouth, slightly ahead of media and the government ahead the representatives of the fishermen, the fishermen associations. That can be seen as an indicator that the fishermen representatives organizations' reach could need some improvement to provide better information or quality of such, to fulfill its tasks to a higher satisfaction of the people they represent. The KIs are gaining most of their information from the DOF and DMCR which are quite specific central government representatives.

5.2.5 Results of survey in regards of IUU-fishing

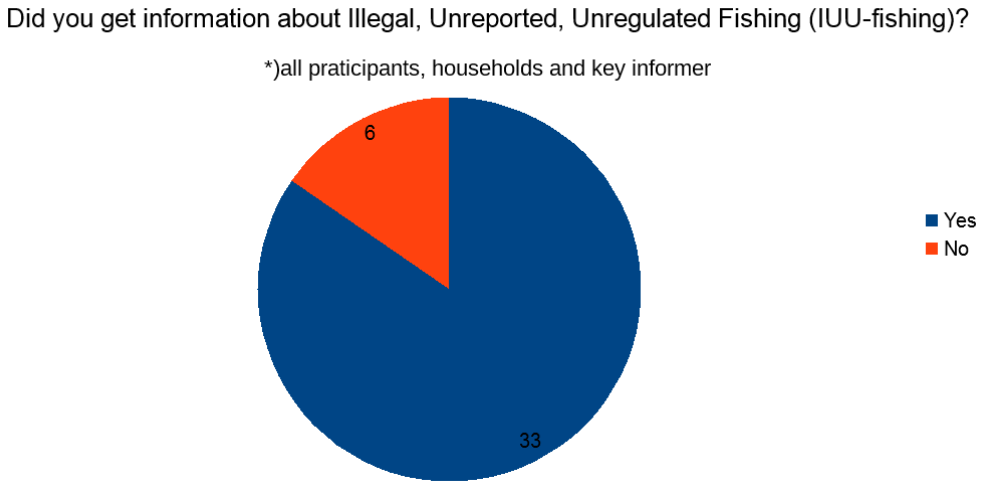


Figure 36 Information on IUU

The overwhelming majority of participants (84.6%) has heard of IUU-fishing, which shows that there is some awareness about the issue, even within most of the non-fishing participants.

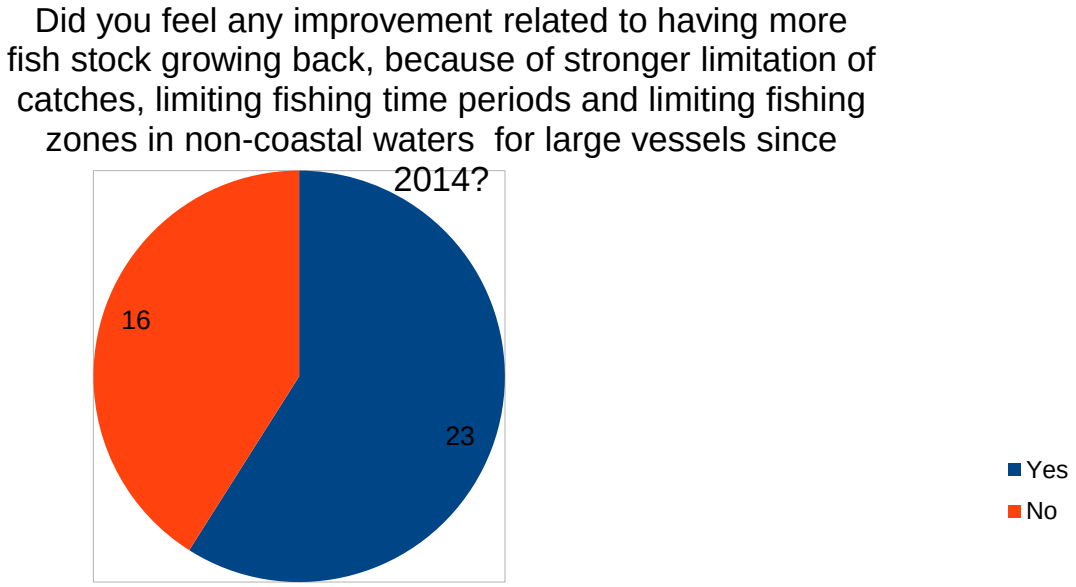


Figure 37 Fish stock improvement related to IUU-countermeasures

The majority of the participating HHs and KIs (59%) has felt an improvement in regards of fish stock growing back since 2014 and 49% have not felt an improvement from regrowing fish stock.

