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Shrimp Fisheries and Aquaculture
Making A Living in the Coastal Frontier of Berau, Indonesia

Bambang Indratno Gunawan

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The RESCOPAR project

RESCOPAR is a co-operation between research groups at Wageningen University (the Netherlands), Can Tho University (Vietnam), Mulawarman University, Gadjah Mada University, Diponegoro University and WWF-Indonesia studying the resilience of coastal populations and aquatic resources, with an emphasis on mangrove ecosystems, shrimp culture and coastal fisheries. The final objective is to propose guidelines that optimise the sustainability of shrimp production, fisheries, and mangrove forest. To do so RESCOPAR also studied coastal livelihoods and the way decision making processes at different socio-political and spatial scales affect the use, management and conservation of natural resources.

Eleven PhDs, 4 Indonesians stationed in the Berau Delta of East Kalimantan, 6 Vietnamese in the Mekong Delta and one in the Philippines, have studied various aspects of the shrimp sector: the interaction between mangroves, aquaculture and fisheries; the changes in the genome of the WSSV virus causing disease; the epidemiology of this disease; the effects on the people's livelihood and the role of governance by state and markets in the changes. Aggregation and comparison of the results will allow RESCOPAR to provide policy advice

Shrimp fisheries and aquaculture
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Bambang Indratno Gunawan

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This research was conducted under the auspices of the Wageningen School of Social Sciences (WASS).

Shrimp fisheries and aquaculture
Making a living in the coastal frontier of Berau, Indonesia

Bambang Indratno Gunawan

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For Yanty, Syifa and Thoriq

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Bambang Indratno Gunawan
Wageningen, August 2012

Table of Contents

List of Tables

List of Figures

Chapter 1

Introduction

1.1 Motivation of the study

This book is about the everyday life of people living in the coastal frontier of the Berau delta in north-eastern Kalimantan, Indonesia. The shallow waters harbour an abundance of fish species and shrimps. This resource wealth has historically attracted migrants from elsewhere in Kalimantan and especially from the eastward island of Sulawesi. Recently, the Southeast Asian boom in shrimp culture also reached Berau where entrepreneurs started investing in extensive shrimp ponds in the delta in the 1980s.

The Indonesian coastal waters include rich tropical marine ecosystems such as estuarial beaches, mangroves, coral reefs, sea grass meadows, algal beds and small island ecosystems (Hutomo and Moosa, 2005: 89). Cribb and Ford (2009: 9) point out that the Indonesian seas include some of the world's richest fishing grounds, while the country is the world's fourth largest producer of fish after China, Peru and India. In addition, they state that fishing has traditionally provided incomes for millions of people in the coastal villages across the archipelago and has been the most important source of employment in the marine sector. Between 2003 and 2007 fish was the major source of animal protein in Indonesia supplying 70% of the total national protein followed by meat and livestock products (MMAF, 2009).

In the villages of the Berau delta wild and cultured shrimp production has become a major basis for people's livelihoods. Statistics show (Biao and Kaijin, 2007; FAO, 2010) that the global demand for shrimp products is growing. Pond aquaculture has become increasingly important to keep up with the global demand. Since 2000 about one-third of the total world's shrimp supply is contributed by shrimp farming. Asia plays a leading role in shrimp aquaculture, accounting for almost 80% of shrimp production globally through aquaculture (Biao and Kaijin, 2007), Indonesia being one of the mort important contributors. Shrimp aquaculture plays a particularly important role in Indonesia in national

food security, income and employment generation, and in foreign exchange earnings (Cribb and Ford, 2009). In coastal areas, shrimps are the prime commodity, contributing 80% to the total brackish water value (Nurdjana, 2006). With a total fish production of about 5.42 million tonnes Indonesia's export of marine captured fish – including shrimps in the national statistics - contributed approximately 10% to the agricultural GDP in 2000 (Stobutzki et al., 2006).

This PhD research is part of a larger research programme funded by the Interdisciplinary Research and Education Fund (INREF) of Wageningen University that supports problem oriented research programmes on important topics concerning countries in the South. The RESCOPAR programme aimed to contribute to "Rebuilding resilience in coastal populations and aquatic resources: habitats, biodiversity and sustainable use options" hence its acronym.. The research programme was a co-operation between several interdisciplinary research teams at Wageningen University in the Netherlands and universities in Indonesia[1] and Vietnam. The programme focused on understanding the ecological and social processes underlying the resilience of mangrove forested coastal ecosystems, and how the decision making processes at different socio-political and spatial scales affect the use, management and conservation of living aquatic resources. Four sets of interdisciplinary research themes were developed to address these issues: 1. the coastal marine ecosystem and fisheries; 2. the shrimp culture in mangrove ecosystems with a focus on shrimp health; 3. coastal fish based livelihoods; and 4. governance processes. All PhD researches were conducted in Indonesia and Vietnam (RESCOPAR Full Proposal, 2006). Apart from the present study on fish-and-shrimp based livelihoods two other studies were carried out in Berau, one on MPA governance and shrimp certification (Kusumawati et al., *forthcoming* 2013) and the other on environmental management (Siahainenia, *forthcoming*).

1.2 Research problem

The social sciences are still heavily biased towards the land and development studies on coastal livelihoods are still few (Visser, 2004). The present study aims to help fill the gap by applying methodological tools that provide first hand, field research based data for policies that support people and communities in ways that are meaningful to their daily lives and needs, as opposed to ready-made, generalist

[1] This author is a fishery economics lecturer at the Department of Social Economics of Fisheries at Mulawarman University (UnMul), Samarinda in East Kalimantan, Indonesia. UnMul acted as the national co-ordinator for RESCOPAR in Indonesia.

interventionist instruments (Appendini, 2001). Over the last quarter of a century the global concern about the sea level rise and marine biodiversity decline have contributed to the call for Integrated Coastal Zone Management (Visser, 2004: 32). Environmental issues such as global warming and climate change have become predominant in the public media. But political and policy interests leading to the call for ICZM primarily serve land-related technical and macro-economic goals. The social-economic resilience of the coastal population, the existing social and environmental differentiation within and between fishers' communities, and their access to coastal resources are mostly ignored. The acknowledgement, in the early 1990s, of the need to relate sustainable coastal development to poverty alleviation (ibid: 37) also strengthened the call for the integration of social science and (natural) science to understand the effect of human interaction on the marine and coastal environment. For example, the effect of trans-national trade networks on resource exploitation and the competing claims to the marine resources of those who - directly or indirectly - make a living from them, and those who wish to conserve them. While zoning as the administrative boundary marking of marine space is increasingly shown to be ineffective (Chapter 6; Visser and Adhuri, 2010) there is a need for integrative policies addressing the rapid social transformation of the coastal area. This book aims to provide the necessary knowledge basis for the policy making and implementation of such Integrated Coastal Development in the Berau delta which is a part of the Berau Marine Protected Area (MPA).

The research in Berau took place under particular spatial and temporal conditions. Spatially, there was the establishment of the marine park which was realised by the decentralised, since 1999, political-administrative power of the district government. Over the last two decades both the central and the decentralized levels of the Government of Indonesia have established MPAs throughout the country to strengthen marine biodiversity conservation and to provide a more sustainable basis for fisheries resources management. In 2005 the Berau coastal area, including the delta, was declared a marine park (MPA or *KKL, Kawasan Konservasi Laut*) by the District Head through the Decree (*Peraturan Bupati)* No. 31/2005, with a strong support from international environmental NGOs such as The Nature Conservancy (TNC) and the World Wildlife Fund (WWF), as well as national and local NGOs. The MPA covers 1.2 million hectares and forms a part of the Coral Triangle of the Phillipines, Eastern Indonesia, Malaysia, Papua New Guinea, Timur Leste and Solomon islands (Hoeksema, 2004; http://www.coraltrianglecenter.org/). This geographical triangle includes the

islands and reefs with the highest levels of coral biodiversity; the Berau MPA is said to include 507 species of corals (Wiryawan et al., 2005).

Since law no. 22/1999 and no. 25/1999 and law no. 32/2004 on decentralisation the Indonesian districts have become autonomous in the political-administrative domain of resource exploitation. Decentralisation appeared to be a double-edged sword: district governments could decide to increase regional income by stepping up resource exploitation, but increased exploitation conflicted with international environmental dreams of 'democratising' natural resource management. Evidently, the environmentalist discourse on democratisation was not identical to the political-economic practice of decentralisation. The district government of Berau planned to increase exploitation of its natural resources to generate revenues from the development of economic sectors such as from mining and quarrying (*pertambangan dan penggalian*) and the oil palm estate industry, which together constitute approximately 40% of the total district income (*Pendapatan Asli Daerah* or *PAD*). Meanwhile, since 2000 the fisheries (*perikanan*) sector in Berau - including marine fisheries and aquaculture - has contributed only 3% annually (see Chapter 4). Contrary to the two land-based sectors, the fisheries sector is not regarded locally as a primary economic sector contributing to the regional income. Still, it is interesting to note that the district government perceives the fisheries sector as a relevant supplementary source of income despite the fact that its coastal waters are designated Marine Protected Area (Bappeda Berau, 2000; Wiryawan et al. 2005). This is the reason why the district government spends only a small amount of their budget on the fisheries sector including coastal development and people's livelihoods. It is important to know about this policy context because it may shed light on the social, economic, and political relevance of shrimp farming and fisheries in the Berau delta, and the fact that we still primarily find, after almost 20 years, an extensive pond aquaculture in Berau.

Here the study of the everyday lives of fishers and pond farmers is of great value. In relation to the fishers we need to understand their resource management practices, decision making about where to fish and what gear to use, who to allow access and who to exclude from the fishing grounds. About aquaculture in Berau it is necessary to know how it has developed over the last two decades, how decisions are taken and by whom about pond management, and how different economic and cultural perceptions and valuation of fisheries and pond farming influence the production and quality of shrimps on the market. Pursuing to answer these questions through an ethnographic methodology takes us away from the

narrow focus on poverty alleviation. Thus our study complements current livelihood studies that are influenced by the development discourses on poverty alleviation, risk aversion, and livelihood diversification (Kaag, 2004; Nooteboom, 2003). However, livelihood studies have seldom been applied to fisheries (Allison and Ellis, 2001).

Moreover, this research is more than a livelihood study because it also looks at the political-economic relationships between the actors, in particular at the regional networks developed and sustained by the wealthy fish traders, bosses, and pond owners (*punggawa*) and their personal interactions across institutions to improve their multiple and complex livelihoods in the coastal are of Berau and beyond (Chapter 6). We will show that it is not enough to know the technicalities of shrimp aquaculture and that it is also necessary to understand the pond farmer's or fisher's more inclusive social, economic, and political desires for development.

1.3 Aim and objective of this study

The general aim of the livelihood theme within the RESCOPAR programme is to describe the everyday lives of capture fisheries and coastal aquaculture particularly of shrimps, and to provide insight in the social, economic, cultural, and political conditions of small-scale fisheries and pond management in Berau. Such insight will be gained to explain decision making by local actors trying to sustain their livelihoods by carefully following people's everyday fishing practices and shrimp pond (*tambak*) management in the Berau MPA. From a disciplinary environmental or fisheries science perspective these local, regional, or international actors and interests often remain out of sight, while their forces appear to be highly relevant to coastal people's decision making and institutional policy making regarding sustainable shrimp aquaculture and fisheries in coastal areas in Indonesia and Vietnam (see also Ha , 2012).

The present study therefore sees a livelihood as more than the idea of individuals and groups striving to make a living in fisheries or shrimp aquaculture. A livelihood is here understood (see Chapter 2) as ways of coping with uncertainties, responding to new opportunities, and choosing between different value positions (Long, 2001: 54; Wartena, 2006). We aim to understand and describe the social interface between the various actors in the Berau delta in as far as they directly influence shrimp farmers' and fishers' actions, perceptions, and decisions regarding (shrimp) fisheries and aquaculture, about who has a right to

access the marine resources, etc.. Moreover, livelihood in our wider definition clearly includes a historical aspect as people's present ways of living, their value choices, status, etc. vis à vis others flow from their livelihood trajectories.

On the basis of an evidence-based field study on fisheries based livelihood diversity and diversification this research also attempts to contribute to a better understanding of the social aspects of coastal resilience, as required by the RESCOPAR programme. One important point for discussion is the question at what societal or organisational level or levels can we speak about social resilience, and what 'resilience' then means. We agree with Adger that social resilience has economic, spatial and social dimensions and hence its observation and appraisal require an interdisciplinary understanding and analysis at various scales (Adger, 2000: 349). But his statement is seldom taken to practice. The 'social-ecological resilience' approach has been widely adopted in coastal management studies as a discursive framework to describe and prescribe the capacity of social and ecological systems to buffer and adapt to change (Folke et al., 2002: 437). In that approach a socio-ecological system is defined as a system that includes societal (human) and ecological (biophysical) subsystems in mutual interactions (Gallopin, 2006) or it is called a social-ecological system (Berkes and Folke, 1998) coupled with a human-environmental system (Turner et al., 2003). However, it is hard to find detailed evidence-based studies.

In our study we do not apply the systems approach and, together with Tran Thi Phung Ha (Ha, 2012) who carried out comparable research in South Vietnam as a member of the RESCOPAR programme, we contend that the concept of social resilience is in fact a plural concept: there is more than a single notion of resilience at stake within so-called social-ecological systems. Let alone the issue of what that system entails: the MPA, the Berau delta or the political-economic networks of the *punggawa*? Notably, to discover the resilience of a household demands different methodologies, involves different practices, actors, and decision making processes, than the study of resilience of a particular type of extensive pond management. Also, the experimental or technical resilience of a pond may differ from resilience as an external qualification of an aquaculture system or a coastal social-ecological system. The variously constructed 'systems' may even conceptually and physically conflict with each other, like in the case of an economically successful shrimp farm being exploited at the expense of the mangrove trees or the resilience of an MPA. Issues like these bring the message to the interdisciplinary RESCOPAR programme that to understand social resilience it is necessary to position shrimp and fish based

livelihoods within the context of the individual and institutional interests of local policies and regional politics (Chapter 7).

In the literature we find social resilience defined as the ability of communities to withstand external shocks to their social infrastructure (Adger, 2000: 361). This notion also includes the ability of institutions to change (idem: 348). Our research shows that such a definition is problematic because fishers in the Berau delta do not constitute one community in Adger's sense. Fishers organise themselves according to their main gear (Chapter 3) which brings us closer to the definition of a community of interest (Berkes et al., 2001). But then, we did not find institutions specifically targeting gillnetters or pond owners. On the contrary, the Ministry of Fisheries and Marine Affairs does not even differentiate between different gear types as do the fishers themselves (Chapter 3), nor between fisheries and aquaculture, while pond owners seldom specialise in shrimp alone (Chapter 4). In other words, we need to take as a starting point of analysis this very multiplicity of pond management and the institutional environment.

Visser (2004: 25) argues that there still exists a gap in the integration of methods, concepts and approaches of the natural sciences, on the one hand, and the social sciences, on the other hand. This research tries to fill the gap by describing coastal resilience on the basis of empirical social findings and to explain how powerful fishers, traders, and pond owners search to improve their livelihood by being involved in wider political-economic relationships and also to see how their values, interests and knowledge are contested in the social arena of the Berau delta.

Between 2008 and 2010 I periodically lived in the research villages of Kasai, Teluk Semaning and Pegat Batumbuk in the Berau delta where I studied how different social actors make a living from fisheries and pond aquaculture. Thus I witnessed how different values, interests and knowledge were shared and contested in this resource-rich coastal area. Just like the Mahakam delta a decade ago, currently the Berau delta can be regarded as an economic and social frontier area as its marine wealth attract both wealthy entrepreneurs or *punggawa* (Timmer, 2011: 706) and poorer fishers, mainly from Sulawesi. According to Agergaard et al. (2010: 3-4) the term of frontier is not only used to denote areas that are advancing in a spatial sense, but also includes areas that are experiencing social and economic fluidity due to new opportunities. Based on this definition the observed dynamics of fisheries and pond based livelihood opportunities in coastal Berau clearly make it into a frontier area. For example, I discovered the power dependency between a

patron (*punggawa*) and client fisher or between a pond owner and his caretaker in making livelihood decisions (see Chapter 4). The coastal frontier has also attracted outsider fishers (*andon*) to fish in the coastal waters (Chapter 5). Strategic networks are built between individuals and across institutions, such as between fishers, patrons, entrepreneurs and shrimp traders (*punggawa*), the village surveillance organisation (*Pokmaswas*), and government staff (Chapter 6).

1.4 Research objective and research questions

The objective of this research is to describe, explore and understand the dynamics of coastal fisheries and aquaculture based livelihoods in the coastal frontier of Berau. The research focuses on the Berau delta as part of the Berau Marine Protected Area (MPA). The research findings will contribute to the scientific understanding and policy making process to increase the social and the ecological resilience of the Berau MPA, and the furthering of the interdisciplinary debate and policy making concerning fisheries and aquaculture in the coastal areas of Indonesia.

Research Questions

There are three general research questions:

1. How do coastal people create and sustain shrimp fisheries and pond aquaculture based livelihood opportunities in the coastal frontier of Berau?
2. How do the different individual and institutional actors create and negotiate certain practices?
3. How are their different interests, knowledge and power contested in the Berau Marine Protected Area (MPA) as a social arena?

The following specific research questions are derived from the general questions and they are explored in the empirical chapters of the book:

1. How do small-scale fishers make a living, what diversity is shown, and howdo fishers organise and value their livelihood opportunities and risks in view of their future in the coastal frontier of Berau? (Chapter 3).
2. How are ponds (*tambak*) constructed, what is their productivity, how is shrimp marketing organised, and how and to what effect do owners and caretakers engage in patronage networks regarding pond management? (Chapter 4).
3. How does the formal establishment of the Berau Marine Protected Area (MPA), its boundary marking and zoning affect local fishers' livelihoods; how

do they deal with problems of inclusion and exclusion of outsiders (*andon*) and to what effect? (Chapter 5).

4. What are the role and position of embedded social institutions for marine management, especially in the case of the village surveillance organisation (*Pokmaswas*), and how do the political-economic networks of key actors in the MPA influence the effectiveness of *Pokmaswas* as a surveillance institution? (Chapter 6).

1.5 The structure of the book

The book is organised into seven chapters and is structured as follows:

Chapter 1 contains background information on the motivation of the study, research problem, aim and objective of the study, research objective and research questions, and the structure of the book.

Chapter 2 presents the theoretical mapping on livelihood, the concept of agency and social interface as well as and the notion of resilience. The chapter also presents the study design and the research strategy, and the methods used to collect and analyse the data.

Chapter 3 describes the everyday practices of fishers for make a living in the Berau delta. The chapter presents the nature of patronage networks in fishing based livelihoods, the livelihood trajectories of different fishers and the issue of place making determined by Bugis migrants in the frontier of Berau. It also addresses local knowledge and seasonality practiced by fishers, the creation of livelihood diversification by fishers in the delta and how they search for a better livelihood. The chapter ends with a discussion on fishers' perception toward income changes and the caused factors, and how fishers see fishing as their future livelihood.

Chapter 4 presents the multiplicity of pond based livelihood by carefully following the everyday of lives of pond farmers and social actors in the coastal Berau. The chapter introduces a discussion on the history of pond (*tambak*) farming, the problem arise in official pond data, the dynamics of pond development and the contestation of mangrove land as social arena in the Berau delta. It also addresses everyday practices of pond farming including livelihood trajectories from *tambak* caretaker and owner, practical knowledge in pond farming, shrimp and fish production from pond culture, the formation of trade networks, social capital and access loans of farmers from *punggawa* and the

dynamics of patronage networks in pond development. Farmers' perceptions are also discussed to know the future of pond based livelihood as well as the identification good practices by farmers in pond farming.

Chapter 5 addresses the issue of the lack of effectiveness of the formal boundary in the everyday practice of local fishers and outsiders moving in and out of the MPA. Access of both *andon* and local fishermen to fishing grounds inside the MPA has led to social and governance conflicts. *Andon* come from outside the area to fish and the leave again to sell the fish in their home region. The local government understands that the outsiders are a threat to local fishermen, but it also benefits from the outsider fishers through their contribution to regional income by issuing access permits. Economic revenue makes it difficult to force them out of the legal 4-mile zone of the district, so the district in fact legitimises the outsiders' access to the MPA. The decentralised government, together with the international environmental organisations regard outsiders' access to fishing grounds within the MPA as 'illegal and illicit'.

Chapter 6. The political arena of the MPA described in Chapter 5 also influences the functioning of *Pokmaswas* as a village group for resources surveillance, in controlling access to and exploitation of the coastal resources, and the interaction of fishers among themselves at village level. The establishment of *Pokmaswas* has created a political network enabling its members to access local government, and contributes to the ambiguity of controlling outsider fishers who enter the Berau waters, not for the purpose of marine conservation but for the purpose of raising district revenues. This chapter shows how the socially embedded institution of *Pokmaswas* threatens the trust of the local fishers as, on the one hand, it excludes local fishermen who still use the legally prohibited mini-trawls and, on the other hand, it allows access to the *andon* outsiders using the gill nets.

Chapter 7 summarises the main findings of the study to address the research questions formulated. Scientific and policy recommendations are presented to improve shrimp fisheries and aquaculture development and the establishment of Marine Protected Area.

Chapter 2

Theoretical mapping and methodology

2.1 Introduction

This chapter has two parts. The first part explores the main concepts used in this thesis by way of theoretical mapping of the research questions formulated in Chapter 1. In this review the key concept of livelihood is discussed (2.2) while the actor-oriented approach we have applied demands that we also discuss the concepts of agency and knowledge interface (2.3 and 2.4). Other important concepts that are necessary to understand the dynamics of everyday life of the people in the coastal frontier of Berau are resilience (2.5) and patronage as the *habitus* of Bugis people (2.6). Finally, since the livelihoods of fishers and pond farmers are situated within the marine conservation area established in 2005, it is necessary to pay attention to issues of access and ownership of the coastal environment and social exclusion in terms of the Berau coastal waters as a common pool resource (2.7). The second part of this chapter contains the study design and the research strategy, as well as the methods and techniques used to collect and analyse the data.

2.2 Livelihood

This study is about shrimp fisheries and aquaculture based livelihoods in the coastal frontier of Berau. A livelihood study constitutes more than the economic outcome of subsistence activities and it combines several levels of analysis, from the individual actor to his global economic, infrastructural, ecological and institutional environment (Wartena, 2006: 68). Also, the concept of livelihood has a multi-scalar application and as it is usually applied to households making a living, attempting to meet their various consumption and economic necessities, coping with uncertainties, and responding to new opportunities (Niehof and Price, 2001; De Haan and Zoomers, 2005; Kaag, 2004). A strong point of the livelihood concept is that it is widely accepted in academic as well as development policy circles, and

it is not linked to a particular discipline but used by scholars and practitioners of a great variety of disciplines (Wartena, 2006).

Livelihood studies have emerged in response to the limited success of poverty studies and other types of studies in informing policies and practices regarding poverty alleviation and development (Appendini, 2001; Nooteboom, 2003; Kaag, 2004; De Haan and Zoomers, 2005). Livelihood studies improved on poverty studies by creating a more optimistic image, starting their analysis with the strategies and creative choices of (poorer) people in making a living (Nooteboom, 2003). The approach shifted from a focus on what poor people lack to an interest in how they manage to survive, emphasising their strengths rather than their weaknesses, thus providing a message of hope rather than despair. The term refers to all assets and connections that people can employ to make a living: financial, social, natural, infrastructural, educational, agricultural, "and so it pervades the domains of all disciplines and all economic and socio-cultural sectors". (Wartena, 2006: 71).

The study of livelihood aims to search for more effective methods to support people and communities in ways that are more meaningful to their daily lives and needs, as opposed to ready-made, interventionist instruments (Chambers, 1995; Scoones, 1998; Ellis, 2000; Appendini, 2001). The livelihood concept became widely acknowledged when it appeared in the report of World Commission on Environment and Development (WCED) in 1987. Chambers and Conway (1992) at the British Institute of Development Studies (IDS) of the University of Sussex were catalysts to trigger modern livelihood studies to understand the lives of poor people. A popular definition is that:

> *"A livelihood refers to the means of gaining a living, including livelihood capabilities, tangible assets, such as stores and resources, and intangible assets, such as claims and access"* (Chambers and Conway, 1992 cited in De Haan and Zoomers, 2005: 27).

According to Chambers and Conway the definition of assets contains a number of components, some of which belong to recognised economic categories of different types of capital, and others do not, namely claims and access. Ellis (2000) modified Chambers and Conway (1992) by stressing the importance of the notion of access and the impact of social relations (i.e. gender, family, kin, class, caste, ethnicity, belief system) and institutions that affect an individual or family's capacity to achieve its income or consumption requirements.

The livelihood concept has become entrenched in the development discourse (Appendini, 2001: 24). DFID launched a definition of livelihood that became widely accepted among development scholars and practitioners:

> *"A livelihood system comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stress and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base."* (Carney, 1998: 4)

DFID developed a methodological framework for sustainable development analysis which focuses on identifying five types of capital assets which people can build and draw upon, namely human, natural, financial, social and physical assets. The identification of these basic elements and its pictorial representation in the shape of a pentagon became so generally regarded as part and parcel of the livelihood approach that it can almost be considered the approach's logo. DFID developed its intervention strategies on the basis of the livelihood concept and the sustainable livelihood framework. Consequently, the sustainable livelihood approach has become widely accepted by donors and in policy circles such as CARE, EDIAIS, FAO, IIED, IISD, Oxfam, UNDP and allied institutions in the 1990s (Carney, 1998).

It needs a holistic approach to understand livelihoods at community and at individual levels, as well as in the context of macro, micro and sector policies that affect people's livelihoods (Appendini, 2001). The FAO incorporated the concept of livelihood systems into some of its organisational units as a diagnostic tool for project formulation, for example in the Investment Center Division and in a large-scale fishery project in western Africa (idem : 25).

Contributions to livelihood studies that are more theoretical and broader in scope were developed by, among others, Ellis (2000), Bebington (1999), and De Haan (2000). Research may cover rural livelihoods and poverty reduction strategies (Chambers, 1995; Ellis and Freeman, 2004) and case studies about household livelihood strategies in Indonesia (Nooteboom, 2003) and Papua New Guinea (Preston, 1994). Ellis (2000: 10) defines livelihood as:

> *"[C]omprising the assets (e.g. natural, physical, human, financial and social capital), the activities and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household."*

The elements of the livelihood approach are based on identifying and analysing four main social domains: the assets on which a livelihood is based, the contextual or institutional setting that frames access to and utilization of the assets, the emergent livelihood strategies, and the particular livelihood outcomes of this process (Swift and Hamilton, 2001; Carney, 1998; Scoones, 1998).

Assets contain a wide range of tangible and intangible stores of value or claims to assistance and can be divided into three broad categories of investments, stores and claims (Swift, 1989). Here investments include human (individual and collective) assets; material stores like food stores, but also items of value such as gold, and money in the bank; while claims include reciprocal claims on other households and claims on patrons and power holders, government agencies, and even on the international community.

Livelihood assets in this study are treated not only as material but also as non-material. Assets are not only means but also give meaning, and thus build capabilities and capacities which in turn further help create assets. Such a process of asset and resource accumulation by individuals and households can challenge existing structures and pave the way for institutional change and improvements of access, and may affect decision-making on livelihood shifts or diversification (Bebbington, 1999; Ellis, 2000). In this thesis the shift from fisheries to pond aquaculture based livelihoods are an example (Chapter 4).

Livelihood strategies are seen as the various ways or processes (i.e. using skills and capacities to use natural resources in particular ways) to generate a livelihood (Niehof and Price, 2001). They are composed of activities that generate the means of household survival (Ellis, 2000: 40). Livelihood strategies describe a process unfolding over time, and this process results in evolving outcomes that affect individual or household entitlements (Scoones, 1998).

Assets are divided into five types of capital, depicted in the famous shape of the DFID-pentagon, namely natural, human, social, economic or financial, and physical capitals. According to Ellis (2000), natural capital refers to the natural resources base (land, water, trees) that yields products utilised by human populations for their survival. Physical capital refers to assets brought into existence by economic production processes, like tools, machines and land

improvements such as terraces or irrigation canals. Human capital refers to the education level and health status of individuals and populations. Financial capital refers to stocks of cash that can be accessed in order to purchase either production or consumption goods, and access to credit might be included in this category. Social capital finally refers to the social networks and associations in which people participate, and from which they can derive support that contributes to their livelihoods.

The notion of strategy is central to my research since I try to understand fisheries and aquaculture based livelihoods as outcomes of the struggle and negotiation that take place between individual farmers or fishers and their social environment of people with different technical, material, and social experiences, interests, and power positions. Strategy is important in seeing how social actors attempt to solve their livelihood problems and organise their resources (Long, 2001), although we need to be aware that the term strategy might appear to give too much emphasis to processes of rational calculation and decision making. Therefore, authors like De Bruijn et al. (2003) propose the concept of pathway while, for example, De Haan and Zoomers (2005) speak about livelihood trajectories. However articulated, the composite of assets and resources, activities to obtain the means for living, and the access to all these are common threads in the understanding of people's choices or options for certain livelihood trajectories (Ontita, 2007).

The concept of social capital has been critiqued from different sides, and for different reasons but a common undertone is the critique on overemphasising economic rationality in making the social capital an object of policy making. "Important as it is, as a concept the notion of capital represents an inanimate state that is removed from social life and simply symbolises a process of accumulation as a way of rationalising people's activities and decision-making." (Arce, 2003: 855). De Haan and Zoomers (2005) argued that livelihood is not a matter of only material well-being, but also includes non-material aspects of well-being. Livelihood is not only an economic activity but it also encompasses interactions between people and their material and biological environment, and changes over time.

In line with Arce (2003) I can see how the way experts from development agencies have constructed people's livelihoods around the five capital assets, carries the danger of rendering invisible the way the actors assign meaning and attach value to livelihoods and material objects. This applies, for instance, in the

Berau case to fishing gear, boats and shrimp ponds as parts of social relations, such as patron-client interdependencies. As Long wrote:

> *"Livelihood best expresses the idea of individuals or groups striving to make a living, attempting to meet their various consumption and economic necessities, coping with uncertainties, responding to new opportunities, and choosing between different value positions."* (Long, 2001: 54)

Livelihood thus implies more than making a living, i.e. economic strategies at household or inter-household levels. It encompasses ways and styles of living, and thus value choice, status and a sense of identity vis à vis others. In addition, livelihoods are both individually and jointly constructed and represent patterns of interdependencies between the needs, interests and values of particular sets of individuals or groups. Indeed, in the social and ecological environment of the Berau delta where different waves of Bugis in-migrants occupy the coastal lands with extensive pond aquaculture and fisheries, it is necessary to differentiate between the different historical, material, social, and value positions to understand the negotiations and conflicts taking place (Chapter 5 and 6). I also share Allison and Ellis (2001) opinion that access to resources is one of the most important factors to study the livelihood of the coastal people in the Berau area.

Livelihoods nowadays are continuously in flux. They are becoming increasingly multi-local and multiple or multidimensional. The general picture of livelihood in the era of globalisation will therefore become one of increased rearrangement of strategies using various resources in different locations. Globalisation asks for innovative analyses of continuity and change, place and space, and of livelihood networks stretching across different social, political, cultural and ecological contexts (Kaag, 2004). This particularly applies to the global shrimp trade which, as a phenomenon of globalisation, plays an important role for the coastal people of Berau in earning a living. But, at the same time, we can observe some fundamental 'disjunctures' (Appadurai, 1990) between the demand of global economy, Bugis culture, and local politics. Therefore, the study of shrimp-based livelihoods in Berau should take into account how the different coastal actors act and reflect upon the social, economic, and political changes, including the risk of coastal degradation.

With regard to fisheries livelihoods only a few studies can be mentioned, including livelihoods resilience on fishing communities in Cambodia (Marschke and Berkes, 2006), a study on the options for aquaculture based livelihoods in the

coastal zone of Mexico (Pérez-Sánchez et al., 2005), on livelihoods assets through community based management in Bangladesh (Islam, et al., 2006), a study of household fisheries in Lao PDR (Garaway, 2005), and in Madura, Indonesia (Niehof et al., 2005). In addition, Allison and Ellis (2001) and Allison and Horemans (2006) contributed conceptual studies of sustainable livelihoods of small-scale fisheries and fisheries development.

2.3 Actor-oriented approach

This research was carried out with the use of an actor-oriented approach in order to gain understanding of the differences and dynamics of the agency of the social actors involved in coastal development in Berau, primarily the fishers and pond farmers, but also the field officer of the Fisheries Office and the district government. They all have a certain knowledge and capacity to process social experience and generate or sustain political-economic networks in their everyday lives (Chapters 4 - 6).

The actor-oriented approach recognises the existence of multiple realities within a community and among its actors, and it allows us to see how individuals and groups themselves bring about the developments that shape these realities (Long, 2001) rather than outsiders defining what 'development' is. A clear example is shown in Chapter 5 about the different notions of hence interactions with outsider fishers (*andon*). A systematic ethnographic understanding of the 'social life' of development projects allows us to explain differential responses to similar structural circumstances, even if the conditions appear more or less homogeneous at first sight, as in the case of the establishment of marine surveillance groups along the coast (Chapter 6).

An actor-oriented approach, more than an institutional approach, enables us to see the innovative behaviour of entrepreneurs and economic brokers (2.6) on individual decision-making processes, and on the ways in which individuals mobilise resources through the building of a social network. This means recognising that individuals, whether they be fishers, pond farmers, absentee landlords, fisheries officers or local policy makers, attempt to come to grips with the world around them, and that in doing so they rely on existing categories, knowledge and forms of consciousness, and on organisational practices in interaction with other individuals and social groups (Long, 2001). Still, we can not ignore the influence of social institutions and wider structural phenomena, since

many of the choices made and strategies pursued by individuals and groups have been shaped by processes outside the immediate arena of interaction (Long, 2001; Wartena, 2006). In our case this certainly applies to the pervasive role of patrons (*punggawa*) in fisheries, but even more so in the recent expansion of shrimp aquaculture (Chapter 4) and the recent decentralisation laws urging regional government to develop strategies to increase regional income (Chapter 6).

According to De Haan and Zoomers (2005) livelihood trajectories provide individual strategic behaviour embedded both in historical repertoire and in social differentiation. In the case of the history of Bugis migration to the coastal areas of eastern Kalimantan, knowledge of people's livelihood trajectories allows to penetrate into a deeper layer of experiences, beliefs, needs, aspirations and limitations in the context of constellations of power and institutions. In my fieldwork I have used the concept of livelihood trajectories and to observe and analyse actors' lived experiences, desires, understanding and self-defined problematic situations as a continuous, non-linear process, while at the same time trying not to impose my a-priori socio-economic interpretation.

Livelihood strategies in this study are seen as consisting of both strategic or intentional and unintentional decision-making created by social actors in their daily interaction and use of values, knowledge and social networks, such as kinship, relatives, and ethnic relationships. In this sense I agree with De Haan and Zoomers (2005) that livelihood research shows that human behaviour should not always be seen as conscious or intentional; much of what people do cannot be classified as strategic. I see that people can be rational or otherwise, but their choice of rationalities can be based on different value orientations, and this also bears on my analysis and understanding of livelihood strategies.

Evidently, different actors have different goals and objectives in life, and thus there will also be different ways and opportunities to strategically choose a means of living. For example, the livelihood strategies of patrons who often have access to powerful translocal social, economic and political networks differs considerably from their dependent farmers or fishers who do not enjoy autonomy of decision-making, for example in the trade and marketing of shrimp. Data on social-economic, technical, and political differentiation between classes of actors is therefore needed to provide an explanation about distinguished livelihood strategies for both actors (Chapters 3 and 4). Identifying what livelihood assets or resources are required for different combinations of livelihood strategies is a key step in the analytical process. Understanding the dynamics and the historical

context of fisheries and pond farming in Berau, how different resource use practices are sequenced and combined in the pursuit of different livelihood strategies is therefore critical (Scoones, 1998).

We need to differentiate here between livelihood diversity and diversification (Ellis, 2000). Diversity refers to the existence, at any point in time, of many different income sources parallel to each other, which also typically require diverse social relationships to underpin them. One example may be the parallelism of fisheries and polyculture in the coastal area of Berau described in this thesis. Diversification, on the other hand, covers the creation of diversity as an ongoing social and economic process, reflecting factors of both pressure and opportunity that cause actors to adopt increasingly intricate and diverse livelihood strategies. One example from Berau is the strategy of fishers to move out of fisheries and into pond farming (Chapter 4). Livelihood diversification is a process by which rural households construct a diverse portfolio of both activities and social support capabilities to improve their standard of living (Ontita, 2007). Rural livelihood diversification is defined as the process by which rural households construct an increasingly diverse portfolio of activities and assets in order to survive and to improve their standard of living (Ellis, 2000). This thesis, however, does more than provide yet another work on livelihood diversification. Firstly, it is one of the few studies on coastal fisheries in Indonesia using an actor-oriented approach. Secondly, this study is innovative in relating livelihood diversification to the debate on social and ecological resilience (2.5; Chapter 7).

2.4 Agency and knowledge interface

Agency is the ability to define one's goals and act upon them. It is more than observable action and also encompasses the meaning, motivation and purpose which individuals bring to their activity (Kabeer, 1999). The concepts of agency and interface (Long, 2001) are crucial in coastal livelihood studies. Fishers and pond farmers use their capacity to devise ways of coping with coastal life by generating strategies. The notion of agency attributes to the individual actor the capacity to process social experience and to devise ways of coping with life. Within the limits of existing information, uncertainty and the other constraints (e.g. physical, normative and politico-economic) that exist, social actors are 'knowledgeable' and 'capable' (Long, 1989: 22-23).

Long (2001) further explains that agency refers to the knowledgeability, capability and social embeddedness associated with acts of doing and reflecting that impact upon or shape one's own and others' actions and interpretations. He points out that persons and groups of persons have agency that can shape other's perceptions. Similarly, people's perceptions of the actions and agency of others shape their own behaviour. Hence agency is not an individual property, but a relational concept. It refers to relationships between actors and their interacting practices vis à vis relevant institutions, the physical environment, culture, and economic and political institutions and organisations. By applying the concept of agency, many local realities and their intrinsic dynamics, such as daily interactions between actors, the organisation thereof, and negotiations between actors in different institutional or power positions, may be well explained. It should be noted here that analysing agency requires grounding actors' practices, intentions, experiences and values in the circumstances of everyday life, demanding an ethnographic approach.

This research analyses the ways in which fishers and pond farmers in the everyday realities of the Berau delta shape a room for manoeuvre of particular actions and the discourses that justify these actions. This room for manoeuvre in turn defines the spaces that frame the context in which they act, and in which powerful discourses, conflicts and struggles play a role. These elements compose a field of social action in which struggles take place, and are themselves reconfigured by the particular actions and negotiations that ensue (Long, 2001). Individual persons or networks of persons have agency. In this research I have observed the multiple ways fishers and shrimp farmers and their household members, use their social relations to interrelate with relatives, friends, village heads, traders, *punggawa* and the Fisheries field officer to sustain and develop strategies for livelihood security.

The concept of interface conveys the idea of some kind of face-to-face encounter between social actors with differing interests, resources and power, but these interactions are affected in part by institutional and cultural frameworks or resources that may not actually be physically or directly present (Long, 1989: 214). The notion of knowledge interface can be applied where different social actors contest values related to 'scientific', 'bureaucratic', and 'local' knowledge in accessing and using resources in the coastal areas. In our case, t his is relevant to understand the negotiation or rather, contestation of the right to access fishing grounds within the marine conservation area between local fishers, *punggawa*, the

members of the surveillance organisation (*Pokmaswas*) in Chapter 6, and the conflict between shrimp traders, government staff and the inclusion of outsider fishers (*andon*) described in Chapter 5.

2.5 Resilience and vulnerability

This research is carried out within the organisational frame of the RESCOPAR program on coastal resilience (*Rebuilding Resilience of Coastal Populations and Aquatic Resources*). The overarching research question of the programme saw resilience mainly in relation to the coastal ecosystem, in particular mangrove forests (Full Proposal, INREF Application Phase 2, n.d.: 26): *"What ecological and social processes affect the resilience of mangrove forested coastal ecosystems, and how do decision-making processes at different socio-political and spatial scales affect the use, management and conservation of their living aquatic resources?"* In the present research and the parallel research in Vietnam (Ha, 2012) on coastal livelihoods and their interaction with the ecological system, however, decision- making processes have been studied in a wider context of the dynamics of social interface and historical experience, knowledge, and power of the different actors. But what about social resilience?

Social resilience in this research is not seen as the property of an individual or group of actors, let alone of 'the' social system. Resilience is an *emergent property* of the interface between actors and their social, economic, political, physical and material environment. Also, social resilience is not a quality of the actor alone, whether he is a farmer or fisher, a powerful shrimp trader or a district head. Social resilience is partly the outcome of historical actions and experiences like Bugis migration into Kalimantan, the recent political-administrative decentralisation, and the cultural institution of patronage that is so pervasive in the coastal area of Kalimantan.

In the social sciences the concept of resilience of the ecosystem has been borrowed and adapted particularly by human geographers. The notion of resilience refers to the ability of an ecological or livelihood system to 'bounce back' from stress or shocks (Allison and Ellis, 2001: 378; also Davis, 1993). Also Adger (2000: 361) defines resilience as the ability of communities to withstand external shocks to their social infrastructure. It also means the ability of institutions to withstand change (idem: 348). Walker et al. (2004: 1) see resilience as the capacity of a system to absorb disturbance while undergoing change so as to still retain essentially the same function and structure.

Interestingly, the notion of resilience is less common in mainstream social science than the concept of vulnerability, particularly in livelihood studies. Chambers (1989: 20) stated that vulnerability refers to exposure to contingencies and stress, and difficulty in coping with them. Vulnerability refers to "a high degree of exposure to risk, shocks and stress and proneness to food insecurity" (Allison and Ellis, 2001: 378). According to Moser (1998: 3) the definition of vulnerability in urban studies addressed insecurity and sensitivity in the well-being of individuals, households and communities in the face of a changing environment and, implicitly, their responsiveness and resilience to risks that they face during such changes. Vulnerability thus has two sides: an external side of risks, shocks, and stress to which an individual is subjected; and an internal side which is defencelessness, meaning a lack of means to cope without damaging loss (Chambers, 1989: 20). In a similar vein Allison and Ellis (2001: 378) point to the dual aspect of external threats to livelihood security due to risk factors such a climate, markets or sudden disaster, and an internal coping capability determined by assets, food stores, support from kin or community, or government policies providing a safety net.

However, this thesis is not about vulnerability. In my view vulnerability is an externally defined 'expert' concept that is part of a discourse on poverty alleviation and rural development focussing on social systems or populations as units of analysis. In this thesis we apply an actor-oriented approach which implies that we follow the definitions and perceptions of the coastal actors. Our ethnographic data do not provide a case where a patron, not even a dependent pond farmer or a fisher calls himself or their households categorically 'vulnerable'. Of course they experience shocks like the decrease in the sizes and quantity of fish or the death of an entire shrimp harvest. But then our research deals with their agency to overcome these shocks and to improve their livelihood conditions in the context of the technical and environmental developments taking place in the Berau Delta. In this sense, social resilience seems a more challenging concept than vulnerability (Chapter 7).

2.6 Patronage, power and network

When one 'follows the actor' in the Berau research area, one inevitably encounters the social practice of patronage. The Bugis of southern Sulawesi have a long history of migration and mobility (Pelras, 2000). Bugis people live across the

Indonesian archipelago 'Nusantara' from Malacca Strait to Papua, and from the southern Philippines and North Kalimantan to Nusa Tenggara, where they engage in trade, agriculture, aquaculture and fisheries, forestry, and plantation economy depending based on time and space. In Bugis hierarchical society patron-client networks lie at the basis of the everyday practices between patrons (*punggawa*) and followers, both in fishing and in pond aquaculture (Pelras, 2000: 333). The Bugis migrants transferred their *punggawa* institution to the east coast of Kalimantan where this historical practice still very much permeates social interaction and political-economic interface at village and regional levels.

Bourdieu (Bourdieu, 1977: 78) uses the term *habitus* to describe enduring, learnt, embodied dispositions for action. Habitus is inscribed into the bodies and minds of humans as an internalised, implicit programme for action or "the durably installed generative principle of regulated improvisations" (Bourdieu, 1977: 78). Often it is believed that habitus does not allow for change, but ethnographic research shows that a *punggawa* nowadays has become an economic entrepreneur, sometimes a shrimp trader, often a pond owner who has several dependent pond farmers or caretakers managing his ponds on a daily basis (Chapter 4). Although the habitual dependency structure may not have changed, their shape and content have changed. The examples from this thesis are supported by other studies (Schrauwers, 1999; Acciaioli, 2000).

In his classical paper on patron-client politics Scott (1962: 92) defines the patron-client relationship as an exchange relationship between roles; a special case of dyadic ties involving a largely instrumental friendship in which an individual of higher socioeconomic status (patron) uses his own influence and resources to provide protection or benefits, or both, for a person of lower status (client) who, for his part, reciprocates by offering general support and assistance, including personal services, to the patron". Boissevain (1966) who studied patronage in Sicily extended the definition of patronage to include the complex of relations between those who use their power, social position or other attributes to assist and protect others, and those whom they so help and protect. Patron-client links are characterised by three features namely inequality, face-to-face interaction, and diffuse flexibility (Scott, idem: 93). A client is someone who has entered an unequal exchange relation in which he is unable to reciprocate fully (idem). Further, the role of the patron ought to be distinguished from his role as broker, middlemen, or boss with which it is often confounded. The term boss itself implies that he is the most powerful man in the arena and that his power rests more on the inducements

and sanctions at his disposal than on affection or status. Scott's observations are highly relevant for Berau where the caretakers of the ponds may refer to their patron/pond owner (*punggawa*) as '*bos*'. They see their patron and other patrons as the most powerful actors in the coastal arena, whether it is the shrimp trade or fisheries, and they definitely entered into an unequal exchange relationship with him. However, they are not fully dependent on one particular individual as a patron, as they may negotiate the exchange terms or even quit and move to another patron.

Pelras (2000:16) characterised "the patron-client relationship as an unequal (but theoretically non-binding) relationship between a superior (a patron or leader) and a number of inferiors (clients, retainers, or followers), based on an asymmetric exchange of services, where the de facto dependence on the patron of the clients, whose unpaid services may include economic obligations, paid or unpaid work, armed service, political support and other services, is counterbalanced by the role the patron plays as a leading figure for all the clients and by the assistance, including monetary loans and protection, he or she provides when necessary". As I explained in Chapter 1, patron-client ties have been institutionalised in Bugis society of old, and constitute powerful local, regional, national, and even transnational political-economic networks in the sense of the social networks defined by Long (2001: 55).

Today, Scott's observation (1962) upon the difference between the patron and the entrepreneur or boss does not apply anymore to today's social-economic and political position taking of modern *punggawa* in Sulawesi or coastal Kalimantan. My observations concur with Olivier de Sardan who stated: "Modernity, the search for profits, and commodification, are in no way incompatible with clientelism" (Olivier de Sardan, 2005: 76). I met *punggawa* in Berau who are patrons-pond owners to their clients-caretakers of the ponds, pond owners who were at the same time translocal shrimp traders, and other *punggawa* who combined a local political position with pond ownership and entrepreneurship. Thus, their interest in shrimp farming can not be seen as isolated from a livelihood history of other sectoral and spatial interests, particularly in occupying coastal land by way of opening new ponds in the Berau delta (Chapter 6). For this reason I prefer to speak of patronage as a network rather than as a dyadic relationship. Also, patrons construct a network between themselves exchanging services and knowledge, or they themselves may depend on more powerful patrons who operate at provincial or transnational scales, especially in the resource trade with Malaysia (Chapter 6).