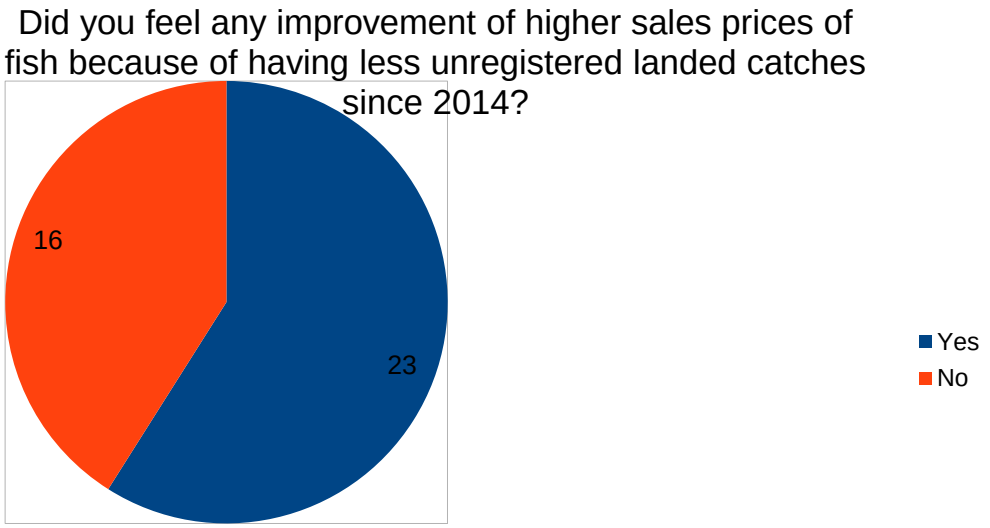


Figure 38 Improvement of higher sales prices of fish

For the aspect of higher sales prices for fish, from the point of view of the fishing HHs, 59% of the HHs and KIs agree that one of the underlying causes is the reduced unregistered landed catches.

5.2.6 Results in regards of observed threats to sustainable fishery

Here it will be looked at the issues of threats to sustainable fishing and what causes the participants see underlying to it. The main threats in the opinion of the participating fishing HHs will be described in more details.