2.7 Decentralisation, fisheries co-management and the Berau Marine Protected Area (MPA)

Research on fisheries in the coastal waters of northeast Kalimantan in the 21st century needs to be well positioned in the context of the recent political-administrative decentralisation and co-management of fisheries between the local government, e.g. the Fisheries Office and the fishing communities of the Derawan Islands and in the Berau Delta. Also, international environmental organisations, local NGOs and the district government agreed on the establishment of the Berau Marine Park in 2005 as a part of the Coral Triangle Initiative. Therefore, I conclude this theoretical mapping exercise with a short reflection on these issues.

Global resource degradation, particularly in fisheries, have triggered a growing need for fisheries co-management because it became evident that a fishery cannot be managed well without the cooperation and participation of fishers to make the laws and regulations work effectively (Pomeroy and Berkes, 1997). Fisheries co-management is defined as a partnership in which government, the community of local resource users (fishers), external agents (non-governmental organisations, academic, and research institutions), and other fisheries and coastal resource stakeholders (boat owners, fish traders, money lenders, tourism establishments, etc.) share the responsibility and authority for making decisions about the management of a fishery (Berkes et al., 2001: 202). Co-management covers various partnership arrangements and degree of power- sharing and integration of local and centralised management systems (Pomeroy and Berkes, 1997: 466). The role of the government in co-management is to provide enabling legislation to authorise and legitimise the right to organise and to make and enforce institutional arrangements at the local level (ibid: 478). Co-management should be viewed by government as an alternative management strategy to the centralised management system, which in many cases does not work effectively anyway (idem). Jentoft et al. (1998: 435) cast their net wider, arguing that "co-management as an institution is not only about rules. It is also about creating opportunities. It is a process of social creation through which knowledge is gained, values articulated, culture expressed and community created".

The co-management discourse saw co-management programs assigning local communities shares in control over and benefits from renewable resources (Agrawal and Ribbot, 1999). Unfortunately, such optimistic constructions of an idealised collaboration between local government and fishers have never been

realised in Berau (Chapters 5 and 6). This is partly due to decentralisation and the new powers assigned to district governments in Indonesia. Satria and Matsuda (2004) describe how decentralisation of fisheries management in Indonesia has evolved during three periods: the post-independence period (1945-66, the New Order period (1966– 1998) and the Reform period (after 1998). Decentralisation has been carried out at provincial and at district levels by law no. 22/1999 and law no. 32/2004. They argue that the decentralisation of the Indonesian fisheries management gradually developed from deconcentration and delegation to devolution. In line with the general definitions given in Pomeroy and Berkes (1997: 471) there are major differences between deconcentration and devolution. Deconcentration is the transfer of authority and responsibility from the national government departments and agencies to regional, district and field offices of national government offices. Such shift of place, not power is usually referred to as administrative decentralisation. Devolution is the transfer of power and responsibility for the performance of specified functions from the national to the local governments. The nature of transfer is political (by legislation), in contrast to deconcentration, which implies that local governments obtain the authority to manage all sectors. Devolution also implies that local governments are now held responsible for the financial health of their territory. Often this implies, as in the case of Berau, that the district increased terrestrial and marine resources exploitation. Paradoxically, as explained in Chapter 5, fisheries 'co-management' under conditions of decentralisation now implies that fishers' communities in Berau experience greater pressure on the fishery resources rather than less.

In conjunction with decentralisation, there is the issue of the Marine protected Area. According to Berkes et al. (2001: 25) establishment of a Marine Protected Area (MPA) primarily aims at protecting target species from exploitation in order to allow their populations to recover. In addition they contend that MPAs can protect entire ecosystems by conserving multiple species and critical habitats, such as spawning areas and nursery beds. The MPA is believed to be an instrument for biodiversity conservation and a tool for fisheries management in Indonesia (Mous et al., 2005). The role of MPAs is principally studied from a biological perspective but MPA research lacks detailed accounts of the social implications of MPA development (Christie, 2004).

Christie (idem) on the basis of his long-term involvement with the Bunaken MPA and a comparison with three MPAs in the Philippines, stated that MPAs that meet the narrowly defined biological goals are generally presented as 'successes'

whereas these same MPAs may, in fact, be social 'failures when social evaluation criteria are applied. Alder et al. (1994) reviewed three MPAs in Indonesia, namely Kepulauan Seribu, Bunaken Manado Tua and Taka Bone Rate. They found that the MPAs have common problems in management planning and implementation. Major factors influencing the management were proximity to urban areas, the protected area's economic potential, current uses and the resolution of jurisdictional disputes.

According to the World Database on Protected Areas (WDPA) Indonesia has 248 marine protected areas covering 1.94% of the territorial seas (WDPA cited in Glaser at al., 2010). However, the Berau MPA, Togean Islands and the Savu Sea are not included. By 2020, 20 million hectare of Indonesian marine territory is planned to be under formal protection frameworks (MMAF 2011a, Mulyana and Dermawan 2008:31).

The Berau MPA was established with the dual objective to conserve the of globally endangered turtle species that are nesting mainly on the beaches of the Derawan Islands, and to curb overfishing in the coastal waters of Berau. I fully agree with Christie's observation that hardly any data were gathered concerning the effects of the establishment of the MPA on the livelihoods of the fishers in the Berau Delta. Neither was any social science research carried out about the practices of increased aquaculture development in the delta on the ecological conditions of the MPA. This thesis intends to fill the gap.

In this chapter I present the sequence of district regulations for the conservation of the marine ecosystem in Berau. The fishers and pond farmers in the delta were not involved in their formulation and have hardly any knowledge of these decrees. The co-management of the MPA, so often idealised in the literature, has not been realised.

Table 2.1 Succession of regulations for marine conservation in Berau

Regulations	The titles
Decree of the Minister of Agriculture No. 604/Kpts/Um/8/1982 dated 9th August 1982	Establishment of Forest Area in Semama Island including its waters as wildlife sanctuary *(Suaka margasatwa)* and of Sangalaki Island as Marine park *(Taman laut)*
Decree of Head of Berau No. 35/2001 dated 24th January .2001	Establishment of Conservation Surveillance and Research Team for Sangalaki and Derawan Islands
Decree of Head of Berau No. 02/2002 dated 3rd January 2002	Appointment of CV. Derawan Penyu Lestari as the management of Turtle Egg Islands in Berau.
Decree of Head of Berau No. 36/2002 dated 5th February 2002	Establishment of Surveillance and Security Team for conservation in Sangalaki, Derawan Islands and its surrounding areas
Decree of Head of Berau No. 179/2003 dated 28th April 2003	Establishment of Surveillance and Security Team for Sea Turtle Conservation
Decree of District Head of Berau No. 225/2004 dated 14th September 2004 revised to Decree of Head of Berau No. 63/2008 dated 18th February 2008	Establishment of Steering Committee of marine and coastal management of Berau district
District Head Regulation *(Perbup)* No. 31/2005 dated 27th December 2005	Establishment of the Berau MPA
Decree of Head of Berau No. 351/2006	Framework for the Management Plan of the Berau MPA
Decree of Head of Berau No. 208/2007 dated 10th May 2007	Establishment of Integrated Team for the Security of the Berau MPA
District Regulation *(Perda)* No. 3/2007	Fisheries regulation
District Regulation *(Perda)* No. 5/2008 dated 17th March 2008	Fisheries permit and retribution
Decree of Head of Berau No. 460/2008 dated 2nd September 2008	Development of a Coordinating Body for the Implementation of the Berau MPA *(Badan Kolaborasi)*

2.8 Conceptual framework

On the basis of the previous theoretical mapping a conceptual framework is designed to understand the process of social resilience and livelihood formation in the interface of ideas, knowledge, interests and power of the different social actors.

The conceptual framework (Figure 2.3) shows that livelihoods in the coastal frontier of Berau are diverse and multiple. Social actors such as fishers, pond farmers, the Fisheries Office, and *punggawa* use their agency to cope with changing material and social conditions. They negotiate and contest interests, values and knowledge over the resource rich Marine Protected Area and build political-economic networks to create and maintain their social resilience.

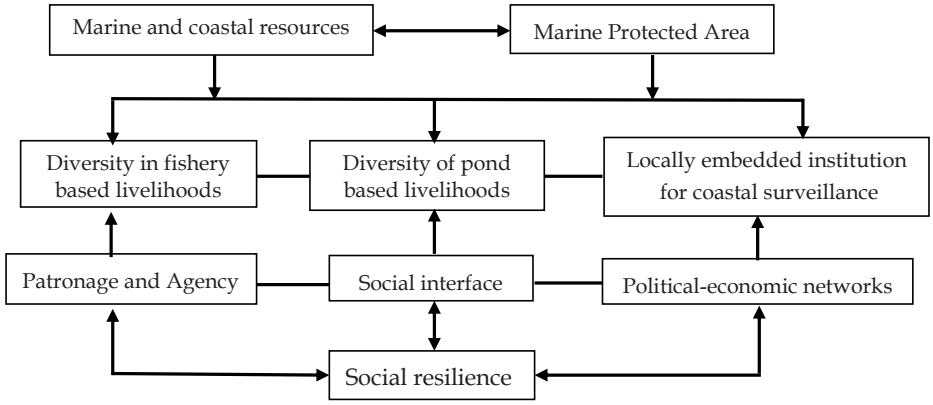

Figure 2.1 Conceptual framework of the research

2.9 Research methodology

2.9.1 Study area

The study was conducted in the coastal area of the province of East Kalimantan in the Berau district where fishing and pond aquaculture are the main livelihoods generated by coastal people. The study area is located in three villages namely Kasai, Teluk Semanting and Pegat Batumbuk (Figure 2.2). The district is situated in the northern part of the province and geographically located between latitudes 01^0 N to 02^0 33' N and longitudes 116^0 E to 119^0 E and has a total area of 34,127 km^2 of which the Berau coastal and marine waters cover 35.7%.'s (Wiryawan et al., 2005; BPS Berau, 2011).

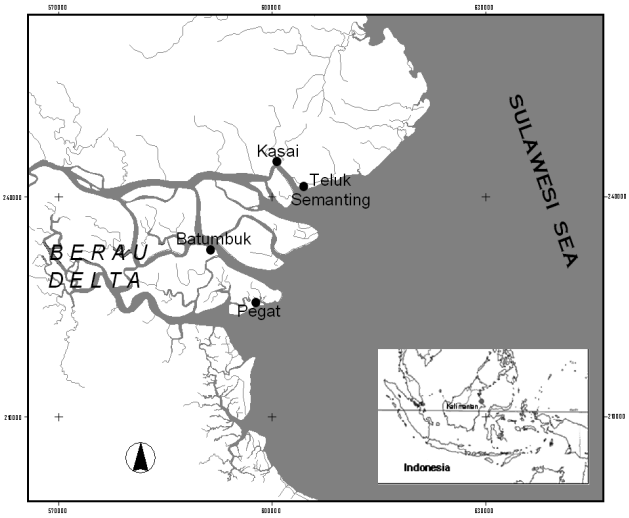

Figure 2.2 Map showing study sites in the Berau delta (East Kalimantan)

The district is bordered by Bulungan district to the west and north, Makassar Strait to the east and Kutai Timur District are to the south. The Berau district consists of 13 sub-districts namely Tanjung Redeb, Gunung Tabur, Teluk Bayur, Segah, Kelay, Sambaliung, Pulau Derawan, Maratua, Tabalar, Biatan Lempake, Talisayan, Batu Putih and Biduk-Biduk. Administratively, the study villages belong to the Pulau Derawan sub-district.

According to the Statistical Bureau of Berau (BPS 2011), Berau has a population of 179,079 people, 38% of whom are living in the coastal area. The district has 42,410 households of which Tanjung Redeb as the capital city has the highest number (14,629 households) as shown in Table 2.2. Tanjung Redeb is also the most densely populated sub-district with 35% of the total population, followed by Sambaliung (13.5%) and Teluk Bayur (11.5%) sub-districts. In terms of population density Tanjung Redeb and Maratua have the highest numbers of people per km^2 and per household, respectively.

Table 2.2 Population density of Berau district

Sub-districts	Area (Km^2)	Number of households	Population	Population density	
				Per Km^2	Per HH
Kelay	6,134.60	1,236	4,493	0.73	3.64
Talisayan	1,798.00	2,588	10,061	5.60	3.89
Tabalar	2,373.45	1,200	5,151	2.17	4.29
Biduk-biduk	3,002.99	1,164	5,342	1.78	4.59
Pulau Derawan	3,858.96	1,825	8,372	2.17	4.59
Maratua	4,118.80	587	3,076	0.75	5.24
Sambaliung	2,403.86	5,611	24,174	10.06	4.31
Tanjung Redeb	23.76	14,629	62,725	2,639.94	4.29
Gunung Tabur	1,987.02	3,457	14,938	7.52	4.32
Segah	5,166.40	2,006	8,396	1.63	4.19
Teluk Bayur	175.7	5,031	20,596	117.22	4.09
Batu Putih	1,651.42	1,745	6,691	4.05	3.83
Biatan	1,432.04	1,331	5,064	3.54	3.80
Total	34,127.00	42,410	179,079	5.25	4.22

Source: BPS Berau (2011)

According to the Spatial Plan of Berau District (2001-2011) the total district area is calculated to be 1,572,307.34 ha. It is classified as forest (protected, production and conversion forest) area, mangrove and *Nypa* stands, cash crop agriculture, ponds (*tambak*), industrial area, and areas for tourism, residential purposes, wet land, estate and island areas. Interestingly, the area under pond aquaculture (*tambak*) was planned to be developed by 2011 to cover 3,958.48 ha in Pulau Derawan sub-district only.

The total population of Berau district in 1997 was 104,607 people, rising to 179,079 people in 2010. The average population growth in Berau district during the period of 1997-2010 was calculated as 4.25% per year (Figure 2.3).

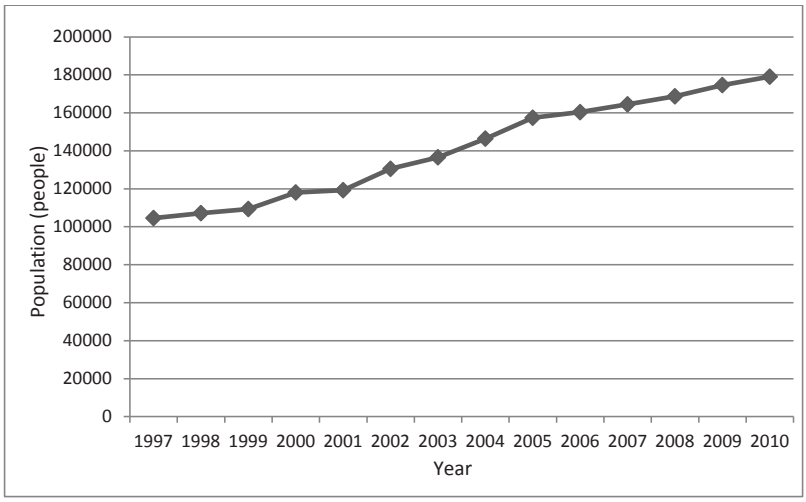

Figure 2.3 Population growth of Berau district from 1997 to 2010

The research villages differ in size (Table 2.3) and occupational specialisation (Chapters 3 and 4). Kasai is the largest, has a considerable terrestrial space, and the majority of its inhabitants are fishers as well as in Teluk Semanting. Pegat and Batumbuk areas are located along the borders of the Berau delta near extensive mangrove and Nypa areas. The inhabitants are mainly pond farmers. Pegat was recently split off from Batumbuk, so in the district administration the two are still regarded as one village.

The total area of Kasai village is 40.97 square kilometres while Teluk Semanting and Pegat Batumbuk are almost 100 and 547 square kilometres respectively (Table 2.3). The demographic situation of the research villages is as follows. The population of Kasai village was calculated 2,126 people and 428 households, Teluk Semanting is small and counts 192 people and 50 households, and Pegat Batumbuk has 699 people and 193 households (Table 2.4).

Table 2.3 Total area of the research villages (km2)

Village	Land	Waters	Total
Kasai	18.22	22.75	40.97
Teluk Semanting	9.52	90.40	99.90
Pegat Batumbuk	73.84	473.34	547.18

Source: BPS Berau (2011)

Table 2.4 Population and household numbers in the research villages

Village	Male	Female	Total	Household
Kasai	1,110	1,016	2,126	428
Teluk Semanting	96	96	192	50
Pegat Batumbuk	394	305	699	193

Source: BPS Berau (2011)

Based on official data the agricultural sector employed the majority of people in Berau (44.5%) followed by commerce (15.57%) and the services sector (13.53%). The remaining sectors were construction (6.43%), government (5.62%), mining and quarrying (5.56%), industry (4.11%), transportation and communication (3.92%), electricity and water supply (0.60%), and finance (0.17%) (BPS Berau, 2008).

The coastal area of Berau can be divided into three regions namely the northern, middle and southern region. The northern region consists of Pulau Derawan and Maratua sub-districts where there is an abundance of marine space, small islands, coral reefs, sea grass beds and mangrove areas, including the Berau Delta where this research was carried out. The middle region includes Tabalar, Biatan Lempake and Talisayan sub-districts with marine and mangrove resources. Lastly, the southern region embraces Batu Putih and Biduk-biduk sub-districts with also marine waters, small islands, coral reefs, sea grass beds and mangroves can be found.

Berau's marine waters are strongly influenced by the Indonesian "through flow", the major tropical oceanic exchange current between the Pacific and Indian Oceans, as well as the periodic deep-sea upwelling from the Sulawesi Sea, and major river outflows from East Kalimantan (Wiryawan et al., 2005). In addition, the inter-island passages between the major reef complexes and islands are governed by substantial tidal and ocean exchange currents ranging from 2-4 knots. This makes the Berau MPA a highly diverse and dynamic marine environment with numerous riverine, coastal and oceanic cetacean habitats in close proximity. These habitats include river deltas, mangrove, shelf and oceanic coral reefs, pelagic waters and seamounts, as well as migratory corridors of eco-regional importance (idem).

The district government of Berau launched the Berau Marine Protected Area in 2005 through the District Head Decree no. 31/2005. The MPA covers an area of 1,223,000 hectares and is part of the Coral Triangle. It is located between latitudes 02^0 49′ 42.6″ N to 01^0 02′ 0.06″ N and longitudes 117^0 59′ 17.16″ E to 119^0 02′ 50.30″ E. The MPA is bordered by the Pulau Panjang Reef, Karangtigau cape and

Baliktaba Reef to the north, by the Kalimantan mainland to the west, Makasar Strait to the east and by Cape Mangkalihat in the south (Wiryawan et al., 2005).

As the district is situated near to the equator it has a high rainfall as well as a large number of rainy days per month during the year. The number of rainy days ranges from 13 to 25 days per month. The mean annual rainfall ranges between 100 mm and 300 mm per annum, while the mean annual temperature in the district ranges between 26^0 C and 27^0 C. In the coastal area the climate is influenced by the Pacific Ocean, and it is characterised by west and east monsoons. The coastal rainfall is a little less than on the mainland and ranges between 0.6 mm to 21.8 mm with 4 - 28 rainy days per month. The coastal area of Berau has a very rich marine life with an abundance of fish species, crustaceans, coral reefs, mangroves, and sea grass fields in the estuarine ecosystem and the small islands ecosystem. . The corals reefs system of the Berau MPA consists of six main islands namely Pasir Panjang, Derawan, Semama, Sangalaki, Kakaban and Maratua. The reefs can be distinguished by their fringing reefs, barrier reefs, and atolls (idem).

2.9.2 Research design

The research is designed so as to combine both qualitative and quantitative methods. It is a bottom-up study of the everyday ways of making a living by the individual and institutional actors who are involved in fisheries and pond aquaculture at multiple social scales using actor and the actor-oriented approach (see 2.2 and 2.3). Ethnographic, qualitative and quantitative research methods are applied, including a household survey. The units of analysis vary from individuals to households and institutions.

The field research was carried out between 2008 and 2009, while the pond farmers were revisited in 2010. I periodically lived in the research villages of Kasai, Teluk Semanting and Pegat Batumbuk in the Berau delta (see Fig 2.2). The field research was designed in two phases; I used qualitative methods and techniques like in-depth interviews with key informants and focus group discussions to obtain the necessary knowledge to formulate appropriate questions for the household survey in the second phase.

Qualitative data

From January 2008 onwards I first carried out a qualitative study to collect evidence from different social actors with various perspectives in relation to fisheries and pond based livelihoods. Cases from individual fishers, pond farmers

(both owners and caretakers) were gathered to answer the 'how' and 'why' questions, with the aim of investigating a contemporary phenomenon within its real-life context (Yin, 2003). Analysis of life histories is used in this study to gain insight in how multiple livelihood trajectories happen simultaneously in the different settings of the actors (Ontita, 2007).

Data for the excerpts of case studies and life histories presented throughout this thesis come from participant observation, unstructured in-depth interviews and semi-structured interviews with key informants from all categories of actors including the different classes of fishers based on the use of gear, shrimp traders, fish collectors, village heads, *punggawa,* outsider or *andon* fishers, external entrepreneurs, pond owners and caretakers, the heads and members of the marine surveillance organisations (*Pokmaswas)* in the villages, and government staff especially from the Berau Fisheries Office.

Topics raised in the qualitative study included life histories of the actors, settlement history and motivation, perceived changes in income from when actors started to engage with fisheries or pond farming, motivation to choose these livelihoods, issues of access, social values, property rights of livelihood assets, such as boats, fishing gear, mangrove land etc., their experiences during the monetary crisis of 1997-98, and other relevant problems and issues actors related to their livelihoods and how they created strategies to cope with them.

Household survey

The household survey in Kasai (N=97) was done between March and April 2009 while in Pegat Batumbuk (N=97) it was carried out during May 2009. In August 2010 I returned to Pegat Batumbuk to visit the same farmers again (N= 45) who were interviewed during survey 2009. The results are two comparable sets of data from the surveys of 2009 and 2010 specifically related to *tambak* production.

Sampling method

In the survey a proportionate stratified random sampling was applied (Poate and Daplyn, 1993; Bernard, 2002: 150). In fisheries survey I divided the fishers' population into sub-populations based on gear differentiation, after which respondents were chosen randomly from each subpopulation (Bernard, 2002: 149). Then I made a gear classification of fishers using trammel net, mini-trawl, longline, gill net, and crab catchers. The number of fisher respondents was determined proportionate to the population number of Kasai (Table 2.4).

The same methods and techniques were applied when choosing pond farmers respondents by using proportionate stratified random sampling. The sampling categories here were based on their position in pond production as caretaker or pond owner; and on the type of pond farmers, whether they were applying shrimp monoculture, fish monoculture or polyculture in pond management (Table 2.5 and 2.6; Chapter 3)

Table 2.5 Number of fishers according to the gear used in Kasai (N=97)

Type of fisher	Total	%
Trammel netter	60	61.9
Mini trawler	17	17.5
Longliner	4	4.1
Gill netter	9	9.3
Crab catcher	7	7.2
Total	97	100.0

Topics addressed in the survey

During the household survey data were collected from different type of fishers on demographic characteristics, geographical/ethnic origin, access to loan from a patron, fish catch, gear diversification, livelihood diversification, land access, savings, monthly household expenses and fishers' perceptions on environmental and societal changes. Survey data were likewise collected from pond farmers and caretakers on *tambak* area, ethnicity, and fishery as a former livelihood, source of *tambak* knowledge, pond harvests, gross revenue from harvests, market access of caretakers and pond owners, access and source of loans, farmers' perceptions on main factors affecting pond income. The data obtained from these surveys are presented as descriptive statistics, including the calculation of means, standard deviations and ranges by using SPSS. Furthermore, the Pearson's chi-square tests are applied to see whether there is a relationship between two categorical variables (Field, 2005: 682).

Table 2.6 Number of respondents according to main function in pond farming (N=97)

Main function	Total	%
Caretaker	39	40.2
Owner	58	59.8
Total	97	100.0

Table 2.7 Number of respondents according to type of pond farmers (N=97)

Type of pond farmers	Total	%
Shrimp monoculturist	13	13.4
Fish monoculturist	2	2.1
Polyculturist	82	84.5
Total	97	100.0

Focus Group Discussions (FGD)

Two FGDs were conducted in Kasai on 13th February 2009 to which 14 fishers with different gear uses were invited, together with two Fisheries field officers. In Pegat Batumbuk a FGD was held on 23rd October 2009 which was attended by eight pond farmers and one Fisheries field officer. During these discussions participants were asked to construct a participatory map both for fishing and pond farming.

Secondary data

During the fieldwork I collected relevant documents and reports from central, provincial and district governments. During the proposal writing and thesis drafting phases I gathered reports from international, national and local NGOs as well as scientific literature, internet sources and maps. They provided secondary data on fisheries and *tambak* production, a general overview of the studied areas, patronage networks, total areas of mangrove in the research area, etc.

Chapter 5 has been published in the Anthropological Forum 22(2): 187-207 while other two chapters are planned to be submitted to international journals after the thesis is produced.

Chapter 3

Diversity in fishery based livelihoods

3.1 Introduction

This chapter aims to unravel the everyday life of fishers making a living in the coastal frontier of Berau. The first objective of the chapter is to describe everyday practices of fishers making a living in the Berau delta. In this part I will argue why gear differentiation is important for people's livelihoods, followed by the life histories of the main gear fishers in the research villages. I will discuss the life histories of different fishers to understand their strategies for making a living, fish production resulting from using different gears, fisher's practices, fishing seasons, livelihood diversification. I will address the question how income is derived from capture fishery, how the different actors see fishery based livelihoods, and how fishers perceive changes in fishery based livelihoods in view of the future. The second objective is to understand local knowledge, strategies and socioeconomic relations in fishing practices. I will describe how fishers in Kasai are aware of local arrangements in their fishing operations and how local fishing knowledge is brought to practice. In addition I will discuss the nature of patron-client relationships between patrons/bosses (*punggawa*) and their dependent fishers in Kasai. In this chapter I will also show how a trade network is built between traders/bosses.

Fishery is the major source of income and plays a very important role in the lives of the fishers in the coastal villages of the Berau delta. The notion of fishery or *perikanan* in this chapter refers to fishery activities such as catching marine fishes and crustaceans[2] including shrimps and crab. The villages of Kasai and Teluk Semanting are well known for their rich resources, especially shrimps and fishes.

It is important to know formal definition of fisheries, which defines by law that it includes all activities related to management and appropriation of fish resources

[2] Crustacean is major group of animals, including crabs, shrimps, prawns, lobsters and crayfish; invertebrate organisms whose members have a hard outer skeleton, and occurring in marine and fresh waters and on land (see http://www.fishbase.org.cn/glossary/Glossary.php?q=crustaceanns)

and their environment ranging from pre-production, production, processing up to marketing, which together form the fishery system. In addition, capture fishery *(perikanan tangkap)* is explained as an activity that aims to catch fish in marine waters (as opposed to aquaculture) using gears or any means, including activity that use a boat to load, carry, store, freeze, handle, process, and/or preserve (Law 31/2004 concerning Fisheries, Article 1, own translation).

Aquaculture is not part of the fisheries system, but the Ministry of Fisheries and Marine Affairs captures both domains. Fisheries production in Berau consists of capture fishery and aquaculture (*perikanan budidaya*). Capture fishery refers to marine capture fishery (*penangkapan di laut*) and inland fishery (*penangkapan di perairan umum*) while aquaculture includes mariculture (*budidaya laut/pantai*), brackishwater pond culture or shrimp pond (*tambak*), freshwater pond culture (*kolam*) and fish cage (*karamba*). In Pegat Batumbuk village we can find shrimps/fish mixed ponds.

In this chapter fisheries are defined as activities to catch shrimp and fish using certain fishing gears. I used the different fishing gears as units of analysis in the survey in Kasai to describe the fisheries based livelihoods. Respondents were classified by their main gear namely trammel net, mini trawl, longline, gill net and crab trap fishery. In the initial fieldwork stage I found that most fishers in the village use trammel net or *gondrong*. Official data from 2009 shows that in Kasai, a village of 472 (2007) households, 217 households or 46 % was dependent on fisheries. I have also included crab fishers, because research shows that crab fishers in Kasai also catch shrimp. Most fishers have more than one gear. For example, trammel net or gill net fishers also use *rakkang*, the local name for crab trap fishery and it uses when fishers catch less shrimp, as part of their fisheries strategy.

In this chapter the focus is again on Teluk Semanting as this village specialises in gill net fishery. There were 36 gill netters in this village. Later on the punggawa in this village have a relationship in fish transactions with fishers from outside. In Chapter 5, I will discuss more about this *andon* phenomenon which has quite an impact on the livelihood of fishers in the delta.

In Kasai there are five main fishing gear types namely trammel net or *gondrong*, mini trawl or *trawl*, longline or *rawai*, gill net or *pukat*, and crab cage or *rakkang*. Trammel net is used to catch *udang putih*[3] (white shrimp, *Penaeus indicus*), trawl for *udang windu* (tiger shrimp, *P. monodon*) and *udang bintik* (*Metapenaeus monoceros*), gill net for *ikan putih* (bigeye trevally, *Caranx sexfasciatus*) and *ikan bawal* (silver

[3] Local people in Kasai recognize white shrimp as *udang putih* or *udang ekspor*.

pomfret, *Pampus argenteus*), longline is for *ikan hiu (*shark), *kerapu* (grouper), and *ikan kakap* (snapper, barramundi) and rakkang for *kepiting bakau* (mud crab, *Scylla serrata*).

The shrimp caught by fishers from Kasai are bought by the shrimp trader CV Surya Indah Perkasa (SIP) based in the district capital of Tanjung Redeb, who distinguishes different shrimps, namely tiger, white, pink-T, yellow and brown shrimps, and uses different prices depending upon shrimp sizes. This company also buys tiger shrimps from shrimp ponds or *tambak* which produced mainly from Pegat Batumbuk village (see chapter 4).

It is relevant for our discussion of shrimp quality to realise that the shrimps ending up at the market through the shrimp trade network are shrimps of a mixed pond and marine origin. From field observation I recognise shrimps are transported throughout the networks between actors from fishers, punggawa and shrimp traders. The network system may imply to the quality of the shrimps mainly for tiger and white shrimp commodities and certainly affects the prices which are crucial to fishers' livelihood. The role of fishers and punggawa in maintaining shrimp quality is needed as they form a mutual relationship to ensure shrimps are bought by trader.

Table 3.1 Scientific names for traded shrimps in Tanjung Redeb

Trade shrimp names	Scientific shrimp names
tiger	*Penaeus monodon*
white	*P. indicus*
pink-T	*Metapenaeus affinis*
yellow	*M. brevicornis*
brown	*P. semisulcatus*

Source: CV. SIP Tanjung Redeb (2009)

Most fishers in Kasai are Bugis. Based on my data survey from 2009 (Table 3.2) 51 out of 97 (53%) of the fishers are of Bugis origin. Originally their homeland is the south-western peninsula of Sulawesi Island and they belong to the great family of the Austronesian people (Pelras, 1996:1). Outside Sulawesi, the different kingdoms are not well distinguished, and often people just call migrants from southern Sulawesi Bugis, Bugis-Makassar, or BBM *(Bugis-Buton-Makasar*), although they may also include migrants from Bone, Wajo, and even include the very different sea-dwelling *Bajo* or *Bajau* (Lowe, 2003).

Table 3.2 Origin of Kasai fishers (N=97)

Type of fisher	Origin										Total	%
	Bugis	%	Makassar	%	Bajau	%	Pasir	%	Others	%		
Trammel netter	27	27.8	2	2.1	5	5.2	14	14.4	12	12.4	60	61.9
Mini trawler	11	11.3	1	1.0	0	0	2	2.1	3	3.1	17	17.5
Long liner	3	3.1	0	0	0	0	1	1.0	0	0	4	4.1
Gill netter	5	5.2	0	0	1	1.0	1	1.0	2	2.1	9	9.3
Crab catcher	5	5.2	1	1.0	0	0	0	0	1	1.0	7	7.2
Total	51	52.6	4	4.1	6	6.2	18	18.6	18	18.6	97	100.0

*Pearson chi-square =10.81 (not significant)

> *The Bugis are known by their neighbours for their fierce character and sense of honour, which sometimes result in violence; and yet they are among the most hospitable and amicable peoples and the most faithful in their friendships. The cohesion of their society is based largely on the existence of a system of pervasive and interlocking clienteles; and yet most of them have a strong sense of their individuality. Bugis society is one of the most complex and apparently rigidly hierarchical of any in Insulindia; and yet competition for office or wealth ranks high among their motivations"* (Pelras, 1996: 3).

Migrations of Bugis people from their home land in South Sulawesi to East Kalimantan can be traced back from the fact that a small settlement of Wajo traders was already established in the early 18th century in Pasir (Levang, 2002:4). He noted that the first settlements in the Mahakam delta of East Kalimantan were in Pemangkaran village which were inhabited by Bajo and Bugis fishers. This village was probably established by Bajo originated from Muara Telake (Pasir) around the end of the 19th century. But the first important migration wave was initiated by conquest of Bone Kingdom by the Dutch in 1905. Nowadays in fact, Bugis people live along the coast of East Kalimantan and mostly engage with fishing and aquaculture based livelihoods.

Before we move to the everyday fishing practices in the research villages, let me provide a picture of the fisheries production in the district of Berau over the years as compared to the whole province of East Kalimantan.

Table 3.3 Marine fisheries production (tons) in Indonesia, East Kalimantan and Berau

Admin levels	Years											
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Indonesia	nd*	nd*	3,966,480	4,073,506	4,383,103	4,320,241	4,408,499	4,512,191	4,734,280	4,701,933	4,812,235	5,058,260
EastKal	78,934	71,937	82,715	84,089	87,803	93,511	99,692	90,825	95,740	92,176	94,938	111,703
Berau	9,822	10,507	11,193	11,989	12,629	13,268	13,561	13,854	14,136	14,631	15,056	15,327

*nd= no data

Source: DKP RI, BPS Kaltim, BPS Kabupaten Berau, DKP Berau various years.

In 2010 marine fisheries in Berau shares 13.7% of the provincial level (Table 3.3). Time series data show that the contribution of marine fisheries production in Berau compared to the province, grew by 14.4% on average per year in the period 1999 to 2010. In the same period the growth of Berau's marine fisheries production was calculated on average at 4.1 % per year.

Shrimp fishery in Berau started in 1993 with the main target being white shrimp. At that time captured shrimp production contributed 5% to the total marine fisheries production. While, tiger shrimp fishery was first recorded 6 years later and produced 18.3 tons. Data on fishery production in 2010 states tiger and white shrimp fisheries contributed around 0.6% and 4.6% to the total marine fisheries production in Berau district respectively (Table 3.4).

Table 3.4 Marine fisheries production (tons) in Berau

Year	Production	Tiger shrimp fishery	White shrimp fishery
1993	7,092	nd*	349.0
1994	7,449	nd*	340.3
1995	7.846	0	377.2
1996	8,315	0	415.6
1997	8,759	0	442.7
1998	9,259	0	468.0
1999	9,822	18.3	675.3
2000	10,507	18.1	884.6
2001	11,193	21.9	942.0
2002	11,989	48.2	937.3
2003	12,629	68.0	810.7
2004	13,269	123.4	780.2
2005	13,836	107.6	687.4
2006	13,854	143.3	907.8
2007	14,136	62.0	615.0
2008	14,631	86.2	673.6
2009	15,143	90.2	705.6
2010	15,326	95.3	710.7

*nd= no data

Source: DKP Berau various years.

3.2 Patronage networks

Pelras (1996) pointed out that in the patron-client system leading individuals and their followers are linked to each other by a number of reciprocal duties and rights. In Makassar and Bugis hierarchical societies of pre-colonial times, every leading nobleman was at the centre of such a network or clientele. The relationship between patron and client is voluntary and based on a moral contract (Schrauwers, 1999; Bourdieu, 1990).

I define a patron-client relationship in Berau as an asymmetric but mutually dependent relationship between a patron and his clients or followers which is based on services exchanged in the economic and political realm in a historical inter-island network between Kalimantan, Malaysia, and Sulawesi.

In Bugis communities this network is called the *punggawa-sawi* relationship. The word *punggawa* originally comes from the Sanskrit word for a ship's captain, while the term originally *sawi* refers to a crew member (Pelras, 1996). In the social-economic and political networks these terms have obtained wider meaning as boss or trader, and dependent of a punggawa respectively. These patronage networks apply both to aquaculture and to fishing (*punggawa pa'kaja*) activities (Pelras, 2000), to the effect that one patron can have several dependent fishers and pond farmers at the same time who all deliver shrimps to him, but from different origins.

In Eastern Indonesia and in Kalimantan where Buginese are the dominant social class a patron-client relationship exists between fishers or pond farmers (followers) and the entrepreneurs (patrons or punggawa). The punggawa lends money, in terms of boat or gear or production costs to the fisher engaged in his network, and the debt is then repaid by the fishers in instalments by deduction from the sale of the fish. Levang (2002) clearly differentiates the punggawa from the money lender; the patron providing a loan to fishers on rather different conditions. The loan can be used to buy a boat, engine, or fishing gear and can be paid back. It is different from the fisher's obligation to pay the debt to a money lender in a punggawa-sawi relation, as long as the debt is not repaid the client is obliged to sell his catch to the patron (Levang, 2002: 8). It means that the fisher remains dependent on the punggawa. To secure repayments the patron and the client must remain involved in the same kind of business. Another condition, as Levang points out, is that confidence building is the key of the patron-client system. If the client is still young or a newcomer to the area then the patron will ask his relatives to be accountable for him. A patron then will give priority to his own relatives for reasons of trust (idem: 21). We can clearly observe these

interactions in Kasai, as this chapter will show. It is interesting to know the life history of a major punggawa in Kasai in this context:

> *Abdurrasyid (AR) was born in Muara Pasir in 1949. He came to Kasai in 1994 and brought 11 fishers from Muara Pasir Tanah Grogot. When he was in Muara Pasir AR started as trammel net fisher. AR has got 5 children and married in 1967. He went to primary school until 6th grade in Muara Pasir. Formerly he bought fishes, wild shrimp and* kembung *fish and carried around 2 tons to Samarinda and Balikpapan. So when he had enough money he decided to buy shrimps directly, he asked for help from the Cendana Company. AR came to Kasai to follow his mother when she was following Haji Baco. AR's parents and his siblings are staying in Kasai as well. Currently AR has 24 fishers within his patronage network. All children except the oldest one are fishers. AR sees that the business is fine and he is satisfied as four of his children have been to Mecca. AR admitted that his wife's participation is needed to run the business.* (Abdurrasyid, Kasai, 29.02.2008)

In fishing at Kasai village it is common to see that fishers are engaged with one of the punggawa who collect and buy their shrimp or fish production. At the time of the field research in Kasai there were seven punggawa. The number of engaged fishers for each boss varies. Abdurrasyid for instance had 24 fishers and Rahmani had 60.

Trust is a main aspect in maintaining the relationship between patron and client. According to both bosses at least, their clients sometimes cheat them by selling shrimps or having their catch sold to other bosses or patrons. Since this relationship is based on trust then the solution for the problem needs to be done persuasively. If there are fishers that do not concur to this kind of relationship then the consequence is that all the fishers' debts have to be paid before the relationship can be stopped.

Fishers have no opportunity to go for the best price on the market as they are a 'price taker' that is, they are dependent on the boss. Shrimp prices are determined by each boss individually hence can differ from the one to the other punggawa. Below I give an overview of shrimp prices in Kasai. There are two prices, namely the so-called direct price (*harga langsung*) and the commissioned price (*komisi*). Direct price means the price that is directly applied during transactions between the fisher and the trader, while the commissioned price is known as the selling price that is deducted to repay a debt instalment for an engine, fishing gear or other debts for costs like fuel and ice. For example, a fisher in Kasai can bring home

net cash of more than IDR 500,000 per trip after expenses are deducted and the instalment is paid (see Table 3.20). All records of both debts and instalments are documented in a book and each fisher has his own account book.

Table 3.5 Different prices of shrimps with punggawa and traders (IDR)

shrimp size	punggawa price	trader's price	price difference
20	120,000	-	-
25	95,000	-	-
30	88,000	92,000	4,000
35	77,000	80,000	3,000
40	64,000	72,000	8,000
45	54,000	62,000	8,000
50	48,000	57,000	9,000
55	41,000	48,000	7,000
60	35,000	41,000	6,000
65	30,000	37,000	7,000
70	27,000	37,000	10,000
75	22,000	37,000	15,000
80	18,000	36,000	18,000
85	17,000	35,000	18,000
90	15,000	30,000	15,000
95	13,000	29,000	16,000
100	12,000	28,000	16,000

Source: Punggawa in Kasai 29/02/2008 and shrimp company SIP.

Of the 97 fishers in Kasai 73 revealed to have an arrangement with a punggawa (Table 3.6). There are seven such bosses or traders in the village. It means that a more or less permanent loan from this patron is needed to maintain the fisher's livelihood.

Table 3.6 Access to loans from a patron by class of fisher

Type of fisher	Having loan*				Total	%
	Yes	%	No	%		
Trammel netter	47	48.5	13	13.4	60	61.9
Mini trawler	13	13.4	4	4.1	17	17.5
Longliner	4	4.1	0	0	4	4.1
Gill netter	6	6.2	3	3.1	9	9.3
Crab catcher	3	3.1	4	4.1	7	7.2
Total	73	75.3	24	24.7	97	100.0

*Pearson Chi-square = 5.937 (not significant)

It is very common that fishers in Kasai have a loan from a punggawa. Survey data shows that the majority (75.3%) of the respondents have one. In addition to that 47

out of 60 trammel net fishers (78.3%) and 13 out of 17 mini trawl fishers (76.5%) have a loan for their livelihoods. It means that financial access of fishers have been supported by patrons. Another fact is that most fishers have no saving for maintaining their livelihoods. Table 3.21 shows that 82% of trammel net fishers and 94% of mini trawl fishers have no savings. It is relevant to know how these patronage networks develop, in other words, how fishers choose their boss and how a boss searches for clients. Fishers usually choose their patron or boss based on a stimulus of some kind. For example, the selling shrimp price was an important factor on how fishers choose his patron. The group of Haji Husin has another stimulus, namely that he gives an award per month to the fisher who has a good catch. If one of his fishers is very active, meaning he spends more time fishing, then the punggawa will give the fisher a television. This approach is used by the punggawa to achieve his set target per 'one water' or fortnight.

Meanwhile the boss will choose certain fishers to be his clients under the condition that the fisher shows a good catch, proved by the receipt (nota) brought to the punggawa. If the fisher yields a low catch then the punggawa does not want to give him a loan. Another important condition for the patron to select a client is trust. If one fisher is already engaged with a punggawa then he has to sell the catch to that patron and not to other patrons, even if his patron gives him a lower price compared to others. Concerning the trust between patron and client and how a punggawa relates to his fisher, one punggawa in Kasai said:

> *If the engaged fisher continues to sell his catch to another punggawa and does not comply in giving his catch to his patron on three proven occasions , then the final decision is that the fisher has to pay off his debt to us, as we are his patron, and only after that he can go to other punggawa.* (Abdurrasyid, Kasai 29.02.2008)

In addition, the bosses in Kasai also cooperate among each other. A fact from the field shows that Haji AR has an economic collaboration with the patron Haji Husin in providing trammel nets. The first punggawa buys from the second one to fulfil the need of nets of the former's fishers. The way they agreed about the repayment is that the first punggawa will pay three instalments starting one month after the net is delivered to the fisher.[4]

[4] During the interview Haji AR showed me a paper stating that his fishers has borrowed for buying *gondrong* through *punggawa* Haji Husin which amounted to more than 19 million IDR.

Interviews make clear that when an engaged fisher does not feel satisfied with the political-economic support from his patron, then he can move to another boss. Yet, for the dependent fisher, maintaining his relationship with the punggawa, as informal leader in the village, is more important than his frustration about the patron. The situation was reversed with Amin who was originally the client of Haji Husin. During the village head election Amin did not support punggawa Haji Aminuddin to become the village head. However, to still show his respect to him, Amin consciously exchanged his original patron, Haji Husin, for the new punggawa Haji Aminuddin.

Another case is Eswahyudi who is a follower of a patron in Teluk Semanting. He observed that in 1998 in this village, when fish selling prices were high, a new punggawa successfully attracted followers by giving them a free boat and engine, and lending them fishing gear. But nowadays, as the fishing income has generally decreased the dependent fishers have to pay for all those things themselves instead of being given to them by boss.

Normally a punggawa will give the fisher a loan to get a boat, engine and fishing gear. For example, say his total loan is IDR 10 million. If the fisher is active he can return his loan in less than one year, because in one trip during the good season a fisher can generate IDR 1 million. Some fishers can repay all their debts to the punggawa, but others do not manage, and remain fully dependent upon their boss. We have observed that some fishers have been to Mecca. To be able to conduct a pilgrimage to Mecca was the highest priority to them because not only was it very important in the view of religious achievement and the status, but also a fisher who has been on pilgrimage and become Haji indicates that he has already freed himself from being indebted to a punggawa.

We move now to the topic of boats or vessels data in the different administrative units especially when the decentralisation policy of government was implemented after 1998. Evidently the national and provincial governments have difficulties in controlling vessels that operate in the provincial waters. I interviewed a fisheries officer at the provincial level who is responsible for fisheries surveillance. He said that the problem of fishing permits has been occurring in all districts and towns in the province. The number of boats from Malaysia that are reported to the provincial office while illegally fishing is much lower than the actual number:[5]

[5] District government can issue permits for vessels with the capacity of up to 10 GT (gross tonnage) while the provincial one issues those between 10-30 GT, central government issues permits for

> *From the district yearly statistical book, for example, the number of boats in Berau is 1,000, but the district office only reported to the province between 20 to 40 boats. Another example is the number of vessels up to 30 GT in the province seems to be 600, but according to the permits that were processed there were only 37. So, what happened to the rest?* (Joko, 10.08.2010)

Official data on fishing boats is problematic at different level of administrative units. It seems that after decentralisation is implemented the number of fishing boat permits issued by the district government cannot be monitored by the province. As the coastal management now is given to the district, the district can manage their 'own' marine territory up to 4 miles from the coast line and the province from > 4 miles to 12 miles. From above reflections we see that there is different data from district and provincial levels. Another problem is the province cannot chase out vessels up to 30 GT whose permit has been issued by the central government. As the officer said above, we may reflect that the official reports of boat or vessels at central, provincial and district levels do not represent the actual number as perhaps it is caused by lack of enforcement and the question remains whose institution can solve this problem. In my view the owners of boats or vessels, even from other countries such as Malaysia, may benefit from this uncertain situation.

3.3 Everyday fishing practices

This section is about everyday practices in coastal Berau. I will discuss the nature of fishing based livelihoods in Kasai, how fishers choose and change fishing gears through the seasons depending on fluxes of the resources, and fish production. In addition I will discuss fishing practices and livelihood diversification, market networks, and actors' perceptions of fishing as a source of their livelihood. My data are based on information from different actors including fishers with different fishing gears, punggawa acting as both shrimp or fish collectors and money lenders, a shrimp trader from Tanjung Redeb who buys shrimps from the punggawa, the district fisheries' field officer, and an external fishing entrepreneur in Berau .

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vessels of more than 30 GT. For boat under 5 GT in particular, there is a policy that there is no need to get a permit, instead they have to register at the district office by way of a *Tanda Pencatatan Kegiatan Perikanan* (Registration of Fisheries Activities).

In the Berau district the sub-district of Pulau Derawan consisting of Kasai, Teluk Semanting, Pegat Batumbuk, Tanjung Batu and Pulau Derawan villages, is the main producer of both white and tiger shrimps. According to official data 2010 Pulau Derawan was one of the largest producers (25.6 tons) in producing captured white shrimp (129.9 tons), and the largest one for tiger shrimp fishery (108.7 tons).