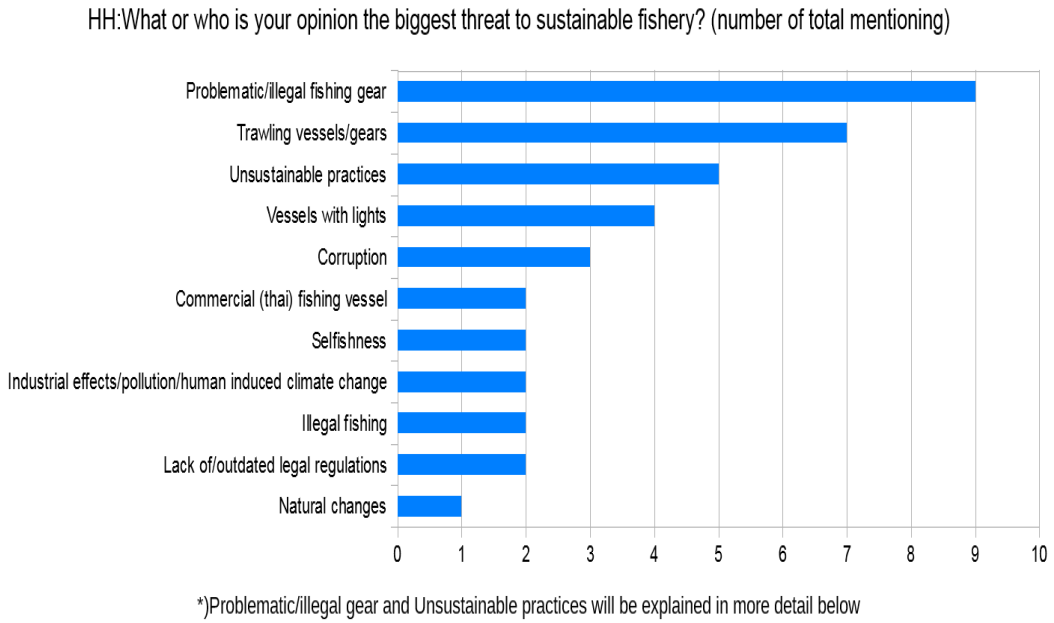


Figure 39 HH: Biggest threat to sustainable fishery

This shows that according to the involved fishing HHs problematic and illegal used fishing gears in general pose the biggest threat to sustainable fishing (23%), followed by the specific gears of trawling nets in all its forms and the according trawling vessels (18%). Third ranked the unsustainable fishing practices (13%) and fourth another specific type of gear, the vessels that use light systems of any kind, to attract the according catch (10%).

Gear and vessel types (trawling and lights) that are seen as a threat, were in addition to above mentioned ones, shellfish nets, surrounding nets and boats with small net sizes (e.g. anchovy nets). So it can clearly been seen that the sum of the illegal or problematic gears with a staggering total of 51% are seen as the main problem for sustainable fishery of small scale fishermen, more than the current commercial fishing vessels (5%) or illegal fishing (5%) itself in 2017.

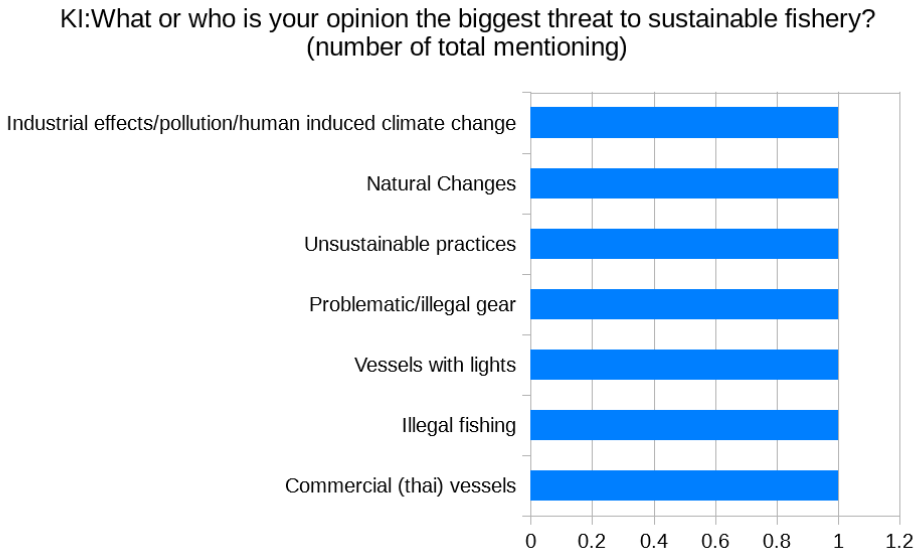


Figure 40 KI: Biggest threat to sustainable fishery

The KIs have no clear opinion which is the biggest threat to sustainable fishery, but mention in sum also the illegal or problematic gear with 28% as the most dangerous issue in this regard.

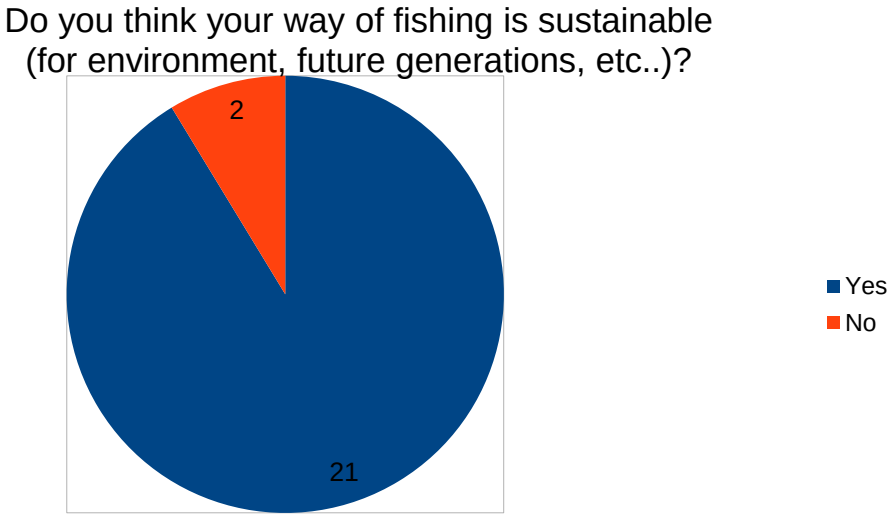


Figure 41 Sustainable yourself

The overwhelming majority of the responding fishing HHs and key informers see their own way of fishing as already sustainable with 91%, only 9% see their way of fishing as non-sustainable.

5.2.7 Results in regards of fishermen representation within decision making processes

Here we will have a look if and how the participating HHs, involved in fishing, and KIs are currently represented in the decision making process under a participatory governance system or not, respectively if their desire partaking in such processes is to be improved.

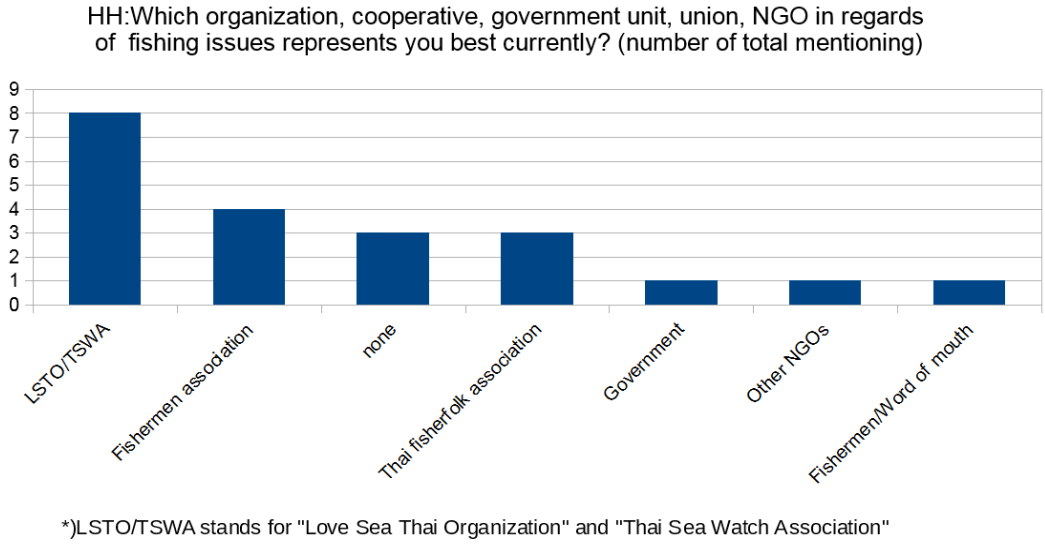


Figure 42 HH: Best representatives

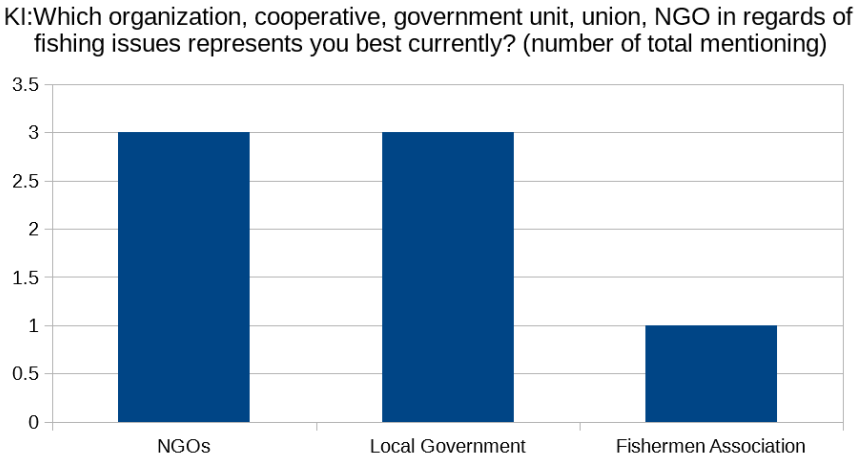


Figure 43 KI: Best representatives

As for their most important representation 40% of the participating fishing HHs mention the "Love Sea Thai" organization and or the "Thai Sea Watch Association" – both by the description as marine conservation and sustainability promoting organizations, that bring practical use to regrowing fish stock. The next most relevant group would be the local Thai fishermen association with 18%. The "Thai Fisherfolk Association" and the participants that explicitly mention not to feel represented by anyone are ranking equally third with 13% each.