Kasai is known as a village that produces the most wild-captured white shrimps in Berau. However, the shrimp price fluctuates depending on the production cost of the fishing operation. According to Amin, a trammel net fisher, people in Kasai used trammel nets for the first time around 1983 with which at that time they could catch at least 5 kilos of white shrimps per trip and have an average catch of 10 kg/trip. There was no sizing for white shrimps and all shrimps were priced IDR 5,000 per kg. In 1993, he said, fishers would catch 15, 20 or 30 kg of shrimps. In that year white shrimp sized 20 was worth IDR 50,000/kg. In 1998-2001 the price of white shrimp sized 60 was IDR 70,000/kg and tiger shrimps were worth IDR 170,000/kg. The catch went down in 2002 and Amin argued that this was because of the higher prices of fuel and trammel net gear. It happened that the price of sized 60 white shrimps decreased and fell to only IDR 30,000/kg. In 2008, during my research, white shrimps sized 60 were bought by the company at IDR 35,000 – 41,000 depending on the trading network (Table 3.5), while the total white and tiger shrimp production amounted to 83,3 tons in Kasai (Table 3.15). If we compare the price of white shrimp size 60 between 1998 and 2008 we see that it went down by 50%.

Trammel net fishery (*gondrong)* is the main livelihood in Kasai. Data from Pokmaswas, the village institution for resources surveillance, indicate the number of trammel net fishers in Kasai was 222 and the rest were fishers using mini trawl, long line, gill net, and crab cages. However, this data is different from that of the fisheries field officer[6] in 2009 who states the number of Kasai fishers as follows: trammel net fishers: 181, gill netters: 8 and mini trawlers: 28. I followed the data from Pokmaswas, as the chair of this organization told me, as they had just recorded the whole fishers' population in Kasai. Here 60 out of the 222 of trammel net fishers are included in my survey tables. Generally the boats of the trammel netters in Kasai are equipped with an inboard engine of the brand named *dongfeng* of 16-30 HP (horse power). The boat capacity is 1.5 GT (gross tonage) and is

[6] During my fieldwork Berau I was greatly assisted by Salman, field officer as local representative of fisheries office, who has worked in the area of 3 villages namely Kasai, Teluk Semanting and Pegat Batumbuk in the delta.

usually 9-12 m long and 1-1.5 m wide. The net consists of a set of 9-15 nets. To keep the catch fresh 3 kg ice per fishing trip is needed. In the following part I will briefly show the life histories of trammel net, mini trawl and gill net fishers in the Berau delta. Through the life histories of these actors we can understand how they deal with fisheries as their main source of livelihood and which strategies they follow to sustain it.

3.3.1 Life histories

Trammel net fishing is the most popular in Kasai, not only as the main gear type, but also as a diversification strategy for fishers who mainly use other nets and have access to land (Table 3.19). Below I present different livelihood histories to indicate the diversity.

A trammel net fisher: Changing gears over time

> *Abdul Samad (AS) was born in Semanting (Berau) in 1972. His first name was Syamsul Alam before his name changed. He lived with his parents and worked for an uncle named Lasse, who was a shrimp fisher for the production of shrimp paste (*terasi*) in 1980s. He is married to Rusnani, a daughter of Haji Singkong (the oldest* tambak *farmer who lived in Kasai), and had 2 children. The first child was born on 1st January 2002 and the second one was on 13th December 2003. AS first helped on trap fishery (*togo*). Locations for trap fishing at that time were in Tanjung Buncit and then changed to Tanjung Budi. Trapping was daily work. After working for two years AS could buy a new* togo *himself, he bought this from his uncle. He worked on trapping until he graduated from elementary school in 1986. When he moved to Kasai he was a fishing crew for Johansyah, a trammel netter. The boat and gear owner got 80% of the harvest and the remainder went to the crew. The owner´s parts consisted of boat, engine, fisher, and gear returns calculated as four parts or 80% of the total income. He worked for Johansyah for two years selling his shrimp to the boss. AS remembered the catch was valued as IDR 20,000 per fishing period of two weeks per month and he could cover the living costs of his parents of around IDR 18,000 while he used the remaining IDR 2,000 for himself. When he was not a crew member anymore, boss Haji Adam gave him a* ketinting *outboard engine boat 3.5 PK (brand Robin) to fish. The boss gave it for free but AS had to sell the shrimp harvest to him. The boat price and its outboard engine were IDR 18 thousands at that time. It had an outboard engine that was commonly used before most fishers replaced it with a* dongfeng *engine. White shrimp was worth IDR 3,000 per kg and there was no sizing. AS had this boat for one year,*

then in 1990 he borrowed money from his boss Haji Adam to buy a second-hand fishing boat with dongfeng *12 PK engine and he paid IDR 500 thousands as a down payment. The price of this engine was IDR 1.2 million and he continued to use a second hand trammel net. This was the situation for two years. AS still uses a trammel net until the present day. After he had worked for three years AS was able to repay his debt on the boat and engine to his boss. He said that he is now a free fisher, meaning one who owns their equipment including engine and boat, but fishing gear and production costs are paid by his boss. AS remains associated with this boss. He gave the following reasons for it: it is to remember the help that he received from his boss, and the location of the boss as shrimp collector was close to his place. Also the price margin between the market price and what he receives for his shrimps from his boss are small compared to other collectors. Later AS increased the engine capacity from the 18 PK motor he used for 4 years, to one of 23 PK for another 3 years. However, as he faced problems with the engine, he changed it again to 20 PK, the motor which he uses to date. Currently AS can save IDR 150,000 and he has been acting as head of the hamlet since 17 June 2003 for which he receives a salary of IDR 100,000 per month. Asked where he goes fishing, AS says that he says he knows that the good fishing grounds for trammel nets are Selalang, Badak-badak, Gedung, Tanda-tanda, Pegat, Daun Kuning, Buntungan and Tengker which he can reach in about 30 minutes from the village. AS prefers to go to Selalang and Gedung. However, he would change to other fishing grounds if the usual places are less productive.* (Samad, Kasai, 04.02.2008)

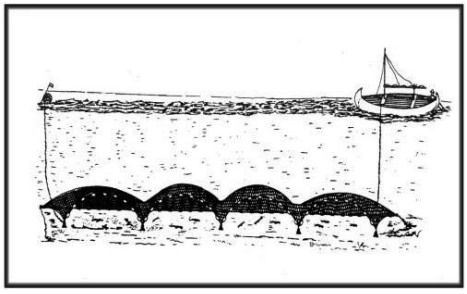


Figure 3.1 Trammel net *(gondrong)* fishery

From the above life trajectory it is understood that a fisher´s experience involves using different gear to search for a better livelihood (Tab 3.18). Diversified gear is part of a livelihood strategy developed by fishers in Kasai as they know the seasons well and apply appropriate fishing gear in their

coastal fishing grounds. In addition, fishers are involved in the patronage networks with their bosses to reduce the risks of the fishing operation, maintain access to the shrimp market, and to keep up a social and economic safety net.

Compared to trammel net fishing, those owning mini-trawls are the second most numerous in Kasai (N=17), but they diversify much less (Table 3.18) and their risks are also less than for the trammel netters (Table 3.22).

A mini trawler: Limited opportunity to change the gear

*Rupi (R) was born in Ulingan nearby Teluk Semanting village and is 55 years old. In the 1980s he went to Kasai after moving from Pegat and then to Mangkajang. He married in Kasai and has stayed there up to now. When he was 12 he followed his parents to Pegat to operate fish trap (*kelong*). In Kasai he first caught fish using a trammel net for three years. He used an outboard engine boat* (ketinting) of *3 PK and had five sets of trammel nets.*

*He said that he is less satisfied about the catch so he has tried to use a mini-trawler until present. Trammel nets produce a good catch but the cost is high. R perceived that a trammel net (*gondrong*) can be used longer than one month, because it often tears. It is not the shrimp that causes this but the fish. Whereas with a mini- trawl net, although one gets less fish compared to trammel net, it can be used years longer than of trammel net, except of course when the net becomes entangled (*tersangkut*) then it will be torn. When it is torn one just buys a new one, otherwise it lasts 4-5 years. Maybe a trawl is a bit expensive but I have no other job. So due to less catch R has moved to trawling since 1995. At that time almost all Kasai fishers changed to mini-trawl from* gondrong*. R moved to trawl since he felt that the production cost of trammel net had increased and the gear was broken quickly therefore it had to be replaced, while a trawl can be used longer than a trammel net. R keeps using mini-trawl until now as he has a skill for this fishery. When the interview took place R said that he actually would prefer to have to a fish trap (*kelong*) but he couldn't afford it as there was no loan available. He believed that can give him more income. Currently, he has got five children in which four out the five children attend school outside Kasai. The mini trawl is not used at* konda *time or* air mati *(see section 3.2.2). R uses an outboard motor 20 PK and the length of trawl is 5* depa *long. The catch is about 10 kg* bintik *shrimps sizing 150, 200 or 250 per trip. The price of these shrimp is IDR 11,000. The production cost consists of*

> *10 litres fuel, ice for IDR 5,000, cigarettes for IDR 10,000. The net income is around IDR 30,000. The shrimps are sold to punggawa Haji Bidin or Daeng Kulle and they take them to the market at Tanjung Redeb. Within a one day fishing trip R has 4 haulings and between two haulings the gear is left for two hours. The fishing ground for trawlers is in Selalang, formerly in Pegat, about a half hour from Kasai by boat 20 PK. Since he is not sure about finding more shrimp in other places R does not move from there. He is aware that movement means higher cost of production. He sets himself the target of catching 6-7 kg a day; if he manages he can continue fishing. But if he catches only 5 kg or less he prefers to stay at home instead.* (Rupi, Kasai, 9.02.2008)

Shrimp and fish production caught by fishers in Kasai were varied. We interviewed respondents and discovered the production variations for the day before, the day before that and earlier on the interview day. As we did not ask all respondents on the same day, it means that the actual days mentioned were not the same for all respondents. The number of fishers per type of gear who catch shrimps and fish over a four day period is presented in Table 3.11 to Table 3.14 below. They do not target the catch themselves. However, they strategically attempt to have more fish in the good fishing grounds, mainly during the good season which is the north season (see section 3.5).

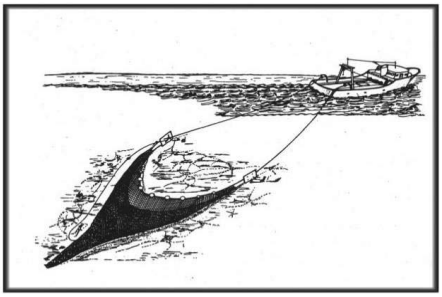


Figure 3.2 Mini trawl fishery

A gill net fisher: making strategic choices

> *Eswahyudi (E) is a gill net fisher in Teluk Semanting village. He was born on 8 August 1974. As a fisher he usually goes fishing at 7 am and returns at 2pm . But sometimes it varies, he goes at mid-day and returns at night. Gill net fishers in Semanting normally start fishing at* guris *3 or 4 until* guris *6 and*

continued with undur *1-3*[7] *(see Tab 3.16). Some others do not go at that time. After this time they stop fishing, as there is no fish in the sea, E believes that there is no fish as the water is clear. But E said usually fishers in Teluk Semanting start fishing at* guris *4. E said that gill net fishers in the village have a 9-10 metres boats, that are 130 cm wide with inboard engines known as* dongfeng *of 24 HP. They use local gill net gear called* pukat tasi*, the mesh size of the gill net is 4 or 5 inches depending upon the fish target. If the mesh size of the net is only 2 inches then it is for the smallest fish they catch named* selangan*. There is also a net with mesh size ¾ inch for catching small species up to 6 inches to catch* bawal *(pamfret,* Pampus argenteus*) If using a gill net with mesh size 4 or 5 inches we can catch all sorts of fishes but 6 inches is only for valuable fish species. According to E the value of highest catch is around IDR 2 million per trip. It means that the catch is 50 kg both fish and other fish. Fishers catch throughout the year even from January to March, which is an uncertain period when winds cannot be predicted, and the catch is small. In contrast to the period from August to November when fish is abundant. Gill net fishers need 5 litres of fuel per trip. They go fishing for 5 hours so they do not need ice. Fishing grounds for trammel net and mini-trawl are in the same places without any restrictions. Fishers are moving around within these areas following the fish. Near fixed objects, like* bagan *and the sunken tanker, where gill nets cannot be used long lines are used. While crab fishers operate along the riverside and estuary of the Berau delta.* (Eswahyudi, Teluk Semanting, 22.05.2008)

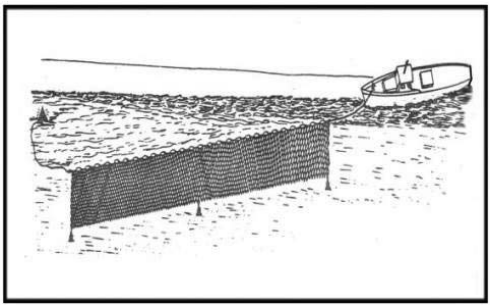


Figure 3.3 Gill net *(pukat*) fishery

[7] Fishers in Teluk Semanting recognise *nyorong* as *guris* (see Table 3.16). Guris starts from guris 1 up to guris 6. After high tide fishing day starts again with *undur* which begins with undur 1 up to undur 3.

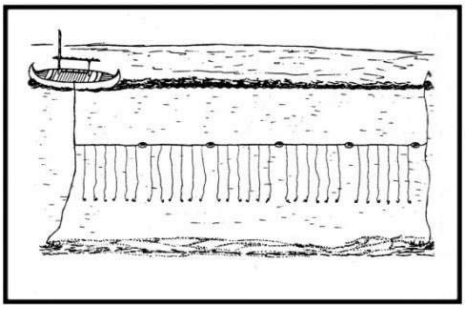


Figure 3.4 Long line *(rawai)* fishery

3.4 Place making and continuous social space

Place making means that place is not a given, but an active process of historical construction and identification (Gupta and Ferguson, 1992: 6) especially in the case of immigrants from Sulawesi who define their new frontier area of tambak livelihoods in coastal Berau. Migration is an issue that is important to raise here as it is kind of fisher strategy to find a better livelihood. Migration is a response from rural communities to deal with negative factors such as environmental degradation, population growth or economic pressures (De Haan, et al., 2002). Most of the migration literature deals with land-based rural communities, and hardly any study deals with migration by fishers. Interestingly, migration for fishers is a normal part of their life experience. Since fishers do not cultivate the resource, they depend on the fishes' movements at sea. Over time, as marine resources are dwindling in the Indonesian coastal waters, Bugis fishers have moved from one island to another and from one place to another. In the Berau delta, migrants came from other coastal places in Kalimantan, like Pasir, or across the sea, from Sulawesi. Villagers therefore have a seaward orientation (Pauwelussen, 2010) in keeping up social networks.

Most of the people living in the coast of East Kalimantan are from South Sulawesi[8], mainly Bugis. Pelras (1996:320) stated that in Kalimantan (Borneo),

[8] Pelras (1996:12) notes that the four main ethnic groups in South Sulawesi are Bugis, Mandar, Toraja and Makassar. He adds that Bugis people distinguish themselves according to their former major states (Bone, Wajo, Soppeng, Sidenreng) or groups of petty states (those around Pare-pare and Suppa on the west coast; those around Sinjai in the south).

Bugis settlements in areas around Pontianak and Mampawa on the west coast and in Pulau Laut, Pegatan, Pasir, Kutai (especially in Samarinda), Bulungan and Gunung Tabur (Berau), controlled the upriver trade. He further argues (idem) that Bugis migration is aneconomic strategy which is connected with the resolution of a personal conflict, an affront received, political insecurity or the desire to escape either unsatisfactory social conditions or undesirable repercussions from an act of violence perpetrated at home. It is known that Bugis have migrated and developed settlements throughout the Indonesian archipelago since the end of the seventeenth century.

> *"[I]n east Borneo, La Ma'dukelleng concluded political matrimonial alliances with local rulers just as he would have done in his home country; thus he married one of his sons to one of the Sultan of Pasir's daughters and, later, their daughter to Sultan Idris of Kutei, while he himself became Sultan of Pasir. He was also active in organising other Wajo communities all down the east coast of Borneo, each under its elected chiefs. Having obtained from the previous Sultan of Kutei the right of settlement for Bugis in Samarinda, a strategic settlement near the mouth of the Mahakam River, somewhat downriver from the Kutei capital, he later also obtained from Sultan Idris monopoly rights over the export of products from the hinterland, including gold-dust, benzoin, camphor, damar,* gaharu *wood, rattan, birds' nests, beeswax, bezoar stones and rhinoceros horn (for which, however, only Kutei Malay were permitted to trade upriver), and of sea products such as tortoise shell, turtle eggs, agar-agar and trepang. Some Bugis leaders were granted titles by the Sultan which put them on a par with the Malay nobility and qualified them for intermarriage with the ruling dynasty"* (Pelras, 1996: 321-322).

Case of Amin: from Tinobu to Kasai and became Pokmaswas head

> *Amin (A) was born in Southeast Sulawesi in 1969. He grew up there until he was 6 years old. Then he moved with his parents to the Bone district, South Sulawesi where he lived until he was 12 years old. He studied SD at grade 6 and before he passed SD he moved with his family to Simpang Empat village in Batulicin South Kalimantan. This move was due to the fact he had family there and some economic opportunities and the availability of land for agricultural activities. He then finished primary school in 1982 and lower secondary school (SMP) in 1985 in Batulicin. Salman (field officer) was in the same school. A continued to study at the higher secondary school (SMA) "Garuda" in Kotabaru and graduated in 1988. While he was in the SMA he worked as*

> *labourer in a housing construction project where his wages was IDR 5,000 per day. Every week he went down to parents' house and he continued to get money from them. Furthermore, he followed religious meetings every night for 5 months and became the Moslem teacher´s assistant until 1988. Later he followed his parents to work in gold panning in Mangayapa. The gold price was IDR 18,000 per gram and he could earn IDR 30-50,000 per day. A sent money to his parents for 2 years. As the gold location was not good A moved to Batubalik to do the same. The economy was getting better as he earned IDR 50-100,000 for 1.5 years. A married his 1st wife, Fauziah from Martapura, in Telawi in 1992 and divorced her one year later. In January 1993 he moved to Kasai to follow his parents who had gone there already in 1991. When A travelled to Berau he stopped in Merancang for two days and people there asked him to go with them to Kasai. In Kasai he first worked as daily labourer for four months with a wage of IDR 7,000 per day. After that for five months A became a fisher in a crew with the assistance of his cousin. The income of the fisher crew was IDR 50,000 net; the total income was divided into three parts, one for the boat, and one for the owner and the rest for the crew. A used his initial loan to buy a boat priced IDR 300,000. The fishing engine was provided on credit by his boss Haji Adam. At that time white shrimp sized 60 was IDR 15,000 per kg. He bought a net (brand Arida) for IDR 12,000 per piece which had to be replaced every 15 days. A was appointed as general staff of the village in 2002-2004. At that time Kasai was not a formal village yet and the head of the village-to-be Kasai was Haji Jebar. The main task of H was to make ID cards for people there. As village staff A was paid a salary of IDR 300,000 per month. A sold diesel fuel (solar) in the village that he bought from Tanjung Redeb or Merancang. His wife also helped the family income by opening a small kiosk. A became head of Pokmaswas in Kasai. The establishment of this surveillance organisation was initiated in a meeting on the 23rd of May, 2006 which was attended by ten people, with village representatives coming from different hamlets. Officers from Dinas and police were present. A, as the representative of hamlet 3 (RT 3), was voted to be become the head. During his time in Kasai A has had different bosses starting from Haji Adam, then Haji Baco, Haji Aspan, Haji Abdusrrasyid, Haji Husin and lastly Haji Aminudin* (Amin, Kasai, 25.01.2008)

In the Kasai case, the population is mostly immigrant and is dominated by people who have migrated since the 1990s from the Pasir district in East Kalimantan, mostly from the villages of Pasir Mayang, Pondong and Air Mati. These immigrants live in the upstream part *(hulu)* of the village which is sometimes called Kasai Baru (new Kasai) while local people live in the downstream part *(hilir)*. The immigrants stay in the vicinity of their patron. One of the immigrants

from Pasir is the village head named Rahmani. Below I share part of his life history:

From fisher to boss and village head

> *Rahmani (R) is the village head of Kasai and is known as the youngest punggawa and collector of shrimps. He was born in Banjarmasin, South Kalimantan on the 10th of June 1968 and grew up there for 21 years. He has had a few jobs ranging from opening a food stall, becoming a taxi driver´s assistant and a motorcycle driver (ojek). In 1990 he started to live in Pasir Mayang village (Pasir district) with his mother and he got married there. During his life in Pasir, he worked on a dredging activity of Kapal Musi 22 and as a salt finder and diver in the mining industry. After that he became a gill net fisher and got a loan from a boss in Pasir Mayang. R decided to move to Kasai to follow relatives who were there already. When he first came to Kasai R started as a* gondrong *fisher and learned how to handle the sea with his brother-in-law for several months. The fishing economy went up and down but it improved since he became a boss with his owns boats and clients. In 1998 when the economic crisis hit Indonesia, until 2003 R was successful having 14 boats and 60 fishers. His assets also included six ice boxes and five generators. He could produce at least 150 kg of shrimps per day and reached a profit of IDR 1 million per day. He then was appointed as village head by the district head for his 1st term in 2004. R is connected to CV Novianti, a shrimp buying company who works both in Anggana, the Mahakam delta and in Banjarmasin. Shrimp production consists of 90% white shrimps and 10% tiger shrimps. He feels that the production has decreased in the last three years and he is thinking about expanding his business outside Kasai. R believes that his initial business has never stopped even though it is deficit, but it has to be operated even if slowly. If his followers are not satisfied and go to another boss to sell shrimps he says that he will solve the problem by approaching his fishers and restore their trust as he sees this is the fundamental aspect in their cooperation.* (Rahmani, Kasai, 22.01.2008)

I wanted to know why people have chosen Kasai for their settlement. I asked Johansyah, a senior village member about it. He contended that he had chosen Kasai as people there can easily get clean water compared to the Pegat area[9]. In Pegat one needs to get clean water from other areas or rely on rain water. According to our survey data most of fishers (66 %) moved to Kasai after 1995.

[9] When I stayed at Amin's house in Kasai I saw that people in Kasai came to his house to get water during the dry season. At the back of this house there is a fresh water well.

Only 6 fishers were there before 1980, leaving 28 fishers still there from their arrival in the period 1980-1995 (Table 3.7).

Based on the life histories of different fishers above I conclude that a fishing based livelihood is not only a means to make a living. Fishing as a livelihood also includes knowledge and values (Long, 2001), and it has a long history, often including a trajectory of migration and strategies of place making that they have practiced over time during their life history.

Table 3.7 Fishers' residence in Kasai (N=97)

Type of fisher	Year of arrival						Total	%
	after 1995	%	1980-1995	%	before 1980	%		
Trammel netter	39	40.2	18	18.6	3	3.1	60	61.9
Mini trawler	11	11.3	6	6.2	0	0	17	17.5
Longliner	3	3.1	1	1.0	0	0	4	4.1
Gill netter	5	5.2	2	2.1	2	2.1	9	9.3
Crab catcher	5	5.2	1	1.0	1	1.0	7	7.2
Total	64	66.0	28	28.9	6	6.2	97	100.0

3.5 General characteristics of the fishers of Kasai

In demographic terms, the fishers' households of Kasai are not large, and they mostly have primary school education. 54 of the 97 respondents (56 %) have two or three children (Table 3.8). A majority (84%) of all fishers have finished primary school (SD), 11% have three years secondary school education (SMP), and only 3% have completed all 6 years of secondary school (SMA) (Table 3.9). One of older fishers sent his son to study at the university in Samarinda and he graduated in 2010. He is the only university graduate in Kasai.

Let me now discuss the catch produced by fishers in Kasai. From the survey I conducted in 2009 with 97 fishers I found that the average catch per day ranged from 11 - 20 kg per fishing boat owner. The highest catch was that of long line fishers and the smallest was of a gill net owner, as shown in Table 3.10.

Table 3.8 Family size of Kasai fishers (N=97)

Type of fisher	Family size						Total	%
	1 child	%	2-3 children	%	>3 children	%		
Trammel	24		31		4		59	
netter		24.7		32.0		4.1		60.8
Mini trawler	4	4.1	12	12.4	1	1.0	17	17.5
Longliner	3	3.1	0	0	1	1.0	4	4.1
Gill netter	2	2.1	6	6.2	1	1.0	9	9.3
Crab catcher	2	2.1	5	5.2	0	0	7	7.2
Total	35	36.1	54	55.7	8	8.2	97	100.0

Table 3.9 Education of Kasai fishers (N=97)

Type of fisher	Family size								Total	%
	no	%	SD	%	SMP	%	SMA	%		
Trammel	0		53		7		0		60	
netter		0		54.6		7.2		0		61.9
Mini trawler	0	0	13	13.4	3	3.1	1	1.0	17	17.5
Longliner	0	0	2	2.1	0	0	2	2.1	4	4.1
Gill netter	1	1.0	7	7.2	1	1.0	0	0	9	9.3
Crab catcher	1	1.0	6	6.2	0	0	0	0	7	7.2
Total	2	2.1	81	83.5	11	11.3	3	3.1	97	100.0

*Pearson Chi-square =44.248 (very significant at 1%)

Table 3.10 Distribution of average daily catch per fisher in Kasai*

Type of fisher	Average catch (kg)				Total
	3days ago (N=72)	2days ago (N=70)	Yesterday (N=78)	Today (N=47)	
Trammel netter	15.28	12.89	13.64	13.21	55.02
Mini trawler	14.92	13.18	15.07	11.60	54.77
Longliner	19.00	11.33	20.00	9.00	59.33
Gill netter	10.75	17.20	10.44	12.83	51.23
Crab catcher	15.00	14.71	13.60	20.00	63.31
Total	74.94	69.32	72.75	66.65	283.66

I would like to mention why only 47 fishers were fishing on the day of the interview. The number of fishers differs per day because some fishers do not go fishing for several reasons. They do not go out if it is high tide or if it is low tide (*air mati)*. Moreover, fishers also confirmed that if they travel out of the village to go to Tanjung Redeb or they are sick, or previous fishing income was minimal (*tekor*) then they do not go fishing either.

During my interviews fishers in Kasai mentioned additional climatic, social, and religious reasons to cancel a fishing trip, such as: i) Strong wind and bad weather; ii) The wife proposing that her husband should not go fishing but help, for example, preparing a wedding, giving birth etc.; iii) The Friday prayer, for some fishers; iv) Social-political events in the village, like public meetings and general elections; v) The first three days of *Ramadan*, the fasting month; vi) Moslem festive days; and vii) *Lebaran*, the festive day at the end of the fasting, and the following three days.

Fishers in Kasai were asked how much fish they caught on the three days before the interviews took place in the survey period (between March and May 2009). The majority of fishers stated that most of their catch ranged between 10-20 kgs of shrimp and/or fish depending upon the gear a fisher used per day. Tables 3.11, 3.12, 3.13, and 3.14 show that during the three days before the interview took place and on the day of the interview, 65%, 60%, 62% and 79%, respectively, caught 10-20 kgs marine produce. But the number of fishers who had not gone out to sea differed per day, so I show the data in separate tables. However, they counted the total catch, without distinguishing between fish, shrimps, and crab as they diversify the use of gear during the day. For example trammel net fisher, who aims to catch shrimp, may have a gill net to catch fish. From my own observations, the amount of shrimp of the total catch for a trammel netter may be up to 90% and the catch of fish and/or crab 10%.

Table 3.11 Number of fishers per gear in Kasai 3 days earlier (N=72)

Type of fisher	catch (kg)						Total	%
	<10	%	10-20	%	>20	%		
Trammel netter	7	9.7	34	47.2	6	8.3	47	65.3
Mini trawler	3	4.2	7	9.7	2	2.8	12	16.7
Longliner	0	0	2	2.8	1	1.4	3	4.2
Gill netter	2	2.8	2	2.8	0	0	4	5.6
Crab catcher	2	2.8	2	2.8	2	2.8	6	8.3
Total	14	19.4	47	65.3	11	15.3	72	100.0

Source: interviews March-May 2009.

Table 3.12 Number of fishers per gear catching shrimp, fish and crab in Kasai 2 days earlier (N=70)

Type of fisher	catch (kg)						Total	%
	<10	%	10-20	%	>20	%		
Trammel netter	13	18.6	26	37.1	5	7.1	44	62.9
Mini trawler	4	5.7	6	8.6	1	1.4	11	15.7
Longliner	1	1.4	2	2.9	0	0	3	4.3
Gill netter	1	1.4	4	5.7	0	0	5	7.1
Crab catcher	2	2.9	4	5.7	1	1.4	7	10.0
Total	21	30.0	42	60.0	7	10.0	70	100.0

Source: interviews March-May 2009.

Table 3.13 Number of fishers per gear in Kasai the day before the interview (N=78)

Type of fisher	catch (kg)						Total	%
	<10	%	10-20	%	>20	%		
Trammel netter	14	17.9	29	37.2	4	5.1	47	60.3
Mini trawler	3	3.8	8	10.3	3	3.8	14	17.9
Longliner	0	0	2	2.6	1	1.3	3	3.8
Gill netter	4	5.1	5	6.4	0	0	9	11.5
Crab catcher	1	1.3	4	5.1	0	0	5	6.4
Total	22	28.2	48	61.5	8	10.3	78	100.0

Source: interviews March-May 2009.

Table 3.14 Number of fishers per gear in Kasai on the day of the interview (N=47)

Type of fisher	catch (kg)						Total	%
	<10	%	10-20	%	>20	%		
Trammel netter	4	8.5	24	51.1	0	0	28	59.6
Mini trawler	4	8.5	6	12.8	0	0	10	21.3
Longliner	1	2.1	1	2.1	0	0	2	4.3
Gill netter	1	2.1	5	10.6	0	0	6	12.8
Crab catcher	0	0	1	2.1	0	0	1	2.1
Total	10	21.3	37	78.7	0	0	47	100.0

Source: interviews March-May 2009.

Survey results show that there is no big difference among the four consecutive days in production levels of fishers in Kasai. Data indicate a catch of 10-20 kg of shrimp/fish is the most frequent daily catch on four consecutive days of fishing operations.

3.6 Fishing practices, local knowledge and seasonality

Trammel netters generally start fishing around 06.00 - 07.00 am until midday during fishing days. Some fishers will come back around 6 pm and do not go fishing after that. Fishing activities depend upon the season and the catch they have but they do not have a target. They go out fishing for a continuous period of two weeks following the moon cycle, which is known as 'one water' *(satu air).* At full moon when the tide is highest or the so called high tide *(air besar)*, and at low tide *(air surut)* also called *konda* the trammel net fishers do not fish. Within one month they effectively fish for 20 days.

Fishers in Kasai are very knowledgeable of seasonality. They distinguish four fishing seasons; namely the north season *(musim utara*) from October to March, the south season *(musim selatan)* from June to October, and transition seasons *(musim pancaroba)* in between. According to them the north season is known to be the best for fishing. The south season is known as the time of lesser catches, while the hardest times to fish are the transition seasons running from April to June every year. These fishing seasons apply mainly for trammel net and mini-trawl fisheries. The other types of fishers also recognise the seasons with little variations. Trammel net and mini-trawl fishers fish in the same fishing grounds in the more shallow waters, while gill netters and long line fishers go further toward the deep sea. A map of fishing grounds for different gear types in the delta is presented in Chapter 5.

Table 3.15 Shrimp fishery production (tons) in Kasai (2008)

Month	Production
January	6.8
February	7.5
March	9.6
April	7.1
May	5.9
June	7.3
July	4.4
August	6.4
September	5.3
October	6.1
November	10.0
December	7.0
Total	83.3

Source: shrimp trader CV SIP (2009).

Since fishing depends upon seasonality I asked a shrimp buyer in Tanjung Redeb about the variation of shrimp production in Kasai during a year. I am sure that data provided by the shrimp trader here is not recorded by local government and I know that most of the white shrimps in Kasai collected by punggawa were bought to Pak Suryadi[10], the representative of SIP Company in Berau. It means that the data is not transparent and the company does not provide information to *Dinas*. According to data from 2008 the highest production of shrimp fishery was reached in November, calculated at 10 tons, and the lowest one was in July calculated at 4.4 tons.

In addition to the survey data above I arranged a Focus Group Discussion (FGD) in Kasai (13.2.2009) to which I invited fishers using different gear. I was lucky that Mr Salman, the Fisheries Field Officer, offered Kasai to be used for the meeting, rather than some office in the district capital, because that would certainly have attracted less fishers. This FGD was attended by 16 participants including 2 officers, one staff member from the Fisheries Service *(Dinas Perikanan)* in Tanjung Redeb and Mr. Salman as field extension officer. The fishers who attended the meeting represented the main gear classes: trammel netters, mini-trawlers, longliners, gillnetters, crab catchers (*rakkang*), and scoop netters (*serok*). In the tables above I have included trammel net, mini-trawl, long line, gill net and crab catcher fishers as they are using the main fishing gear operated in Kasai. In the FGD there was a scoop netter but I did not include this category in the survey as it is a minor fishing gear in the village.

Figure 3.5 Women helping to size shrimps

[10] Suryadi is representative of shrimp buying company named CV Surya Indah Perkasa (SIP) Berau branch. The head office of this company is in Balikpapan.

Practical knowledge based on long-time experience regulates their fishing operations. Fishers in the delta have found the good fishing grounds by experience and they know when it the best time and season to fish where. A gill net fisher explained his strategy for identifying fishing ground as follows:

> *To decide where to go to fish on certain days, sometimes we spread the locations. For example today I am in Selalang and my friend is in Tiang, but we keep coordinating by meeting each other or by using mobile phones. After three days the numbers of fish will be getting fewer, so if the fishes are not there anymore, we stop. I go fishing alone, but we know where we meet. We plan ahead where to go to find fish, we use our feeling based on our experience from the last year. In the south season we go to Tiang and Buntungan. In the north season we go to Buntungan, Gedong, Sindring and Bingkar. During the transition period we can go to anywhere.* (Eswahyudi, Teluk Semanting 22.05.2008)

Coastal fisheries highly relate to the tidal system. Hutabarat and Evans (1985: 99) define the maximum tide as spring tide (see Figure 3.6) while the minimum tide is recognised as neap tide (see Figure 3.7). Spring tide happens on new moon and full moon times,while neap tide occurs during the first and the third quarter of the moon (idem). In addition to that Dahuri et al. (2000) point out that the tidal system in Indonesia can be divided into four types, namely diurnal tide, semidiurnal tide, mixed diurnal and mixed semidiurnal. In the study area the tidal system of the Berau delta is regarded as mixed semidiurnal tide, including the Berau river.

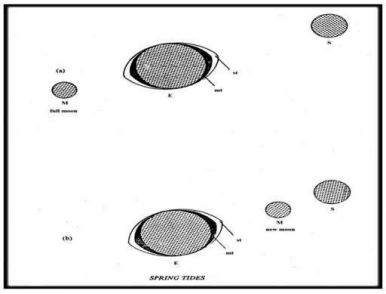


Figure 3.6 Position of the earth, moon and sun at spring tide (after Hutabarat and Evans, 1985)

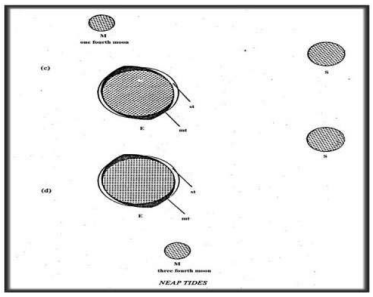


Figure 3.7 Positions of the earth, moon and sun at neap tide (after Hutabarat and Evans, 1985).

Fishers in the Berau delta use their local knowledge in the fishing operation. They know the fishing calendar which is based upon the lunar calendar. For example they distinguish between low tide (*air mati),* when there is no current at low tide *(gila-gila)*[11], incoming water *(nyorong* or guris), outgoing water (*konda*), and high tide (air besar). Fishers recognise several good fishing grounds according to seasons and gear usages. In addition, fishers have a local fishing arrangement of *satu air* (one water time) which means that they go fishing every day during two weeks, so there are two periods of 'one water' per month. Of the two weeks' time of 'one water' they effectively fish for about 10 days (Table 3.16).

[11] I translated myself the concept of *gila-gila* and *nyorong* or *guris*. *Gila-gila* is local knowledge which refers to the fishing-off day as there is no current in the coastal waters so the drift trammel net gear cannot move to attract fish.

Table 3.16 Monthly arrangements for trammel net fishing based on lunar calendar

Days of month	Local name	Fishing day (Yes/No)
1 and16	-	Yes
2 and 17	-	Yes
3,18	-	Yes
4,19	-	Yes
5,20	-	Yes
6,21	-	Yes
7,22	-	Yes
8,23	*Konda or air mati*	No
9,24	*Gila-gila*	No
10,25	*Nyorong 1 or Guris 1*	Yes
11,26	*Nyorong 2 or Guris 2*	Yes
12,27	*Nyorong 3 or Guris 3*	Yes
13,28	*Nyorong 4 or Guris 4*	Yes
14,29	*Nyorong 5 or Guris 5*	Yes
15,30	*Air besar*	No

Based on interview with Amin, trammel net fisher (21.01.2008)

The strategy developed by fishers is not public knowledge but individual or family knowledge. It may be kept within the family or shared with friends. Trust between different fishers using similar gear within the coastal fishing community is as important as normative rules, e.g. the prohibition of the use of mini-trawls in the rivers of Kasai and Pegat Batumbuk following the Presidential Decree 39/1980 on the trawler ban. It means social and symbolic capital constructed by the local fishers shapes the fisheries-based livelihoods in the coastal area.

> *The decision to go out at sea is based on information provided over time by fishers' friends, whether they have got shrimps or not, and on which fishing grounds. Generally this information is correct but the catch has decreased. It is probably caused by other fishers as they come to fish in those areas.* (Johansyah, Kasai 21.01.2008)

3.7 Livelihood diversification

Fishers choose different kinds of gear such as trammel net, gill net, mini-trawl and longline during different seasons and in different places depending on the presence of shrimp and fish resources. Some fishers strategically use more than one type of fishing gear. They may have a trammel net and a gill net or a trammel net and a longline in one boat depending on the fisher's calculation of the spatial

and seasonal distribution of the catch, or they change their fishing techniques during their life time (e.g. from mini-trawl to trammel net). In addition to the usage of different types of gear to cope with daily or seasonal changes of catch (Table 3.17), they extend into non-fisheries activities: agriculture *(berkebun)*, opening a small store (Ontita, 2007). Also, the fishers build and maintain a trade network with other actors, like shrimp farmers, and patrons.

Topics that I raised during the FGD were the type of livelihoods which were important for their households, a livelihood calendar, the local mapping of fishing grounds for different fishing gear used by villagers and outsiders (*andon*), and conflicts about fishing grounds between locals and *andon* fishers (see Chapter 5). During discussion I was told that livelihoods in Kasai are diverse. People can earn money not only from fisheries such as trammel net, longline, mini-trawl, gill net, shrimp trap net, crab trap (*rakkang)* and scoop net but also from fish drying, jellyfish catching, shrimp-and-crab pond aquaculture (*tambak)*, upland paddy, gardening, and opening a small village store (*kiosk*). Since we are speaking here of households, these activities clearly include the women as well. Women in Kasai help their husband in processing shrimp or fish to be dried. In Teluk Semanting women process fish into fish snacks (*kerupuk*).

Our survey data clearly show that fishers in Kasai have gear diversification as livelihood strategy. For example, trammel net fishers (N=60) also use other gears including mini trawl (n=3), long line (n=11), gill net (n=6) and they alternate with crab catching (n=2) during their fishing operations (Table 3.17).

Table 3.17 Gear diversification (N=97)

Type of fisher	Number of fishers per gear										Total	
	Trammel net	%	Mini trawl	%	Long line	%	Gill net	%	Crab catcher	%		%
Trammel netter	60	44	3	2	11	8	6	4	2	1	82	61
Mini trawler	3	2	17	13	2	1	0	0	2	1	24	18
Long liner	0	0	1	1	4	3	0	0	1	1	6	4
Gill netter	1	1	1	1	4	3	9	7	0	0	15	11
Crab catcher	0	0	0	0	0	0	1	1	7	5	8	6
Total	64	47	22	16	21	16	16	12	12	9	135	100

My key informant, Amin, told me that his wife sells from a small kiosk mainly to fulfil the needs of primary school pupils and village children. In addition, Amin sometimes engages in upland rice cultivation. Another case is Rupi, a mini trawler,

who has upland rice cultivation as his most important additional livelihood. He can harvest 2 bins (*kaleng*) which is about 20 kg of hulled rice per bin, once a year.

Another example was given by Johansyah, a trammel net fisher and former village administration staff who tried to farm *(berkebun)*: five years ago. Johansyah planted cassava *(singkong)* but the roots were too attractive to wild pigs and the harvest failed. Now he plants jackfruit *(nangka)* and orange *(jeruk)* mainly for home consumption. He says that it is important for the future to have this land rather than buying fruits and thus provide security of land that can be inherited by his children.

The survey results regarding livelihood diversification show that 63% of the total number of fishers in the survey in Kasai has diversified their livelihoods (Table 3.18).

Some fishers have access to land (Table 3.19). Kasai is one of the few villages in the Berau delta where a hilly hinterland allows the inhabitants to use gardening as an additional means of livelihood to fishing. Fishers are cultivating land ranging from 0.5 ha to 21.5 ha. I found that they generally do not have a letter of ownership through a formal cadastral registration. But locally, access and rights to land are well known and recognised.

Table 3.18 Livelihood diversification (N=97)

Type of fisher	Complementary livelihood means*				Total	%
	Yes	%	No	%		
Trammel netter	34	35.1	26	26.8	60	61.9
Mini trawler	15	15.5	2	2.1	17	17.5
Longliner	2	2.1	2	2.1	4	4.1
Gill netter	6	6.2	3	3.1	9	9.3
Crab catcher	4	4.1	3	3.1	7	7.2
Total	61	62.9	36	37.1	97	100.0

*Pearson Chi-square = 6.11 (not significant)

Table 3.19 Land access of Kasai fishers (N=97)

Type of fisher	Land ownership*				Total	%
	Yes	%	No	%		
Trammel netter	27	27.8	33	34.0	60	61.9
Mini trawler	8	8.2	9	9.3	17	17.5
Longliner	2	2.1	2	2.1	4	4.1
Gill netter	2	2.1	7	7.2	9	9.3
Crab catcher	5	5.2	2	2.1	7	7.2
Total	44	45.4	53	54.6	97	100.0

*Pearson Chi-square = 3.291 (not significant)

Trammel net is the main class of fishing gear in Kasai. Some of the fishers have alternative livelihood on land like gardening and upland rice cultivation. Some others cannot afford to buy land as it is expensive. Most of trammel net fishers have no savings (Table 3.21) and they spend most on buying new gear and fishing goods.

Table 3.20 Fishing income of trammel net fishing (Kasai)

Descriptions	Rp
A. Total shrimp:	
- *size* 30 for 4,40 kg	387.200
- *size* 50 for 5,20 kg	249.600
- *size* 65 for 1,50 kg	45.000
Total income	681.800
B. Deduction from fuel and ice cost	70.000
Remaining income	611.800
C. Deduction from the instalment of trammel net loan (10% of net income)	61.800
Net income	550.800

Source: Fisher's receipt showed by Kasai's punggawa on 28.2.2008.

In addition I wanted to know whether fishers in Kasai had savings or not to manage their household needs. I found (Table 3.21) that most of them (84.5%) have no savings. When fishers' households save money it is the wife who takes this responsibility.

Table 3.21 Savings of Kasai fishers (N=97)

Type of fisher	Savings*				Total	%
	Yes	%	No	%		
Trammel netter	11	11.3	49	50.5	60	61.9
Mini trawler	1	1.0	16	16.5	17	17.5
Longliner	1	1.0	3	3.1	4	4.1
Gill netter	2	2.1	7	7.2	9	9.3
Crab catcher	0	0	7	7.2	7	7.2
Total	15	15.5	82	84.5	97	100.0

*Pearson Chi-square =3.445 (not significant)

When we differentiate between the types of fishers we can see that 49 out of the 60 (81.6%) of trammel net fishers and 16 out of the 17 (94%) of mini-trawl fishers have no savings. During the survey I asked respondents in Kasai how much money they spent per month for household expenses. The majority (37.1 %) said that they spend IDR 1.5-2 million (equivalent to US$ 158-211 in 2009) for monthly household

expenses. They give the money to their wives as the women are responsible for managing the household income.

Table 3.22 Monthly household expenses range by fisher types (N=97)

Type of fisher	Expenses range per month* (million rupiah)								Total	%
	0.5-1	%	>1-1.5	%	>1.5-2	%	>2	%		
Trammel netter	6	6.2	14	14.4	20	20.6	20	20.6	60	61.9
Mini trawler	1	1.0	6	6.2	8	8.2	2	2.1	17	17.5
Longliner	0	0	2	2.1	1	1.0	1	1.0	4	4.1
Gill netter	0	0	1	1.0	6	6.2	2	2.1	9	9.3
Crab catcher	0	0	4	4.1	1	1.0	2	2.1	7	7.2
Total	7	7.2	27	27.8	36	37.1	27	27.8	97	100.0

*Pearson Chi-square = 12.96 (not significant)

As I mentioned earlier Kasai is known best for white shrimp fishery. Shrimp buyer Suryadi told us that between 2002 and 2005 the shrimp production in Berau went down as a consequence of the presence of trawlers from Malaysia – while these bigger trawlers have been banned in Indonesia since 1980. This illegal trawl fishing has very much contributed to the decreased production of shrimps in Berau, including Kasai. However, at the time of research, his company could get shrimps all right.

> *Certainly the highest tiger and white shrimp production is there (in Kasai). I see every delivery time the highest amount is white shrimp. In terms of production Kasai is the best. We started to do business here in Berau because of Kasai. I started here in 1998 but Kasai was good for a long time before that. We were there in 1991 and heard that production in Kasai is good In Kasai the shrimps are rich even in the very shallow water.* (Suryadi, Tanjung Redeb, 12.02.2008)

The economic crisis of 1998 has positively affected the shrimp production in Berau, because it is an export commodity that benefited from the lower value of the Indonesian Rupiah against USD which resulted in a higher price on the global market for exported shrimps. This of course was most profitable for shrimp buyers, traders or punggawa, but also for the fishers. In 2009 production costs were higher and particularly the limited availability of fuel for fishing operations meant that the income from fishing was a lot less when compared to 1998.

> *The era of 1998 was known as the busiest time for shrimp. Shrimps are plentiful, high production, good prices, and low operational cost. So people thought it easy to manage shrimps. But now shrimp farmers are more numerous and fishers compete with each other to get shrimp. They face high operational costs; meanwhile the selling price is different compared to before. Fishers are on edge, they are quick to protest.* (Suryadi, Tanjung Redeb 27.08.2008)

Johansyah mentioned that at the time of the crisis in 1998 within 2 weeks he could earn IDR 1 million per day. Ten years later, when the fuel price was high, catching shrimp became also hard because he did not want to move far away. In 1998 the fuel price was IDR 2,500 per litre and kerosene was IDR 2,000 per litre. In 2009 these prices had increased to IDR 6,000 and IDR 4,000 per litre, respectively. A gill netter in Teluk Semanting said:

> *Fuel is rare even in the Berau stations where fishers cannot buy it. Sometimes we search for illegal places to find it. There is someone who sells 20 litres but we have to pay around IDR 150,000 instead of the normal price IDR 105,000. But fuel scarcity is even harder. Now we do not care about the high price of fuel as long as it is available*. (Eswahyudi, Teluk Semanting 22.05.2008)

Fishers in Kasai face problems with prices of both shrimp and fuel. They are dependent on the fuel price provided and controlled by their patron. This certainly affects the fishers' livelihood, especially since are not free to sell shrimps directly to the company for a better price, as they depend on their patron's trade network.