The KIs see the local government equally with unspecified NGOs with 43% as the most important representatives to the community and ranking third the Thai fishermen association with 14%. Even though the KIs did not specify the NGOs, their comments about them reflect the same type of organizations with practical use to regrow fish stock in the area, as mentioned by the fishing HHs before.

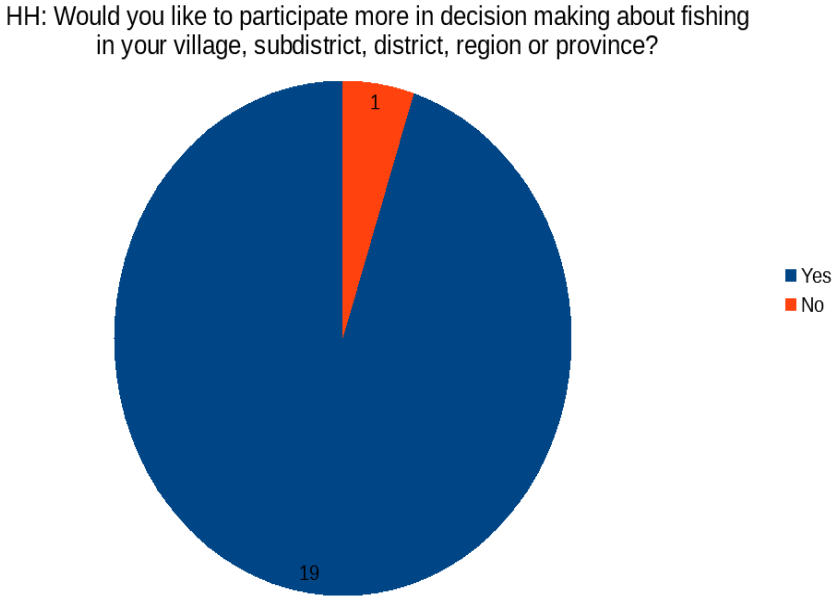


Figure 44 HH: Will to participate decision making

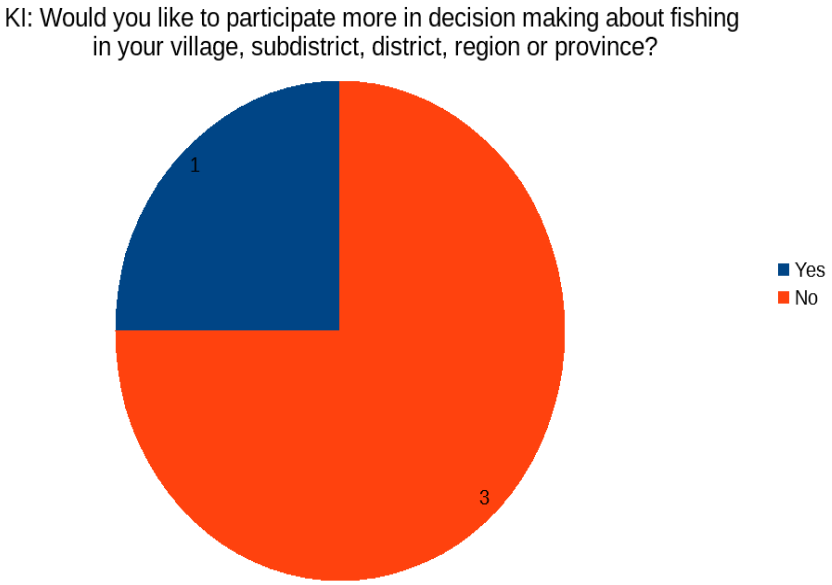


Figure 45 KI: Will to participate decision making

The vast majority of the fishing HHs with 95% would like to participate more in the decision making process, which clearly shows there is room for improvement of the current decision making procedures, institutions and representatives' structures. This is a good indicator showing that the people would be interested in participating in some similar systems like the reformed ACs or RACs as present for example in EU and the USA.