> *The price of shrimps set by the punggawa is lower as compared to the price we would get if we directly sold to the company. For example, the price of tiger shrimp sized 20 in CV. SIP was IDR 160,000 per kg while with the punggawa it was only IDR 125,000 per kg. In addition to his profit margin, the punggawa also benefits from bonuses from the company. There are two marketing channels of captured shrimp in Kasai, one is from fishers to the punggawa and then delivered to CV. SIP; the other is from fishers to the boss and subsequently to Pisang-pisangan (by CV. Apollo) and then delivered to Tarakan. From 1980-2002 CV. Apollo through its cold storage exported shrimps to Taiwan and China. We (the fishers) felt the price of diesel fuel (solar) was very high. In order to tackle this problem, fishers mix 'solar' with kerosene as we cannot afford to buy pure 'solar'. By mixing these two the fuel cost is lower. Another thing is ice. I pay Rp 5,000 per trip for ice, and I pay a lower price through*

> *him. He also provides me with trammel net gear (brand 'Udang') which he gets from Malaysia.* (Abdul Samad, Kasai 04.02.2008)

From this interview we see that the punggawa benefit from the shrimp marketing process in Berau as they are the middlemen (Table 3.5). In Kasai fishers mostly have a loan from the punggawa (Table 3.6). We also learned that the fishers in Kasai in 2009 had to cope with higher prices for fuel and fishing gear which caused the fishing income to go down (Table 3.23). They are indebted to their boss. Thus macro-economic conditions affect fishers' livelihoods and forces fishers to invent strategies to deal with this situation. Fishers from different five classes distinguished in our survey have different strategies to maintain and search for a better livelihood. In the next section I show examples of life trajectories of actors who carry out shrimp and fish marketing in the coastal frontier of Berau.

3.8 Searching for better livelihoods: examples from different classes

In this section I show how some fishers manage to improve their lives by moving out of fisheries into related livelihood opportunities, using personal, family, and patronage networks, and knowledge from previous life experiences.

Andi: From gill netter to fish collector

> *Andi Erson (Andi) was born in Pegat in 1967. He grew up and studied SD until grade 5. He followed his uncle and started to work as a gill net fisher in 1982 to catch ikan bawal. After 10 years he became a fisher he then changed to trade fishes and shrimps to carry to Tawau and created a joint business with a Chinese businessman (*toke*) there. Andi did this job for 3 years. This patron in Tawau lent him, a gill net and he expected that the catch would be sold to him. The process is like this: the fishers catch fish and shrimps during one week and then we collect the produce and take it to Tawau. When the fishers' catch went down, this negatively influenced Andi's income to the extent that he could not cover the production costs. Andi decided to change to selling fish and shrimps to CV. Tunas Mandiri in Tarakan for 5 years as he had a family relationship with the company owner. The process was like that in Tawau: during low tide he delivered the products to Tarakan. From Pegat to Tarakan was a one day trip. But the catch decreased and it was hard to maintain the business. Later, he changed to selling fish in Tanjung Redeb to Pak Sukirman as Andi believed him that there was a good market in*

> *Samarinda. Andi met a buyer in Berau when he looked for* bawal *and* tenggiri *fish through Haji Maman, the boss of the fish traders in the market. Later, Andi cooperated with Sukirman to supply fish for restaurants in Samarinda. Currently Andi is the head of the hamlet in Pegat and he trades fish, shrimps and shrimp paste (*terasi*). Andi has a clientele of 22 gill net fishers, 7* togo *fishers and 10* terasi *fishers. The latter fishers catch the raw fish to make shrimp paste of small shrimps called* hambaring. *Usually women make the* shrimp paste *in this village* (Andi, Pegat 28.02.2008)

It is important to know how Andi, who now is a boss in Pegat Batumbuk in the Berau Delta, sees the sea as the basis for a livelihood:

> *I wanted to be a collector because then I do not need to push myself to go to the sea. I really want to operate a shrimp pond (*tambak*). But it needs much money, I think, since I have been to Jepara with Pak Amin where there is a professor who developed a shrimp pond system which cannot fail. Here in Pegat the ponds cannot be reached by road, so even if the* tambak *is successful we still remain waiting for good market access. For example, many examples have shown, such as in Tarakan, that there are often robberies or even murders in pond areas. I am really scared that when we want to harvest from the pond that then the robber might come.* (Andi, Pegat 28.02.2008)

I had an opportunity to talk with Haji Nassir, a local entrepreneur who owns the Pippos Company based in Tanjung Redeb. This fish buyer company is the main fish producer playing a very important role in supplying fish and other marine products in Berau. When I asked him how much fish he produces for the local market in Berau, he told me:

> *Basically my calculation is that 80% here is produced by my self and 20% is from outside Berau. It is clear that if my vessels do not enter landing site of Tanjung Redeb market (to supply) then there will be no fish at the market.* (Haji Nassir, Sambaliung, 24.12.2009).

I met Haji Nassir at his office in Sambaliung on 24th December 2009 with an introduction by Salman, the Fisheries field officer. Meanwhile an officer of the Dinas had just informed me that Haji Nassir was nominated to go for the national competition for the best performing marine fisher, called *Adibakti Mina Bahari* , after he had obtained the best position for this award for the province of East

Kalimantan in 2009 he was now eligible to compete at the top level. I tried to capture the life history of this important actor:

> *Haji Nassir was born in Barru, South Sulawesi in 1972. His complete name is Haji Muhammad Nasir Juneid. He followed primary school in Takalasi, secondary school (SMP) in Madello, and he completed secondary technical development school (STM Pembangunan) in Ujung Pandang in 1992. He bought 13 trawlers with the support of someone in Malaysia. He recognised himself as a pioneer of trawl fishing 5 years ago. HN is the owner of CV Pippos. This company has three* lengkong *or purse seine vessels, five courier vessels in Berau and two in Tarakan. The courier vessels collect the catch from other boats at the fishing grounds and bring them back to the fish base. When the vessels go to the fishing grounds they bring fuel, food and water. CV Pippos can produce five tons of fish per day. It has an ice maker and a 80 ton-storage. The fishing operation is only when the moon wanes or waxes (*bulan gelap*) around 20 days per month. He mentioned that the vessel can only store 30 tons since the fish has to be taken out when there is a clear moon (*waktu terang bulan*) to sell it on the Berau market during 3-4 days. During these days there is no fishing activity for purse seiners. The fishing grounds are 4 miles seawards, but they usually fish at 10 miles since the height and width of fishing gear are 100 m respectively. They do not want to fish at a 40 m depth since the nets will easily be caught behind stones on the sea bottom. The location of fishing grounds in Talisayan waters is around 6 miles from the coastline. They have a fishing permit from KKP (from the Ministry of Marine Affairs and Fisheries) in Jakarta. Some local people in Talisayan have complained to purse seiners as they affect the local catch.* (Haji Nassir, Sambaliung, 24.12.2009)

It appears that Haji Nassir was the first person who used trawls in Berau, but because of the Trawler Ban from 1980, he was forced to cooperate transnationally with an entrepreneur from Malaysia to fish in Berau waters (see below). He exchanged his trawlers for purse seiners in 2007. His called his company CV. Piposs and he operates in the fields of fresh fish trading, frozen fish and ice factories.

> *At that time the price for a trawler was IDR 238 million, and in Malaysia it was permitted to use trawlers. I took the initiative to use this gear and coincidently there was a Malaysian person who wanted to give money as a simple loan, one that can just be repaid afterwards without rent. Whoever would not jump at this opportunity? Although I knew this was prohibited, but if we are afraid we cannot go ahead. Eventually I took this chance, I took the*

> *trawlers and I operated in Indonesia. I thought it would be hard to do this but I believed I could do it. I observed that logging was illegal but it happened. So, what was wrong in trying to work with trawlers that were illegal? I just had no worries at that time and eventually I could bring in 13 trawlers from Malaysia. This happened between 2000 and 2004. The yields were okay. However, after we calculated the income that had gone to the Malaysian traders to whom we brought the fish, we certainly did not have much profit. There were still three vessels left out of 10 that I was given from Tawau. All the vessels were assumed to belong to me. Later, since I felt many prohibitions from the tightened rules, I then changed two vessels into purse seiners. I changed the fishing gear but the vessels and engines remained the same. I took the gear from Nunukan since I thought if I got them from Malaysia and sent it to Berau it would be very difficult. For that reason I assembled the nets (*pukat*) there in Nunukan instead of in Malaysia. If I would have them made in Malaysia and imported directly into Berau, how would I have managed? Surely, the process would have taken longer as it takes time to make the gear outside Berau and it needs time to deliver them here.* (Haji Nassir, Sambaliung 24.12.2009)

The interviews above are parallel with the issues of territorialisation and transborder marine resources. Visser and Adhuri (2010) discuss that the concept of transborder fishery shows the complex interactions of social, economic and political events and actions within particular institutional settings across regional and national boundaries or borders. The life histories of Haji Nassir above show that transborder fish trade between Malaysia and Indonesia enabled access to the rich coastal resources in Berau. It also shows that transborder resource trade is created by political networking between actors in two different countries and across institutions, including the political and administrative changes from centralisation to decentralization government systems.

3.9. Fishers' perceptions of their future

This section discusses fishers' perceptions regarding fishery income changes and its causes, and how fishers see fishing as their future livelihood. For that purpose I take the example of how a gill netter in Teluk Semanting sees the changes in fishery:

> *There are clear differences in annual catches. From one year to the next the difference is not so evident actually. But if we compare five years ago and today we really see the difference; it was better five years ago. However, for example from 2007 to 2008, the difference in the catch could not be seen as it was only*

little. When I first went fishing in the 1990s, fish were easy to catch. (Eswahyudi 22.05.2008)

Table 3.23 Perceptions of income changes in the last 5 years (N=97)

Type of fisher	Perception on income changes*						Total	%
	decrease	%	stable	%	increase	%		
Trammel netter	46	47.4	7	7.2	7	7.2	60	61.9
Mini trawler	10	10.3	4	4.1	3	3.1	17	17.5
Longliner	3	3.1	0	0	1	1.0	4	4.1
Gill netter	7	7.2	2	2.1	0	0	9	9.3
Crab catcher	5	5.2	2	2.1	0	0	7	7.2
Total	71	73.2	15	15.5	11	11.3	97	100.0

*Pearson Chi-square = 6.62 (not significant)

Table 3.24 Perceptions of factors causing income changes (N=97)*

Type of fisher	Perception of factors cause income changes						Total	%
	higher cost	%	decreased catch	%	lower price	%		
Trammel netter	46	34.6	21	15.8	21	15.8	88	66.2
Mini trawler	10	7.5	4	3.0	4	3.0	18	13.5
Longliner	3	2.3	0	0	0	0	3	2.3
Gill netter	7	5.3	4	3.0	4	3.0	15	11.3
Crab catcher	5	3.8	2	1.5	2	1.5	9	6.8
Total	71	53.4	31	23.3	31	23.3	133	100.0

*Multiple answers possible.

Fishers in Kasai perceive that the income changes they face are caused by the higher costs of production (53.4%) due to higher fuel prices in 2008 and higher gear prices. Some other fishers said that income went down due to a decreased catch (23.3%) and a lower shrimp price (23.3%).

Fishers in Kasai perceive their fishing income has indeed changed over the last five years. Most of them (73.2%) felt the income had decreased. Meanwhile some fishers (15.5%) remark their income remained stable, while others saw an increased income (11.3%). Fishing income went down, especially during the transition and southern seasons when they have a poor catch. A few fishers indicated that they might move out of fishing as their main livelihood (Table 3.25), probably to a pond aquaculture-based livelihood.

Table 3.25 Perceptions of fishing for future livelihoods of Kasai fishers (N=97)

Type of fisher	Fishing as future livelihood*				Total	%
	Yes	%	No	%		
Trammel netter	44	45.4	16	16.5	60	61.9
Mini trawler	10	10.3	7	7.2	17	17.5
Longliner	3	3.1	1	1.0	4	4.1
Gill netter	5	5.2	4	4.1	9	9.3
Crab catcher	6	6.2	1	1.0	7	7.2
Total	68	70.1	29	29.9	97	100.0

*Pearson Chi-square =3.099 (not significant)

Fishers believe that fishing is their future (70.1%) as they do not have any other main livelihoods. However, I got the impression that they actually want to be pond farmers as they perceive it earns better than fishing. However, in Kasai they do not have access to ponds as in this village there is little mangrove forest, and there are less ponds (*tambak*) than in Pegat Batumbuk.

3.10 Conclusion

In this chapter I have shown that there is no single livelihood in coastal Berau. I have presented the diversity of fishery-based livelihoods according to the five main gear classes as they are distinguished among the fishers in Kasai and Teluk Semanting, and applied in our survey. The everyday life of fishers shows not only that fishing is the main livelihood for coastal people but also that it is embedded in political-economic patronage networks between actors and across institutions as the result of values, interests and knowledge contestations. Fishing practices are influenced by the *habitus* of the Bugis hierarchy that generates the patronage network between the punggawa (boss or trader) and the dependent fishers and sometimes pond owners as his clients. Loans are provided by the punggawa who himself depends on the delivery of the produce; thus interdependency characterises the hierarchical power relation between punggawa and fisher. I also investigated the shrimp trade conducted between patrons. This is particularly interesting because relationships between patrons are seldom included in the discussion of patronage networks.

Livelihood trajectories of different fishers from various classes show that as social actors, whether rich or poor, they have the agency to search for better livelihoods. The patrons usually do not go out at sea, and much of the decision making is done by the dependent fishers on the boats. Changing fishing gear over a life time, taking a variety of fishing gear into the boat for a trip, dealing with the

seasons and having practical knowledge to access good fishing grounds in the rich coastal waters are important strategies developed by the fishers in Berau. Many of their social networks are not exclusive to fishery. In the next chapter we will see that they likewise apply to shrimp pond farmers.

Chapter 4

The everyday life of a pond

4.1 Introduction

In the previous chapter I showed the diversity and diversification of fisheries based livelihoods in the village of Kasai in the Berau delta. In this chapter the focus is on shrimp aquaculture (*tambak*) in the Berau delta, particularly in the village of Pegat Batumbuk. Several commonalities can be observed between shrimp fisheries and aquaculture. While for small scale fishermen wild white shrimp (*Penaeus indicus*) is the most significant species, the farmers in Pegat Batumbuk, whose livelihoods are based on pond aquaculture, cultivate primarily tiger shrimp *(Penaeus monodon)* and milk fish *(Chanos chanos)*, but they obtain an additional yield of the wild speckled shrimp (*Metapenaeus monoceros*) or '*udang bintik*'. The wild shrimp larvae[12] enter the pond through the sluice gate (see below) and grow up in the pond to be harvested. Another link between shrimp fishery and pond farming is that the role of the shrimp trader. Importantly, the trader buys both captured shrimps from fishers and cultured shrimp from pond farmers.

This chapter is about the multiplicity of livelihoods based on pond aquaculture in the coastal Berau. I will apply the concept of agency in presenting qualitative and quantitative data about how individual actors use their capacity to process social experience and to devise ways of coping with life, (Long, 2001: 16) even under relationships of dependency of patronage networks. There are four specific objectives. First, I want to capture the everyday practices of pond farming in the coastal frontier of Berau. Therefore I need to define a few terms relating to shrimp culture and briefly describe the general background of *tambak* development at different administrative levels and the need for a trans-sectoral, trans-national and trans-disciplinary approach to integrated coastal and pond development[13].

[12] Shrimp larvae was called seed while milk fish larvae was known as fry.

[13] Visser (2004; further elaborated in class, 2007) proposed the 3-T model to approach integrated coastal development (ICD) involving trans-sectoral decision making and policy development; trans-national resource appropriation and governance, and the need for a trans-disciplinary approach to ICD.

Secondly, I describe pond construction, why pond farmers excavate a pond of a certain size, how much they produce, to whom they sell their shrimp harvest, and how local knowledge is practised by the pond farmers in Pegat Batumbuk. It is important to realise that economic data on pond production do not differentiate between shrimps and fish or crab production (below). My aim here is to see to what extent different social actors have influenced tambak development in the delta, particularly the social interface between punggawa-engaged farmer, pond owner-caretaker, outsider punggawa-local farmer, trader-pond farmer and the phenomenon of inter-island patronage networks resulting in continuous translocal migration to Kalimantan from Sulawesi. It is important to explore the process of place making in coastal Berau by showing the dynamics of how social actors access coastal resources and the role of social relations in the process of identification of tambak. In section 4.3 I will show in particular how shrimp can be used to build a socio-political network between regional actors. Finally, in the last section I will describe what problems farmers identify affecting their income from shrimp culture, what factors determine 'good practices' in tambak culture, and how they perceive shrimp farming as a future livelihood.

A tambak is a salt or brackish water pond. As the term *tambak* denotes the singular as well as the plural, and the word is now internationally accepted to refer to pond farming in Indonesia, I will use it in this thesis as well. Hishamunda et al. (2009) translated tambak as a brackish water pond used for rearing herbivorous fishes. This definition evidently reflects a bias toward Java and its coastal ecology, as in Indonesia fish ponds were first built in East Java. We therefore need to be aware that tambak construction and production are place specific. Tambak in the coastal areas of Berau and generally in East Kalimantan are constructed to cultivate shrimp only or fish only (monoculture), or farmers can culture shrimp and fish together (polyculture). The main species reared in tambak are tiger shrimp *(Penaeus monodon)* and milkfish *(Chanos chanos*). In addition, after a culture period of two months, the farmer may open the sluice gate to let wild speckled shrimp larvae (*udang bintik*) come in and grow up in the pond.

Indonesia has a long history in aquaculture (Muluk and Bailey, 1996). It is hard to know exactly about the beginning of tambak culture (Brown and Prayitno, 1987), but it is generally believed that brackish water fish ponds had their origins on the island of Madura or in East Java (Schuster, 1952; FAO, 2009). Furthermore, Schuster (1952) reported, based on the information by the Regent of Sedaju to P.W.A. van Spall, the Inspector of Agriculture, that the first tambaks in Java were

constructed in 1780 near the mouth of the Solo River. Schuster (1952) also mentioned that tambak were a familiar phenomenon during the Majapahit era (around 1400):

> *"Another historical source is Raffles who, in his 'History of Java' (1817), states that the first tambak in East Java were built in the 15th century at the initiative of travelling teachers of Islam (Wali). However, Raffles does not give proof of this supposition, and the Javanese law code 'Kutara Menawa', supposed to have been written about 1400, provides earlier information about the tambak. In this lawbook punitive measures are laid down 'against those who steal fish from a fresh-water pond (*siwakan*) or a salt-water pond (*tambak*)'"* (Schuster, 1952: 4).

Since the 1960s shrimp as a commodity has played a crucial role in Indonesian export (Sano, 2000). Cribb and Ford write that the Indonesian government began to promote shrimp farming in the mid-1970s and to develop intensive farming techniques from the mid-1980s. In 1995 a catastrophic viral disease struck most of the shrimp farms, reducing production by 90 per cent, but production eventually resumed in southern Sumatra (Cribb and Ford, 2009: 9-10). East Kalimantan contributes significantly to the national shrimp export and has become one of the main producers nationally. In 1978, East Kalimantan reached the highest productivity of tambak culture in Indonesia accounting for 0,692 ton/ha and the production of shrimp alone was 0.146 ton/ha (Djuhriansyah, 1992: 102). Today, after the virus outbreak in the 1990s, shrimp pond productivity at national level averages 0.668 ton/ha. There is a large difference between the intensive technically advanced ponds in Sumatra, especially the province of Lampung which produced shrimp 3.99 ton/ha, and provinces like Aceh with 0.266 ton/ha, and East Kalimantan with 0.174 ton/ha, where mostly extensive ponds are found (MMAF, 2010a). In the coastal area of Indonesia intensive tambak culture is found in Lampung, East Java, Bali, Nusa Tenggara Barat and North Sumatera. Meanwhile extensive tambak culture can be found along the coasts of South Sulawesi, Aceh and East Kalimantan.

Shrimps are steadily seen as a superior product for national export. Nowadays the Government of Indonesia is actively promoting export production in this sector. According to the strategic plan of the Ministry of Fisheries and Marine Affairs Indonesia is pictured as the greatest producer of marine and fisheries products worldwide by 2015 (MMAF, 2010b: 28). For that reason Indonesia has

designed a National Shrimp Production Plan for the period 2010–2014 which has an initial production target of 400,300 tons consisting of 125,300 tons tiger shrimp and 275,000 tons of *Vanamei* shrimp in 2010, rising to a final target of 699,000 tons, 199,000 tons of tiger shrimp and 500,000 tons of *Vanamei* shrimp, in 2014 (MMAF, 2009; Sugama, 2011). It seems that the target was reached, since according to data tiger shrimp production at national level was 125,521 tons and *Vanamei* shrimp was 206,577 tons in 2010 (MMAF, 2011b). Tiger shrimp production contributed 12.7% to the total national tambak production (990,403 tons) while *Vanamei* shrimp 20.9%. The rest of the tambak production was made up of fish and crustaceans.

The extensive and intensive types of shrimp aquaculture in the coastal areas of Southeast Asia have recently been called the landscape approach and the closed system approach (Bush et al., 2010). Tambak farmers in East Kalimantan and Berau construct their ponds by applying a landscape or extensive approach. Djuhriansyah (1992) contends that tambak in East Kalimantan can generally be classified as primitive, extensive, semi-intensive and intensive tambak culture management based on the number of larvae[14]. However, today both in the Mahakam deltan and in the Berau delta we observe mainly extensive pond aquaculture. We follow Ilman, et al. (2009) by classifying them as traditional tambak (*tambak tradisional*). In Berau, traditional tambak farmers release the larvae or seed obtained from the hatchery into the pond, while some farmers use pesticide, calcification and fertiliser together others use them separately or in combination with one or two elements. Organic shrimp farming[15] is not practiced in East Kalimantan. The open access to sea water through the sluice gates at specific times, together with the practice of traders buying and selling shrimps of undifferentiated origin from both fishery and pond aquaculture, would make quality control quite impossible.

Polyculture apears to be preferred above monoculture of shrimps by coastal farmers in Berau. I surveyed 97 pond farmers in Pegat Batumbuk village (41% of all households, see Chapter 2). The sample was proportionally stratified according to the two main social-economic and political positions of caretaker and owner.

[14] In his book the author defines each classification as follows: (i) primitive management is tambak culture that does not use sell fry but relies on the tidal flow; (ii) extensive means it uses 1,000-5,000 milkfish fry/ha/year or 1,000-20,000 shrimp fry/ha/year for monoculture, and 1,000-3,000 milkfish milk fish fry/ha/year and 1,000-10,000 shrimp fry/ha/year; (iii) semi-intensive uses 5.000-20,000 milk fish fry/ha/year or more than 20,000-100,000 shrimp fry/ha/year for monoculture, and 2,000-10,000 milkfish milk fish fry/ha/year and more than 10,000 shrimp fry/ha/year; (iv) intensive management of shrimp uses 100,000-1,000,000 fry/ha/year.

[15] Some tambaks in Tarakan have been certified by Naturland (see Kusumawati et al., *forthcoming*).

The caretaker is a man who is hired by the owner to be responsible for the tambak operation. Usually there is an income sharing arrangement between the two (Section 4.3). The owner is a man who 'formally' owns one or more ponds which can be proved by his possession of the land through a so-called tillage letter *(surat garapan)* issued by the village head and approved by the head of the hamlet *(ketua RT)*.[16] During the survey I found that there were several different aquaculture practices, namely shrimp monoculture, fish monoculture, and shrimp-fish polyculture. Most respondents prefer to apply polyculture. A tambak caretaker in the hamlet of Lungsuran Naga explained why polyculture of shrimps and milk fish (*bandeng*) is beneficial:

> *If they (shrimp or fish) are cultured separately the food or plankton will be abundant, but it will appear and sink again and then become putrid* (busuk) *and cause the shrimps to become sick. So, to have* bandeng *in the pond here is important since they eat this food.* (Toha, Lungsuran Naga 5.02.2009)

Most tambak farmers in the survey (84.6%) in Pegat Batumbuk have chosen to apply polyculture (Table 4.1).

Table 4.1 Type of tambak culture by main positions in Pegat Batumbuk (N=97)

Main positions	Type of pond farmer*						Total	%
	Shrimp monoculturist	%	Fish monoculturist	%	Polyculturist	%		
Caretaker	6	6.2	1	1	32	33	39	40.2
Owner	7	7.2	1	1	50	51.6	58	59.8
Total	13	13.4	2	2	82	84.6	97	100

*Pearson chi-square = 0.319 (not significant)

4.1.1 Government data on tambak

Official data on tambak production are confusing and make proper analysis problematic for two reasons: because government statistics are based on a mixed harvest and trade of cultured shrimps and wild shrimps, and because pond production data are a merger between the volumes and prices of shrimp and fish or crustaceans. When we look at the data on production, either from national,

[16] I use 'formal' here because this letter is not recognised by the State (BPN) and ownership is not registered cadastrally.

provincial or district government statistics, we do not obtain a clear picture of which species are produced from the tambak. As mentioned earlier we know that farmers can develop their pond as monoculture or polyculture system, and in both cases they are also able to allow wild shrimp to come in. The same difficulty appeared with how data on tambak in Berau were presented. When I followed the field officer from the *Dinas*[17] and discussed the reported data on tambak production with the desk officers in Tanjung Redeb I found out that the data were not an accurate representation of the actual situation in the field. The field extension officer, who is very well informed, agreed that tambak data provided by *Dinas* underestimated the real production. According to him around 1,800-2,000 ha of tambak had been opened in Pegat Batumbuk. However, the fisheries office has a major problem, a lack of staff to collect these data and also a lack of budget, making it difficult to carry out this task. Table 2 shows, nevertheless, that tambak production has increased since 1999 according to the data at all administrative levels[18].

In the central government report (MMAF, 2006: 3) products from brackish water ponds or tambak can be divided into fishes and crustaceans, not only shrimps. In detail, tambak fish in Indonesia include river eel *(sidat)*, milk fish *(bandeng)*, mullet *(belanak)*, giant sea perch orbarramundi *(kakap)*, tilapia *(mujair)*, and java barb *(tawes)*. In addition, the cruataceans are black tiger shrimp *(udang windu)*, white shrimp *(udang putih)*, *metapenaeus* shrimp *(udang api-api)*, Metapenaeus Vanamei *(udang vaname)*, mysids *(rebon)*, swimming crab *(rajungan)*, seaweed *(rumput laut)* and mud crab *(kepiting)*.

Table 4.2 Tambak production (tons) at national, provincial and district levels (1999-2010)

Admin levels	Years											
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Indonesia	412,935	430,017	454,718	473,128	501,977	559,612	643,975	629,610	933,833	959,509	907,123	990,403
E.Kalimantan	7,187	7,551	11,136	11,304	11,311	16,728	26,978.2	21,828.2	27,305	28,194.7	31,689	53,326
Berau district	*21.9*	*27.5*	*52.2*	*68.2*	*92*	*134.7*	*162.7*	*218*	*309.3*	*304*	*309.2*	*314.4*

Source: DKP RI, BPS Kaltim, BPS Kabupaten Berau, DKP Berau.

The fisheries (*perikanan*) sector in Berau, including capture fishery and aquaculture, contributed about 3% per year to the total district economy during the period

[17] I use word *Dinas* to refer to the Fisheries and Marine Affairs Office of Berau district.
[18] It should not come as a surprise that there is a correspondence between the data, because data provided at district level is consequently used in the provincial and national statistics.

2000-2010 and contributed around 12-16% per year to the agriculture sector as a whole (Table 3). The strongest development performance is seen in the mining and quarrying sector *(sektor pertambangan dan penggalian*), together with the oil palm estate industry, which constitutes approximately 40% of the total Berau Gross Domestic Product (GDP). The Berau government does not see the fisheries sector as a prime economic sector to improve the regional income (PAD), particularly in the era of fiscal decentralisation (Hira and Parfitt 2004), this does not coincide with the national plan (above). Moreover, the Berau government planning (2006-2010) shows that tourism and agribusiness sectors are viewed as becoming leading sectors in improving the welfare of the Berau people.

Table 4.3 Contribution (million IDR) of the fisheries and aquaculture sector to overall development sector (C/A) and to the agricultural sector (C/B)

	Years										
Berau GDP	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All sectors (A)	2,185,151	2,235,822	2,358,134.4	2,456,196	2,520,957	2,649,726	2,784,277	2,943,042	3,089,404.38	3,273,202.77	3,690,404.41
Agriculture (B)	540,689.5	546,297.9	557,252.03	573,013.8	581,657.1	604,713.4	626,685	643,643	668,290.13	696,428.21	710,624.94
Fisheries and aquaculture (C)	67,041.63	68,571.91	71,371.48	73,909.75	75,641.72	77,910.45	85,466.22	90,337.79	99,520.01	110,804.52	118,064.11
Percentage (%) C/A	3.07	3.07	3.03	3.01	3.00	2.94	3.07	3.07	3.2	3.4	3.2
Percentage (%) C/B	12.4	12.55	12.8	12.89	13	12.88	13.63	14.03	14.9	15.9	16.6

Source: BPS Kabupaten Berau various years, GDP based on constant price year 2000.

According to the statistical data of Berau on aquaculture, tambak production contributes only 1.5% to the whole fisheries sector in Berau. However, this data may be confusing as there is no official data on tambak production for milk fish production and wild speckled shrimp (*bintik*) separately. However, from my interview with the shrimp trader in Tanjung Redeb I know that the CV. SIP Company collects around 15 tons of shrimp per month.

The presence of tambak in Berau was first recorded by the fisheries office in 1984, in this report the gross area of 22 ha is mentioned. There was no tambak production data at that time. However, I know from one of the key informants that in Kasai tambak have produced shrimp since 1983. I have collected tambak data on Berau production from 1984 to 2010, both recording the gross area and the net pond area. The gross area is defined as the tambak area, which is calculated

including the canals *(caren)* and the platforms that belong to the pond, while the net area is calculated on the basis of the effective waterways or canals where the shrimps live (see Figure 4.1).

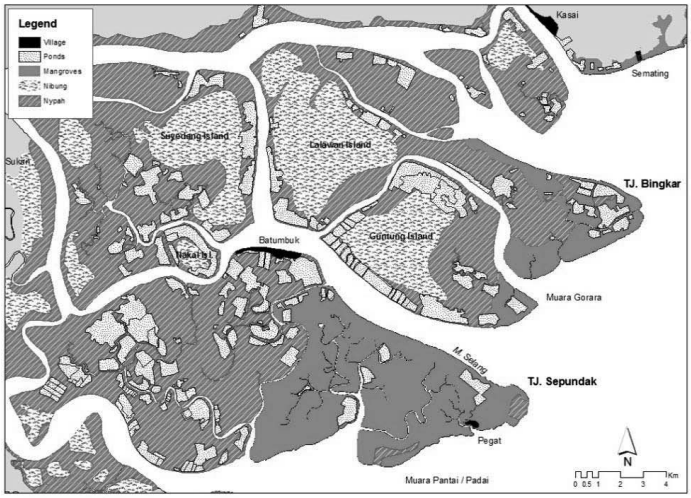


Figure 4.1 Tambak expansion in the Berau delta

Source: WWF Field Coordinator, 2010.

Table 4.4 shows that both production and the area covered by ponds have increased enormously over the last decade. The highest production (321.2 tons) was achieved in 2008, and 2010 had the largest tambak area (gross one 3,710.7 ha).

Table 4.4 Tambak area and production in Berau 1984-2010

Year	Production (ton)	Gross area (ha)	Net area (ha)
1984	nd	22	0
1985	nd	29	16
1986	nd	27	22
1987	nd	53.75	42.8
1988	0.87	57.8	45.9
1989	2.5	71	56.8
1990	3.7	71	56.8
1991	3.9	93.5	74.8
1992	4.7	98	78.4
1993	5.3	106	85
1994	8.3	117	93.6
1995	13.1	125	100

Year	Production (ton)	Gross area (ha)	Net area (ha)
1996	15	141	113
1997	16.8	162.5	130
1998	19	192	159.5
1999	21.9	295.2	236
2000	27.5	511.4	nd
2001	52.2	1100.7	698.7
2002	68.2	1147.5	670.1
2003	92	2100.3	nd
2004	134.7	3186.5	1616.6
2005	162.7	3480.3	nd
2006	218	3542.9	1917.4
2007	309.3	3564.8	1939.9
2008	321.2	3,542.9	1,765.6
2009	309.2	3,710.7	2,003.7
2010	314.4	3,710.7	2,003.8

Source: DKP Berau, various yearly reports.

The data on aquaculture include more than just shrimp production, and apart from brackish water ponds it also includes freshwater ponds *(kolam),* cages and mariculture (DKP Berau, 2010). Tambak, howevers, are dominant, contributing 64.9% to the total aquaculture production (Table 4.5).

Table 4.5 Aquaculture production in Berau (2010)

Aquaculture	Volume (tons)	Percentage (%)
Tambak	314.0	64.9
Freshwater pond	20.2	4.2
Cage culture	83.0	17.1
Maricultue	66.9	13.8
Total	484.1	100.0

Source: DKP Berau (2010).

Table 4.6 The area of mangrove conversion in Teluk Semanting, Kasai and Pegat Batumbuk

Location names	Type of conversion	Converted mangrove area (ha)
Teluk Semanting		
Teluk Semanting	settlement	4
	tambak	30
Sungai Sembilan	tambak	300
Pindu Kanan Kecil	tambak	8
Tanjung Ulingan	degraded mangrove area	5
Cela-cela/Jamban kera	degraded mangrove area	5
Kasai		
Muara Kasai	settlement	15
	tambak	20

Location names	Type of conversion	Converted mangrove area (ha)
	tambak (land cleared)	7.5
	coconut tree garden	1.5
	logyard	4
Pulau Badak-badak	tambak	40
	tambak (land cleared)	14
Pulau Tempurung	tambak	4
	tambak (land cleared)	6
Pulau Simon	tambak (land cleared)	2.5
Pulau Usiran and Selalang	tambak	140
Tanjung Bingkar	tambak	70
Pegat Batumbuk		
Pegat	settlement	3
	tambak	3
Batumbuk	settlement	5
	tambak	50
Muara Selang	tambak	45
Pulau Buntungan	tambak	210
Lungsuran Naga	tambak	150
Sungai Lungsuran Naga	tambak	130
Total converted mangrove area		1,272.5
Total tambak area		1,230

Source: Bestari (2002).

4.1.2 Tambak development and the coastal environment

Pegat Batumbuk is known as the best *tambak* production area in Berau. Another area is in Tabalar. During my visit to Berau I had the opportunity to visit Tabalar, at the southern end of the delta, and learned that pond farming had been abandoned because farmers were facing harvest failure, probably due to virus and low productivitiy.As a consequence, people have become more interested in investing in Pegat Batumbuk, both Berau people and recent migrants from Sulawesi started constructing ponds by cutting down Nypa palms (*nipa*) or mangrove trees with the use an excavator.

Table 4.7 Tambak area and production in the three villages in the Berau delta (2009)

Name of village	Area (ha)	Tambak dependent household
Kasai	243	30
Teluk Semanting	39	16
Pegat Batumbuk	825	85
Total	1,107	131

Source: Field officer database

Let us compare this data again with the survey data of 2002 by the local NGO, and with the GIS data from the WWF Field Coordinator, who had calculated that total mangrove area of Pegat Batumbuk was 31,000 ha, 4,642 ha of which was converted into tambak area divided among a total of 179 ponds (Sihaninenia, personal communication).[19] There was a big gap between different sources of the estimated tambak area in Pegat Batumbuk. If we use the data of 2002 from Bestari and 2010 from WWF then the increase of tambak development was 377% in the period of 2002-2010. Outsider traders (*punggawa*) from Mahakam delta reached the area to invest their money for tambak development such as Haji Rusli and his relatives (Section 4.3).

Mangrove land as a social-political arena

Access to mangrove forest is facilitated by the Village Head. Interestingly, the village head is acting as a middleman working for the owner of the excavator. He always welcomes and offers outsiders who are interested to invest in tambak in his village. Villagers are also eager to invite people, especially outsiders who come to Pegat Batumbuk, including myself when I was there. I was asked by Ali, the son-in-law of Padang (see Section 4.2.1) to invest in tambak development. He said that if I agreed to join then the initial cost I should pay would be IDR 36 million per a 10ha pond, which was calculated to be half of the tambak construction costs. The rest of the expenses could be paid after the harvest. Ali explained that he knew a good area for opening a pond. In addition when I interviewed Suryadi of CV SIP he told me that to get access to one land parcel or *kavling*[20] in Berau someone has to pay IDR 250,000 per plot to the village and then receive a *surat garapan* (tillage letter) signed by the Village Head.

There was a difference in perception between the farmers and the institutional actors about the status of mangrove forest, particularly in the delta. When I held Focus Group Discussion in the house of Padang, that was attended by tambak farmers, the Village Secretary and the field Extension Officer, I found that pond farmers and village staff did not know the status of the mangrove forest in the Berau delta. However, they recognise the coastal area around Tanjung Batu as a Marine Protected Area. During the FGD we discussed topics including how

[19] Sihaninenia, A. from WWF-TNC Berau presented this data based on satellite image, during the local stakeholder meeting of the RESCOPAR project in Tanjung Redeb, early 2010.
[20] From the original Dutch word *verkaveling*. 1 *kavling* or plot is a 10 ha of (mangrove) land

farmers developed tambak and where they have converted mangrove into ponds in the village. We created a participatory map showing which areas were opened into tambak (Figure 4.2).

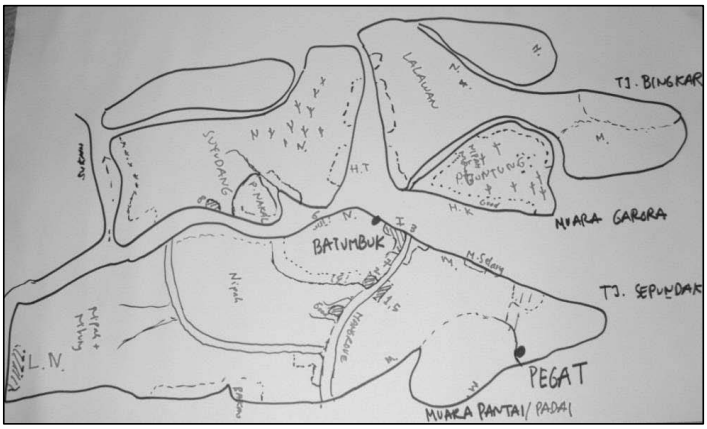


Figure 4.2 Participatory map created during FGD in Batumbuk (23.10.2009)

As I was eager myself to know more about the status of the mangrove forest of Pegat Batumbuk, I obtained a map from the Berau Regional Planning Board (*Bappeda*) that indicated the mangrove areas in Pegat Batumbuk recognised as Protected Areas (KL, *Kawasan Lindung*). There are two protected areas in the delta, one for Nypa and the other for mangrove. Zulkifli, the representative of the Forestry Office in Berau, once questioned the Fisheries Office during our RESCOPAR project's stakeholder workshop in February 2010, as to why tambak are operated in the mangrove forest that in fact belongs to the KBK *(Kawasan Budidaya Kehutanan)* or Forest Reserve Area, while the Fishery staff allows people free access to the forest to construct ponds. There is an on-going strife between the Forestry and the Fisheries Office (*Dinas*), and the staff of the former institution again challenged the performance of *Dinas*, the Joint Secretary of Berau MPA (*Sekber*) and the Coordinating Body of the Marine Conservation Area (*Badan Kolaborasi*). I know from the field Extension Officer that the *Dinas* has never issued tambak permits in the mangrove forest. However, the office does receive taxes from the pond owners and shrimp/fish traders, which creates the impression that the *Dinas* does indeed officially hand out permits to open tambak in the Forest Reserve (KBK).

Given these conditions, the Nypa and mangrove forests in the Berau delta can be regarded as a social arena. Arenas are social locations or situations in which contests over issues, resources, values, and representations take place (Long, 2001: 59). It seems there are different views held by the secretary and the village head, local farmers, outsiders, including the government. When I was in Batumbuk the Village Secretary said to me that it was unfair when the Village Head gave outsiders from Samarinda 100 ha of mangrove land but the villagers themselves were entitled to only 10 ha of mangrove land. The power of the village head is used for tambak expansion in Pegat Batumbuk which may serve his political-economic position, but at the expense of ecological deterioration or demise, since mangrove or Nypa forests are rapidly disappearing. The interview below with the village Secretary of Pegat Batumbuk gives an example of the contestation of mangrove:

> *(We) have known about the prohibition for some time, but the government can only urge, but take no action. Let us take the aquaculture regulations which formalise one certificate for a tambak of 2 ha. My tambak is 30 ha, and how many certificates do I have? Even outsiders have 100 ha. The regulation issued by* pak Camat *(Subdistrict Head) is that the size of a pond should be is 200 x 100 meters, if it is more than that then it cannot be issued. There is the signature from head of the RT, the village head, and if forest land is transferred the* Camat *need to sign.* (Haji Wadi, 24.10.2009)

4.1.3 Pond construction

The tambak design in Berau is believed to be different from the one in Java, where no canals are used and the pond consists of just one excavated area of the same depth. The farmer in the Berau delta digs a canal *(caren* or *parit)* along the edges of the pond of approximately 20 per cent of total pond area. They can only use the canals for shrimp culture as the centre (*pelataran*) is not cleaned of the uprooted Nypa (*Nypa* palms) and mangrove trees, that are slowly rotting away producing a eutrophic environment that is harmful to the shrimps. An old tambak farmer in Kasai said to me:

> *"It is better if the pond is cleaned, if so then shrimps very often grow faster. If the pond is cleaned of roots and trees then there will be more oxygen for the shrimps"* (Haji Singkong, 15.05.2008)

During the Focus Group Discussion held in Pegat Batumbuk on 24th October 2009 I was informed how farmers design the layout of the tambak. He opens the tambak by making a 10 ha pond of 200 metres wide and 500 metres long. It has only one sluice gate. The width of the canal or *parit* is 7 metres and the depth, at the lowest point of the pond, is 1m. The construction of the tambak in Pegat Batumbuk is slightly different from tambak built by farmers in the northern part of East Kalimantan mainly in Tarakan (Figure 4.3a).

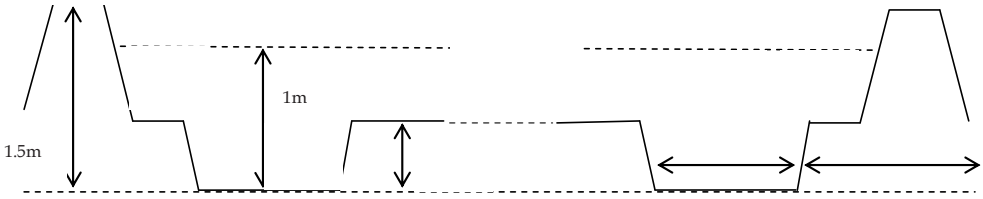
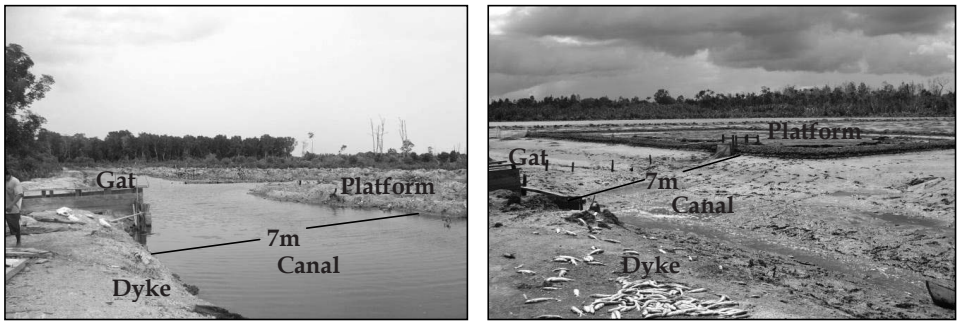


Figure 4.3a Horizontal profile of tambak in the northern part of E. Kalimantan (Ilman et al., 2009)



(a) Pegat (b) Batumbuk

Figure 4.3b Horizontal profile of tambak in Pegat Batumbuk

Generally there are some technical steps that need to be taken first during the preparatory stage to develop and manage the tambak, including the initial construction to build and clean the *parit* (canal) and *pematang* (dyke) around the pond and the higher platform in the middle. This is followed by the preparation and drainage of the land, pest control, calcification, fertilization, shrimp or fish

seed release, the addition of supplementary feed, and the management of the water quality and the harvest.

In Berau the tambak are constructed on the coastline in the mangrove-and-Nypa zone. This makes sense from the perspective of the spatial distribution of land and ethnicity. More inland the land is owned by indigenous Dayak people, while the coastal people opening tambak are usually overseas migrants. Thus, in the Nypa-mangrove environment, especially of the Berau delta, the mangrove forest and Nypa palms need to be excavated to make place for the tambak. Farmers prefer to have ex-Nypa land rather than mangrove forest (*Rhizophora* or *Avicennia*) because the Nypa trunks can be more easily grasped by the excavator, and the remainder of its roots in the pond will quickly rot away and dissolve in the pond. On the other hand, according to farmers it takes more than 5 years for uprooted mangroves to decay and disappear. The slow cleaning up or decaying process of mangroves can affect the success of the shrimp harvest for years, as after the opening up and cleaning of the pond, the farmers said it takes about 3-4 years before the shrimp larvae and fish seeds are ready to be released.

The owner of the *be'ko* or excavator machine is therefore a key actor. The land clearing permit of 'tillage letter' comes from the village head to access the land, whether the applicant is an original member of the village or an outsider. The permit issued by the village head secures access to 2 ha, i.e. 200m x100m, following the national regulation of the National Land Authority (BPN, *Badan Pertahanan Nasional*). Once such permit is acquired for 2 ha, the Village Head of Pegat Batumbuk extends the permit for pond farmers who wish to occupy 200m x 500m plots, that is 10 ha to, covered by the same *surat garapan*. This permit is issued by the village head, after approval by the hamlet head (*ketua RT*), as they are interested in attracting more people to develop aquaculture. The clearing permit is officially valid for three years, but in practice its validity is often taken for granted and the land access title is taken to be valid during a life time, and can even be inherited. The owner of the land clearing permit can proceed to secure the status of this land by acquiring a letter of inalienability of the land (*surat pelepasan lahan*) issued by sub-district head (*kepala kecamatan).* The next step would then be that he can apply for a land ownership certificate (*sertifikat hak milik*) that is issued by the National Land Authority (BPN).

A tambak farmer in Teluk Semanting explained why the pond farmers prefer to have a big aquaculture area, and why their strategy in coastal Kalimantan differs from making a tambak in their original place in Sulawesi. The prime reason is that

by excavating mangrove-Nypa forest for an aquaculture pond of 10 ha, they obtain a land clearing permit that allows them to open much more land, and extending their pond area this then becomes a way to lay claims to land which is amply available in the Berau delta. In other words, pond farming is a land acquisition strategy for newcomers, as much as it is a strategy for the village head to increase the number of inhabitants.

In addition, my survey data (Table 4.8a/b) shows that most respondents manage the pond from more than 5 ha (50.5 %) and even more than 10 ha (24.7), which accounts for a total of 82.5% of the pond farmers who have extended the acreage under their land clearing permit. Another interesting conclusion from this table is the difference between caretakers and owners. Evidently most caretakers work on the larger pond areas (19.6 % on any acreage above 5 ha), while the majority of the pond owners (30.9%) have 5-10 ha land available for pond development. But we may need to keep in mind that only 25% of the total excavated area of the village was effectively in use as a shrimp pond.

Table 4.8a Tambak area by main positions of pond farmers (N=97)

Main positions*	Tambak area						Total	%
	0 – 5 ha	%	>5 – 10 ha	%	> 10 ha	%		
Caretaker	1	1	19	19.6	19	19.6	39	40.2
Owner	16	16.5	30	30.9	12	12.4	58	59.8
Total	17	17.5	49	50.5	31	32	97	100

*Pearson Chi-square =14.105 (very significant at α = 1%)

Table 4.8b Tambak area by main type of pond (N=97)

Main type*	Tambak area						Total	
	0 – 5 ha	%	>5 – 10 ha	%	> 10 ha	%		%
Shrimp monoculturist	2	2.1	5	5.2	6	6.2	13	13.4
Fish monoculturist	0	0	1	1	1	1	2	2.1
Polyculturist	15	15.5	43	44.3	24	24.7	82	84.5
Total	17	17.5	49	50.5	31	32	97	100

*Pearson Chi-square = 2.055 (not significant)

Shrimp and fish are cultured in monoculture or polyculture system. In Table 4.8b we see most of respondents (84.5%) apply the polyculture one. Within shrimp monoculture farmers manage more than 10 ha (6.2%), while fish monoculture farmers work both in the areas of >5-10 ha and >10 ha. Furthermore, in polyculture group tambak farmers are mostly in the >5-10 ha (44.3%) range.