The KIs on the other hand seem to be satisfied with their current participation and would not like to increase their levels of involvement in the decision making structures and processes (75%).

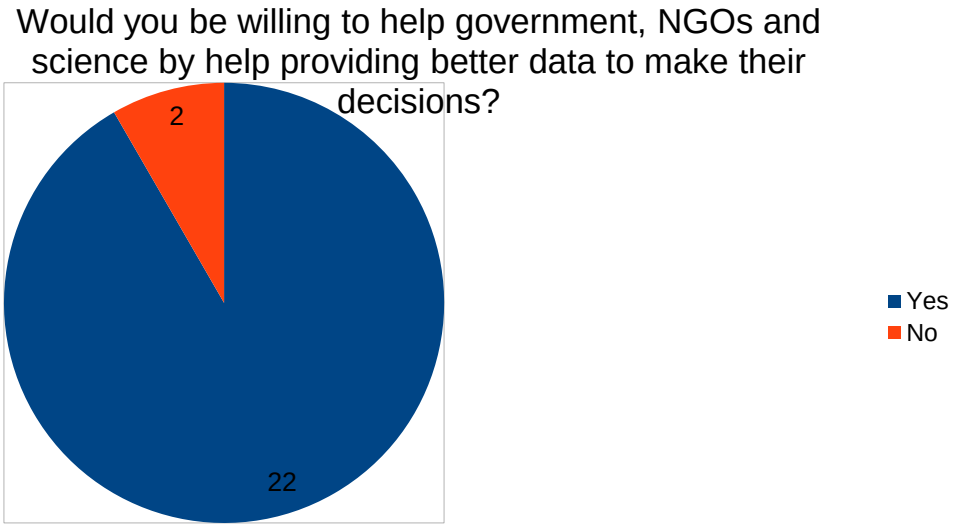


Figure 46 Will to participate in data collection

Here again the vast majority of fishing HHs and KIs (92%) would like to support the data collection. This is another good indicator showing that the people would be interested in participating in some similar systems like the reformed ACs or RACs as present for example in EU and the USA, where data collection and cooperation with the usually opposing parties in the decision making process is one of the key factors for the failure or success of such reformed ACs.

5.3 Additional observations and comments by the affected population

5.3.1 Topics of interest and issues mentioned by fishermen and observations

1) The small scale fishermen seem to be organizing themselves, sometimes with the support of government programs and NGOs the regrowing of fish spawning grounds, such as e.g. artificial reefs or support ropes for shells and protecting "their" area from illegal outside fishing boats and especially from illegal operating Thai commercial vessels. Some of these Thai vessels were thought to be from the Eastern region (Trat area). In recent years since 2015 the effects of stepped up government efforts to combat IUU-fishing seems to have a caused a reduction the occurrence of such incidents with outsiders' vessels and they are able to "defend" their area now by themselves successfully and without any interference by authorities. Such incidents are reported by them to the provincial governor and the DOF to build up some pressure and it seems as they get heard now more than before.

2) Another mentioning was that the corruption with the region has been decreased amid stepped up government enforcement of anti-corruption procedures.

3) There seems to be no full implementation or no strict enforcement of the laws and regulations in regards IUU-fishing in the region. But since 2017 the marine life seems to have been recovering mainly because of the stricter enforcement of the 3-nautical-mile-zone ban for commercial vessels and boats of over 10 GT.

4) The creation of artificial reefs and the establishment of a crab breeding bank has improved the marine life in their area. This was done together by local fishermen

together with NGOs and some support from official side as well. Seemingly the fishermen would prefer local solutions, whereas authorities would also like to do some larger projects with more impacts, that are not always having the expected positive effects or having side effects.

5) The commercial fishers in general and in the larger region are listened to more by authorities on a local, regional and national level. Small scale fishermen feel underrepresented in the decision making processes that affect them as well.

6) They have founded a company that is locally owned by their greater community to process and market their products directly to retailers and end consumers directly. There statutes do not allow any individual to gain a controlling stake and everyone is participating to his capacity in the capitalization. The local fishermen sell their catch nearly exclusively to their company to profit in the future also of the payouts of their own business.

7) The local small scale fishermen were remarking that increased fuel and fishing net/gears prices have eradicated the gains from higher sales prices of the catch especially since 2016 and 2017.

8) Another point was the availability of custom tailored equipment to their needs, the situation here seems to show, that the gears and materials on the market have to be customized by themselves to their need or existing solutions would be too expensive.

9) The roads in and around the community have been improved after a longer period of discussions and complaints with the sub-district administration.

10) Public (road) transport is basically not existing, but that seems not to be a problem as they can rely on enough motorcycles, cars and pickup trucks they have themselves. By observation there is even a train station in the end of the village with several trains a day stopping there, but it seems bit inconvenient to use.

11) A community fuel station was established with some external funding support.

12) Some improvements to their local water systems were undertaken and completed by officials from the regional level recently.

13) State or government organized garbage removal plans or system do not exist, locals have to organize and conduct themselves the removals.

14) Crime rates were low to basically not existing, the only thing that was mentioned is youth brawls with neighboring villages and some youth drug abuse. That has not changed much in the relevant period.

15) They participated actively in the demonstrations against larger (coal) power plants that were planned in their own and neighboring regions.

16) They were able to build their own sport facilities, children's playground and a communal meeting hall with their local fishermen association to improve their local activities.

Chapter 6 Discussion and conclusions

6.1 Discussion of research question and objectives

Based on the research question “What are the socio-economic impacts of IUU-fishing and it's countermeasures on Thai fishing communities and specifically on small scale fishermen households, before and after 2015?” the goal was to look into several aspects of this matter. Firstly it was found in consistency with existing literature that the small scale fishermen in the relevant target community are feeling an impact to their socio-economic situation by others engaged in IUU fishing.

1. The first objective of this research is aiming to analyze the effects of the socio-economic impact of the IUU issues on a local fishing community
The findings of the research show that especially the depletion of fish stocks by the ones engaged in IUU fishing and the use of illegal or harmful fishing gear were the main problems. This was leading to subsequently lower catches and lowered the amount of juvenile fish for the future catches, which made it difficult for them to sustain their livelihoods. The effects of the measures introduced by the Thai government since 2014/2015 to reduce the IUU-fishing activities in Thai waters, this seems to have some positive effects to small scale fishermen, especially the extended no-fishing zones and times for commercial vessels in coastal areas. In the economic aspect of increased income the effects were not felt by the relevant fishermen so far, as other aspects, especially increased costs of fishing and operating fishing vessels have consumed most of the gains in 2016.

The base for their socio-economic well-being, the situation of fish and marine life in their area, has been seen some signs of improvement. It has been shown that there are positive effects on small scale fisheries, such as improved protection of the coastal areas, with the complete ban of commercial fishing vessels over 10 GT from that areas, that are the only reachable fishing grounds for the small scale fishermen’s vessels, but also one of the most important breeding and spawning grounds for juvenile marine life forms. The researched target group was confirming this as a step in the right direction, whereas they still would like to see further improvement in the regards of enforcement of laws and regulations as well as updates of existing laws regulations, to include newer fishing technologies and prevent harmful fishing gears to be used. The social situation within the community in regards of internal and external conflicts and better infrastructure has been seen as overall improving, partially by their own efforts as well as some governmental efforts. The crime rates remained equal in the comparison between 2014 and 2017.

2. The second objective is to analyze the interest and willingness of small scale fishermen to take part in participatory governance measures in order to improve their livelihood in the target community.

The results show that in general the fishermen were of the opinion that some combined fishermen-governmental ongoing efforts towards more sustainable approaches to catch and preserve fish made the situation better in regards of regrowing fish stocks. The objective to analyze if participatory government processes can improve the livelihood of the small scale fishermen has been completed in so far as their interest into more participation in governmental processes is high and is seen by themselves as a way to get more attention for their issues in order to improve their living and income situation. Their participation on local and regional/provincial levels is not to their full satisfaction so far.

3. The third objective is to assess if such measures applied successfully in other regions of the world can be applied to the Thai small scale fishermen.
The results show that they are quite interested and willing to participate in decision making processes as well as in supporting research and data collection for a system that could lead to some locals system similar to the reformed ACs in other regions of the world. Assessing implementation of something similar to reformed ACs, the finding was there are some organizations in their area working similar to other successful regions in the world. They would actively support science, government and NGOs, so it is more a matter of letting them participate and establish the relevant processes between science, governmental organization and other interest groups.