Generally pond farmers are immigrants from Sulawesi (Table 4.9). The village head confirmed that almost all village members are Bugis. They have migrated to Berau because of the availability of mangrove-Nypa forest, which they assume is open access land. They are only interested in opening a tambak if it is 10 ha or more. When Buginese people open a tambak and they think it too small, they will say *becu*[21]:

Table 4.9 Ethnicity of pond farmers (N=97)

Main positions*	Ethnicity background*				Total	%
	Bugis	%	Non-Bugis	%		
Caretaker	34	35.1	5	5.2	39	40.3
Owner	58	59.7	0	0	58	59.7
Total	92	94.8	5	5.2	97	100.0

*Pearson Chi-square = 7.84 (very significant at α = 1%)

Before tambak were introduced by outsiders, people in Batumbuk were mainly fishers using shrimp traps (*togo*) and gill nets. The following sections describe the aquaculture based livelihoods of the people of Batumbuk. Almost all (85 out of 125) households in Pegat Batumbuk are involved in tambak culture, and all pond owners are of Buginese origin. Only 5 per cent of the caretakers are of Javanese origin.

It is clear that the social actors are very cleverly strategizing with tambak development in Berau. The pond areas were first opened by Sulawesi immigrants who were skilled in tambak, although I also visited pond caretakers in Batumbuk whose backround was Javanese.

> *Bugis people, wherever they are, are tough at a start, because that is how they are formed by their cultural history, and they work hard until they can see the output of their tambaks (*Suleman, Teluk Semanting 23-05-2008*)*

From the life histories of these social actors it can be seen that Berau delta as frontier area is an open space for Buginese immigrants. They access the coastal area to open a pond as they did in Sulawesi. Just like the mangrove and Nypa above, the ponds also become a social arena as actors negotitate, cooperate and contest their different interests.

[21] The Buginese word of *becu* was explained by the former field officer in Tanjung Batu, who is Buginese himself, when the RESCOPAR stakeholder meeting took place in Tanjung Redeb in 2009.

4.2 Everyday practices of tambak farming

This section is about tambak based livelihood in Berau. I will present how farmers make a living from ponds in the Berau Delta. Pegat Batumbuk is a village where most of *petambak* or tambak owners in Berau constructed their ponds. This village consists of two hamlets, i.e. Pegat and Batumbuk. Most tambak were opened in Batumbuk while *terasi* (shrimp paste) making and shrimp trap (*togo)*[22] fisheries are common in Pegat.

Tambak enterprises in Berau may have started in the 1980s in Kasai and Tabalar followed in the 1990s. Tambak production was firstly reported by Dinas in 1988, which then accounted for 0.87 ton. Tiger shrimp culture significantly increased in the period 1997/98 when the Asian economic crisis hit Indonesia. Since the Indonesian rupiah was undervalued against the USD it affected the much higher price of tiger shrimp which was exported abroad. The distributional pattern of tambak development in the Berau delta is from Tabalar in the south, shifting to Pegat Batumbuk in the north. According to the interviews most tambak were developed in Kasai and Teluk Semanting in 1997 and later reached Tanjung Batu.

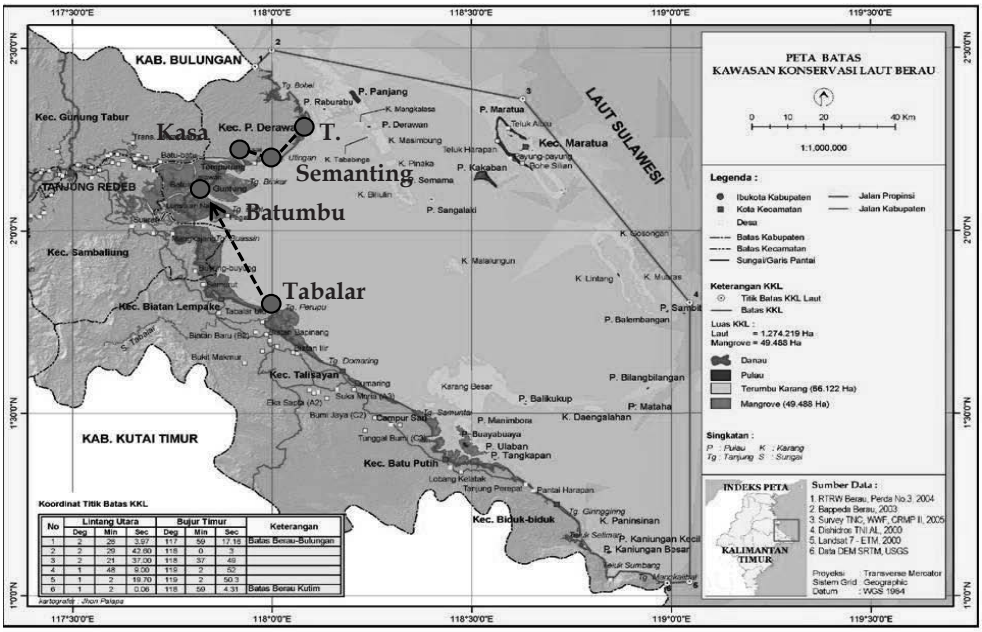


Figure 4.4 Historical distribution of tambak development in the Berau delta

[22] Togo is a stationary fishing gear that can trap shrimps through water tidal changes.

According to my informant in Kasai, Haji Singkong (80 years old), who is known as the oldest pond farmer, the first tambak was opened in Kasai in 1983. I interviewed him with assistance from his son-in-law who translated his Bugis language into Indonesian, since Haji Singkong[23] could only communicate in his mother tongue. I knew that he had family relationships with the big punggawa Haji Abu in Samboja, Mahakam delta, and that he cooperated with some punggawa in Anggana (in the province of Kutai). Pond farmer Padang in Batumbuk acknowledged it was Haji Singkong who had encouraged him to open a pond himself (see above). When I met with Haji Singkong he said that it was true that Padang had once worked for him in Kasai before he opened a tambak in Batumbuk, which is a nice example of how practical skills and knowledge about pond farming are transmitted by actors across villages within the same coastal community in the Berau delta.

4.2.1 Livelihood trajectories

In this section I will show livelihood trajectories of different actors who have created aquaculture based livelihoods in Berau. First I will provide the life history of a caretaker who migrated to Berau and takes care of tambak operation in Pegat.

> *Before coming to Pegat Asman (34) was a migrant worker (TKI) in Malaysia. He was born in 1973 in Bone, South Sulawesi. Since he was 5 years old he has been in Malaysia following his parents who were workers too. He worked for the Pamol Plantation Company in Sandakan Sabah Malaysia, as he could afford to pay working guarentee to the Malaysia Government. Then in November 2004 he resigned and moved out to Nunukan and Tanjung Redeb. In the latter city he first worked in the field of forestry to look for* kayu *(wood)* blambangan *and then changed to be* bagan *(lift net) fisher. After two years he was contacted by his friend, Haris, who was a caretaker in Pegat. Haris suggested he applied for the position of caretaker . Around April 2006 he arrived in the Pegat hamlet and worked as tambak caretaker for Haji Aco together with Haris. Together they managed three ponds of 10 ha each., belonging to Haji Aco's tambak in Pegat. He has experienced two harvest times; one harvest lasts three or four months. Both harvests were good. Asman received 20% of the net income of tambak and the cost of living was paid by the owner. Asman has got a wife and two children living in Sulawesi. The wife worked for the cake and bakery shop there. Asman sent money IDR 3*

[23] Haji Singkong died early 2010.

> *million to his family after the first harvest. During that period 800 kg was harvested from two ponds; 400 kg from each pond, the rest of the pond was not harvested. (*caretaker, Pegat, 28-01-2008*)*

Furthermore, it is important to know the livelihood trajectory of a pond owner as well. Below I describe the case of the oldest farmer, Padang, in Batumbuk. At present Padang is head of Batumbuk hamlet and at the same time was appointed as head of Pokmaswas, a village group of resources surveillance (see Chapter 6) in the Pegat Batumbuk village.

> *Padang was born in Bone, South Sulawesi, in 1955. He came to Batumbuk for the first time on 18th May 1977. There he learned to fish using gill nets. This activity only lasted one year as he could not maintain himself by fishing as he was constantly seasick. Arsyad, his boss, granted him a loan for* senangin *fishery. Padang subsequently moved on to trapping shrimp (*togo*) as someone from Lombok, a shrimp paste (*terasi*) buyer, helped him raise the money to use the trap or* togo *of the owner. He started to manage a tambak in 1988 as he was inspired by Haji Singkong (see Chapter 3) in Kasai. Once Haji Singkong said to him: 'You will feel disappointed if you do not open a tambak'. He then manually prepared land for two years and waited for the roots to decay. He started with a pond of 2 ha and currently has 20 ha. The main species cultured in his tambak is tiger shrimp and he can collect* bintik *shrimp after 1.5-2 months of culture. Shrimp seeds came from Tanjung Batu, Samarinda and Surabaya. In his 10 ha pond area he puts 150,000 tiger shrimp seeds. The survival rate, according to him, is 30% of which he can harvest 4 or 5* pikul (400 or 500 kg) *per pond.* (Padang, Batumbuk, 28-01-2008)

Some tambak farmers in Berau started as shrimp trappers (*togo*) in the coastal waters. The life histories of Haji Singkong (Kasai), Haji Ambo Nae (Batumbuk) and Bastian (Batumbuk) involved capture fishery before starting pond farming. In both shrimp and fish culture there is a period of several months before harvesting, so meanwhile they continue to fish for their daily livelihood. In other words, pond farming may be seen as the dominant livelihood and identity marker, but it does not mean that the farmer does not fish anymore at the same time. Bastian, a farmer in Batumbuk for instance, goes to sea between November and March to capture mackerel (*tenggiri*). He believes that fishing only generates enough income to buy

food but nothing more (see also 4.3.2 for more economic data). But by engaging in pond farming he earns a bit better *(lumayan)* he says:

> *I go fishing almost every day. When it is* air besar *(high tide) I go to the tambak. I just came back from a fishing trip yesterday. So, within one month there are two high tides and one* air mati *(dead tide). At the moment it is* air mati*, there is no current so I do not go fishing.* (Bastian, 6.02.2009)

Tambak farmer Padang used to be a shrimp trap fisher before he decided to open a pond in Batumbuk. He said:

> *I see that the people who own one or more ponds do not always work the same as in other professions. If you let the sea water come into your tambak then you can always expect something, such as wild larvae, to enter the pond. In other words, even if the tambak is not filled with seeds from the hatchery, it can still be expected that wild specimens will come in to be harvested later* (Padang, 30.01.2008)

The qualitative explanation of these two men is supported by the quantitative data from the survey showing that 50% of the total number of respondents was formerly fisher. It is important to know that fishermen see tambak as being better for the future. However, they can still go fishing for daily needs and operate ponds at the same time.

Table 4.10a Fishing as a former livelihood by main positions (N=97)

Main positions	Former fisher*				Total	
	Yes	%	No	%		%
Caretaker	10	10.3	29	29.9	39	40.2
Owner	38	39.2	20	20.6	58	59.8
Total	48	49.5	49	50.5	97	100

*Pearson Chi-square =14.834 (very significant at α = 1%)

Table 4.10b Fishing as a former livelihood by type of culture (N=97)

Type of culture	Former fisher*				Total	
	Yes	%	No	%		%
Shrimp monoculturist	7	7.2	6	6.2	13	13.4
Fish monoculturist	2	2.1	0	0	2	2.1
Polyculturist	39	40.2	43	44.3	82	84.5
Total	48	49.5	49	50.5	97	100

*Pearson Chi-square =2.262 (not significant)

4.2.2 Practical knowledge

Knowledge is constituted by the ways in which people categorise, code, process and impute meaning to their experience (Long, 2001:189). Pond farmers obtain their knowledge about tambak mostly from practical experience acquired by working for tambak owners, and through information from friends or bosses (Table 4.11). It is generally believed that farmers know how to cultivate shrimp or fish in aquaculture by duplicating the model from South Sulawesi (Ilman, et al., 2009). Pond expansion in the Berau delta only happened after the arrival of Haji Kahar from 'outside' the village. People always remembered that his pond could harvest 2.5 ton of shrimps, worth IDR 1 billion in one season (Focus Group Discussion, 2009). This successful harvest achieved by an outsider has inspired the villagers who were engaged in trapping wild shrimps and capture fisheries to move out of the sea into an aquaculture based livelihood.

Table 4.11a Source of tambak knowledge by main positions (N=92)

Main positions	Source of tambak knowledge						Total	%
	TV	%	extension	%	friends/boss	%		
Caretaker	5	5.4	3	3.3	29	31.5	37	40.2
Owner	20	21.7	4	4.4	31	33.7	55	59.8
Total	25	27.2	7	7.6	60	65.2	92	100

*Pearson Chi-square = 5.194 (not significant)

Table 4.11b Source of tambak knowledge by type of culture (N=92)

Type of culture	Source of tambak knowledge						Total	%
	TV	%	extension	%	friends/boss	%		
Shrimp monoculturist	5	5.4	0	0	7	7.6	12	13
Fish monoculturist	2	2.2	0	0	0	0	2	2.2
Polyculturist	18	19.6	7	7.6	53	57.6	78	84.8
Total	25	27.2	7	7.6	60	65.2	92	100

*Pearson Chi-square = 8.05 (not significant)

Just as it is commonly practiced in coastal fisheries in Berau, tambak farmers also manage their ponds based on the lunar calendar which includes *nyorong* and *konda* tides similar to local fishermen practices (Chapter 3). This periodisation determines the times for releasing seeds into the pond, renewing the water, harvesting the adult shrimps, for repairing the tambak and even for letting the pond rest. It means all pond-related tasks are done following the traditional knowledge of a shrimp management scheme (Ilman, et al., 2009).

4.2.3 Shrimp production from tambak

'Batumbuk is the greatest supplier of shrimp in Berau,' (Suryadi, Tanjung Redeb, 12.02.2008). Suryadi is the representative of the Surya Indah Perkasa (SIP) company in Tanjung Redeb, a shrimp buyer based in Balikpapan. SIP plays an important role as most of shrimps, both from tambak and capture fishery in the district, are bought by this company. SIP has been working in Berau since 1998, collecting and buying shrimps from the tambaks in Batumbuk, Tabalar, Padai, Semerah, Sungai Labu and Batu-batu.

It takes 3-4 months to rear the small shrimps. If the survival rate is 30% then, according to one farmer they can harvest around 4-5 *pikul* per pond, which equals 400-500 kg per pond. The shrimp sizes may start from 20[24], 30, 35, 45 or 55 depending on stocking density and management. A pond of 10 ha can be filled with 150,000 shrimp seeds or larvae and 20,000 fish seeds. Some respondents during the survey confirmed that they released 100,000 shrimp seed (*benur*) and 50,000 fish fry (*nener*). In Teluk Semanting one caretaker said that he had released 25,000 of shrimp seeds, and 3,000-5,000 fish seeds, of which he once harvested 1 pikul[25] of *udang windu* and 6 pikul of *bandeng* in his 1ha pond.

[24] The size of the shrimp used in the harvest is indicated by the number of shrimps that fit in one kg For example size 20 means a calculation of 20 shrimps in 1 kg.

[25] 1 pikul = 100 kg

When we visited Haji Aco's tambak in Batumbuk in 2008 it was clean of Nypa. I talked to Asman, the caretaker, to find out what had happened. He told me that in the last nine months since he came there the shrimps and fish had been harvested twice. It is a polyculture tambak in which the stocking density for tiger shrimp is 150,000 and for milk fish 10,000-20,000 in a pond of 10 ha. Seeds came from Tanjung Batu and Tarakan. In this pond he collected 4 *pikul* or 400 kg in the first harvest and 7 *pikul* or 700 kg in the second harvest three months later. Most shrimp was size 30 and 35. In addition milk fish yielded between 300-500 kg.

Inquiring about real costs and expenses is not an easy task. Many pond owners are reluctant to share their 'secret', some caretakers know well about prices and cost for seed, pesticide, etc. but may not have the overall picture of investments by the owner. Also, they would not find it appropriate to answer the question about income because they do not own the pond.

Tambak investment means the expenses allocated by farmers to buy mangrove land and construct it into pond which is calculated for IDR 70,000,000 per ha. A 10-ha pond is common in Pegat Batumbuk. Tambak inputs consist of seeds and or fries, fertilizer TSP and urea, and pesticides. Total net income (balance) is defined as total revenues less total expenses. So we have two total net incomes, namely one after and one before investment has been deducted. Net income after investment is calculated from the difference between total revenues and total expenses including investment, whereas the net income before investment is obtained by deducting total expenses excluding investment from total revenues.

Table 4.12 Average expenses and revenues of tambak owners per harvest

Items	Quantity	Price per unit (Rp)	Total (IDR)
Expenses			
tambak construction (investment)	10ha	7,000,000/ha	70,000,000
shrimp seed	110,000	35	3,850,000
fish fry	40,000	80	3,200,000
fertilizer			
- TSP (kg)	50	2,400/*kg**	120,000
- urea (kg)	100	1,500/*kg***	150,000
pesticide (*tiodan*)	2	180,000/bottle	360,000
Total expenses			
including investment			77,680,000
excluding investment			7,680,000
Revenues			
shrimp production (kg)	75	91,000	6,825,000

Items	Quantity	Price per unit (Rp)	Total (IDR)
milkfish production (kg)	800	10,000	8,000,000
Total revenues			14,825,000
Total net income (balance)			
after investment			-62,855,000
before investment			7,145,000

Note: *= IDR 120,000 per bag of 50 kg; **= IDR 75,000 per bag
Source: survey 2010; Data was provided by respondent no. 16[26]

Data on estimated farmer income as given above are from tambak owner respondent no. 16 (see appendix). We see in Table 4.12 total net income per crop season without investment was calculated at IDR 7,145,000 (USD 752.1) and total net income after investment per season (less the expense of tambak construction) has a negative balance of IDR -62,855,000 (USD -6,616.3). If the revenue of tambak production remains the same per season and it is assumed that 1 year has got two seasons, then the payback period will be 10 seasons or 5 years.[27] So tambak's net income in Pegat Batumbuk may return the investment in 5 years.

I have also tried to calculate the harvest rates of the tambak yields of tiger shrimp, milk fish, and speckled shrimp during the two surveys of 2009 and 2010 in Pegat Batumbuk. The measurements I used to determine tambak production were the mean, standard variation and range[28]. In 2009 the average production of tiger shrimp was 10.94 kg/ha and it increased slightly to 11.48 kg/ha in 2010. Speckled shrimp increased from 2.96 kg/ha in 2009 to 3.87 kg/ha in 2010. On the other hand, milk fish went down from 75.65 kg per ha in 2009 to 63.12 kg/ha in 2010. It can be said that the variations among farmers' production were high as the standard deviation values were more than the mean (milkfish) and close to the means (tiger and speckled shrimps). The mean, standard deviation and range values of tambak production during the surveys of 2009 and 2010 are shown in Table 4.13. Data calculated in Table 4.13 were derived from one harvest in 2009 and one in 2010. The same was applied for both surveys where one season lasts around

[26] Respondent no 16 was Jamain who has a 10 ha pond in Batumbuk. Data in this table is based on his harvest on July 2010.
[27] Payback period here is meant how long net income can return the initial investment.
[28] It is useful to give the mean, standard deviation and range to see the average and variations among farmers' production. The mean is one of most widely used measures of central tendency. Here the mean or the average is defined as the sum of the individual values of tambak production divided by the number of total respondents. The standard deviation is a measure of how much the values of production vary from the mean values. The range indicates minimum and maximum values of tambak production (Bernard, 2002).

3 months. We interviewed the same farmers for 2009 and 2010 to find out their tambak production variations. Surveys were held in May 2009 and August 2010.

The three measurements above improved the information from different sources The mean shows the average production of different harvests achieved by farmers. However, the information is not enough since we need to know the variation of those productions by indicating the minimum and maximum values of production. It shows that during the survey of 2009 only 9 out of 45 farmers (20%) and 10 out of 45 farmers (20.2%) produced all three commodities at the same time.

Table 4.13 Mean, standard deviation and range of harvests in the surveys of 2009 and 2010 (N=45)

		Tiger shrimp[29] (kg/ha)		Milk fish (kg/ha)		Speckled shrimp (kg/ha)	
		Mean (SD)	Range	Mean (SD)	Range	Mean (SD)	Range
Survey (2009)	1	10.94 (10.49)	0-43.5	75.65 (207.94)	0-1000	2.96 (5.58)	0-20
Survey (2010)	2	11.48 (9.64)	0-44.25	63.12 (128.63)	0-681.82	3.87 (5.61)	0-25

I further calculated the gross revenue of tambak organisation per ha in Pegat Batumbuk for the harvests in 2009 and the one in 2010. Table 4.14 shows that the avarage revenue in 2010 (USD 193.01) is larger than that of 2009 (USD 173.46). The range between the individual revenues also varies as in the survey for 2009 I found that the minimum revenue of tambak farmers was USD 1.16 and the maximum USD 936.84. The same calculation was done for 2010 where the minimum was USD 39.47 and the maximum was USD 899.04.

The results show there were big differences in the gross revenue among farmers as showed by the standard deviations[30]. In detail, we see data from 2009 in which one farmer only had a gross revenue of USD 1 . He had very low productions in both milkfish (6 kg per 10 ha) and wild shrimp (2 kg per 10 ha) and had no tiger shrimp harvest. For the overall picture I see that even though the mean (average) gross revenue is relatively good (USD 173 per ha in 2009 and USD 193 per ha in 2010) the range varied greatly. The range shows (2009) that on the

[29] I arrange the sequence as follows: shrimp (main cultured target), milk fish (cultured target) and wild speckled shrimp (captured wild shrimp as sideline harvest)

[30] The different gross revenue resulting from tambak was great. This is because the standard deviation in the survey 2009 (USD 194) was more than the mean (USD 173) and in 2010 it was close (USD 182) to the mean (USD 193).

one hand one farmer had only USD 1 for his harvest while on the other hand the other farmer had USD 936 from tambak. The same situation also applied in 2010 since the difference in the gross revenue among the farmers were so great.

Based on the results shown in Table 4.14 I contend that the variations of tambak revenues were caused by the different harvests of cultured species (tiger shrimp and milk fish) and captured wild shrimp (speckled shrimps) produced by farmers. From the 2009 and 2010 surveys it also shows that among the farmers the revenues achieved from tambak were greatly varied for shrimp alone, as well as between revenues from the different commodities. The varied revenue resulting from tambak affects the farmer's livelihoods.

Table 4.14 Average gross revenue from harvests in the 2009 and 2010 surveys (N=45)

	Gross revenue (IDR/ha)		Gross revenue (USD/ha)*	
	Mean (SD)	Range	Mean (SD)	Range
Survey 1 (2009)	1,647,876.75 (1,845,378.68)	11,000-8,900,000	173.46 (194.25)	1.16 -936.84
Survey 2 (2010)	1,833,585.43 (1,729,579.82)	375,000-8,540,909.09	193.01 (182.06)	39.47 -899.04

Note: USD 1 = IDR 9,500.

4.2.4 Trade networks, social capital, and loans

The SIP or Surya Indah Perkasa Company has been the main shrimp buyer company in Berau since 1998 as discussed in the previous chapter. Shrimps are transported to Balikpapan by truck in loads between 1.5-2 tons. When the road from Berau to Samarinda was damaged they temporarily carried shrimps to Bulungan instead of Balikpapan. There is a cold storage company, called Bulungan Lestari Mandiri, in Bulungan. The local branch chief of CV. SIP, Suryadi, told me that formerly, three years ago, the company had used air transportation to deliver shrimps but subsequently stopped when the air fare became too expensive. In addition between 1999 and 2004 the company used the *Teratai* ship to carry shrimps. Now they are once again using road transportation to deliver shrimps to Balikpapan.

The company sends shrimps to Balikpapan around ten times per month. They can collect 25-27 tons of shrimps per month both from capture fisheries and tambak. From Balikpapan shrimps are then sold by the company to Surabaya, Medan or Banjarmasin, depending on which companies or traders there can

provide higher prices. He said that Kasai is a main supplier for white shrimp from fisheries (Chapter3). For tambak, he gets shrimps from the areas of Batumbuk, Tabalar, Padai, Semerah and Labu (see Figure 4.2). He confirmed that the ratio of wild shrimp to shrimps from tambak is 50:50. According to him, Batumbuk is the greatest producer of shrimps. CV. SIP receives shrimps from the three biggest punggawa in Batumbuk. The big punggawa were Haji Rusli (5 ton/month), Haji Ambo Nae (3 ton/month), H. Bera (2.5 ton/month), and also smaller volumes of shrimps from Haji Bahar and other punggawa. This means that the total harvest from Batumbuk can reach around 15 ton/month. Compared to other tambak areas in Berau, Suryadi believes that the quality of the shrimps from Batumbuk is the best.

Shrimps can be sold by both pond owners and caretakers. The income arrangement between caretakers and pond owners is described in Section 4.3. Some shrimp buyers in Berau belong to a wider network of buyers, and they send shrimps onto the cold storage or buyers in Tarakan, Balikpapan and Bulungan. The main selling points for shrimps are the local market in the capital of Berau, Tanjung Redeb, directly or through their patron (Table 4.15). In this shrimp marketing CV. SIP received shrimps from punggawa in the Batumbuk hamlet. Punggawa Haji Rusli and Haji Ambo Nae were the big punggawa in Batumbuk who sell their shrimps to CV. SIP (see above).

Table 4.15 Selling points of caretakers and owners of ponds (N=97)

Main positions	Selling points												Total	
	Boss	%	Berau collector	%	Berau market	%	Company	%	Tarakan	%	Bulungan	%		%
Caretaker	10	8.9	0	0	29	25.9	1	0.9	1	0.9	3	2.7	44	39.3
Owner	37	33.0	2	1.8	29	25.9	0	0	0	0	0	0	68	60.7
Total	47	42.0	2	1.8	58	51.8	1	0.9	1	0.9	3	2.7	112	100.0

Note: respondents can give more than one choice

In the shrimp marketing network in the Berau delta showed in Figure 4 we see that shrimps go to different selling points, namely the punggawa-collector and the Berau market. In addition shrimps will get outside Berau, i.e. Tarakan, Balikpapan and Bulungan through marketing channels.

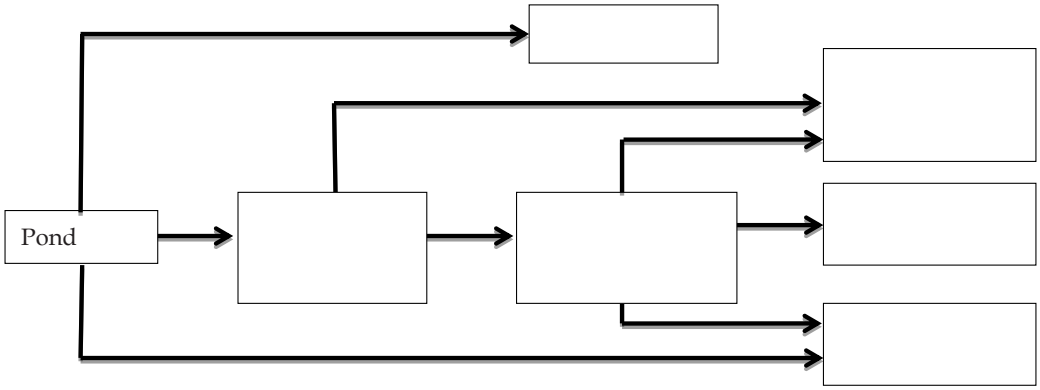


Figure 4.5 Shrimp marketing network of the Berau delta

Another relevant network relationship is that between the shrimp seed (*benur*) hatchery and the pond farmer. The establishment of some hatcheries in the province, namely in the districts of Tarakan, Kutai Kartanegara, and Balikpapan during the last three decades can be understood as a response to the increasing value of tambak expansion in Tarakan, Bulungan and the Mahakam delta. Nowadays, to my knowledge and experience, it is hard to find a pond farmer in Berau who is using wild seed, especially after the virus outbreak of 1995. To meet the increased demand for shrimp seed the government of East Kalimantan established an office for coastal fish farming (BBIP, *Balai Budidaya Ikan Pantai)*[31] with the major function as a shrimp hatchery in the Talisayan subdistrict of Berau. I visited this hatchery on 21st November 2008 and I talked to the Head of the Service, Budi. He is a graduate from the Faculty of Fisheries of University Mulawarman. Budi explained to me that seeds are delivered to two particular destinations. One is a private company named PT Fauzan Benur in Sambaliung, and the other is the tambak in Batumbuk belonging to Haji Rusli and his sons Basri, Haji Muhrim, and Rudi. The officer carries shrimp seeds to the consumers and proposes the price of IDR 20 per seed to them. Interestingly, the brood stock is from Balikpapan, the provincial hatchery in Manggar. The officers from the provincial service come regularly to Talisayan and bring brood stock to BBIP. They

[31] When I visited the office in Talisayan in 2008 I saw it has facilities to generate shrimp seeds and according to the officer they did not develop fish cultivation. This office belongs to the provincial government of East Kalimantan.

also come when harvesting time is due. Coincidently, I met this officer in the plane while he was travelling to Berau to prepare the seed harvest in BBIP Talisayan.

In other words, aquaculture is far from being a local affair. The punggawa/boss trade networks, the role of big entrepreneurs from the Mahakam delta, and experienced pond farmers from Java, and the provision of shrimp seeds from Balikpapan to Talisayan to Batumbuk are all evidence of the fact that the networks of shrimp seed (*benur*), of knowledge, and of people, are all crossing district, provincial, and island boundaries.

Suryadi, from the shrimp buying company, added more interesting facts to the story of shrimp seed. He told me that it is not always true that the seed in Balikpapan is really coming from Surabaya. People in Tarakan sometimes cheat by doing the following. They wait in Tarakan for the plane to land before continuing its journey to Berau. At this moment they enter the aircraft and place a label showing the Surabaya brand on the seed box as if it has come from the hatchery over there.

Another story is from a farmer in Teluk Semanting. He believes that the failure of tambak culture is caused by bad seeds provided to the pond farmers. The farmer is only a seed taker. He said:

> *Now I do not believe the quality of the seed from Tarakan anymore, since they are mixed. I like a long seed with a bit of red, because it is a sign for the first hatching. Many people like a black seed. But for me that seed is an old seed. If seed comes from the first hatching then the shrimp yields will be good - size 35, but it should not be mixed with other seed.* (Suleman, 5/02/2009)

4.3 Patronage networks in tambak development

Pond development in the coastal frontier of Berau can only be understood well if we take the social interface, particularly of the patronage networks seriously into consideration. The previous sections have shown that intensive social interaction and mutual interdependence at multiple social scales of *punggawa* as patrons, traders-bosses and entrepreneurs (see also Chapter 2) and his caretakers (*sawi* or *anak buah)* characterise the organisation of shrimp aquaculture and fishery, from the organisation of the tambak to the buying and selling of shrimps. Patron-client relationships are the strongest source of social and symbolic capital (Acciaioli, 2000; Bourdieu 1990; Pelras,2000; Schrauwers, 1999) producing relationships of

familiary, trust, and affection in tambak development, not only in Berau but also in the whole of the coastal area of East Kalimantan province where migrants from southern Sulawesi are a majority.

Caretakers of a pond and pond owners are trusted by their patron, who are often bigger entrepreneurs and absentee landlords, because they are indebted to them for a shorter or longer period of their life, and they heavily depend on loans. The lender of the loan can be a larger pond owner or a trader who acts as a patron. We have seen examples throughout this thesis. Moreover, it is not uncommon to hear that punggawa among themselves have debt relationships as well, as the story of Hadji Rusli shows. Table 4.16 shows that 47% of all respondents have a loan, 40% of the caretakers and 60% of the pond owners (Table 4.16a), the majority being involved with polyculture (Table 4.16b).

Table 4.16a Loan access of caretakers and pond owners (N=97)

Main positions	Has loan				Total	
	Yes	%	No	%		%
Caretaker	9	9.3	30	30.9	39	40.2
Owner	37	38.1	21	21.6	58	59.8
Total	46	47.4	51	52.6	97	100.0

*Pearson Chi-square = 15.505 (very significant at $\alpha = 1\%$)

Table 4.16b Loan access of caretakers and pond owners (N=97)

Type of culture	Has loan				Total	
	Yes	%	No	%		%
Shrimp monoculturist	5	5.2	8	8.2	13	13.4
Fish monoculturist	2	2.1	0	0	2	2.1
Polyculturist	39	40.2	43	44.3	82	84.5
Total	46	47.4	51	52.6	97	100.0

*Pearson Chi-square = 2.637 (not significant)

Loans can be accessed by farmers primarily from their boss (76.3%) and relatives (23.7%). In Table 4.16a only 46 of the respondents asked, confirmed they have a loan. This loan may be from more than one source (Table 4.17). Most of pond owners, especially when they need large investments, as in the case of Padang when he started his own pond, receive a loan from their boss (62.7%). In Pegat Batumbuk there are both local (co-villager) and outsider bosses. They have clients or indebted pond farmers and some caretakers who are obliged to sell their shrimps to their own boss and only a few with low quality go to the Berau market. The bosses in turn deliver their shrimp to CV. SIP and go outside Berau.

Table 4.17 Source of loan by caretakers and owners of ponds (N=46)

	Source of loan*				Total	%
	Boss	%	Relatives	%		
Caretaker	8	13.6	3	5.1	11	18.6
Owner	37	62.7	11	18.6	48	81.4
Total	45	76.3	14	23.7	59	100

Note: respondents can give more than one answer

The owner and the caretaker are jointly involved in the development and management of a pond, but they often have different tasks and obligations, especially when the pond is larger or an owner has a number of ponds. The owner has to provide the caretaker with his daily living costs and is responsible for providing seeds and or fries and other tambak inputs. Meanwhile the caretaker is responsible for the day-to-day tambak management, such as fixing the dykes, taking up mud and harvesting tambak.

The caretaker receives a 'wage' from the owner following a contractual arrangement for sharing the harvest. There are mainly two types of contracts in Berau, a 50:50 per cent sharing (*bagi dua*) arrangement, and a 20 : 80 per cent distribution of the harvest between the caretaker and the owner. For example, Toha who takes care of the ponds belonging to the former district head of Berau in Lungsuran Naga (nearby Batumbuk) admitted that he receives 50% of the net income of the tiger shrimp harvest. This means all tambak revenues have been deducted from all the operational costs of pond. It should be noted that the owner guarantees the caretaker's living costs, housing, etc. The same arrangement was valid for Suleman as caretaker of Durjat's *tambak* in Teluk Semanting. He said that apart from the revenue from harvesting the tiger shrimps, also the revenue from the harvesting of *bintik* shrimps had to be shared equally with tambak owner. However, the contractual arrangement Asman experienced as worker on Haji Aco's tambak in Batumbuk was quite different. He explained that the harvest sharing arrangement was only 20% of the net income for him and the rest (80%) for the owner. The owner in Asman's case is not responsible for providing the caretaker's living cost. In the case of Asman in Pegat, it shows that he receives a lower amount from the sharing arrangement and that he was not given living costs from the owner, in comparison to other caretakers in Lungsuran Naga and Teluk Semanting who receive more and were provided with daily living costs.

Punggawa Ambo Nae told me:

> *In general the yields will be shared as follows: 20% is for the caretakers (*anak buah*), which is 20 % of the net revenues, including the meals of the caretaker. If there are two people then it will be divided between the two. It is normally one person, who is responsible for one pond, and another will work on the next pond, but they share the same kitchen [near the pond area where they live]. For example, one can share with his brother who takes care of the second pond.'* (Haji Ambo Nae, 24/10/2009).

I calculated the net revenue that can be derived from a 10 ha tambak in Batumbuk based on primary data from my respondents. Due to the high investment cost of buying and constructing a pond, the net income per shrimp harvest season did not cover these expenses. That is why in Table 4.16a above, far more pond owners than caretakers need a loan. It is noteworthy that 38.1% of pond owners in Pegat Batumbuk need a loan with a punggawa when they are the owner of at least one pond, but they want to expand and open a new pond. The financial interdependency of pond owners and punggawa, and of punggawa among each other, is closely related to the size of the ponds they develop. Most aquaculture farmers in Batumbuk start with 10 ha, and then add another pond of 10 ha, and so on. Thus over the years they may develop a pond area of 40 ha that in fact consists of a range of adjacent smaller ponds, usually moving inland progressively 'eating' into the mangrove forest, as the next tambak is laid out at the 200 m basis of the previous pond, and stretching inland for another 500 m. This practice contrasts with that of the bigger entrepreneurial punggawa, like Haji Rusli (below) who are able to invest in opening a single big pond of 40 ha.

It is important to mention what social values farmers who become involved with shrimp culture believe in. These farmers are likely to be eager to go for Haji if they succeed in life. So Haji also means a successful farmer. Haji is a high status of respect in the village. Haji Singkong said:

> *It is better to have tambak because it enables (us) to go for a pilgrimage (Haji), compared to* togo*, tambak is better. The location for tambak is good if it is not too close to another villager. Ex-Nypa land is better than ex-mangrove, as the result is faster. (*Haji Singkong, 15.05.2008*)*

Padang contends that tambak can be seen as assets for the future, particularly for children. For him more land is better as it means he can extend from one pond by addingmore ponds. As he explained:

> *For tambak it does not always work, if we want to enter water into the pond, we can expect shrimps. If for instance it is not filled with seed we can still expect* bintik. *While in the ocean - I know because I have been there a long time - when one has a dry oar it means no yield at all. If there is a yield from a well-producing tambak, then a new one can be opened. I have many children, 6, they will fight one another if my tambak are not shared between them. It has to be one pond to each of them so that they are not clashing. If there is fortune (*rezeki*) 10 ha more or 5 more is fine for me.* (Padang, 30.01.2008)

In the same vein Bastian agreed if you have a pond you have a future . He confessed that last time when he did togo it only produced enough for food expenses and nothing can be saved. Although tambak lasts for 3 months he said, your daily cost can be supplimented bygill net fishery and shrimp yields is not bad.

> *Ambo Nae (AN) was born in Bone, South Sulawesi. He is 68 years old. He followed elementary school (SR:* sekolah rakyat*) for 3 years in Pakasalo village, in Bone. He came to Berau in 1951 and four years later he came to Tanjung Redeb. He then worked for his in-laws as a* togo (*shrimp trap*) *fishermen. AN remembered that a group of immigrants from Sulawesi gathered in Pegat to make a living. They came to Pegat to earn their living mostly with shrimp trap fishery. AN was married in Pegat in 1958. Batumbuk subsequently was founded by Mejang, AN's grandfather-in law, in 1959 to provide a new place to stay after Pegat. This place is well-known as a* terasi *(shrimp paste) producer. It was started when people in Pegat cooperated with Bugis people from Lombok, including AN's father-in-law. In 1963 AN bought a* pinisi *(traditional Bugis) boat with a 40 ton capacity. He caught shrimp and or bought from friends and brought shrimp paste to Lombok. He remained a fisher and coordinated his fishermen-clients. From 1970 until 1976 he stayed in Lombok because* togo *yields went down at that time. People in Batumbuk asked him to come back and he was appointed as village head of Pegat Batumbuk in 1977. Since then he continued to capture shrimps instead of trading shrimp paste. He made traps for shrimp and learned from fishermen in Pantai Amal, Tarakan. He had 50 boats in 1990 which were used for trapping. AN tried to cut down mangrove manually in 1987 but he failed as the chainsaw broke. After 3 years without a pond, AN started to look for excavator in Jakarta and Palu but he couldnot find one. In 1992 he prepared 300 ha of land in Guntungan and invited outsiders to invest. At the time AN said that some owner of the excavator machine were from Samarinda including Haji Edi from*

> *Samarinda Seberang and Haji Kahar from Sulawesi. Subsequently AN joined with the owner to buy new excavator with a down payment of Rp 100 million (a new one was IDR 800 million). In 1993 the machine was used to build ponds. He did nothing with the ponds but in 2003 he started tambak again by calling someone who could construct a water gate. This happened as he had heard from somebody that a farmer in Tarakan had got rich through tambak. AN cooperated with Haji Usman from Tanjung Redeb to open ten ponds, he gave five ponds to Haji Usman and kept the remaining five ponds for himself and his family. They constructed ponds of 10 ha each. AN then ordered shrimp seed from Haji Edi who was a successful farmer. Haji Kahar and Haji Ali were interested to invest in Batumbuk. People from outside were attracted to come since they knew there was 'a result' from tambak. Nowadays AN is the most famous punggawa in Batumbuk. He claims that he and his family have 20 ponds. He established CV Megabuana for shrimp marketing and formed a pond farmer group called Udang Tiger. He continues to collect shrimps from traps as well.* (Batumbuk, 23/10/2009)

From the above segments of his biography we can see the interface between Ambo Nae (AN) and individual actors for tambak development in Batumbuk. A social interface is a critical point of intersection between life worlds, social fields or levels or organisation where social discontinuities, based upon discrepancies in values, interests, knowledge and power, are most likely to be located (Long, 2001; 243). Here I would add that especially social networks and inter-island (ethnic) relations create entrepreneurial networks in tambak development.

Big shrimp traders (*punggawa*) from outside Berau play an important role in inspiring local people in Pegat Batumbuk to open a tambak. There is a link between the punggawa in the Mahakam delta south of Berau that was developed earlier, and the Berau delta. Over the past 10 years they have invested in and expanded their large shrimp business from Mahakam into Berau. The following excerpt from my diary gives an example:

> *On Friday 6th August 2010 around 8 a.m. I was called by Salman, the field officer from Dinas who is willing to help me to contact punggawa from the Mahakam delta. Salman said, "Pak Bambang, can we go to the house of Haji Rusli now? After Salman had reached me, we went to Sambaliung on the motorcycle. After a 20 minutes' drive we arrived at a beautiful house - very different from the other houses around here. To be honest when I met him I was surprised because from my experience of meeting punggawa in the Mahakam delta I perceived that they are usually much older than me.*

But Haji Rusli, as people call him, appeared to be a bit younger than me. He was 30 years old. There were three other people with him in the house when we entered the living room. Haji Rusli came with his friend and sat with us. His friend was from Java and he had had much experience with tambak over there, and he had helped Haji Rusli. I introduced myself to him. We talked about why he had come to Berau. Haji Rusli is the son of Haji Basri. He said he had taken over tambak farming from his father's business. He received 270 ha of forest land from Haji Edi, who had a debt to Haji Basri amounting to IDR 500 million. Haji Rusli informed us that for two years he had failed to have a good shrimp harvest, but that afterwards he had become more successful. Haji Rusli has one big pond of 40 ha with only one gate. He also has a tambak in Suaran near Batumbuk. He is very pleased with his assistant workers who come from Java, especially from Lamongan near Surabaya, rather than from Bugis areas. He says the Lamongan people have better experience with tambak management and they provided him with a good harvest. Then I asked him about his relation to the punggawa in Mahakam. Haji Mangkana, I know is the owner of CV Samsuria shrimp export company based in Anggana, was his uncle[32]*. He mentioned that punggawa Haji Onggeng came to Batumbuk as well. He learned to manage aquaculture ponds from his father in Muara Pantuan. However, he did not know much about practical things. Therefore he had to rely upon and trust his assistant for those all things related to work in the field at the site of the tambak. When I asked him about his future plans, he said that he wanted to open more ponds in Batumbuk since there is still 700 ha l there. Now he manages 500 ha which are divided over 18 ponds. Now that there is better airport in Berau he and his family go more often to Samarinda. Then we had to finish the conversation since he had to drive his wife and child to Kalimarau and to go to Samarinda* (Sambaliung, 06.08.2010)

4.4 Farmer perceptions on whether pond farming has a future in Berau

In the previous section we have seen that around 50% of the respondents moved out of fishing into aquaculture as the primary basis of their livelihoods. Intervention by outsider entrepreneurs who started investing in the Berau delta also has been influential in their decision to engage with tambak farming.

It is important to know the perception of the fishers-pond farmers since their decision making undoubtedly is affected by what environmental, technical, social and political-economic changes they perceive. Qualitative data shows that one

[32] For more details about the life history of punggawa Haji Mangkana see Levang (2002:16-17).

important reason why fishers turn to pond farming is their observation of outsider-pond farmers who are successful in harvesting shrimp from tambak (Table 4.18a and 4.18b).

Table 4.18a Perception on income changes over the last 5 years by caretakers and owners (N=97)

Main functions	Perception on income changes over the last 5 years*								Total	%
	decrease	%	stable	%	increase	%	do not know	%		
Caretaker	8	8.2	18	18.6	8	8.2	5	5.2	39	40.2
Owner	11	11.3	36	37.1	9	9.3	2	2.1	58	59.8
Total	19	19.6	54	55.7	17	17.5	7	7.2	97	100.0

*Pearson Chi-square = 4.26 (not significant)

Table 4.18b Perception on income changes over the last 5 years by type of pond farmer (N=97)

Main types	Perception on income changes over the last 5 years*								Total	%
	decrease	%	stable	%	increase	%	do not know	%		
Shrimp monoculturist	2	2.1	8	8.2	3	3.1	0	0.0	13	13.4
Fish monoculturist	0	0.0	2	2.1	0	0.0	0	0.0	2	2.1
Polyculturist	17	17.5	44	45.4	14	14.4	7	7.2	82	84.5
Total	19	19.6	54	55.7	17	17.5	7	7.2	97	100.0

*Pearson Chi-square = 3.279 (not significant)

Table 4.19a Tambak believed as future livelihood by caretakers and owners (N=97)

Main functions	Tambak believed as future livelihood*				Total	%
	Yes	%	No	%		
Caretaker	22	22.7	17	17.5	39	40.2
Owner	53	54.6	5	5.2	58	59.8
Total	75	77.3	22	22.7	97	100.0

*Pearson Chi-square = 16.261 (very significant at α = 1%)

Table 4.19b Tambak believed as future livelihood by type of pond farmer (N=97)

Main types	Tambak believed as future livelihood*				Total	%
	Yes	%	No	%		
Shrimp monoculturist	8	8.3	5	5.2	13	13.4
Fish monoculturist	2	2.0	0	0	2	2.0
Polyculturist	65	67.0	17	17.5	82	84.6
Total	75	77.3	22	22.7	97	100.0

*Pearson Chi-square = 2.61 (not significant)

Apart from the fishers who moved into tambak farming over the last 5 years, the majority (73.2 %) also are considering investing in, consolidating or expanding on the number of pond they have (Table 4.20a/b). Based on these findings I can conclude that since farmers are certain that a tambak based livelihood has brought them a more stable, or even better livelihood conditions and they also believe that pond farming is sustainable, particularly polyculture of shrimp and fish, they are eager to expand their tambak area.

Table 4.20a Perception on the plan to open tambak by caretakers and pond owners (N=97)

Main function	Open tambak*				Total	%
	Yes	%	No	%		
Caretaker	32	33	7	7.2	39	40.2
Owner	39	40.2	19	19.6	58	59.8
Total	71	73.2	26	26.8	97	100.0

*Pearson Chi-square = 2.607 (not significant)

Table 4.20b Perception on the plan to open tambak by type of pond farmer (N=97)

Main types	Open tambak*				Total	%
	Yes	%	No	%		
Shrimp monoculturist	6	6.2	7	7.2	13	13.4
Fish monoculturist	1	1	1	1.0	2	2.1
Polyculturist	64	66	18	18.6	82	84.5
Total	71	73.2	26	26.8	97	100.0

**Pearson Chi-square = 6.378 (significant at 5%)

In terms of sustainability of pond farming, I investigated what tambak farmers perceive to be 'good practices' in aquaculture. The criteria they mention are technical indicators of rearing shrimp and/or fish in the pond. Firstly, the tambak area should be 10 ha or more per pond. Secondly, the pond farmer should cultivate the shrimp for at least 1.5 to 2 months. Thirdly, the pond has to be cleaned from Nypa and mangrove vegetation. Lastly, there is no need for calcification. In addition to the technical requirements a few social parameters are also important to mention. The caretakers especially, are eager to own tambak themselves. The pond owner expresses the wish to be able to divide his ponds equally between his sons and daughters. Women can inherit ponds in which case her husband will take care of the shrimp farming The boss and pond owner mean by 'good practices' that they have enough harvested shrimps. Another important parameter is that punggawa and pond owner can freely sell tambak products to any buyers.