The "Due to the stricter enforcement of regulation and new policies especially for commercial fisheries since 2015, there are positive effects for the small scale fisheries" is accurate in regards to the fish stock regrow and therefore the base of the small scale fishermen's livelihood. On the other had the important factor of finding a correlation between improved IUU-situation and improved income situation of the fishermen could not be validated. An analysis of the situation in the very community over a longer time would be necessary to show a more significant result in that regard. The findings also show that improved enforcement of regulations in regards of IUU-countermeasures and constant update of these regulations, in regards of technological and other changes, would proof very useful in order to reduce the impact of IUU-fishing to small scale fishermen.

6.2 Conclusions: The situation of small scale fishermen and outlook

Despite the limitation of time and material means this study is building a base for further research in this specific field. Especially as there was no up-to-date data existing previously on the socio-economic impact, by IUU-fishing and the relevant countermeasures, to small scale fishing communities in Thailand. In regards of the overall process to reach sustainable levels of income and social balance within the small scale fishing communities, it would be highly recommended to use their potential as data suppliers and valuable sources of information by establishing a more direct approach and from government side a more proactive approach to understand their needs and on time measures in addition to larger projects.

The central and local governmental agencies should be having more direct visits and meetings to the communities in that area on a regular at base, as the small scale fishermen are not having the means to constantly travel to the capital and their felt

representation by local or regional authorities seems not sufficient. There are still additional efforts required to ensure the sustainable development of fisheries in general and the support of small scale fishermen specifically, but the outlook is slightly positive if the current enforcement of regulations is stepped up even more and their local knowledge is included in decision making processes, even though the commercial fisheries might not agree with them and demand different approaches on a larger scale.

The local people have started some small improvement projects, which is less invasive to existing natural structures, and should be encouraged to continue to do so or step up their existing efforts even with the help of local, regional and national government. The local communities should be enabled to build up resilience themselves against the effects of IUU-fishing and other human made or natural threats to their livelihood. That can range from direct funding to their projects or using their local expertise for consulting authorities when building projects in the region or scientists who are researching similar topics. Some larger top down building projects initiated by governments of all levels were not having always positive effects or even shown negative impacts on the natural resources, so it cannot be stressed enough to also involve local fishermen and their knowledge to the waters in the region.

6.3 Limitations of the study

The results are representing an analysis of the situation to the specific small scale fishermen community of the sub-district of Ao Noi in Prachuap Kiri Khan Province. Therefore it is obvious that the results include very local specifics and that the results should not be applied to other communities and regions without reviewing the applicability beforehand. The activities of the large commercial fishing operations in the surroundings of small scale fishing communities have a direct influence on the socio-economic situation of small scale fishermen, but the commercial side's points of view and situations were not included in research in this paper, due to limitations of the study. The result is not representing the complete picture of fisheries in the relevant community and region.

6.4 Recommendations for future research

It cannot to be stressed enough to encourage further studies and field research, as well as close contact development of decision makers with the relevant communities. Anti-IUU-fishing-measures should be even more strictly enforced to ensure a sustainable live for all living of fisheries and the sea and build up a common front against the those who threaten it.

In addition it might be recommendable for the Thai authorities to visit and analyze the successfully reformed ACs in the EU and other regions of the world and to see firsthand how valuable the information, data collection and knowledge of fishermen can help improve the situation for the coastal small scale fishing communities and even how it benefits the commercial fisheries in the long run. Especially how the trust

between the disagreeing parties can be established and how the initial opposing interests can be put into an effort to work together for a sustainable future of Thai fisheries and preserving the small scale coastal fishing communities at the same time.

The author would offer to support any organization (government of all levels, NGOs and academia) interested, that is willing to continue this research or larger projects in this field. Prevent mistakes of the past and work with all stakeholders for a better future of the people and the country and thus the global marine system.

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APPENDIX

VITA

The Author Roman Zwoelfer, was born in Austria. He worked for a global engineering group as first project leader in mulitnational projects and later as head of global solution design in IT. In 2012 he has been rewarded by the Ferdinand Porsche FFH University of applied science in Vienna with a bachelor in business in the field of business informatics, a combined degree for IT and business. In 2015 he went on to the field of Environmental Development and Sustainability within the EDS-program of Chulalongkorn University in Bangkok.