Farmers actually prefer to have a bigger pond area. Table 4.21a/b shows that 66.2% of the respondents want to operate a tambak area of more than 10 ha, the more the better. But not all 97 respondents answered because from Table 4.20 a/b we can see that only 71 respondents wanted to open tambak. My informant in Batumbuk told me, "For me 10 ha is good, if we dig out 10 ha or 20 ha it seems the much same. They differ only 200 m from each other (Samsu, Batumbuk 22/01/2010).

Table 4.21a Tambak area preference by caretaker (N= 71)

Main function	Area preference				Total	%
	5-10 ha	%	>10 ha	%		
Caretaker	17	23.9	15	21.1	32	45.1
Owner	7	9.9	32	45.1	39	54.9
Total	24	33.8	47	66.2	71	100.0

*Pearson Chi-square = 9.72 (very significant at α = 1%)

Table 4.21b Tambak area preference by type of pond farmer (N=71)

Main types	Area preference				Total	%
	5-10 ha	%	>10 ha	%		
Shrimp monoculturist	0	0	6	8.5	6	8.5
Fish monoculturist	1	1.4	0	0	1	1.4
Polyculturist	23	32.4	41	57.8	64	90.1
Total	24	33.8	47	66.2	71	100.0

*Pearson Chi-square = 5.152 (significant at α = 10%)

When I asked pond farmers about the role of mangrove, some answered that mangrove is needed to build tambak, and that it is important to protect their coast. They know little about the ecological function of mangrove as a cradle for marine resources. They prefer Nypa palm stands to be converted into ponds rather than mangrove trees areas, because of the root system of the latter that are difficult to excavate, as opposed to the root clump of the Nypa palm. Table 4.22a/b shows farmers' perception of the functions of the mangrove forest.

Table 4.22a Perception on the role of mangrove by caretakers and pond owners (N=97)

Main function	Perception on the role of mangrove										Total	%
	tambak	%	protecting coast	%	fuel wood	%	construction	%	hosting species	%		
Caretaker	15	9.7	33	21.3	3	1.9	4	2.6	5	3.2	60	38.7
Owner	21	13.5	52	33.5	9	5.8	10	6.5	3	1.9	95	61.3
Total	36	23.2	85	54.8	12	7.7	14	9.0	8	5.2	155	100.0

Note: respondents can give more than one answer

Table 4.22b Perception on the role of mangrove by type of pond farmer (N=97)

Main types	Perception on the role of mangrove										Total	%
	tambak	%	protecting coast	%	fuelwood	%	construction	%	hosting species	%		
Shrimp monoculturist	5	3.2	11	7.1	1	0.6	2	1.3	0	0	19	12.3
Fish monoculturist	0	0	2	1.3	0	0	0	0	0	0	2	1.3
Polyculturist	31	20.0	72	46.5	11	7.1	12	7.7	8	5.2	126	81.3
Total	36	23.2	85	54.8	12	7.7	14	9.0	8	5.2	155	100.0

Note: respondents can give more than one answer.

Table 4.23a Main factors affecting tambak income by caretakers and pond owner (N=97)

Main types	Main factors										Total	%
	Pesticide&disease	%	Water quality	%	Soil	%	Water availability	%	Mangrove presence	%		
Caretaker	33	15.3	32	14.9	9	4.2	5	2.3	8	3.7	87	40.5
Owner	51	23.7	49	22.8	10	4.7	14	6.5	4	1.9	128	59.5
Total	84	39.1	81	37.7	19	8.8	19	8.8	12	5.6	215	100.0

Note: respondents can give more than one answer

Table 4.23b Main factors affecting tambak income by type of pond farmer (N=97)

Main types	Main factors										Total	%
	Pesticide&disease	%	Water quality	%	Soil	%	Water availab.	%	Mangrove presence	%		
Shrimp monoculturist	8	3.7	9	4.2	4	1.9	1	0.5	3	1.4	25	11.6
Fish monoculturist	2	0.9	1	0.5	0	0	1	0.5	0	0	4	1.9
Polyculturist	74	34.4	71	33.0	15	7.0	17	7.9	9	4.2	186	86.5
Total	84	39.1	81	37.7	19	8.8	19	8.8	12	5.6	215	100.0

Note: respondents can give more than one answer

According to respondents problems of pesticide and the appearance of the shrimp disease in ponds became a major factor influencing the success of tambak operations. Farmers in Batumbuk recognise the disease as white spot virus that kills shrimps in the pond. They perceive that the virus will attack when shrimp is cultivated up to two months and know it from their practical experience. It means that the highest risk in shrimp farming is in the first two months. The survival rate of shrimp farming is estimated at about 30% in general because cultured shrimps face risks such as virus attack, low water quality and the rainy season which affects the water salinity. It means that if Padang, for example, releases 150,000 post-larvae seeds into a pond of 10 ha, he expects to have a harvest of 4 or 5 *pikulan* (400

or 500 kg). Below I provide the discussions concerning shrimp disease in tambak with farmers during FGD in Batumbuk.

> *Here we see from observing the shrimps whether the tambak is successful or not. The water colour is an indicator. There are two colours namely red, which indicates iron (*besi*) substance is increasing in the tambak and shrimps come up to the water surface. And there is the green colour, with mucus (*lendir*) which certainly affects the shrimps negatively. During the rainy season shrimps will be sick since the water constantly changes; the problem that farmers face here, in general, is red gill (*insang merah*). This normally happens at an age of around two months, sometimes not all the shrimps die, unlike white spot that can kill all the shrimps in the tambak. If shrimps are sick they will go to the surface. We are facing moss (*lumut*) and green seaweed like material (*seperti rumput laut hijau*) in the pond which may cause shrimps to die. We tackle the problem of moss in the tambak by adding milk fish (*bandeng*), if we have a 10 ha pond then we release 20,000 fries, but it depends upon the amount of moss present in the pond. (FGD Batumbuk, 23/10/2009)*

4.5. Conclusions

This chapter has discussed the multiplicity of tambak based livelihoods by carefully following the everyday life of pond farming in coastal Berau. I have used the concept of agency to show how tambak farmers use their practical experience which refers to the knowledge, capability and social capital (Long, 2001) to build their livelihoods. Furthermore in the frontier of Berau, mangrove land has become a social-political arena between social actors including the village head and the secretary, the punggawa in his various roles as pond owner, boss and , shrimp trader, the caretakers of the ponds, field officers and other government staff.

Patronage networks between punggawa as larger pond owners/patrons and/or shrimp traders and farmers and play an important role in tambak based livelihoods. Caretakers of a pond and their patrons/pond owners are mutually dependent upon each other, because caretakers are heavily indebted to their patron and depend on loans provided by the patron who in turn depends on them for a good production of shrimp. There are two different contractual arrangements implemented in the villages between punggawa/owners and caretakers, namely on a 50:50 or 20:80 basis. Farmers have their own indicators of 'good practices' in

pond aquaculture, and they can recognise white spot virus as well as other environmental problems that may kill the shrimps in the pond.

From the life histories of the social actors involved in pond farming we can learn that the coastal frontier of Berau is an open access area for Buginese immigrants. They construct ponds as they did in Sulawesi, but in Berau it appears to be an important future strategy of laying claims to land ownership. Ponds thus become a social arena as actors negotiate, cooperate and contest different interests. The majority of farmers in Pegat Batumbuk village see tambak as their future livelihood.

Chapter 5

Permeable boundaries: Outsiders and access to fishing grounds in the Berau Marine Protected Area

Bambang I. Gunawan and Leontine E. Visser

The designation of Marine Protected Areas (MPAs) in Indonesia has been accelerated over the past two decades in line with international biodiversity conservation commitments and to secure a basis for decentralised fisheries resources management. The Berau MPA of northeast Kalimantan is one of them. This paper shows how the establishment of the park boundaries and zoning affects local fishers' livelihoods. Particular attention is paid to the position of outsider fishers or andon *who have a legal right to access the resource rich fishing grounds. Decentralised district government legitimises outsider fisheries activities because* andon *fishing permits bring in fees as a contribution to the regional income (PAD* or pendapatan asli daerah*), while international environmental organisations and local fishers regard the outsider fishers as illegitimately entering the MPA to access resources they regard as their own. Thus, MPA boundaries appear to be highly permeable, with both local fishers and environmental NGOs seeing the presence of* andon *outsiders as illegitimate and illicit, despite being legal.*

Keywords: Marine Protected Areas; Coastal Governance; Fisheries Livelihood; Exclusion; Kalimantan; Indonesia

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5.1 Introduction

Indonesia belongs to the world's highest biodiversity areas, harbouring about 3,215 marine fish species, 350 species of corals and an area of about 75,000 km^2 of coral reefs (Hutomo and Moosa, 2005). International environmental organisations have increased the awareness of the need of marine biodiversity protection in Indonesia (Mous et al., 2005) and the government believes the establishment of MPAs to be an effective tool to address the crisis of fishery management. Over the past two decades, attempts have been accelerated to preserve coastal and marine waters by establishing MPAs or Marine Conservation Areas (MCA) as they are often called in Indonesia (Satria *et al.,* 2006). The event of the World Ocean Conference held in Manado in May 2009 and the resulting Manado Declaration show national commitment to strive to achieve long-term marine conservation and sustainable management of coastal and marine waters.

In the era of decentralisation starting from the enactment of Law No. 22/1999 and its revision by Law No. 32/2004 on local government, the management of fisheries and coastal resources was devolved from the central government to district governments *(kabupaten/kota)*. Law No. 31/2004 on Fisheries decreed that fisheries management through the Ministry of Marine Affairs and Fisheries (MMAF) would also include ecosystem and fish resources conservation. This law was implemented three years later under Government Regulation No. 60/2007 in relation to Fish Resource Conservation and covers ecosystem-stimulated development of Coastal Waters Conservation Areas or *Kawasan Konservasi Perairan* (KKP). The regulation focuses on conservation in coastal waters including the monitoring and control of the conservation area, the protection and rehabilitation of fish habitat and population, research and development, and livelihood improvement of the local communities. These KKPs may include national parks (which were established under the Ministry of Forestry before the existence of MMAF), tourism parks, natural sanctuaries and fishery sanctuaries. By 2010, more than 13.95 million hectares of marine conservation areas - including thirty-two park areas initiated and governed by the Ministry of Forestry and fifty areas governed by both the MMAF and the district governments - were designated all over Indonesia. By 2020, Indonesia is targeted to have 20 million hectares of Coastal Water Conservation Areas (Mulyana and Dermawan, 2008: 31).

Furthermore, this Government Regulation No. 60/2007 stipulates the roles of central, provincial, and district governments respectively in the different zones (*jalur*). Central government has the authority to manage marine conservation areas

covering marine waters beyond twelve sea miles. The provincial government governs the coastal waters up to twelve sea miles, while the district government is authorised to govern coastal waters within four nautical miles (Satria *et al.* 2006; Visser and Adhuri 2010). These District Marine Conservation Areas are known as *Kawasan Konservasi Laut Daerah* (KKLD). Today, more than twenty KKLDs have been established in Indonesia, including the marine conservation areas of Berau (Kalimantan) and Radja Ampat (West Papua).

In 2005, in line with Law No. 31/2004 the local government of Berau assigned an area of 1.2 million hectares for marine conservation with the financial and organisational support of the joint program of The Nature Conservancy (TNC) and World Wildlife Fund (WWF) to protect an area with the highest level of coral biodiversity in the world (WWF, 2006; WWF Indonesia, 2009). This MPA is an integral part of the Indonesian Coral Triangle Initiative, and it harbours some 507 species of corals (Hoeksema, 2004; Wiryawan et al., 2005), as well as the wealth of other important coastal and marine species, such as mangroves, sea grasses, endangered sea turtles, and economically valuable fish species (The Coral Triangle Center, 2012).

This paper is based on socioeconomic field research[i] conducted in three different villages of the Berau delta in northeast Kalimantan, namely Kasai, Teluk Semanting and Pegat Batumbuk (Figure 5.1), between 2008 and 2010. Administratively, the village of Pegat Batumbuk consists of two hamlets, namely, Pegat and Batumbuk. The fieldwork was part of the first author's PhD research using an actor-oriented approach (Long, 2001) and applying ethnographic, qualitative and quantitative research methods, including a household survey. Villagers were invited to participate in focus group discussions on the subjects of access to fishing grounds, conflicts among fishers using different types of gear and livelihood diversification. A participatory mapping exercise resulted in Figure 4.2 which was used for discussions on zoning and conflicts between local fishers and outsiders (*andon*) also created a map of their fishing areas within the MPA.

5.2 District government and marine conservation

Law No.27/2007 concerning coastal, marine and small islands resouce management explains that fishing communities are allowed to satisfy their social and economic needs by accessing the conservation area for their livelihoods. In 2008, through the District Head Decree No. 460 a Coordinating Body for the Implementation of the Berau Marine Conservation Area (*Badan Kolaborasi*) was

established through which the different institutional actors involved with the MCA are represented, including the Fisheries and Marine Affairs Office, the Regional Environmental Body, the District Planning Board, the Tourism and Culture Agency, the Agency for Natural Resources Conservation and Forestry, the Joint Programme representing TNC, WWF, the Turtle Foundation *(Yayasan Penyu)* and local NGOs like *Dakkayu Akkal* (One Thought) and the Fishers Society Network (JAMAN). The Faculty of Fisheries and Marine Science of Mulawarman University, Samarinda, facilitated the meetings in which the first author participated. Our empirical study of the perceptions of governmental actors on the Berau MPA area shows that despite the presence of environmental agencies, there is a lack of understanding and awareness about the objectives of marine conservation among the heads of the government agencies and policy implementers, and even among the members of the Coordinating Body of the MPA in Berau (Bennett et al., 2006). This might challenge the achievement of the related goals of environmental conservation and fishers' livelihoods improvement through the development of the MPA. The land-side boundary of the MPA established in 2005 by TNC, WWF and the district government of Berau follows the district administrative boundary, thus including the fishing villages in the Berau delta of Kasai, Teluk Semanting and Pegat Batumbuk (Figure 5.1).

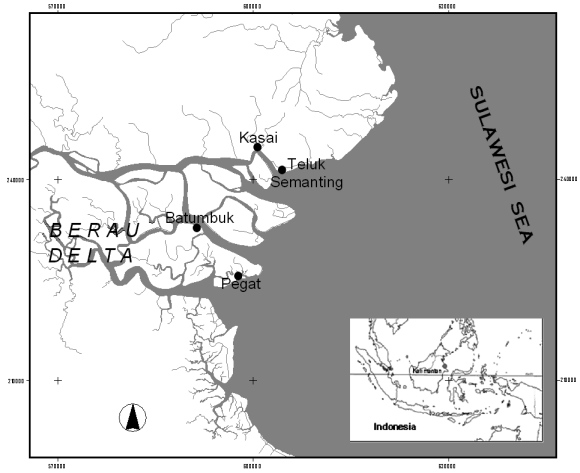

Figure 5.1 Map showing study sites in the delta of Berau (East Kalimantan)

Formally, in Indonesia marine conservation area development has two main objectives: marine resources conservation and its monitoring, and sustainable fisheries development that benefits the local fishers, as well as the district government. Devolution of central government authority to provinces and districts in the domains of resources management and economic development increasingly creates the need for the district government to finance regional development out of its own pocket. In Berau this means that resources exploitation, especially coal mining and forestry, together with marine fisheries and aquaculture, is rapidly stepping up.

District agencies are searching for all kinds of means to increase the district income (PAD) as a consequence of fiscal decentralisation (Hira and Parfitt, 2004). One of the strategies applied by the Fisheries Office is the requirement for *andon* who regularly come to fish inside the Berau four-mile-zone to buy a permit for two weeks of fishing (*satu air*) within the Berau coastal waters, which, in fact, belong to the marine park area declared by the Berau government (see below). This action poses a dilemma because at the same time Law 31/2004 and Regulation 60/2007 attempt address the need to improve the livelihood conditions of local fishers' communities, there is also the need to curb over-fishing in order to develop a sustainable fishery. Another dilemma is that the district government, especially the Marine Affairs and Fisheries Office or *Dinas Kelautan dan Perikanan (Dinas),* concentrates more on shrimp farm development in the coastal areas, which means that there are no attempts to design fisheries-based social programs for the coastal inhabitants whose livelihoods may be impacted by spatial and material restrictions from the marine park development. Finally, the environmental organisations are not interested in coastal fisheries *per se*, only in as far as fishery is a threat to coral reefs and small islands, like the Derawan Islands included in the Berau MPA.

We know from the literature that fisheries development projects aiming to improve local fishers' livelihood have often failed to achieve this objective because of a lack of understanding of coastal livelihoods and their institutional contexts (Visser and Adhuri, 2010; Walley, 2004; Allison and Ellis, 2001; Bavinck, 2001; Bailey and Jentoft, 1990). Jentoft (2000) argues that over-fishing is not so much a fisheries problem as a problem often caused by lack of livelihood alternatives and political conditions. It is now generally accepted that local livelihoods are a crucial factor in determining the success of an MPA. Pomeroy *et al*. (2005) pointed out that to achieve the MPA objective we need to include not only governance and biophysical factors, but also the socioeconomic situation of the local communities,

including cultural-historical experiences, knowledge, values, beliefs and attitudes (see also Long, 2001).

5.3 Local fishers' livelihoods and marine conservation area development

In Indonesia the development of marine conservation areas is still weak in actively involving local people, and its formal institutionalisation sometimes leads to a conflict of interests between local fishers and outsider entrepreneurs (Adhuri et al., 2005; Satria et al., 2006). Pomeroy et al. (2007), Boomgaard et al. (2005), Butcher (2004) and Charles (1992) describe how conflicts and wars related to rights of access and use of marine space and fisheries have been important human issues throughout recorded history. Although fisheries conflicts are not a new phenomenon, Adhuri (2009) shows how access to marine space for fishing is increasingly contested in terms of local identity.

This paper adds to the literature on sustainable livelihoods (Ontita, 2007; Allison and Ellis, 2001; Carney, 1998) from the perspective of the everyday practices of fishing communities in the delta of the Berau Marine Park Area, in particular, to understanding how local fishermen act upon their notions of territoriality and outsiders' access and use of what they regard as their fishing grounds. The formal institutionalisation of the MPA boundary and zoning not only affects local fishers using different types of gear, but it also forces us to consider how the decentralised district government exacerbates the contestation of access to fish resources between local and *andon* fishers. Ethnographic research shows that social actors hold different pragmatic and cultural views on who is seen as local and who is an outsider. These views appear to be far from stable or consistent, as they are continuously challenged by new regulations and events.

The fishery activities of especially trammel net fishers and local mini-trawlers overlap spatially in Zone Ia with the gill nets of outsiders. Therefore, it is not surprising that fifty-one per cent of all fishers out of the random sample (N=97 which is 22.6% of total number of households) from Kasai village indicate that the presence of *andon* fishers is a major problem, and another nineteen per cent mention outsider conflict as a main source of problems.

5.4 Fishers' livelihoods and access to coastal space

The livelihood concept is well covered in the social science literature from economics to anthropology. Different disciplinary approaches use different social categories and aggregation levels, ranging from individual actors, households, and groups making a living, to national and international institutions and organisations. Authors focus on attempts to meet the various consumption and economic needs of households, as well as how people cope with uncertainties and respond to new opportunities (Hebinck and Lent, 2007; De Haan and Zoomers, 2003; Ellis, 2000). It is important to include the different values and perceptions actors may have, as these encompass the many ways in which people construct a living over time (Ontita, 2007; Wartena, 2006) and choices, status and a sense of identity *vis à vis* other people and the environment (Adhuri, 2009; Kaag, 2004; Long, 2001). The point of departure of most livelihood studies is the following definition from the UK Department for International Development (DFID):

> *"A livelihood system comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stress and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base" (Carney, 1998: 4).*

DFID developed its intervention strategies on the basis of the livelihood concept and the sustainable livelihood framework. That approach has become widely accepted by donors, practitioners and policy makers since the 1990s, such as the Entreprise Development Impact Assessment Information Service (EDIAIS), the Food and Agriculture Organization (FAO), the United Nations Development Program (UNDP) and allied institutions (Carney, 1998). The basic elements and pictorial representation of the pentagram representing the DFID framework for sustainable development analysis has become so widely regarded as part and parcel of the livelihood approach that it can almost be considered the approach's logo (Wartena, 2006). So, there are two key points concerning the livelihood concept, namely, that it is widely accepted in academic as well as development policy circles, and that it is used by scholars and practitioners of a great variety of disciplines. A third advantage is that it combines several levels of analysis, from the individual actor to their global economic, infrastructural, ecological and institutional environment (Wartena, 2006).

Livelihood processes refer to interactions between people and their environments and to changes over time. Social values like trust are a crucial element in the study of people's everyday interactions:

> *"The term livelihood best expresses the idea of individuals or groups striving to make a living, attempting to meet their various consumption and economic necessities, coping with uncertainties, responding to new opportunities, and choosing between different value positions" (Long, 2001:54).*

The notion of livelihood has proven to be useful in drawing a picture of how people appropriate and apply a variety of natural and sociocultural resources, including labour, financial and symbolic capital - such as trust and dependency networks (Bourdieu, 1990; Schrauwers, 1999; Acciaioli, 2000) – knowledge, and the technology to produce and harvest, generate an income and improve their wellbeing. Ellis's (2000) often cited definition of livelihood focuses on the institutional and organisational aspects of livelihood generation:

> *"[C]omprising the assets (e.g. natural, physical, human, financial and social), the activities and the access to these, which is mediated by institutions and social relations, that together determine the living gained by the individual or household" (Ellis, 2000:10).*

Livelihoods are multiple and diverse**.** In the coastal frontier of Berau, fishers have various strategies to sustain their lives, depending on the availability of the marine and coastal resources and on bosses or traders in personalised networks. Based on their experiential knowledge, the fishers of Kasai choose to apply different kinds of gears, such as the trammel net, gill net, mini-trawl and long line during different seasons and in different fishing grounds, depending on the availability and catch of shrimp and fish resources. Some fishermen strategically take more than one type of fishing gear on board per trip. For example, they may have a trammel net and a gill net or a trammel net and a long line in the boat, depending on their calculation of the spatial and seasonal distribution of the catch (Table 5.1).

Table 5.1 Gear diversification in Kasai (N=97)

Type of fisher*	Number of fishers per type of gear					Total
	Trammel net	Mini trawl	Long line	Gill net	Crab catcher	
Trammel netter	60	3	11	6	2	82
Mini trawler	3	17	2	0	2	24
Long liner	0	1	4	0	1	6
Gill netter	1	1	4	9	0	15
Crab catcher	0	0	0	1	7	8
Total	64	22	21	16	12	135

*Classification based on self-identification and reports according to the dominant gear used.

There is an important local time arrangement for fishing. Trammel net fishers, for instance, go fishing according to the lunar calendar based on the tidal movement of the water. The local name for low tide is *konda* or *guris* and high tide is called *nyorong*. They fish starting from the first day of the month, following the Arabic calendar, until the seventh day. On the eighth day, called *air mati* and the ninth, called *gila-gila*, fishers stop fishing because of the low tide, as the net cannot move because of the lack of current. Fishing operations may be continued on days ten to twelve. Then they stop fishing again for the five days between the thirteenth and the seventeenth days, as the tide is then high. High tide (*air besar*) occurs on the fifteenth day, indicating the appearance of the full moon (*bulan purnama*). This temporal scheme of fishing is then repeated during the next two weeks. Thus, in the case of trammel net fishing, fishers may be effectively fishing for fifteen to twenty-four days per month, depending on their personal and social conditions and obligations (Chapter 3). Most fishers do not fish on Fridays because they are Bugis Moslems. Fishers also recognise seasonal peaks or low periods for fishing. There are three seasons to fish, namely, the north season, the transition season and the south season. The north season from November to March is a good time especially to catch shrimp because the northern winds make the sandbanks more accessible. This is followed by the transition season between April and May, which refers to an uncertain time for catching shrimp or fish. Finally, the south season from June to October is perceived by fishers as the bad or lean season *(paceklik),* when shrimp or fish harvests are low and the waters are rough.

Shrimp fishing is aimed at catching *udang putih* or white shrimp (*Penaues indicus*) by using a trammel net *(jaring gondrong)*, and catching *udang windu* or tiger shrimp (*P. monodon*) by using a mini-trawl. Most fishers (seventy per cent) depend on local entrepreneurs-patrons (*punggawa*), to whom they deliver their catch against a fixed price, as they cannot easily access the traders themselves who pay a

better price (Chapter 3). These *punggawa-sawi* or patron-client networks are common in the socioeconomic environment of eastern Indonesia and Kalimantan, where the coastal population consists of waves of Bugis migrants and where Bugis are the dominant social class. Patron-client relationships are asymmetric, but characterised by mutual dependency between fishers (clients or followers) and entrepreneurs (*bos* or *punggawa*), who often occupy political positions in the local arena based on services exchanged in the economic and political realm (Gunawan, 2008; Acciaioli, 2000; Pelras, 2000).

5.5 Access to coastal space

Access involves the differential ability of actors to own, control and otherwise claim a particular place by means of rules and social norms (Ellis, 2000) and it is a prominent issue in fisheries-based livelihoods because of the mobility of its resources. It is important to investigate how fishers in the Berau delta of the Marine Park Area can access the resources, mainly shrimp and fish, by looking at the social, cultural and economic values attached to them. We look at the interdependencies between the needs, interests and values of local fishermen, their bosses (*punggawa*), government officials and *andon* fishermen involved with marine resources exploitation in the delta, and show how these are to a large extent based on social and symbolic capital or trust (Adhuri, 2009; Acciaioli, 2000; Schrauwers, 1999).

In the Berau marine conservation area, access of small-scale fishers to coastal fisheries resources is not restricted by law. In fact, Law No. 31/2004 Article 61(1) states that Indonesian small-scale fishermen can freely fish in all fishing grounds of the Republic of Indonesia. This implies that marine spaces like the Berau MPA are *de jure* an open access resource area to local as well as outsider fishers, on the condition that they use artisanal gear and boats. Recently, this definition has created much dispute, as it is no longer self-evident who the small-scale fishers are (Visser and Adhuri, 2010).

During the first author's stay in the Berau delta, it was interesting to observe that small-scale fishers from three different villages create one 'fishing community'. A community here is not defined in terms of political-administrative boundaries, but in terms of a social community of interest of those who access certain marine resources (Berkes et al., 2001). They know who is fishing with what gear, and from which social and ethnic group they originate. In the coastal frontier of East Kalimantan, Bugis, Wajo, and migrants from other places of origin in South

Sulawesi have often blended into the local self-identified assemblage of 'Berau people'. A second dominant group is the Bajau or Bajo originating from the southern Philippines (Chou, 1997; Sather, 1978). In the different fishing grounds they create a particular social configuration of local fishers who are classified by gear. For example, most fishers in Teluk Semanting and some from Pegat Batumbuk are gill netters (*nelayan pukat*) who catch economically valuable fish, such *bawal (Pampus argenteus), perak (Gerrs oyena), kakap merah (Lutjanus bohar), kakap putih (Lates calcalifer), arut (Pomadasys hasta), senangin (Polydactilus plebius)* and *tenggiri (Scomberomorus sp)*. In Kasai they are mostly trammel net fishers (*nelayan gondrong*) who catch white shrimps (*Penaues indicus*). Also, fishers from Kasai using mini-trawls and long lines targeting tiger shrimps are operating in Kasai's fishing grounds. Conversely, fishers from other villages along the Berau coastline may have the legal right to access the same fishing grounds and use the same gear, but they are culturally and economically regarded as outsiders by the fishers of the delta (see below).

5.6 Local names of fishing grounds

Fishers recognise several good fishing grounds according to seasons and gear usages. They seem to have a day-to-day strategy to go fishing here or there, rather than any long-term planning, for example, by changing fishing gear or shifting fishing grounds in search of a better place. The strategy developed by fishers is not public knowledge, but individual or family knowledge. It may be kept within the family or shared with friends.

When local names of fishing grounds were asked about, both during focus group discussions and when interviewing individual actors, fishers often mentioned *Badak-badak, Gedung, Selalang, Buntungan, Daun Kuning, Pegat* and *Tengker,* which are commonly perceived as places where they prefer to catch shrimp (Figure 5.3). Together this marine area forms the trammel net fishing grounds. Since fishers may have more than one type of gear on board, they also use these grounds to fish by using mini-trawl or gill net. The map (Figure 5.2) shows which fishing grounds in the Berau delta are occupied by local fishers using particular types of gear.

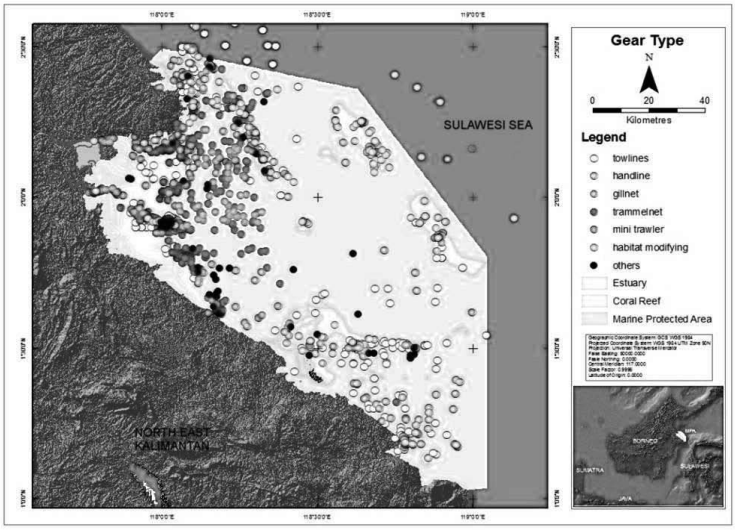

Figure 5.2 Map of fishing grounds per type of gear

Source: Adapted from Venstra (2007)

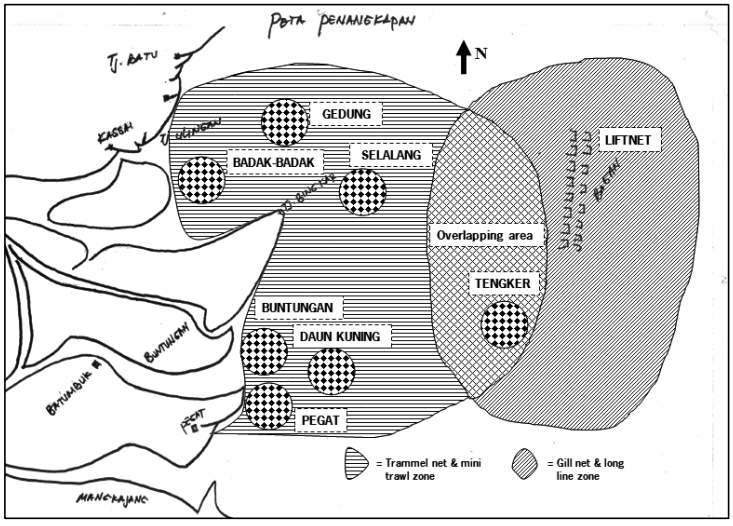

Figure 5.3 Map by first author of main fishing grounds of Kasai in the MPA in 2009

In Kasai, Teluk Semanting and Pegat Batumbuk, we elicited a map of local fishing grounds covering the first few miles of the delta within the MPA (Figure 5.3). Close to the coastline are the fishing grounds for trammel net and mini-trawl fishers catching shrimp in the estuarine waters. More than three miles seaward is generally the place for gill net and long line fishing. Figure 5.3 shows the fishing grounds up to about six miles and indicates where local and outsider fishers access resources, as well as the types of gear they use. The overlapping fishing grounds are particularly interesting since these are the places where the presence of outsider fishers may lead to social conflict with local fishers (see below).

5.7 Implication of MPA zoning on access to fishing grounds

Recently, the formal boundary marking and zoning of the Berau MPA has become a tool in the hands of the local government together with the international environmental organisations to ensure their multiple – and ambitious – objectives, such as the sustainability of artisanal fisheries, patrolling and law enforcement against illegal and destructive activities, the development of alternative livelihoods, the financial sustainability of MPA management and the creation of strong legal foundations for marine conservation (WWF, 2006). The Berau marine conservation area has been designed as a KKLD following UU 31/2007. This law prescribes the formalisation of a zoning plan. According to the Draft Zoning Plan for the Berau MPA, the marine space will be divided into a core (no-take) zone, a buffer zone, a utilisation zone and special zones. This draft plan shows that local small-scale fisheries can only access the utilisation zone under certain conditions, although according to Law 31/2004 they are entitled to access the whole fishing area of the MPA. For instance, the no-take zone is designed in such a way that it is permanently closed for all users and activities, except limited programs such as research, rehabilitation, species enrichment, limited tourism and monitoring actions. Table 5.2 lists the different MPA zones, as decreed by the district government supported by TNC/WWF, and the activities permitted and prohibited based on environmental criteria, yet without any reference to the formal fisheries zoning (*jalur*).

Table 5.2. Zoning Plan of Berau MPA

Name of zone	*Allowed activities*	*Prohibited activities*
No-take zone	Monitoring, rehabilitation, research, species enrichment and limited tourism by permit and special badge	Unauthorised entry, anchoring, except at allowed sites, taking biota from land and marine waters, habitat destruction, fishing, aquaculture and building houses
Buffer zone	Allowed to pass, rehabilitation, research, species enrichment and limited tourism	Like a no-take zone except allowing entrance
Tourism utilisation zone	Tourism visits, diving, water sports, scientific tourism, monitoring, rehabilitation, species enrichment and research	Taking land or marine waters biota, resource destruction, destructive fishing (using cyanide, electricity, potash)
Aquaculture zone	Sustainable marine culture and ponds	Unsustainable aquaculture practices, using pesticides, using live feed, except for cultivation, and overfeeding
Fishing zone	Taking, utilising and catching marine biota	Destructive fishing using cyanide, electricity, potash, taking and catching protected biota, including turtle eggs, fishing in certain seasons and places
Residential and public facilities zone	Housing developments, offices, jetties, ports, HH industry, mosques, restaurants, hotels, resorts *etc.* according to regulations	Housing or infrastructure development in places sensitive to hazard, unsustainable development
Maritime zone	Shipping zone, boats and other modes of transportation	Fishing, aquaculture and activities blocking marine transportation traffic
Research and training zone	Research and training activities	Fishing, aquaculture and activities not related to research and training

Source: Adapted from Pemerintah Kabupaten Berau and TNC-WWF (2009, 47).

When we place the map of Figure 5.2 on top of the zoning plan, it becomes evident that most of the no-take zone and the buffer zone sites are fishing grounds of the local fishers. At the presentation of the zoning plan in 2009, only one fisher from Derawan Island was invited. He told the audience that the no-take zone should not overlap with fishing grounds. However, fishers in Kasai in the delta were not invited and did not know about the plan. When the first author discussed the zoning with them, they said that they would not object to the plan unless it affected their fishing grounds. Evidently, the result of the draft zoning plan does not take the perceptions and livelihood practices of the local fishers seriously. In effect they were excluded from communication, participation, and decision making, quite contrary to the formal objectives of the very environmental organisations who were instrumental in formulating the plan.

5.8 Conflicts over access to fishing grounds

Usually, conflict over access to fishing grounds is known to occur either within small-scale fisheries groups, between users of different types of gear or between small-scale fishermen and *andon* fishermen in the coastal areas of Madura and Java, such as in Sidoarjo, Probolinggo, Pasuruan and Lamongan (Kusnadi, 2002). The most common conflict is that of large trawl operators or *pukat harimau* against artisanal fisheries. Other cases are recorded from the Sulawesi Sea relating to purse seine fishermen (Butcher, 2004) and the Nunukan border conflict (Visser and Adhuri, 2010). It is generally acknowledged that fisheries conflict may result from the contestation between locals and outsiders who claim access to the same fishing grounds, particularly when resources are scarce. However, our research shows that conflicts within one single artisanal sector may also occur when resources are abundant, and that contention is less often caused by material than social boundaries and political contexts.

Keeping up relationships and mutual trust between fishermen using similar types of gear within the coastal fishing community is often more important than complying to normative rules like fisheries zones and the local prohibition to use mini-trawls in the rivers of Kasai and Pegat Batumbuk, especially under conditions where most fishers depend on patron-client networks. This paper presents a clear example of how social and symbolic capital, including perceptions of familiarity and trust, shape locally valued action, producing flexible and sometimes conflicting interpretations of what is legal or illegal, licit or illicit, in the fishery-based livelihoods of Berau, thus creating permeable boundaries of the MPA.

The struggle over fishing grounds within the Berau MPA takes place between the fishing community of Kasai, Teluk Semanting and Pegat Batumbuk, on the one hand, and *andon* from Nunukan district (mostly Sungai Nyamuk), on the other. The local fishing community have been living in the Berau delta in the three villages for years. Most of the local fishers descendants of Bugis and Bajau, ethnic groups found predominantly in Sulawesi. The latter have migrated into the Berau delta from the Pasir district in the southern part of the province close to Balikpapan, particularly the villages of Pasir Mayang, Muara Pasir, Air Mati and Pondong. Oral history has it that the local Bajau and Bugis may first have migrated from Pasir to Berau delta around the 1990s. They are not regarded as outsiders, and have been allowed to fish in the marine space of the delta fishing community for many years.

5.9 Who is an outsider (*andon*)?

The Ministerial Decree of Marine Affairs and Fisheries No. KEP.13/MEN/2004, Article 1(2) concerning the guidelines for the monitoring of *andon* fishermen in managing fish resources states:

> *"An andon fisher is a fisher who is fishing in the marine waters by using a vessel that is not more than thirty GT or has an engine that is not more than ninety HP, accessing changing or shifting fishing grounds so that such fisher will be staying only temporarily or residing for a relatively longer period in a fishing port outside his original fishing home" (author's translation).*

Kusnadi (2002) states that *andon* or *andun* means to search for a livelihood or income in places outside one's own that harbour potential fisheries resources, while at home less or no fish is available. *Andon* fishermen enter the coastal area of Berau during about two calendar weeks (*satu air*). Most *andon* originally come from Sungai Nyamuk in the Nunukan district and some from Tarakan near the Malaysian border, north of Berau. They have to report to the district Fisheries Office in Tanjung Batu, which serves as the entrance gate to get a permit. The branch officer told me that *andon* have to pay IDR 25,000 to get a permit or Letter of *Andon* Identification *(SKNA: Surat Keterangan Nelayan Andon)* per fishing period, irrespective of how often they enter during that two-week period. This is a fee that they have to pay to the local government of Berau. According to the district regulation, the fee amounts to two per cent of the (expected) total value of the catch during that period. The officer also said that the *andon* fee of IDR 25,000 was just to make it easier to follow the district regulations (*Perda)* instead of actually weighing and collecting the two per cent of the fish catch from the outsider fishers.

In fact, it is not too difficult to visually distinguish local fishers from *andon* fishers. This is on account of the specific architecture of the outsider's boat, a so-called *kapal panjang* or *jungkung,* which is approximately twelve meters long in comparison to the average nine meters of the local boats, and the fact that they also put little coloured flags both in the middle and at the edge of their boats. *Andon* have forty gill nets per boat, which are about four times the size of the local nets (one net = twenty-five meters).

The Fisheries officer explained that officially the *andon* fishers have to go back home to Nunukan when their permit is not valid anymore. To renew the permit they should apply again to the officer in Tanjung Batu. However, during talks with *andon* fishers in Pegat they conveyed that if their fish catch is insufficient, then they

remain where they are instead of coming to the office to extend their permit. After waiting for five days (at *air jadi*), they go fishing without having a valid *andon* permit in hand. If the catch is good, they subsequently travel back to Nunukan. This shows how *andon* balance their costs of catching fish and fuel, and how the local government may lose opportunities to attract fees from them.

5.10 The Berau waters as *andon* destination

In January 2008 the first author visited a group of outsider fishers staying in the Pegat area. They were from Sungai Nyamuk of Nunukan. He saw five *andon* boats anchored in the waters around the hamlet. One *andon* fisher told him that they usually stay in Pegat for about 15 days before returning to Nunukan. Effective fishing trips take place for one week, and they take five days off due to high tides. The fish they catch are actually the same species that they fish in Nunukan, such as pamfret (*Pampus argenteus*) or *bawal*, red snapper *(Lutjanus bohar)* or *kakap merah*, giant perch *(Lates calcarifer)* or *kakap putih*, and grunter (*Pomadasys hasta*) or *arut*. Yet, they are attracted to Berau because the catch in Nunukan, according to their view, is smaller than in the Berau waters. The trip from Sungai Nyamuk to Berau lasts two days. They have to stay overnight in Tarakan, and the following day they arrive at Tanjung Batu. The outsider fishers take the good catch to Nunukan and sell a mix of fish like *otek* or catfish and other less economically important species to traders in Pegat or in Teluk Semanting.

It is important to know how *andon* perceive the Berau fishing area. They see it as a good fishing place as it is close to a river, even though the Letter of Agreement excludes *andon* from zone Ia, and permits them only to access zone Ib (Table 5.3). They prefer fishing in zone Ia since it saves fuel consumption. However, the *andon* were not co-signatories of the agreement (see below). They tactically start from three miles at sea, but their net may drift closer to the river mouth with the current. If a patrol boat from the Fisheries Office together with the navy found them in the 'wrong place' or in the zone Ia they would argue that the movements of the gill nets are unpredictable at sea, and that they did not go there on purpose.

When asked how they knew about the wealth of the Berau waters, they said they heard from friends who had already been there. The decreasing yield and increasing number of fishermen in their home fishing grounds around Nunukan have attracted them to Berau to fish. Both local government and the fishing community are paying serious attention to the problem of outsiders coming in. The gill net fishers of Teluk Semanting are most critical of outsiders' presence in their

waters. However, the dilemma is that the local fishers of the Berau delta wish to exclude the outsiders, whereas these small-scale *andon* fishers have the legal right to fish anywhere, including in the Berau coastal waters.

Interestingly, along with their legal right to access Berau waters, the *andon* were actively welcomed by the Fisheries Office *(Dinas)* of the Berau district, whose officer tried to legitimise their access by means of an agreement between all local stakeholders. This Letter of Agreement served to monitor the fishing activities of *andon* and was signed on 12 October 2006 in Teluk Semanting by quite powerful institutional actors including the head of the district's Fisheries Office, the heads of the three villages, the chiefs of the community groups for surveillance (*Pokmaswas*) of the three villages, informal leaders of the three villages, the head of Tanjung Batu subdistrict *(Camat)*, the head of the subdistrict army *(Danramil)*, the head of the subdistrict police *(Kapolsek)* and Fisheries field officers.

In our view there are still a few weaknesses regarding this signatory agreement. First, it was not an agreement between the two opposite groups of gill netters, namely *andon* and local fishers. Both have, as part of the sector of Indonesian artisanal fishers, the same legal right to access all Indonesian waters, including the Berau MPA. According to this regulation concerning the rights of artisanal fishers, *andon* should have an equal position with local fishers who receive technical assistance from provincial or district-level fisheries extension officers. Moreover, the agreement was aimed at controlling access and forcing *andon* to comply with regulations governing fishing in zone Ib; it was not meant for solving the imminent problem of the contestation of the border between the zones Ia and Ib. Thus, there is no formal or legal ground to differentiate the treatment of or benefits from the Berau government to *andon* and local fishers, which makes the government requirement for *andon* to pay for an access permit illicit and illegal.

Table 5.3. Translation by first author of Letter of Agreement of local fishermen in Teluk Semanting, Kasai and Pegat Batumbuk concerning the fishing permits for andon

Categories	*Description*
Boundaries	The boundary of the fishing ground for *andon* is the border between zones Ia and Ib at 3 miles from the lowest tide marked by lighthouse *(mercusuar)* or the eastern side of Kampung Teluk Semanting at the geographical position of 02° 158'908" N and 118° 172'973" E, and the coal loading site or southeast side of Kampung Teluk Semanting at the geographical position of 01° 928'270" N and 118° 089'526" E.
Obligations	*Andon* must have a fishing permit *(surat izin penangkapan ikan)* issued from the Marine Affairs and Fisheries office from their place of origin and an *andon* fishermen identification letter (*SKNA*) that is issued by the Marine Affairs and Fisheries office of the Berau district; *The andon* has to report their arrival and the catch and also pay fee of fisheries production; *They have* to comply local customs and regulations in area they are visiting. *They have* to keep a good relationship with local fishermen.
Sanctions	The first sanction consists of three consecutive warnings: a written warning followed by stopping the fishing permit temporarily and withdrawing the fishing permit as well as SKNA. The second sanction is the confiscation of fishing gear if the offender persists in fishing in the wrong place. The third sanction is the confiscation of the fishing boat and gear used by *andon* fishermen.

Source: DKP Berau (2006) personal communication

Lastly, the effective implementation of the agreement is problematic since *andon* fishers were not formally invited to co-sign the agreement. It was evident during the field research period that the problem of outsiders fishing in the Berau waters with or without permits remains according to local fishers. In a focus group discussion on February 13, 2009 in Kasai the fishermen raised the issue of *andon*, since it was directly affecting their livelihoods. They requested that the staff of the Fisheries Office, who were also present, to immediately take up the problem and find a solution to reduce the number of *andon* entering their fishing grounds. Evidently, even two years after the signing of the Letter of Agreement in 2006, nothing had changed. Recent visits to Berau made clear that in 2010 the problem persisted. The survey results show that the presence of *andon* in the Berau MPA waters is the most important problem perceived by local Kasai fishers (Table 5.4).

Table 5. 4 Sources of problems perceived by fishers (N=97)

Type of fisher	Sources of problem								Total	%
	andon presence	%	fishing zone conflict	%	gears conflict	%	water pollution	%		
Trammel netter	45	*32*	18	*13*	14	*10*	8	*6*	85	*61*
Mini trawler	10	*7*	3	*2*	8	*6*	6	*4*	27	*19*
Long liner	3	*2*	2	*1*	1	*1*	0	*0*	6	*4*
Gill netter	8	*6*	0	*0*	1	*1*	1	*1*	10	*7*
Crab catcher	5	*4*	4	*3*	2	*1*	1	*1*	12	*9*
Total	71	*51*	27	*19*	26	*19*	16	*11*	140	*100*

Note: The total number of the answers is more than the number of respondents because a respondent could give more than one answer. Percentages in the columns refer to the percentage of the total numbers of fishers who mentioned the previous column's label as a problem.

5.11 An attractive source of regional income

Why would the district government of Berau be interested to attract outsider fishers, whereas the fishers' community in the Berau delta obviously would prefer to control the access of these competitors for the same resources? Why does the district government collaborate with TNC and WWF to create a marine conservation area, and at the same time allow more fishers to come in, even if they do not land their catch in the district, but go back home to Nunukan? There is a clear connection between the influx of *andon* fishers and their obligation to pay fees to the district's Fisheries Office, on the one hand, and the local government's need for a sustainable regional income (PAD) in the context of fiscal decentralization (Hira and Parfitt 2004), on the other hand. In the era of decentralisation Indonesian district governments have to generate their own income originating from the economically most productive sectors.

To increase the PAD regional income the Fisheries Office of the Berau district planned to earn IDR 150 million in 2008. To meet this target the office in the district capital of Tanjung Redeb authorised all field fisheries officers to collect as many fees, taxes, or other formal sources of revenue from economic activities in the fisheries sector. Thus, the Fisheries officer in Tanjung Batu, for example, started to collect fees from *andon* fishers, from permits for lift net (*bagan*) construction to taxes from aquaculture business. He expected that the contribution to the regional budget from his Tanjung Batu office would be about IDR thirty million, and he was sure he would accomplish this target. Yet, if the fisheries revenues from Tanjung Batu were to come from *andon* fees alone, this would mean that 1,200 outsider boats needed to be attracted during each two weeks period.

So, on the one hand, intrusion into MPA waters by *andon* is legitimised by the local governmental actors and, on the other hand, it is seen as illegitimate and illicit by the environmental organisations and the local fishers.

5.12 Conclusion: Illegitimate and illicit

Small-scale *andon* fishers have the legal right to access coastal waters in Indonesia, thus to cross the borders of the fishing grounds in the Berau coastal waters. Yet, the Berau district government's regulation excludes them from zone Ia to prevent conflict with local fishers. Also, in 2005 the coastal waters including the Berau delta have been formally decreed as a marine conservation area (MPA or MCA) and later in 2007 as a KKLD. However, the same district government that collaborated with the international environmental organisations in the establishment of the marine park are welcoming outsider fishers (*andon*) and legitimising their fisheries activities by issuing a fishing permit for two weeks entry - an attitude that reminds us of the governmental attitude towards illegal logging a decade ago (Casson and Obidzinski, 2002). As a result, *andon* keep coming in, and the Berau fishers' community contests the presence of the *andon* as competitors in their fishing grounds. They see the *andon* fishers from Nunukan as illegitimate, but they lack the legal ground to exclude them from what they see as their fishing grounds. Thus, outsider small-scale fishers' access to the Berau waters is legal by national law, and legitimised by the need for additional district income, but seen as illegitimate and illicit, both in the eyes of the local fishers' community and the international environmental organisations who try to create marine conservation areas and curb over-exploitation of fish in the coastal waters of Berau. The political and economic demands of the decentralised government thus make the boundaries of the MPA quite permeable.

Notes

[1] The first author is a member of staff of the Department of Social Economics of Fisheries at Mulawarman University, Samarinda. He is grateful to the Wageningen INREF-RESCOPAR program, and the Chair and the group of Rural Development Sociology at Wageningen University (WUR), for their scientific and financial support to undertake his PhD studies.

[2] Data on catches per type of gear are beyond the scope of this paper but can be found in Chapter 3 Table 3.10.

[3] The zoning plan was part of the Management Plan of the Berau MPA. The draft report was presented to the *bupati* or district head of Berau in Tanjung Redeb on 10 February 2009 by the Mulawarman University team on behalf of the Joint Programme of TNC-WWF. The meeting

was also attended by the Vice-*Bupati*, the MPA Coordinating Body members, almost all of the heads of the regional offices (*Dinas*) in Berau, and the environmental organisations.

[4] *Nelayan andon adalah nelayan yang melakukan kegiatan penangkapan ikan di laut dengan menggunakan kapal perikanan berukuran tidak lebih dari 30 (tiga puluh) Gross Tonnage (GT) atau yang mesinnya berkekuatan tidak lebih dari 90 (sembilan puluh) Daya Kuda (DK) dengan daerah penangkapan yang berubah-ubah atau berpindah-pindah sehingga nelayan tersebut berpangkalan atau berbasis sementara waktu atau dalam waktu yang relatif lama di pelabuhan perikanan di luar daerah asal nelayan tersebut*.

[5] *Andon* stay for some time and may be found in the places like Pegat, Tanjung Batu, Pisang-Pisangan and Teluk Semanting. They usually form a group, which generally consists of 10 boats, with each boat occupied by two or three fishers.

[6] The law and regulations referred to in this letter of agreement are: (a) Law No. 31/2004 concerning fisheries Article 7 (2c), Article 6 (2) and Article 27 (1); (b) Government Regulation (PP) No. 54/2002 concerning fisheries enterprise Article 15 (2a); (c) Minister of Agricultural Decree No. 392/KPTS/IK120/4/1999 concerning fishing zones; (d) Minister of Marine Affairs and Fisheries Decree No. KEP.13/MEN/2004 concerning guidance of monitoring *andon* fishermen in managing fish resources.

[7] Realisation of PAD revenues for the whole of Berau district in 2007, according to the Fisheries officer, was IDR 132 million. He also mentioned that the target for Kasai village to get a contribution to the PAD of IDR eight million in 2007 and IDR nine million in 2008 respectively (interview, January 2008).

Chapter 6

Political networking, inclusion and exclusion: The role of Pokmaswas in the surveillance of coastal resources

6.1 Introduction

This chapter investigates how a locally embedded government institution, affects, and is affected by, the everyday dynamics of fishers' and government officials' practices. Particular attention will be paid to their political-economic networking to serve their interests in the management of the coastal resources of the Berau delta. The first objective is to show local actors' practices in controlling fisheries resources in the newly created MPA of Berau through the socially embedded institution named Pokmaswas *(Kelompok Masyarakat untuk Pengawasan Sumberdaya Perikanan dan Kelautan)*, a village-based organisation for coastal resources surveillance established by the Fisheries and Marine Office of Berau following Ministerial Regulation No. 58/2001. The collaboration between national and local institutions, takes place in an era of administrative and political decentralisation. Therefore, the different views about the marking of coastal boundaries between the different levels of government need to be addressed first (see section 6.2). It is followed by a discussion on the establishment of an MPA as a common pool resource (CPR) by local government and international NGOs and the role of central government in this policy. In section 6.3, I will discuss the origin of Pokmaswas and how decentralised political practices affect the role and functioning of Pokmaswas in the coastal villages of Berau regarding the monitoring of inclusion and exclusion of local fishers and outsider fishers or *andon* in accessing the coastal resources.

The second objective of this chapter is to show why the effectiveness of an embedded institution like Pokmaswas is problematic because of the political-economic networking of key local actors. In section 6.4, I will discuss how different social actors including outsiders or *andon* develop a political network and how social values, knowledge, interests and power regarding the marine protected area are contested.

6.2 Decentralisation and coastal conservation in Indonesia

Coastal and marine resources currently are becoming important. The growing knowledge of conserving marine space has led to the issues of commercialisation of the sea. Furthermore, coastal and marine resources are playing an important role in terms of conservation and sources of local people's livelihood as discussed in Chapter 3 and attracted andon fishers to enter the MPA as explained in Chapter 5.

In order to respond to the global need for managing marine space and fisheries on a sustainable basis, the Government of Indonesia (GOI), supported by international environmental organisations such as The Nature Conservancy (TNC) and the World Wildlife Fund (WWF), has implemented several marine conservation programs (WWF, 2006). In the province of East Kalimantan for instance, projects like MREP (Marine Resources Evaluation and Planning) and *Proyek Pesisir* (Coastal Project) have recently been implemented with the financial support from external donors. The MREP project was carried out in the coastal area of Samarinda-Sangkulirang in 1995. It was part of national MREP project and supervised by the Department of Internal Affairs *(Depdagri)*. The Proyek Pesisir was carried out in Balikpapan, and others were funded by the Joint Programme of TNC and WWF, like the marine conservation project based in the Berau district.

Indonesia entered the new era of decentralisation when Law No. 22/1999 as the first local autonomy law in Indonesia (Satria et al., 2006) and Law No. 32/2004 concerning Local Government (*Pemerintahan Daerah*) were enacted in which economic and political-administrative affairs were devolved from central government to district government. The marine protected area (MPA) of Berau was formally and internationally launched in 2005 by the district head of Berau on the basis of the Bupati Regulation No. 31/2005. This coastal area is well-known globally for its biodiversity and the richness of its coral reef, sea grass meadows, mangroves, fish and shrimps. The park is part of the coral triangle area together with marine parks elsewhere in Indonesia, The Philippines, Malaysia, Papua New Guinea, Timor Leste, and the Solomon Islands and includes about 507 coral species (Hoeksema, 2004; Wiryawan et al., 2005; http://www.coraltrianglecenter.org/). The Berau MPA constitutes 1.27 million hectare located between Karang Pulau Panjang and Karang Baliktaba in the north, facing Makasar Strait in the east, and the Cape of Mangkalihat in the south. It was launched by the district of Berau in 2005. The government of Indonesia established 31 MPA by 2008 and is targeted to

have 20 million hectares of marine protected area by 2020 (MMAF 2011a; Mulyana and Dermawan, 2008).

The abundance of fish and shrimps is also significant as a source of small-scale fisheries livelihoods. It attracts not only local fishers but also fishers from outside are eager to come to Berau to search for a better life (see Chapter 5). If we look at the fishing villages in the Berau delta, many of their inhabitants came from Sulawesi or Pasir and other places (see Table 3.2). In this thesis I use the term Marine Protected Area (MPA) to translate the term *Kawasan Konservasi Laut (KKL)* in the Berau district. Siry (2006: 277) has reviewed coastal zone management (CZM) in Malaysia and Indonesia and found that for almost five decades CZM in Indonesia suffered from a legal ambiguity between different laws and jurisdictional disagreement. Taking an example from the case of boundary marking in the Berau MPA in which different boundaries were made between central and district governments (see the case below). In fact, there seems to be a double sided and sometimes opposed set of needs for coastal management (Visser, 2004). On the one hand, there is the need of coastal conservation in order to protect and preserve globally endangered species; on the other hand there is the need to sustainably manage national and regional fisheries.

The government has enacted Law No. 27/ 2007 concerning the management of coastal areas and small islands, which has been strengthened by Law No. 26/2007 concerning spatial planning (*Penataan Ruang*) the renewal and improvement of Law 24/1992. However, Law 26/2007 does not cover spatial planning in the coastal areas. Both the Laws No 27/2007and 26/2007 were issued basically to support Law No. 32/2004 on regional autonomy in which the fixed boundaries are mentioned where the district and province have the authority to manage their resources within 4 and 12 miles off the coast, respectively. These are explicated in article 18.4 of Law 32/2004 differentiating the coastal authority between provincial and district government.

> *"The authority to manage resources in the marine areas in the same manner as stated in article (3) that extends up to 12 miles measured from the coastline seaward and toward the islands' waters belong to the province and one-third of the provincial waters belong to district/city."* (Article 18 (4) Law No. 32/2004 concerning Local Government (Pemerintahan Daerah).

In the same vein Satria et al. (2006: 442-443) pointed out that Law No 22/1999 on Local Government institutionalised the new authorities on marine fisheries management in which the coastal waters up to 12 miles from coastline are under provincial government authority and within these 12 miles, there are 4 miles under the authority of the local or district government (articles 3 and 10). Furthermore, under Law 32/2004 the central government has authority and jurisdiction to explore, conserve, process, and exploit the resources beyond the 12 miles up to 200 miles (Siry, 2006: 275). In addition, it is stipulated that both provincial and district governments have six tasks to undertake in the management of their decentralised zones namely (i) exploration, exploitation, conservation and management of coastal resources; (ii) administrative affairs; (iii) zoning and spatial planning affairs[33]; (iv) law enforcement of the regulations issued by the districts or delegated by the central government; (v) participation in the maintenance of security and (vi) participation in the defense of state sovereignty (idem).

The decision making about the boundaries and its implementation has proven to be far from easy. The key issue is the question whether measurements should start from the mainland coastline or from the Derawan Islands in front of the Berau Delta. This dilemma became evident during the public presentation of the Berau MPA management plan to the Mayor of Berau held in Tanjung Redeb in 2009 by representatives from the district offices who were involved in the making of the coastal strategic plan document. The meeting was attended by district parliament members and executives of the Berau district. When I indicated that clarification of the boundaries of the MPA were needed according to Law No. 27/2007, which was launched after the Berau MPA formalisation in 2005, it became clear that there is no mutual understanding about coastal boundaries, particularly whether they should be measured from the coast line or from the starting point of the Derawan islands. The different formal arrangements can be seen between the map of provincial and district government (Figure 6.1) according to Law 32/2004 (see article 18 (4) above) provided by Bakosurtanal (National Coordination Agency for Surveys and Mapping), and the MPA boundaries map defined and designed by TNC-WWF (Figure 6.2) and this has been adopted by the district head of Berau. This implies that the coastal area of district government has become bigger than shown in the Bakosurtanal map. Thus if we use the Bakosurtanal map then the district does not have the authority to control their waters in the middle of the

[33] Based on Law 27/2007 article 7 (1) the management of coastal and small islands planning consists of the following documents: strategic plan, zoning plan, management plan and action plan.

MPA and the outer areas as these areas are indicated as belonging to the province. However, the district of Berau currently continues to use the MPA map and this was supported by the Joint Program (JP).

There are several problems in managing the coastal waters in Berau. Firstly, the district head, strongly supported by the financial and technical intervention of the international environmental donor organisations, has declared a marine protected area (KKL) as a kind of CPR, but as a technical project (Li, 2007) without participation of the fishers,whose livelihood depends on the coastal waters, in the decision making. Secondly, the boundaries of the KKL Berau are defined by District Head Regulation (*Peraturan Bupati*) 31/2005, article 7 (1) which states that the outer boundary of 4 miles is measured from the most seaward point of the Derawan Islands as the outer islands *(pulau-pulau terluar),* in accordance to the spatial planning (RTRW Berau) issued by District Regulation (*Peraturan Daerah*) No. 3/2004. Thirdly, District Regulation No. 5/2008 article 3 (a) stipulates that the fishery space *(wilayah perikanan)* under district authority covers the 4 miles measured from the coastline. The discrepancy between the two regulations issued by the same district authority produces legal and practical ambiguities for both the *Dinas* (Fisheries Office) and the fishers: The coastal waters between the coastline in the delta and the Derawan Islands are part of the legal fishery zone.

The seaward area up to 4 miles 'beyond' or east of the Derawan Islands is declared marine protected area by the district head, supported by TNC-WWF, and potentially will exclude small scale fishers. Fourthly, the map (Figure 1) from the Bakosurtanal shows that there is a small space or 'hole' in the MPA that is in fact under provincial, not district, management authority. I have searched for confirmation from the Provincial Fishery Officer in Samarinda, as well as from the Berau Fishery Office concerning fishing permits in the Berau waters. They confirmed that some parts within the MPA are under provincial authority. The overruling of provincial authority over district authority in this area (see Figure 6.1) implies that the district has no formal authority to issue and control fishing boats operating within that part of the MPA.

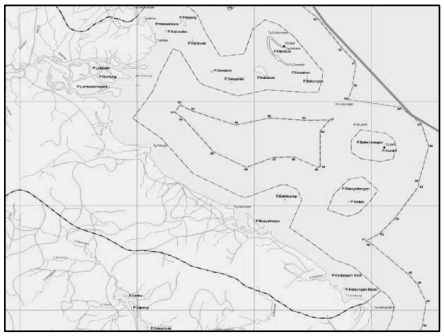

Figure 6.1 Map of marine management boundaries of the province and district government according to Law No. 32/2004.

Source: Bakosurtanal, 2004.

Data from the Berau Fisheries Office (2006)[34] shows that one of strategies of fisheries and marine development of the district is to enhance the surveillance and monitoring of fish and marine resources. By the creation of the Berau MPA therefore these became the main objectives and a priority of the integrated approach regarding the MPA besides the protection, conservation and utilisation of marine resources. The point is that the district will enhance coastal monitoring as it has been declared as an MPA and will limit fishers' access to fishing grounds. As shown on the map of fishing grounds per gear in the MPA (Fig 5.2. Chapter 5) we see that most small-scale fishers catch in the waters surrounding the small islands, in waters declared as no-take zone (Chapter 5, Table 5.2).

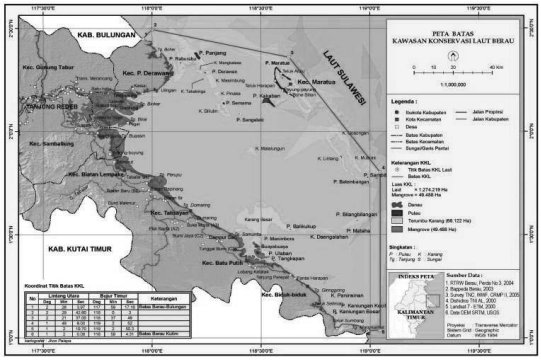

Figure 6.2 Map of the boundaries of the Berau MPA

Source: District Head Regulation No. 31/2005.

[34] Based on the Dinas Report entitled: *The implementation of Pokmaswas programs in the 32 villages of Berau*.

Even though the district of Berau has enacted the decree to establish the Berau marine protected area, I got the impression that the implementation of this regulation was very weak particularly during the period 2005-2009. I observed there was no significant conservation program implemented in the MPA during that period. Only in 2009 a new policy effort was undertaken. The Ministry of Marine Affairs and Fisheries (MMAF) in Jakarta offered and facilitated the district of Berau in creating a coastal and small islands strategic plan document. According to Law No. 27/2007 the district government has to create their own management documents, including a strategic plan for coastal areas and small islands (Article 7 (3)). The district head of Berau then agreed to develop the document with the support financial from MMAF and technical aspect from Mulawarman University, Samarinda.

Under the title of*: "We do not have to sacrifice people: MMAF develops a Strategic Plan marine conservation for the sake of the coastal community's welfare"* the district head explained:

> *"Marine conservation does not mean it has to sacrifice people's interests. For that reason the district of Berau, which is rich in marine resources, has created a strategic plan system (*Rencana Strategis*) for marine resources in order to balance conservation and community's interests."*((Kaltim Post, 5 September 2009, author's translation)

SABTU, 5 SEPTEMBER 2009 KALTIM POST

"Bukan Harus Korbankan Rakyat"

DKP Susun Renstra Konservasi Laut Demi Kesejahteraan Warga Pesisir

TANJUNG REDEB- Konservasi kelautan bukan berarti harus mengorbankan kepentingan rakyat. Oleh karena itu, Kabupaten Berau yang kaya akan hasil laut membuat sistem rencana strategi (Renstra) kelautan yang menyeimbangkan antara konservasi dan kepentinga masyarakat.

Dalam temu warga antara Bupati Berau Makmur HAPK, Wakil Bupati (Wabup) Ahmad Rifai, dan puluhan warga Maratua, Rabu (2/9) lalu, banyak warga mengeluhkan tentang wilayah konservasi.

Menurut mereka, konservasi hanya menguntungkan sebagian pihak, tanpa melibatkan kepentingan warga sekitar. Diketahui, ada beberapa pulau di sekitar Maratua yang dijadikan wilayah konservasi, seperti Pulau Sangalaki. Menanggapi hal itu, Wabup menuturkan, pemkab tidak akan menjalankan konservasi murni. Kebijakan-kebijakan itu masih dasarun di dalam renstra melalui Dinas Kelautan dan Perikanan (DKP) Berau.

IMAM/P

KAYA HASIL LAUT: Pulau Maratua kaya akan hasil laut. Tampak Bupati Berau memancing ikan di kawasan Maratua Paradise Resort.

Terpisah, Kepala DKP Berau Anwar mengatakan, peraturan tentang pembuatan bagan itu akan diatur dalam rencana strategi (renstra) kelautan yang menjadi dasar hukum untuk menindak berbagai pelarangan kegiatan di laut. Di samping itu, renstra tersebut juga dibuat untuk mendukung program 1.2 juta hektare kawasan konservasi laut di Bumi Batiwakkal.

"Di dalam renstra itu memang ada aturan mengenai pembuatan bagan. Selain itu, juga diberikan alternatif bagi nelayan bagan untuk memulai usaha baru," kata Anwar.

Diakui Anwar, memang tidak mudah untuk merancang renstra tersebut. Berbagai aspek harus diperhitungkan demi keuntungan semua pihak. "Jangan sampai kami menetapkan daerah KKL, namun merugikan masyarakat setempat karena tidak bisa menangkap ikan," ungkapnya.

Oleh karena itu, pihaknya sudah melakukan pembagian wilayah kelautan, yaitu daerah mana yang bisa ditetapkan sebagai KKL, dan bagian mana khusus kawasan penangkapan ikan. "Kami juga akan menyosialisasikan kepada masyarakat, daerah-daerah yang sementara waktu tidak bisa dijadikan kawasan penangkapan ikan demi kepentingan perkembangbiakan ikan," ujarnya.

Di samping itu, masalah implementasi ke lapangan juga harus dipikirkan. "Jadi jangan sampai kami ini hanya menyelesaikan tanggung jawab dengan sebuah dokumen, tapi *action plan* (rencana tindakan) juga harus dibuktikan," ucapnya.

Untuk itu, pihaknya akan berkoordinasi dengan beberapa dinas terkait, seperti badan lingkungan hidup, kehutanan, dan stakeholder lainnya untuk menentukan tugas masing-masing.

Terpisah, Bupati Berau Makmur HAPK menekankan kepada seluruh stakeholder wajib mendukung program KKL Berau yang telah menjadi komitmen pemda. (bm)

Figure 6.3 Kaltim Post, 5.9.2009

The above mentioned document mainly consists of the creation of the vision and mission of coastal management in Berau[35]. The document specifically relates to the Pokmaswas issue as in the coastal surveillance and monitoring section it is mentioned that the Pokmaswas institution is expected to become more effective. This is to say that the Fisheries Office of Berau planned to establish more Pokmaswas in other villages in order to reduce destructive fishing activities throughout the MPA.

The effectiveness of decentralisation of fisheries management in Indonesia depends upon the revitalisation and recognition of local institutions by central government (Satria et al., 2006). In line with the policy of the Minister of Marine Affairs and Fisheries it is necessary to establish a local institution like Pokmaswas and it is expected to be effective if the government gives more power and budget to this local institution to carry out the task of reducing destructive fishing practices.

6.3 The origin of Pokmaswas

In this section I will discuss the role of Pokmaswas as a locally embedded institution to assist the district government in combating destructive fishing practices in the coastal waters. Pokmaswas is the acronym for *Kelompok masyarakat pengawas* or Community surveillance organisation. It aims at controlling the fishing activities in both fresh waters and coastal waters according to the Decree of the Minister of Marine Affairs and Fisheries No. 58/2001. Pokmaswas was created in 2004 as a locally embedded institution (Cleaver, 2002) by the Provincial Fisheries Office (Dinas) in two villages namely Tanjung Batu on the mainland, and on Derawan Island. From these two villages destructive fishing activities were often reported, like bombing, potash fishing and the operation of trawls, and also the catching of green turtles by foreign fishers from Sulawesi, Java, Madura, Nusa Tenggara Barat, and Bali. As village-based surveillance organisations the Pokmaswas appeared to be effective, and since 2004 a total of 39 Pokmaswas have been established in Berau (see Table 6.1). With the establishment of Pokmaswas in

[35] The vision of the Berau coastal management was formulated as: To achieve the sustainability, security and welfare of Berau's coast and small islands resources (*Terwujudnya sumberdaya wilayah pesisir dan pulau-pulau kecil Kabupaten Berau yang lestari, aman dan sejahtera)*. In addition it has eight missions for development of which mission no. 6 aims to enhance the surveillance and monitoring of coastal and small islands resources.

these villages its members delivered many reports, especially about sea turtle catching in Pulau Panjang and its surrounding areas (see Table 6.2).

Table 6.1 Number of Pokmaswas established in Berau district in 2009

Tahun	Number of Pokmaswas
2004	2
2005	3
2006	20
2007	7
2008	7
Total	39

Source: Fisheries Office of Berau (2009).

Pokmaswas organisations throughout the district have indeed reported some illegal and destructive fishing practices to the Fisheries Office of Berau. Based on official data (Table 6.2) I show some evidence related to coastal violations in Berau. The violations range from illegally catching sea turtles to fish bombing, which is done by international, national and local offenders, the latter mainly from Derawan.

Table 6.2 Reported violations in relation to coastal surveillance in Berau

Date	Offenders	Origin	Type of Violation	Action taken
19-03- 2005	The ship named Wan Neng and 30 crews	China	Catching sea turtle and immigration violation	Legal process by Tarakan Navy
09-04-2005	The ship named Scocy and crews	China	Immigration violation	Legal process by Berau police
20-04-2005	Outsider fishermen and boat named Karya Nelayan	Tarakan	No fishing permit; having illegal fishing gears	Court sentence: skipper arrested for 6 months and the ship was freed
13-05-2005	Longliners (4 boats)	Pati (Central Java)	No fishing permit and fishing in restricted fishing zone	Offenders received consult from fisheries officer (*dibina)*
21-06-2005	Outsider Purse seiners	Nunukan	No fishing permit and fishing in restricted fishing zone	Offenders received consult from fisheries officer (*dibina)*
28-06-2005			Catching sea turtle particularly in Pulau Panjang	Searching for offenders
14-01- 2008	Salim bin Jepang Alimudin bin Jepang	Balikukup	Destructive fishing using potash and cyanide in Tanjung Perepat	Court sentence 8 months in jail

Date	Offenders	Origin	Type of Violation	Action taken
17-03-2008	Yusran bin Rani Ardanbin Abdillah	Derawan	Fish bombing in Karang Buaya water of Tanjung Batu	Court sentence 18 months in jail
27-04-2008	Sahdani Ganul	Derawan	Catching sea turtle (652 eggs)	Court sentence 9 months in jail
28-05-2008	Jumairi bin Amir	Derawan	Fish bombing in Pulau Rabu-rabu water	Court sentence 18 months in jail
14-06-2008	Ansyari bin Sahwi	Madura	Buying and collectors of *akar bahar* in Tanjung Batu	Court sentence 8 months in jail

Source: Report from Monitoring and Surveillance Section, Fisheries Office of Berau, 2009.

The description and discussion of the everyday practices of Pokmaswas in the research villages of Teluk Semanting and Kasai show that the reporting of illegal activities is severely hampered by the problem of inclusion or exclusion of outsider (*andon*) fishers by governmental actors and fishers communities. Pokmaswas members are sometimes in an ambiguous position. As a member of this governmental institution they have to report on andon activities, sometimes even in cases where co-villagers are involved. Also, there appear to be forces within the district government who are interested in the political-economic advantage of including andon rather than excluding them.

Figure 6.4 The extension officer together with Pokmaswas members checking the fishing permit of andon fishers in Pegat waters.

In Kasai and Teluk Semanting the Pokmaswas organisations were formed in 2007 and consisted of a head, a vice-head, a secretary and seven members. The

head of Pokmaswas in Kasai was Amin, a trammel net fisher, whereas in Teluk Semanting Murjani, a fish collector acted as the head. Heads of Pokmaswas were chosen by village members with the assistance of the Fisheries Office (*Dinas*). The ambiguous social and political position of Pokmaswas demands a clever networking by their heads. In section 6.3 I provide elements from the life histories of Amin, the head of Pokmaswas Kasai and of Ahmad, who is the assistant and brother-in-law of Murjani, the head of Pokmaswas Teluk Semanting to show they are able to create and sustain important political-economic networks and to maneuver in an ambiguous power field.

The assumption behind the institutionalisation of Pokmaswas surveillance organisations was that the coastal waters of Berau was declared a CPR by the district head and the Joint Program of environmental organisations (TNC/WWF), but not enacted as such. Fishers were not included in the decision making about the boundaries, and territorial exclusion of local fishers on the one hand, and a lack of control to exclude outsiders or andon from accessing the waters, on the other hand, was a key problem.

When I held a Focus Group Discussion (FGD) in Kasai there was lively discussion between local fishers and two field officers from Dinas, Salman and another colleague. Tension at the meeting increased when we started discussing the issue of andon presence. Anas, a Kasai trammel fisher and member of Pokmaswas said:

> *"How far does the authority stretch of that Pokmaswas, despite them having permits the andon have to be arrested, and between us we agree that they [andon] broke into [the fishing zone]. How should we construe that we are entitled, we have a say in it, we have the authority, but there has already been an arrangement by kecamatan [Fishery Office in Kecamatan Tanjung Batu]. Pokmaswas is worthless. They gave permits [SKNA] for the boats with full gear, so what does it matter that they [kecamatan officers] go to the field if the people who are victimised are people like us here in Kasai. So what is the value of the Pokmaswas' authority?"* He then added: *"the one who gives out the permits is in Tanjung Batu, but since Pokmaswas is set up to control the outsiders we should be informed quickly by that officer about andon presence, instead of him waiting until some conflict happens, and only then come into action."* (Anas, member of Pokmaswas Kasai, FGD Kasai, 13.2.2009)

Another fisher said:

> "*The locations of the andon and the trammel netters (*gondrong*) are too close to each other; it may happen that when we go home in the afternoon we accidently hit their gill net (*pukat*) because it is six meters high and goes into the water four meters, and it surfaces only about two meter, so we have difficulty evading it*." (Haruna, FGD Kasai, 13.2.2009)

Consequently, the atmosphere during the Focus Group Discussion became rather tense because the participating fishers were frustrated about the andon issue. It was said:

> *"We need steps to be taken quickly, and we want a decision because if the issue is left simmering it can occur again, and what if something happened and there is a victim, [we] would not know what to do with the body."* (Hasan, FGD Kasai 13.2.2009)

At this moment Salman, the field officer, said:

> "*Yes, I get your point; we will inform the Office that they should consider limiting the number of outsiders that is currently about 50 boats per 'one water'".* (Salman, FGD Kasai 13.2.2009)

The letter of identification of andon fishers (SKNA), which is locally known by the fishers in Kasai as the permit (*surat jalan*), is issued by the Tanjung Batu branch of the Fisheries Office for the northern part of the Berau district. In October 2006 a Letter of Agreement was signed between the Pokmaswas, the village head of Teluk Semanting, and the Fisheries Office (Dinas) in Teluk Semanting, stating that the Dinas should monitor the number of outsider fishers coming into the Berau waters, and should enforce the regulations concerning the fishing zone boundaries upon both andon and local fishers (see Chapter 5). But during the FGDs apparently fishers expressed their concern about the lack of any monitoring at sea to control the access of andon coming into their fishing grounds.

I had also discussed this issue a couple of months earlier with Amin, head of the Pokmaswas of Kasai, and with Ahmad, the secretary of the Pokmaswas in Teluk Semanting. Amin confirmed what the Extension Officer had said during the Focus Group Discussion, that the Fisheries Office in Tanjung Batu in fact allowed as many as 40-50 outsiders per 'one water' to enter Berau.
However, Ahmad interrupted by saying:

> *"That was information from the Fisheries Office, but they never go to the field, they have no idea about andon who are not reporting and who are not coming back home. There are passes for specific periods, like when there is no moon (*bulan gelap*) for 50 boats, and another pass for 50 boats coming in at full moon (*bulan terang*). These cards have white and blue colours, white for full moon means they are not allowed to come in when there is no moon and they have to go back; and if they want to come in at both times they must have the blue pass and come with a different crew. But since there is a lack of controls at sea, with controls only taking place on the land, they [andon] can hide or go in the middle of the night, they just wait and do not go home. In Pegat alone there are 20-30 boats. So, it is complicated, we want to prohibit it but we have no legal position to do so. But if we want to limit their numbers we may use a village regulation (*Perkam *or* Peraturan kampung*), that is all we are allowed to do . There is no way to get rid of them, even less so in this era of globalisation, they can just come in and take away our catch.* (Ahmad, Teluk Semanting, 23.5.2008)

From above interview fragments we see that Pokmaswas has no formal right to force andon out in order to prevent conflicts over fishing grounds. Later the problem further escalated when an andon fisher decided to position his gill net so as to block the route of the fishing boats of the local fishermen of Kasai when they go home in the afternoons, which often triggered a conflict.

Fishermen see the patrols (*patroli*) as an ineffective effort when in fact they have already reported the andon catching fish in the local fishing zone. They assume that the district government's only concern for patrolling is to get a contribution to the regional income (PAD), instead of going out to the field and to solve the problem. Ahmad told me:

> *"Sometimes when Dinas, TNC-WWF and Pokmaswas are on patrols it occurs that they do not meet the* andon *as they have gone home already. This means that they do not see the problems that bother the local fishermen. But in the period when no patrol is carried out, like three days ago in Kasai, we could see more than 50 foreign boats making claims to a part of the marine waters. When I went to see Pak Didik, the officer from Tanjung Batu about this, I told him that there were so many andon fishermen coming aggressively into the local fishing ground and taking away more and more of the catch, he replied: "Oh, is that all?" That was only his reaction.* (Ahmad, Teluk Semanting, 23.5.2008)

Amin subsequently added how andon work when they fish in Berau, that when their catch is low, they do not come back but send it through their trade relations.

Evidently, the agreement to impose a restricted fishing zone for both andon and local fishers was not working. To overcome this problem, FORMAL tried to organise a meeting in Pegat Batumbuk with the objective to communicate the regulations about the Berau MPA together with Joint Program of the environmental organisations. The results of this meeting were not clear according to Ahmad:

> *"When I came to Dinas in Tanjung Redeb I asked the officers there about the results. They said there were no results. Then I asked the same question to the Fisheries Office in Tanjung Batu, and I got same response, again they said that they did not know yet.* (Ahmad, Teluk Semanting, 23.5.2008)

It appeared that the very action of the Forum, whose head is also the vice-head of Pokmaswas in Pegat Batumbuk, created the controversies in controlling the resources in the Berau MPA:

> "*I heard what happened in Pegat Batumbuk, that Andi Erson as the head of the Forum has been cornered (*terpojok*) because he supported* andon. *While the fishers of Pegat who disagreed have protested, because Andi – who is a trader (*punggawa*) and the head of Pokmaswas in Pegat Batumbuk as well - received fish from many andon".* (Amin, Teluk Semanting, 23.5.2008)

Apparently, there are two realities. One is the reports received by the provincial government and the legal actions taken against foreign fishers who are caught while carrying out illegal activities (Table 6.2). But the other reality which tells an opposing story, is much less visible and even kept hidden by government officials.. Our ethnographic research in the villages of Kasai and Teluk Semanting and extensive talks, interviews, and Focused Group Discussions provide data that the district Fisheries Office is in fact more eager to attract or include andon in order to receive their taxes for a Letter of Andon Fishers Identification (SKNA), rather than excluding them from the MPA coastal waters of Berau. The resulting conflicts with local fishers are being disregarded. Moreover, powerful traders who are involved in a political-economic network with government officers, but who also have leading positions in Pokmaswas, give priority to receiving marine resources from the andon for private trade activities, instead of controlling access to the MPA. The

effective functioning of Pokmaswas as a locally embedded surveillance institution of the provincial government is thus seriously impeded by the implementers of lower level district government and private power holders. We will further elaborate this conclusion in section 6.4.

6.4 Political networking and inclusion of andon

The purpose of this section is to provide two cases of livelihood trajectories of Pokmaswas elites who create a political-economic network with government staff and andon fish buyers from Nunukan. In the first case, the functioning of the Pokmaswas in Kasai faced the problem of excluding the local mini-trawl fishers, while allowing access to the andon using mini-trawls as well. While in the second case, the Pokmaswas in Teluk Semanting included andon fish traders and fishers because of the importance of the social and symbolic capital for the private enterprise of the Pokmaswas member, rather than the public good of MPA surveillance.

The case of Amin, a trammel net fisher in Kasai and the head of Pokmaswas

Amin came to Kasai to follow his parents on January 1993 (see the life history of Amin in Chapter 3). In the beginning he worked for his nephew for five months and got approximately IDR 2 million. The net income from fishing was IDR 50,000 of which the income for two fishermen was divided into three parts, one for boat, one for owner and one part for the crew. From 2002-2004 Amin was appointed as general staff in *Kampung Persiapan* of Kasai. At that moment Kasai was formally or administratively part of Teluk Semanting village. As a staff member one of the tasks that Amin had was to make citizen ID cards for village members. When the village´s head election took place there were three candidates, namely Rahmani, an immigrant from Pasir, Haji Aminuddin who was incumbent staff, and Haji Bado a former village head of Teluk Semanting.

Amin had tried to improve his relationship with all candidates after the election. He admitted choosing Rahmani for the election since he was not comfortable with Haji Bado. However, since he wanted to keep the relationship with them all Amin then resigned from the village staff, even though he worked well in management matters in the office he said. He subsequently changed his patron from the original punggawa Haji Husin to punggawa Haji Aminuddin, his

patron still today, as during the village´s head election Amin did not support punggawa Haji Aminuddin

The Pokmaswas was established in Kasai on 23rd May 2006. The first meeting was attended by ten hamlets representatives. Officers from Dinas were Jein (Head of the monitoring and surveillance section), Salman (field officer for Kasai, Teluk Semanting and Pegat Batumbuk villages), and Surad from the local police. The result was that Amin was voted as the head of this organisation. The candidates were Amin, Hasan and Haruna. According to the Head of Berau Fisheries Office Decree No. 523/E2/13/2007 dated 2nd January 2007 Pokmaswas was formally established in Kasai. The organisation consisted of the Head (Amin), the Vice Head (Hasan), the Secretary (Haruna), and members (H.A. Zainuddin, Anas, Kasim, Basire, Badrun, Abdul Samad and Bahri). When JP created the local organisation called Forum or FORMAL (*Forum Masyarakat Nelayan,* Fishers' Community Forum) in Kasai[36], Haruna, as the secretary of Pokmaswas, became the head of Formal. During my talks with villagers I learned that the establishment of Forum in Kasai was not effective and its function was not clear.

I saw that the relationship between Amin and Salman, who was senior field officer in the Berau district, was very close like family. They had studied at the same SMP (junior school) in Batulicin South Kalimantan. Before coming to Kasai, Salman had worked in Talisayan. Once in Kasai Salman told me, *"if there is loan from district government or an invite to attend fisheries training etc, Amin is the person who I contact first and give him priority"* (Salman, Kasai, *28 January 2008).*

Cooperation between Salman as a representative of *Dinas* and the two Pokmaswas in Kasai and in Teluk Semanting was good. When I stayed in Amin's house during my field research in 2008 I witnessed Salman's regular visits to the house when he was in Kasai. Salman was also close to Amin's children and he always gave them small amounts of money to buy sweets. With the support of Salman, Amin went to Jepara as a representative from Kasai to attend a pond farming training. In training courses provided by the environmental organisations' Joint Program, Amin always participated on behalf of Kasai together with the Village Head. According to Salman, Amin is a fisher who is very eager to learn but unfortunately only had a senior high school (SMA) education , not one from a university. Amin once asked me, when we shared dinner at his house, if he can continue to study at Universitas Mulawarman. Amin himself wanted to continue

[36] JP also created Jaringan Masyarakat Nelayan (Jaman) for the district level as the upper organisation of the Forum at the village and sub-district levels.

to study at university or at least attend open university courses (*kuliah terbuka*) like Salman did.

Once, during a joint fishing patrol by Amin and some members from Pokmaswas Kasai, Ahmad and some members from Pokmaswas Teluk Semanting, and Salman from *Dinas,* a mini-trawl fisher was caught red-handed. Indeed, the use of mini-trawls in the Berau MPA is legally prohibited. Surprisingly, this fisher was Haji Singkong, the father-in-law of Samad, a Pokmaswas Kasai member who was participating in the patrol operation himself. When I later interviewed Samad I learned that eventually Samad had resigned from his Pokmaswas as he felt unhappy about the incident. This example shows that by capturing local illegally fishing mini-trawlers, Pokmaswas, causes friction and threatens the trust of the local fishers, because they feel excluded, where the same Pokmaswas does not lift a finger against andon using the same boats.

In 2006, not too long after Pokmaswas Kasai was established (see above), Amin, on behalf of Pokmaswas, received an award from the Vice-Governor as the best Pokmaswas in Berau. Salman then told me how Pokmaswas Kasai had won the provincial competition:

> *"I was struggling to help Amin to become the winner in Samarinda. Whenever I visited the provincial office in Samarinda during my formal duty I spent time with Dinas officers there and asked them which factors were important in the Pokmaswas competition held by Dinas Province, so I could inform Amin. I hope Kasai will be the best Pokmaswas at the provincial level."* (Salman, Tanjung Redeb, 28.1.2008)

Actually, it was rather unlikely that the Pokmaswas of Kasai would already perform as the best in the province as it had been established barely two years before. The examples show that Salman and Amin need each other politically to make Pokmaswas look successful.

The case of Ahmad, secretary of Pokmaswas in Teluk Semanting and ex-government official

> *Ahmad Syaifullah (or Ahmad) was born on 10 March 1966 in Anjir Pasir Banjarmasin, South Kalimantan. He attended primary school in Anjir and then both junior and senior high school in Banjarmasin. He enrolled in the Institute of Social Work in Bandung but he did not finish the course. He then worked as a social worker contracted by the central government, in the Social Department (Depsos), to fill a position in Teluk Semanting from*

> *1991 to 1993. By mid-1993 Ahmad was a government official candidate (CPNS) proposed by the Provincial Office for Social Affairs (*Dinas Sosial*) in Samarinda. After 6 months he subsequently became a tenured government official (PNS) under the office of the District Office for Social Affairs in Berau. He was interested and learned about fishing matters when he arrived in Teluk Semanting for the first time. He married a Teluk Semanting woman, named Hustaniah, who was the sister of punggawa Murjani in 1994. With her Ahmad has two children. As a consequence for being PNS, Ahmad was posted in the Kelay district on the mainland of Berau for two years and in Lesan for six years. During this time he went up and down to see his family in the village and often he did not come into his office as the place was far away from home. Finally he was fired as PNS. In Teluk Semanting, Ahmad worked for his brother-in-law as an assistant to his patron from 2003 where he was in charge of fish weighing (*penimbangan*) and marketing. The job division with Murjani was as follows: the boss handles the most valuable fish species such as* bawal *(silver pomfret) and the rest of the fishes, called mix fishes (ikan campuran) like* senangin *(striped threadfin*), 'talang' *fish operated by Ahmad. He is mandated to sell fuel to 13 fishers-dependents within Murjani's patronage network.*

My first sight of Ahmad was when we met each other during my boat trip to Pegat with Salman and Andi Erson[37]. In Teluk Semanting actors in fishery-based livelihoods have created political networks by taking up political positions. Ahmad has a position as the Secretary of Pokmaswas Teluk Semanting. The head of the organization is boss Murjani. Ahmad was also appointed by the Joint Program (established by TNC-WWF) as co-ordinator of Formal (Fishers Community Forum) in Pulau Derawan sub-district. He showed me the *akte notaris* (notarial certificate) of the Formal establishment dated 24th November 2006. It was valid up to 2009.

One of the main tasks of Pokmaswas was to monitor andon fishers who operated in the village waters. Ahmad has a strategy as secretary of Pokmaswas, to reduce the conflict with andon. He mentioned that it is better to approach them first. It is interesting from the case of Pokmaswas Teluk Semanting in which the head and the secretary were the patron and the assistant respectively who sell fish to the andon boss from Sungai Nyamuk. He acknowledges the ambiguity of his

[37] Andi Erson holds several strategic positions as he is Vice Head of both Pokmaswas and the Formal organisation in Pegat Batumbuk and subsequently he was appointed by the Joint Programme as the Head of Jaman (*Jaringan Masyarakat Nelayan* or Fishers Alliance Network) which is the same organisation as Formal, but at district level. He is also a fish trading boss in Pegat.

position, because he also sees that andon fishers' presence creates a problem in the local fishing grounds in the delta:

> *"In the beginning we wanted to warn them (andon) first, and they have indeed been warned several times that they were entering into the marine space owned by the local fishermen, whereas they [andon] have their own area in Berau. But they were stealthily coming in during the night into our place, and more and more came to fish. The problem is that when they release the gear they are blocking our route home until there was this issue of a person who was killed"* (Ahmad, Teluk Semanting, 05.02.2008)

Boss Murjani in Teluk Semanting was engaged with the andon boss by building a network between patrons. Fish buyers in Teluk Semanting were from Sungai Nyamuk and there were two buyers related to Murjani's bussiness, namely Azis and Haji Bahtiar. They came to the village once a week. Azis was the first person to buy fish from Murjani and then he invited Haji Azis to join. According to Ahmad the agreement is formulated as follows: Azis is entitled to buy *bawal super* (big pamfret) and Haji Azis only *perak* fish (common silver-biddy) type 2 and 3, the latter two being of lower economic value. Ahmad added that recently there was high tension between these two buyers to buy fish from Murjani.

Ahmad likes to have buyers from Sungai Nyamuk as he said:

> *"The advantage of being collectors like us is that the money is not stagnant (*tersendat*). If with only one buyer the payment is 1-2 million, for instance, and we still have an outstanding debt of 3-4 million, I would be crazy to see our members as we have to pay to them"*.(Ahmad, Teluk Semanting, 05.02.2008)

When the two Pokmaswas conducted fishing monitoring in the village waters something unexpected happened. They found two people: first, the andon boss who buys fish from Murjani, the head of Pokmaswas Teluk Semanting who was fishing in the "wrong" zone (see Chapter 5) and, second, the father-in-law of Samad who was fishing with an illegal mini-trawl. Samad was the member of Pokmaswas Kasai and joined this monitoring trip.

> *"At a time when we patrolled with Pokmaswas Teluk Semanting and Kasai, we got to location A, but since there was a big wave we moved to location B where we discovered Pak Azis, who has a fish selling-and-buying*

> *transaction with me. Pak Samad saw his father-in-law, so he decided to resign from the surveillance organisation as he contended that his family and friends kept using mini- trawls which were banned by law. He thus faced a conflict of interest if he remained in Pokmaswas. So it is true indeed that sometimes the law cannot effectively be implemented if there are family relationships involved" (*Ahmad, Teluk Semanting, 05.02. 2008)

It follows from the above interviews that the aim of Pokmaswas conflicted with the power of the political-economic networks of the actors. Local fishers in Teluk Semanting questioned the effectiveness of the Pokmaswas to address the andon problem.

> *"Most members are asking about this problem: if the Fisheries Office was actually reacting late, we reported and reported but there was no response, so we took action, seizing one boat and burnt it. Only then the guys from higher up responded to us. But if we kept waiting like this, we report again and again and (they say) we should do this or that … but we see no fast action from them, we just take the risk of doing something wrong, as burning the boat is then our last option. (*Ahmad, Teluk Semanting 23.05.2008*)*

It is also interesting to know that Dinas, represented by Salman, has an interest to increase the regional income (PAD) and asked Ahmad to collect this "tax" money in the village. Ahmad regards it as unfair that andon fishers should be asked to contribute to the regional income by the officer in Tanjung Batu where they have to first report. He said:

> *"…now it charges IDR 50,000 (per* andon *per fortnight') formerly it was IDR 25,000. The contribution from outsider fishers was targeted to amount to IDR 15 million per year for Tanjung Batu. For the domain of Pak Salman (Kasai, Teluk Semanting and Pegat Batumbuk) the target is to collect IDR 10 million per year from* andon *fishers. And he added, skeptically: Now the question is where the rest of the money is, how much was collected, and where did it go? (*Ahmad, Teluk Semanting 23.05.2008*)*

6.5 The political-economy of Pokmaswas

In section 6.4 I have described the real-life organisational practices, actions, and political-economic relationships of the members of the Pokmaswas. I have shown a different reality from that of a formal institution that is locally embedded by the

provincial government for the purpose of coastal management and marine resources conservation by excluding outsider fishers (andon). Contrary to the governmental expectations of Pokmaswas, namely community participatory fisheries monitoring, in practice Pokmaswas members are distracted from their job by the political-economic interests of the district government and private sector. Instead of excluding andon from the coastal waters, they are attracted as their inclusion provides financial contribution (PAD) to the regional income, and traders profit from their regional network to sell fish caught in Berau.

Thus, the andon-Pokmaswas case is an excellent example of the fact that the new society is made up of networks. It is a set of interconnected and flexible nodes (Castells, 2000) that stretch well beyond the institutional and the local. Our analysis has opened a door to permit the entry of interacting people engaged in action that indeed alter and manipulate the institutions in which they participate (Boissevain, 1979).

Livelihoods in the era of globalization are increasingly organised in networks, encouraged by interrelated and accelerated processes of individualisation, multi-tasking and mobility (De Haan, 2008). I have shown through the two cases of Amin and Ahmad that, despite their different backgrounds these actors use their network of politically and economically interesting friends, and particularly the patron-client relationship between andon and Berau bosses, to access and expand their networks, even at the expense of their formal membership of an organisation like Pokmaswas with opposite goals. Pokmaswas is crafted on the basis of an external belief and generated to intentionally shape people's behaviour in appropriation of coastal fisheries resources. However, it does not exist as a workable institution. On the contrary, it evolves into an element of political networking in the coastal arena (Long, 2000) as social encounters or series of situations in which contests over issues, resources, values and representation take place. The present case also challenges Cleaver's optimistic use of the concept of institutional 'bricolage' as the institutional crafting of collective action for resource management (Cleaver, 2000), because her formulation of a locally embedded institution excludes the possibility of political networks that may obstruct or bias the goals of embeddedness (Satria and Matsuda, 2004). Taking a lesson from ethnographic evidence I see that Pokmaswas fails to avoid fishery conflicts between local and outsider fishers, and even has the opposite effect of favouring the social inclusion of outsider fishers on the one hand, and the exclusion of local mini-trawlers, on the other hand.

Finally, we have clearly seen the interface of motivations of actors (Long and Villareal, 1993) in the effort to control the coastal resources of Berau in the discontinuities of interests, values and power, and their dynamic entailing negotiation, accommodation and the struggle over definitions and boundaries. For example, the social-economic and political networking between Salman, as a representative of Dinas, and the Pokmaswas actors, like Amin in Kasai and Ahmad in Teluk Semanting who need one another in pursuing their mutual interests.

It is important to look at the concept of community here because it was instrumental in the construction of Pokmaswas in Berau. Agrawal and Gibson (1998) pointed out that community needs to be conceptualised from three perspectives: the multiplicity of actors and interests, the processes at the local level, and their interaction with governmental institutions. Evidently, the opportunities for livelihood mobility in the frontier area of Berau are many, and it is not realistic to speak of a homogeneous and sedentary fishers' community. Secondly, I question the role of the district government in facilitating the equal share and responsibility of an imagined fishers' community because of the multiple economic and political values and intentions of the actors involved, and the fact that Pokmaswas was mainly established in response to the recently declared marine protected area.

For example, Rahmani, the Village Head of Kasai, was engaged in a political network with Haji Liliansyah, who in turn was affiliated with a political party (PBB, *Partai Bulan Bintang)*. The latter is a member of parliament in the Berau district. Political cooperation between them started in 2004 when they met at a badminton competition in Tanjung Batu. The Village Head then became part of the campaign team (*tim sukses*) for the PBB party in Kasai. Rahmani confessed that he spent IDR 70 million to support this action. Rahmani also told me that when the district elite, like the bupati or Vice-bupati, would come to Kasai he would spend IDR 4-5 million to serve the power holders of local government during their visit. In return, he received support from the local government in the form of a loan of between IDR 50-100 billion with a low interest rate from the Regional Development Bank (Bank Pembangunan Daerah) owned by district. When Rahmani was elected as Village Head, the Bupati and Vice-bupati awarded him with their first visit to Kasai by attending the ceremony.

The development of Pokmaswas Kasai created an internal conflict between its members because one of its members was a mini-trawl fisher. As Pokmaswas aims to combat destructive fishing, including the use of mini-trawl as prohibited by

Presidential Decree No. 39/1980, this organisation was crippled by a conflict of interest of its members.

Coastal space represents a complex drama of human needs and desires, organising capabilities, power relations, skills and knowledge, authoritative discourses and institutions, and the clash of different ways of ordering the world (Long, 2001). First, the district government of Berau established an MPA to control access and use of the marine and coastal resources, and for that purpose instituted Pokmaswas at village level to control fishing activities. Second, the actual practices of Pokmaswas currently function more to fulfill the individual economic and political needs of the actors. Third, Pokmaswas as a socially embedded institution serves as a spring board to build a social resilience of individuals and organisational practices across scales in terms of social exclusion and inclusion, locals and outsiders through patronage networks.

6.6. Conclusion

This chapter confirms how decentralisation implemented in Indonesia since the enactment of Law 22/1999 has affected integrated coastal management in the Berau district, especially with regard to the distribution of responsibilities of the Ministry of Forestry and the Ministry of Marine Affairs and Fisheries, and between the different levels of government on the boundary marking of the MPA. Implementation of the marine conservation area involved more than nature conservation. Surveillance and control of overfishing became an integral objective, and the provincial Fisheries Office (Dinas) has established locally embedded surveillance institutions named Pokmaswas in several villages.

Local fishers have questioned the effectiveness of Pokmaswas, because they were not involved in the boundary marking of the marine conservation area, and the location of their fishing grounds was not taken into account. Moreover, the use of mini-trawls – which is illegal – became an issue, as local mini-trawls were excluded from the coastal waters, while outsider or andon mini-trawls were not. Evidence from our field research in Kasai and Teluk Semanting has shown that the development of the Berau MPA is a product of social interfaces and political networks between actors across administrative and social institutions. Membership of the marine resources surveillance organisation has enabled them to create political-economic networks that affect Pokmaswas' effectiveness as a surveillance institution. Data from interviews with and the life trajectories of powerful traders

or bosses (*punggawa*) clearly show how they are distracted from their job by the political-economic interests of the district government and the private sector. Instead of excluding andon from the coastal waters, they are invited to contribute to the regional income (PAD) by asking payments from them to access the coastal waters of the Berau MPA. This contributes to their ambiguity in effectively controlling outsider fishers who enter the Berau waters: not for the purpose of marine conservation but for the purpose of raising district revenues.

Chapter 7

Conclusion

7.1 Introduction

The objective of this research was to describe, explore and understand the dynamics of coastal fisheries and pond aquaculture based livelihoods in the coastal frontier of Berau. The research focused on four questions. First, I investigated how small-scale fishers make a living and how the diversity of fishery based livelihoods can be explained, using qualitative and quantitative methods to gather data. I have shown how fishers organise their livelihoods using their knowledge of tides and seasons, and how they value risks in view of their future in the coastal frontier of Berau, in particular because their fisheries activities are embedded in political-economic patronage networks.

Secondly, I explored how pond based livelihoods are constructed in the Berau Delta, what the productivity is of the mixed shrimp/fish ponds, how pond farming is practised, shrimp is marketed,, and to what extent different social actors have influenced pond (*tambak*) development in the Berau delta. Such as in the case of fisheries, the interdependency between patrons/bosses (*punggawa*) and pond farmers in pond owner-caretaker, and trader-pond farmer relationships in the context of inter-island patronage networks is a fundamental condition to the practice of extensive pond aquaculture in Berau, as elsewhere in East Kalimantan.

Thirdly, I described how the Berau Marine Protected Area (MPA) was formally established in 2005 and how governmental boundary marking and zoning affect fishers' livelihoods through processes of social inclusion and exclusion. On the one hand, local fishers are formally excluded from accessing their fishing grounds within the marine conservation area but, on the other hand, outsider fishers (*andon)* are attracted on the condition of some payment to the Fisheries Office for accessing the coastal waters of Berau.

Lastly, I examine how the locally embedded government institution named *Pokmaswas* affects, and is affected by, the everyday dynamics of fishers' and government officials' interactions. Including how the contestation of social values,

knowledge, interests and power regarding the coastal resources management of the MPA in the political-economic network of key social actors in the MPA influence the effectiveness of *Pokmaswas* as a surveillance institution. This last chapter presents the main conclusions, the main findings with regard to the research questions, followed by a discussion of the contribution of this study to future research and policy making for a balanced social and ecological development in the Berau Delta.

7.2 Summary of the main research findings

7.2.1 Dynamics of coastal fisheries and pond based livelihoods

The research focused on the livelihoods of small-scale fisheries in the villages of Kasai and Teluk Semanting, and on pond farming in Pegat Batumbuk in the Berau Delta. The villages are inhabited by a majority of Bugis migrants who came to Kalimantan mainly from Sulawesi in search of the wealth of the marine resources, particularly shrimp. Shrimp aquaculture started being developed in the 1980s, and two-thirds of the present population migrated into Berau after 1995.

The first research question dealt with the small-scale fishers make a living through a diversity of fishery based livelihoods in the coastal frontier of Berau. Chapter 3 clearly shows how gear diversification is an important livelihood strategy, using their practical knowledge both by taking a variety of fishing gear into the boat for a single trip and by changing fishing gear over a life time.. In Kasai 63% of the fishers are classified as trammel netters, about 17% as mini-trawlers, and 6% as gill netters. They have in-depth knowledge of the tidal system and seasonality, and make use of the lunar calendar to plan their fishing trips.

An essential element in the decision making of these fishers is their embeddedness in political-economic patronage networks. Fishing practices in the coastal frontier of Berau are influenced by the Bugis *habitus* of patronage networks between the *punggawa* and the dependent fishers and sometimes pond owners (Chapter 4). The patrons usually do not go out at sea, and much of the decision-making is done by the dependent fishers on the boats. The livelihood trajectories of fishers from the different gear classes show that as social actors, whether they are rich or poor, they all use their agency in search for better livelihoods. Over the last years they have experienced both decline and depletion of coastal resources. Consequently, about one third of the fishers have shifted from fishery into pond farming.

The second research question served to provide insight into pond management. Ponds are mainly polycultural. Farmers spread risks and income through the year from harvesting tigers shrimp and speckled shrimp (*Penaeus monodon* and *P. monoceros*) and milk fish (*Chanos chanos*). They have their own indicators of good practices in pond aquaculture, and they recognise white spot virus, as well as other environmental problems, that may kill the shrimps in the pond.

Chapter 4 presents the multiplicity of pond based livelihoods showing how *tambak* are constructed, shrimp marketing is organised, and how and to what effect pond owners and caretakers engage in patronage networks. . I have used the concept of agency to show how *tambak* farmers use their practical experience which refers to the knowledge, capability and social embeddedness (Long, 2001) to build their livelihoods. Like in the fishery case, patronage networks between *punggawa*, farmers and shrimp traders also play an important role in pond based livelihoods. Caretakers of a pond and their patrons/pond owners are mutually dependent upon each other, because caretakers are heavily indebted to their patron and depend on loans provided by them, but the patron or boss depend on their dependents for the quality and quantity of pond production. There are two different contractual arrangements implemented between *punggawa*/owners and caretakers, namely a 50:50 and a 20:80 share-cropping arrangement. This ethnographic study of extensive pond development in the Berau Delta further shows that mangrove/Nypa land in the frontier of Berau, has become the object of land grabbing practices in a social-political arena involving the village government elite, the *punggawa* in his various roles as pond owner, boss and shrimp trader, the caretakers of the ponds, the Department of Fishery's field officers and other government staff. From the life histories of those involved in pond farming we can learn that the coastal frontier of Berau is considered an open access area for Bugis migrants. The majority of the farmers (77.3%) in Pegat Batumbuk saw *tambak* as their future livelihood. They opened *tambak* by constructing the type of ponds they knew in Sulawesi, but in Berau where there is more space, the pond owners prefer to develop bigger pond areas over time, while the caretakers engage in credit dependencies to open their own ponds. Extensive ponds thus become a tool to lay claims to land in a social arena as actors negotiate, cooperate and contest their different interests.

7.2.2 Outsiders and access to fishing grounds in the Berau MPA

Over the past two decades attempts have been accelerated to preserve coastal and marine waters by establishing MPAs or Marine Conservation Areas (MCA) as they are called in Indonesia. Also, Government Regulation nr 60/2007 stipulates the roles of central, provincial, and district governments respectively in the different zones (*jalur*). Central government has the authority to manage marine conservation areas covering marine waters beyond 12 sea miles. The provincial government governs the coastal waters up to 12 sea miles, while the district government is authorised to govern the coastal waters within 4 nautical miles. These conservation areas are then known as District Marine Conservation Areas (*Kawasan Konservasi Laut Daerah*); the coastal waters of Berau are one of these.

The third research question addressed the issue of the Berau MPA, its formal establishment and how its boundary marking and zoning affected local fishers' livelihoods. One of the major problems was the presence of *andon*. Chapter 5 pays attention particularly to the position of small-scale artisanal outsider fishers who have the legal right to access the coastal waters anywhere in Indonesia, including the resource rich fishing grounds in the Berau Delta. In practice this is at the expense of local fishers, whose activities are confined within the marine conservation area. Moreover, the decentralised district government legitimises outsiders' fisheries activities on the condition that these *andon* pay for a fortnight's fishing permit which contributes to the regional income (PAD). Confusing governmental policies make the MPA boundaries highly permeable. Not only are the interests of the district government opposed and contradictory to the interests of sustaining the MPA by the international environmental organisations, they also oppose the interests of the local fishers. Therefore, the presence of *andon* is regarded as both illegal and illicit.

7.2.3 The role of *Pokmaswas* in the management of coastal resources

The last research question dealt with the role and position of embedded social institutions, especially in the case of the *Pokmaswas* established by the provincial government to control overexploitation of the fisheries rources in Berau. Chapter 6 analyses how the political-economic networks of the key actors in the Berau MPA influenced the effectiveness of *Pokmaswas* as a surveillance institution.

Evidently, the decentralisation policy implemented in Indonesia since the enactment of law no. 22/1999 has affected coastal governance, especially concerning the boundary marking of the MPA. We have also seen the development

of the Berau MPA as a product of the social interface and political networking between actors at multiple scales and across institutions.

The effectiveness of *Pokmaswas* is another case. Based on the study of the life trajectories of the village elites I was able to unravel the political-economic network that enabled its members to access local political power. Their interest in accessing power largely contributed to the ambiguity of their monitoring function of outsider fishers who entered the Berau waters, not for the purpose of marine conservation but for the purpose of raising district revenues. Moreover, *Pokmaswas* has challenged the trust of their fellow local fishers by excluding local mini-trawlers from the coastal waters, while at the same time attracting outsiders. Ever since its establishment in 2005 the development of the MPA in Berau has been hampered by value contestation of the major social actors in this coastal frontier area.

7.3 The relevance of social resilience in Berau

This research intends to contribute to a better understanding of the social aspects of coastal resilience, as required by the RESCOPAR programme (Chapter 1). On the basis of empirical ethnographic findings on coastal fisheries and pond aquaculture based livelihoods diversity and diversification, I have shown how fishers, entrepreneurial *punggawa,* shrimp traders and pond owners, and other relevant social actors use their agency to maintain and improve their livelihoods by being involved in translocal, multi-scalar political-economic networks.

Scientific knowledge about livelihood diversification and the political-economy of fishery and pond aquaculture in Berau is important to explore the meaning of coastal resilience in the social context of Berau. Originally resilience was formulated by the programme (Chapter 2) in its overall research question: *"What ecological and social processes affect the resilience of mangrove forested coastal ecosystems, and how do decision-making processes at different socio-political and spatial scales affect the use, management and conservation of their living aquatic resources?"* Fisheries and pond aquaculture in Berau, however, mainly take place outside the mangrove areas in the Nypa covered edges of the Berau Delta. Farmers prefer to establish ponds in the Nypa areas over mangrove forest as the root system of the Nypa palms enables easier excavation.

A second specification that needs to be made is what we mean by social resilience as different from ecological resilience. In the social sciences the concept of ecosystem resilience has been borrowed and adapted particularly by human

geographers as the ability of an ecological or livelihood system to 'bounce back' from stresses or shocks. It is also interpreted as the ability of institutions to withstand change. In this study I have not embraced these definitions and approaches to socio-ecological resilience (Chapter 2) because of their underlying assumption of a social system 'bouncing back' to its original shape and status. I have been taught to see the dynamics of social development through time and space, using an actor-oriented methodology. Fishers and pond farmers in Berau do show a social resilience against environmental stress, for example by strategically engaging in patronage networks.

In this thesis social resilience is not seen as the property of an individual or group of actors. Resilience is an emergent property of the interface between actors and their social, economic, political, physical and material environment. Social resilience is not a quality of a single actor, whether he is a farmer or fisher, a powerful shrimp trader or pond owner or district head. Social resilience is partly the outcome of historical interactions and experiences like the Bugis migration into Kalimantan, the cultural institution of patronage that is pervasive in the development of all coastal areas of Kalimantan, the recent political-administrative decentralisation and the coming into power of the district government of Berau and, finally, of the ecological knowledge and financial support contributed by the international environmental organisations (Chapter 2).

This study has shown the relevance of addressing the social resilience of the coastal communities in Berau against resource degradation, not in terms of their vulnerability but in terms of their agency (2.5). In my view vulnerability is an externally defined 'expert' concept that is part of a discourse on poverty alleviation and rural development focusing on social systems or populations as units of analysis. Following the actor, my ethnographic data do not provide any case where a patron, not even a dependent pond farmer or a fisher, calls himself or their households categorically 'vulnerable'. Of course they experience shocks like the decrease in the sizes and quantity of fish or the death of an entire shrimp harvest. But this research has dealt with their agency to overcome these shocks and to improve their livelihood conditions in the context of the technical and environmental developments taking place in the Berau Delta.

In fishery based livelihoods social resilience is strengthened by patronage networks between *punggawa* and dependent fishers, and depends upon the integration within regional decentralised political-economic networks beyond or across formal institutions, including *Pokmaswas* and the district government.

Meanwhile in *tambak* based livelihoods social resilience is likewise affected by patronage networks between the *punggawa* and pond owner/caretaker or shrimp trader, and their networks.

On the other hand we may speak of a weaker social resilience to explain why fishers' communities for instance, do not resist outsider fishers' intrusion and degradation of marine resources. In this context weak social resilience of the coastal communities in the Berau Delta may depend upon three main factors: 1. Cultural perceptions of environmental change; 2. Conflicting interests between the main actors in the network and; 3. Lack of leadership or conflicts of interest between village elite and the majority of fishers. In the case of *Pokmaswas* as an embedded government institution for resources surveillance, weak resilience can be explained by the fact that this resource co-management institution was externally imposed or 'embedded' rather than generated on the basis of local organisational initiative. Hence, there was no local ownership, and conflicting interests erupted concerning the exclusion of the small-scale fishers from the village (Chapters 5 and 6).

The political-economy of coastal fisheries and pond aquaculture based livelihoods appear to be crucial. This study focused on the dynamic interactions between social actors in creating political-economic networks in search of better livelihoods. It is necessary to position shrimp and fish based livelihoods within the context of the individual and institutional interests of local policies and regional politics.

To achieve fisheries and pond management on a sustainable basis we need to incorporate a political point of view too, as problems of coastal resources degradation are part of a political process:

> *"Management is not just about providing technical solutions to objective problems of development and environmental conservation. It may be important to consider that these problems and their solutions may themselves be part of a political process. Without attention to the politics that generates underdevelopment and environmental degradation as universal problems, it may be impossible to address poverty, underdevelopment, and environmental degradations effectively."* (Agrawal, 2003: 258)

Together with Tran Thi Phung Ha (Ha, 2012) who carried out a livelihood study in the Mekong Delta of South Vietnam as a member of the RESCOPAR programme, I

contend that social resilience is in fact a plural concept: there is more than one meaning to the notion of resilience in so-called social-ecological systems. Let alone what that system entails: the MPA, the Berau Delta or the political-economic network of the *punggawa*? Notably, to discover the resilience of a household demands different methodologies, involves different practices, actors, and decision-making processes, than the study of resilience of a particular type of extensive pond management or the political-economy of a *punggawa* network. Also, the technical resilience of a pond may differ from resilience as an external qualification of a whole aquaculture system or the mangrove-Nypa edges of the Berau Delta. The boundaries of the variously constructed 'systems' may conceptually and physically conflict with and oppose each other, like in the case of an economically successful shrimp farm being exploited at the expense of the mangrove trees or the resilience of an MPA. Issues like these bring the message to the interdisciplinary RESCOPAR programme that to understand social resilience it is necessary to position shrimp and fish based livelihoods within the context of the social and institutional interests of historical developments, local policy and regional politics.

7.4 Contribution of the research to science

Coastal livelihoods are undoubtedly diverse and multiple. Livelihood is not only a matter of economic activity but it also involves social and political-economic interactions between actors and across institutions, and their different interests and valuations of the natural resources in the coastal arena of Berau. The contribution of the findings of this study to science is to increase the social and ecological resilience of the Berau Delta and the furthering of the interdisciplinary debate and policy making concerning fisheries and pond aquaculture in the coastal areas in Indonesia in general. This study is innovative in two ways. First, it is one of the very few social science studies on coastal fisheries and aquaculture based livelihoods in Indonesia using an actor-oriented approach. Using this approach provides an in-depth view of the everyday social, economic and cultural dynamics at the multiple scales of households, coastal villages, the boats at sea with their crew, and government agencies. It enables to move beyond the statement that coastal livelihoods are complex by teaching us how this complexity works.

Secondly, this study is innovative in relating livelihood diversification to the debate on social and ecological resilience. It does not suffice to construct a general model of social-ecological resilience assuming one coherent coastal system or

coastal population. This research clearly shows that we need more detailed social-economic information about the different human-nature interactions, whether through the uses of different gear or the establishment of extensive ponds or otherwise. The scientific relevance of this study also lies in our approach to social resilience by including the political-economic patronage networks that determine who has the power to decide and who does not. The findings about the vital role of the Bugis *punggawa* in the coastal development in Berau and the pervasiveness of the cultural institution of patronage provide an input to policy making.

7.5 Contribution of the research to policy making on co-management

This study is important for policy makers in two ways. The surveys among the various classes of small-scale fishers and pond farmers, owners as well as caretakers made clear that there is a lack of species-specific economic data, especially on shrimp. Moreover, empirical findings of *tambak* culture show a preference for polyculture. International and national economic interest, on the other hand, is more disciplinary oriented to a more rational, industrial type of intensive shrimp aquaculture and certification of its product for the global market. Such contextualisation of shrimp policy is needed, to ensure that local interests are included in coastal development. Moreover, policy making should be transparent about the differences of 'local interests' between the regional and village elites, and the political-economic network of *punggawa* from village to district and provincial level.

Decentralisation appears to have little to do with co-management between the state and fishers communities. It rather legitimises extensive claims to land and coastal resources exploitation by an inter-island entrepreneurial elite in collaboration with local government officials and politicians. Failure to understand the political-economy of patronage in fishers' livelihoods may lead to ineffectiveness of the village based surveillance institutions (*Pokmaswas*) in assisting the government to reduce destructive fishery with the boundaries of the marine conservation area. The active involvement of fishers from the Berau Delta is needed as much as of fishers from Derawan Islands because historically and culturally they do not constitute one single 'fishers' community'.

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Newspaper Article

Kaltim Post, 5 September 2009

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Annex 1. Household survey questionnaire for fishing

No. questionnaire : ……..
Village : Kasai
RT : ……..
House no. : ……..
No. of members HH : ……..
No. of generations HH : ……..
Name of Interviewer : ……..
Date : ……..

I. General Information

No	Name	Sex	Age	Etnicity or origin	Year of residence	Relation with HH head	Marital status
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1							
2							
3							
4							
5							

Notes:

No	Education	Main occupation	Status of main occupation	Name of Boss	Main product	Sideline occupation	Main product
(1)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1							
2							
3							
4							
5							

Notes:

Remarks:
Col 1 : sequence of HH head and 3 oldest HH members including those living elsewhere
Col 2 : name of HH head and HH members
Col 3 : male (M) and female (F)
Col 5 : ethnics (Bugis, Bajau, Banjar, etc) or origin (Makassar, Mandar, Pasir, etc).
Col 6 : what year of residence in this village
Col 7 : if HH head, husband/wife, children, in laws, brother/sister, , grandchild etc.
Col 8 : married (1), divorced (2), single (3), widower (4)
Col 9 : not school, elementary school, passed elementary school, junior high school, high school
Col 10 : mention main occupation: trammel net fisher, gill netter, trap fisher, etc
Col 11 : as Boss (1), employed by boss: as crew (2a), as captain (2b); own capital (3), wage worker (4), help family with no salary (5), etc
Col 12 : name of boss if respondents work for boss
Col 13 : if white shrimp (1), tiger shrimp (2), other shrimp, specify ……..(3) fish, specify …..…….(4)
Col 14 : mention sidelines occupation either daily or seasonaly
Col 15 : mention main product of sidelines occupation either daily or seasonaly

II. Land ownership

2.1. Do you own pieces of land? [ ] yes [ ] no
2.2. If yes, how do you get your own land? [ ] heir [ ] buying

2.3. If not, what arrangement do you have?

[ ] sharecropping [ ] others, specify ……

[ ] rent

2.4. How is the status of your own land?

type of land	number of pieces	land status (indicate)	area of land (ha)
pond area		a. letter of certificate	
		b. letter of camat approval	
		c. letter of production	
		d. rent	
		e. other (specify……)	
upland agriculture		a. letter of certificate	
		b. letter of camat approval	
		c. letter of production	
		d. rent	
		e. other (specify……)	
garden area		a. letter of certificate	
		b. letter of camat approval	
		c. letter of production	
		d. rent	
		e. other (specify……)	
mangrove/nypa land		a. letter of certificate	
		b. letter of camat approval	
		c. letter of production	
		d. rent	
		e. other (specify……)	

2.5. Are you aware how to get land entitlement? [ ] yes [ ] no

2.6. If yes, please explain the procedure ……

2.7. How can you access the coastal water of delta to fish?

[ ] open access to anybody

[ ] previllage to Kasai fishers only

[ ] following village's rule

[ ] following government's rule

[ ] others, specify ……

2.8. Is there any restriction to access fishing ground? If yes where is it? ……..

III. Physical assets and utilities

3.1. Housing building materials:

a. Roof : [ ] nypa/thatced [ ] wooden [ ] asbestos [ ] tiled

b. Wall : [ ] thatched [ ] wooden [ ] brick [ ] cement

c. Floor : [ ] soil [ ] wooden [ ] cement [ ] tiled

3.2. Electricity sources:

[ ] not available

[ ] renting neighbor's generator

[ ] own generator

[ ] other, specify …….

3.3. Water use: [ ] raining water [ ] river [ ] ground water [ ] well [ ] pipe

3.4. Toilet/MCK : [ ] not available [ ] river [ ] backyard [ ] available

IV. Harvesting and income (based on data of last month)

Sources	Usage (%)		Number of operations per year	Estimated costs of production (Rp)	Estimated income (Rp)	Who works (tick)			
	Consumed	Sold				male		female	
						adults	child	adults	child
fishing (per trip)									
white shrimp									
tiger shrimp									
shrimp ……									
fish ……									
fish ……..									
fish ……..									
crab									
pond (per crop)*									
tiger shrimp									
spotted shrimp									
milkfish (bandeng)									
agriculture (per crop)*									
paddy									
cassava									
banana									
vegetables									
fruits									
other products									
forestry (per operation)									
timber									
firewood									
mangrove tree (m3)									
nypa leaf for roof									
charcoal (kg)									
building material (m3)									

Sources	Usage (%)		Number of operations per year	Estimated costs of production (Rp)	Estimated income (Rp)	Who works (tick)			
	Consumed	Sold				male		female	
						adults	child	adults	child
boat material building (m3)									
wage									
farmer									
forestry									
fisheries									
bike driver									
cattle/poultry									
seasonal worker in……..…(specify)									
remittances from hh member in ……..(specify)									
others specify									
Total									

*: the period of each crop varies eg. pond crop (4 months), upland paddy (12 months), etc; interviewer should state detailed period of crop by harvesting in box below.

note:

4.1. What kind of difficulties to get a regular harvest from shrimp fisheries?.....
4.2. Where do you get agriculture input from?.....
4.3. How do you get labor force? …….
4.4. Where does labor force come from?.....through whom do you get? ……..
4.5. Do you pay cash or in kind? ……
Reasons: ……..
4.6. If you do not have necessary cash, how do you get inputs for fishing or agriculture?.....

V. HH expenditure and saving

5.1. Are you able to save? [ ] yes [ ] no
5.2. Depending on what conditions are you able to save?.....
5.3. How much money do you spend within last week or last month? (please choose)

types of expenditure	quantity (unit)	estimated cost (Rp)
basic consumptions		
rice		
sugar		
oil		
kerosene		
gas		
salt		
fish		
vegetables		
electricity		
voucher HP		
cigarette		
education		
tuition		
transportation		
allowances		
school uniform		
traveling		
health cost		
herbal medicine		
drugs from store		
clothing		
daily clothing		
shoes and sandal		
social contribution/*zakat*		
arisan (social money gathering)		
articles credit		
transportation		
public transport		
bikes/cars		
hh equipments		
tv, radio, parabola		
housing		
housing equipment		
housing renting		
housing credit		
others……..		

5.4. Monthly HH expenses (if you choose monthly expenditure)
In general how much money do you spend for monthly HH expense?
[ ] less than Rp. 500.000
[ ] Rp. 500.000 – Rp. 1.000.000
[ ] Rp. 1.000.000 – Rp. 1.500.000
[ ] Rp. 1.500.000 – Rp. 2.000.000
[ ] more than Rp. 2.000.000

5.5. HH saving

categories	kinds	quantity (unit/Rp)
saving	money box	
	bank	
	group	
	cooperative	
	others ……	
investment	boats	
	cattle	
	land	
	jewelry	
	insurance	
	others ……	
capital sharing	joint business	
	others ……	
others…….	……..	

5.6 If you share money with whom do you cooperate? ……

5.7. Financial arrangement within HH

categories	decision made by (tick)		
	dominantly husband	together husband and wife	dominantly wife
education			
hh consumption			
hh business development			
domestic affairs			
earning money			
saving			
financial management			

5.8. Do you have any financial networks outside HH? [ ] yes [ ] no

5.9. If you do business development with whom do you work together?
[ ] relatives,who…….. [ ] crews
[ ] bos [ ] fishing owner

VI. Fishing assets

6.1. What kind of gears and boat do you own? (options more than one gears)
[ ] trammel net [ ] mini trawl [ ] push net (dari) [ ] boat
[ ] gill net [ ] trap (belat) [ ] tidal trap (togo) [ ] others, specify ….

6.2. Which type of gear is the most important? ……..

6.3. Do you use specific fishing gears on specific months or season? [ ] yes [ ] no
Please explain ……
Reasons for using different type of gears:
[ ] suitable with fish types caught and season
[ ] to add income
[ ] anticipate decreased catch

[ ] others, specify ……

6.4. If you do not own fishing gears from whom do you get?.....

6.5. How is status of gears and boat do you use whether from loan, rent or share? .....

6.4. Kinds and number of gears

gear kinds	quantity	Type of net (0=monofilament; 1=multifilament	length per unit (meter)	mesh size	main catch

Notes:

6.5. Boat and engine

kind of boats and engine	specification			engine capacity (HP)	boat owner (tick)	
	length	width	GT		own	belong to others

Notes:

6.6. costs

a. Fixed cost

kinds of fixed cost	quantity (kg)	price (Rp)	year of buying	economic life (years)	maintenance cost per year
boat*					
engine*					
gears*					
weighter					
buoy					
anchor					
oar					
ice box					
thermos					
flashlight					
others, specify …..					

* only if interviewee buy it either from his own or loan

Notes:

b. Variable cost per trip

costs	quantity (unit)	price per unit (Rp)
fuel		
oil		
ice		
meals		
ciggarette		
others …….		

Notes:

Annex 1 Household survey questionnaire for fishing

VII. Production and market

7.1. How much shrimp or fish do you normally catch per trip?

main catch	size or kinds	total (kg)	selling price (Rp/kg)
shrimp			
fish			
others ……..			

Notes:

fishing when					
3 days ago		2 days ago		yesterday	
main catch	size or kinds	main catch	size or kinds	main catch	size or kinds
shrimp		shrimp		shrimp	
fish		fish		fish	
others …….					

Notes:

7.2. How many fishing trips per week do you have? ……. trips

7.3. How is the revenue sharing per fishing trip by different tasks of crew?

a. ……..% owner ……% crew as ……% crew as ……

b. if owner is not the captain…….....

7.4. How many crews do you have when go fishing? …….. crews

7.5. What seasons do you go fishing?

a. north season since…….. until ……

b. south season since…….. until ……

c. transition season since…….. until ……

7.6. What months are you not fishing? [ ] month (mention) ……

7.7. Where do you normally catch?

[ ] shore, how far ……. [ ] along the coast [ ] others, specify ……

[ ] estuarine [ ] along the river

Please show me where you normally fish by seasons (see the map and indicate the areas)……

7.8. Mention names of fishing ground you always fish?

a. …… b. …… c. …….

7.9. How long it takes for your fishing trip? …… hours, starts…. …to ……

7.10. How many days a month are you not fishing?..... days

Reasons: ……

7.11. What is the maximum catch and a normal catch you have experienced in the past year?

max catch …….kg; normal …….kg

7.12. What proportion of your trips yield no catch per week or month* (choose)?.....

7.13. When was you fish with a good yield? Year ……

7.14. How was the difference size of shrimp size comparing now and 5 or 10 years before?
[ ] no change
[ ] a bit smaller (how much ……)
[ ] much smaller (how much ……)
7.15. Did you change mesh size of net?If yes, when ……
7.16. How much did you change? from mesh size…….. to ……..
7.17. Where do you sell the shrimp/fish?
[ ] ponggawa in village [ ] local market [ ] sell door to door
[ ] market in T Redeb [ ] collectors outside Berau [ ] others, specify …
7.18. If you sell to ponggawa, what relations between you and buyer?
[ ] buyer is gear owner [ ] pay debt
[ ] buyer pay for fishing operation [ ] relatives [ ] others, specify …
7.19. During not fishing time, do you have any other economic activities to earn additional money? [ ] yes [ ] no
7.20. If yes, what activities do you make then?
[ ] kiosk [ ] boat making [ ] shrimp pond culture
[ ] fuel selling [ ] agriculture [ ] crab culture
[ ] food stall [ ] trading [ ] services
[ ] others, specify ……

VIII. Financial assets access

8.1. Do you have loans? [ ] yes [ ] no
8.2. If yes, who is the money lender?
[ ] relatives [ ] cooperative [ ] government, program.....
[ ] ponggawa [ ] bank [ ] others, specify ……..
8.3. For what purposes you lend?
[ ] fishing/working capital loan
[ ] buying household things
[ ] buying motorbike
[ ] pay back debt
[ ] buying jewelry
[ ] others, specify ……..
8.3. How do you perceive the degree of access to get loan?
1---------2----------3---------4----------5
Very difficult Very easy

8.4. Do you have relationship with ponggawa? yes [ ] no
8.5. If you have loan from ponggawa, how is the pay back procedure?
[ ] cash
[ ] pay in installments, how much..... for period .....
[ ] catch cutting, how much ..... for period.....
[ ] others, specify ……
8.6. How important is it to keep good relationships with ponggawa?
1---------2----------3---------4----------5
Strongly not important Very important

8.7. What benefits do you get from having relationship with ponggawa?
[ ] getting loan [ ] securing marketing
[ ] raising social status [ ] others, specify ……..
8.8. Do you have any relationships with other ponggawa? [ ] yes [ ] no
8.9. If yes, to what purpose ……

Annex 1 Household survey questionnaire for fishing

IX. Physical assets access

9.1. How is your frequency of using road transportation?

[ ] regular, to ……..
[ ] frequent, to ……
[ ] occasional, to ……

9.2. How is your frequency of using water transportation?

[ ] regular, to ……..
[ ] frequent, to ……
[ ] occasional, to ……

9.3. How do you perceive the access of transportation to market?

1---------2----------3---------4----------5

Very difficult Very easy

9.4. How do you perceive the access of using fish landing site in this kampung?

1---------2----------3---------4----------5

Very difficult Very easy

9.5. How do you perceive the access of using fish landing site outside kampung?

1---------2----------3---------4----------5

Very difficult Very easy

9.6 . How do you perceive access for getting information about shrimp fishing?

1---------2----------3---------4----------5

Very difficult Very easy

9.7. What kind of media you are using?

[ ] television [ ] radio [ ] others, specify ……
[ ] news paper [ ] leaflet/brochure

X. Social aspects

10.1. What importance do neigbors have for you? .....

10.2. If not relatives, are your neighbors more important than relatives?

[ ] yes [ ] no reason .....

10.3. Who is more helpful when you need assistance?

[ ] relatives (from male side (mention) .....; from female side.....)
[ ] Bos [ ] crew [ ] friend [ ] neighbor

Please give an example the assistance you have experienced

.....

10.4. What organisations or groups do you or your relative follow?

[ ] fishery union [ ] cooperative [ ] NGO
[ ] religious organisation [ ] youth organisation [ ] political party
[ ] others, specify ……..

XI. Local rule

11.1. Is there any specific local rule for shrimp fishing in your community?

[ ] yes [ ] no

11.2. If yes, what kinds of such rules?

[ ] taboos [ ] local agreement
[ ] prohibitions from fore father [ ] others, specify ……

11.3 What are these local rules? …….

11.4. Who does look after or control whether people adhere to the rules? ……

11.5. Are there any sanctions for anyone who breaks the rules? ……..
11.6. Do you think local rules are effective for fishing management?
[ ] clear and effective
[ ] clear but not so effective
[ ] neither clear nor effective
11.7. How can they be improved? .....……..

XII. Resources conflict

12.1. Which areas are occuring conflicts or disturbances when fishers go to fish?
.....
12.2. If yes, what kinds of such disturbances?
[ ] the existence of outsiders (*andon*) fishers (from Nunukan or .....)
[ ] the presence of outsiders big trawler
[ ] the presence of fishing zone boundaries between villages
[ ] prohibition of particular gears utilisation
[ ] the usage of different gears in the same fishing ground
[ ] blast fishing
[ ] overlapping fishing grounds and maritime/navigation zone
[ ] pollution by industries and mining
[ ] others, specify ……..
11.3. To what extent is the importance to control fishing ground from outsider fishers?
1---------2----------3---------4----------5
Strongly not important Very important

11.4. What are negative results of *andon* fishers presence?
[ ] reduce catch
[ ] create conflict
[ ] disturb fishing zone of local fishers
[ ] more competitive in fishing
[ ] others, specify ……..
11.5. Where would you seek the solution? ……
11.6. Who should act against it? ……..

XII. Perception

12.1. How is your fishing income in the last 5 years?
[ ] decrease [ ] increase [ ] stable
12.2. since when it decrease or increase? year …….
12.3. If decrease, what factors caused?
[ ] higher operational costs
[ ] decreased catch
[ ] lower price of catch
[ ] low of fishers bargaining power against bos
[ ] more far fishing ground
[ ] decreased fishing trips
[ ] more number of fishers
[ ] lack of shrimp quality control
[ ] others, specify ……..
12.4. If increase, what factors cause?
[ ] price of shrimp/fish catch getting higher
[ ] easier market access
[ ] gears become developed

[ ] having various gears
[ ] others, specify ……..

12.5. How do you perceive shrimp stocks in this villages's coastal area?

1---------2----------3---------4----------5

Very little Very much

12.6. How do you perceive fish stocks here?

1---------2----------3---------4----------5

Very little Very much

12.7. To what extent is being a fisher play a role for your sustainable family livelihoods?

1---------2----------3---------4----------5

Strogly not important role Very important role

12.8. Do you think that being a fisher is a good way to make a living in the future?
[ ] yes [ ] no

12.9. Do you expect to invest for better fishing technology in the future?
[ ] yes [ ] no

12.10. Do you want your children following you to be a fisher? [ ] yes [ ] no

12.11. If not, what kind of job do you expect for children in the future?.....

Thank you for your answers and have a better livelihood.

Annex 2. Household survey questionnaire for tambak

No. questionnaire : ……..
Village/Hamlet : Pegat Batumbuk/ ……..
RT : ……..
House no. : ……..
No. of members HH : ……..
No. of generations HH : ……..
Name of Interviewer : ……..
Date : ……..

II. General Information

No	Name	Sex	Age	Etnicity or origin	Year of residence	Relation with HH head	Marital status
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1							
2							
3							
4							
5							

Notes:

No	Education	Main occupation	Status of main occupation	Name of Boss	Main product	Sideline occupation	Main product
(1)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1							
2							
3							
4							
5							

Notes:

Remarks:
Col 1 : sequence of HH head and 3 oldest HH members including those living elsewhere
Col 2 : name of HH head and HH members
Col 3 : male (M) and female (F)
Col 5 : ethnics (Bugis, Bajau, Banjar, etc) or origin (Makassar, Mandar, Pasir, etc).
Col 6 : what year of residence in this village
Col 7 : if HH head, husband/wife, children, in laws, brother/sister, , grandchild etc.
Col 8 : married (1), divorced (2), single (3), widower (4)
Col 9 : not school, elementary school, passed elementary school, junior high school, high school
Col 10 : mention main occupation: trammel net fisher, gill netter, trap fisher, etc
Col 11 : as Boss (1), employed by boss: as crew (2a), as captain (2b); own capital (3), wage worker (4), help family with no salary (5), etc
Col 12 : name of boss if respondents work for boss
Col 13 : if white shrimp (1), tiger shrimp (2), other shrimp, specify ……..(3) fish, specify …..…….(4)
Col 14 : mention sidelines occupation either daily or seasonaly
Col 15 : mention main product of sidelines occupation either daily or seasonaly

II. Land ownership

2.5. Do you own pieces of land? [ ] yes [ ] no
2.6. If yes, how do you get your own land? [ ] heir [ ] buying
2.7. If not, what arrangement do you have?
[ ] sharecropping [ ] others, specify ……
[ ] rent
2.8. How is the status of your own land?

type of land	number of pieces	land status (indicate)	area of land (ha)
pond area		f. letter of certificate	
		g. letter of camat approval	
		h. letter of production	
		i. rent	
		j. other (specify……)	
upland agriculture		f. letter of certificate	
		g. letter of camat approval	
		h. letter of production	
		i. rent	
		j. other (specify……)	
garden area		f. letter of certificate	
		g. letter of camat approval	
		h. letter of production	
		i. rent	
		j. other (specify……)	
mangrove/nypa land		f. letter of certificate	
		g. letter of camat approval	
		h. letter of production	
		i. rent	
		j. other (specify……)	

2.5. Are you aware how to get land entitlement? [ ] yes [ ] no
2.6. If yes, please explain the procedure ……
2.7. How can you access to mangrove or nypa area?
[ ] open access to anybody
[ ] previllage to village resident only
[ ] following village's rule
[ ] following government's rule
[ ] others, specify ……
2.8. Is there any restriction to access mangrove/nypa area? If yes where is it? ……..

III. Physical assets and utilities

3.1. Housing building materials:
a. Roof : [ ] nypa/thatced [ ] wooden [ ] asbestos [ ] tiled
b. Wall : [ ] thatched [ ] wooden [ ] brick [ ] cement
c. Floor : [ ] soil [ ] wooden [ ] cement [ ] tiled

3.2. Electricity sources:
[ ] not available
[ ] renting neighbor's generator
[ ] own generator
[ ] other, specify …….
3.3. Water use: [ ] raining water [ ] river [ ] ground water [ ] well [ ] pipe
3.4. Toilet/MCK : [ ] not available [ ] river [ ] backyard [ ] available

IV. Harvesting and income (based on data of last month)

Sources	Usage (%)		Number of operations per year	Estimated costs of production (Rp)	Estimated income (Rp)	Who works (tick)			
	Consumed	Sold				male		female	
						adults	child	adults	child
fishing (per trip)									
white shrimp									
tiger shrimp									
shrimp ……									
fish ……									
fish ……..									
fish ……..									
crab									
pond (per crop)*									
tiger shrimp									
spotted shrimp									
milkfish (bandeng)									
agriculture (per crop)*									
paddy									
cassava									
banana									
vegetables									
fruits									
other products									
forestry (per operation)									
timber									
firewood									
mangrove tree (m3)									
nypa leaf for roof									
charcoal (kg)									
building material (m3)									

Sources	Usage (%)		Number of operations per year	Estimated costs of production (Rp)	Estimated income (Rp)	Who works (tick)			
	Consumed	Sold				male		female	
						adults	child	adults	child
boat material building (m3)									
wage									
farmer									
forestry									
fisheries									
bike driver									
cattle/poultry									
seasonal worker in……..…(specify)									
remittances from hh member in ……..(specify)									
others specify									
Total									

*: the period of each crop varies eg. pond crop (4 months), upland paddy (12 months), etc; interviewer should state detailed period of crop by harvesting in box below.

note:

4.1. What kind of difficulties to get a regular harvest from shrimp fisheries?.....
4.2. Where do you get agriculture input from?.....
4.3. How do you get labor force? …….
4.4. Where does labor force come from?.....through whom do you get? ……..
4.5. Do you pay cash or in kind? ……
Reasons: ……..
4.6. If you do not have necessary cash, how do you get inputs for fishing or agriculture?.....

V. HH expenditure and saving

5.1. Are you able to save? [ ] yes [ ] no
5.2. Depending on what conditions are you able to save?
……..
5.3. How much money do you spend within last week or last month? (please choose)

types of expenditure	quantity (unit)	estimated cost (Rp)
basic consumptions		
rice		
sugar		
oil		
kerosene		
gas		
salt		
fish		
vegetables		
electricity		
voucher HP		
cigarette		
education		
tuition		
transportation		
allowances		
school uniform		
traveling		
health cost		
herbal medicine		
drugs from store		
clothing		
daily clothing		
shoes and sandal		
social contribution/*zakat*		
arisan (social money gathering)		
articles credit		
transportation		
public transport		
bikes/cars		
hh equipments		
tv, radio, parabola		
housing		
housing equipment		
housing renting		
housing credit		

types of expenditure	quantity (unit)	estimated cost (Rp)
others……..		

5.4. Monthly HH expenses (if you choose monthly expenditure)

In general how much money do you spend for monthly HH expense?

[ ] less than Rp. 500.000
[ ] Rp. 500.000 – Rp. 1.000.000
[ ] Rp. 1.000.000 – Rp. 1.500.000
[ ] Rp. 1.500.000 – Rp. 2.000.000
[ ] more than Rp. 2.000.000

5.5. HH saving

categories	kinds	quantity (unit/Rp)
saving	money box	
	bank	
	group	
	cooperative	
	others ……	
investment	boats	
	cattle	
	land	
	jewelry	
	insurance	
	others ……	
capital sharing	joint business	
	others ……	
others…….	……..	

5.6 If you share money with whom do you cooperate? ……

5.7. Financial arrangement within HH

categories	decision made by (tick)		
	dominantly husband	together husband and wife	dominantly wife
education			
hh consumption			
hh business development			
domestic affairs			
earning money			
saving			
financial management			

5.8. Do you have any financial networks outside HH? [ ] yes [ ] no

5.9. If you do business development with whom do you work together?

[ ] relatives,who…….. [ ] caretaker
[ ] bos [ ] tambak owner

VI. Tambak assets and operation

6.1. How many years has the pond been operating?.....years

6.2. Is the farm previously a mangrove or nypa area? [ ] yes [ ] no

6.3. What year was it converted to a pond? ……reason …….

6.4. How much of the mangrove area was converted into pond (%)? ……..……

6.5. How much of tambak area is being produced? ……ha

6.6. Is there any tambak area not produced yet? ……reason ……

6.7. Main cultured species and associated harvest :

[ ] tiger shrimp [ ] *bintik* shrimp [ ] fish (if any), specify ……..
[ ] milkfish [ ] crab

6.8. How long is the culture period? …….....

6.9. Pond compartments

compartments	number	size/area (ha)
rearing		
nursery		
settling		
others ……		

Notes:

6.10. Water management

sources of water supply	distance from tambak (m)
fresh water	
sea water	

Notes:

6.11. Number of gates: ……inlet; ……oulet

6.12. Preparations

preparation	type	dosage (unit per area)	frequency	when added
liming				
fertilization				
pest eradication				
pesticides*				

Notes: *usage of local drugs by farmer to kill pest:

6.13. Do you release additional feed? [ ] yes [ ] no

If yes please fill table below

type of feed	frequency	added when shrimp at age	method	source of feed

Notes:

6.14. Do you use drugs to stimulate shrimp growth? [ ] yes [ ] no

If yes please fill table below

type of drugs	frequency	added when shrimp at age	method	where to get

Notes:

6.15. History of disease problems

Have your pond been attacked by disease? (include those due to viruses, bacteria, fungi, parasites, environmental conditions) [ ] yes [ ] no

Name of disease/ description	Year	No. of ponds Affected	Treatment	Adjacent farm affected/ sequence*

* 0= no other pond; 1= this farm first; 2= other farm first (and where to north/south/west/east*(indicate)

6.16. Cost

a. Initial costs (investments and equipments)

kinds of fixed cost	quantity	price (Rp)	year of buying	economic life (years)	maintenance cost per year
rent/buy land					
rent escavator					
dykes					
water gates					
tambak house					
other equipments……					

Notes:

b. Variable cost per crop

cost	quantity (unit)	period (week/month/crop)	price per unit (Rp)
fertilizer			
pesticide			
lime			
shrimp seed			
fish seed			
labor wage			
others…….			

Notes:

6.17. Stocking density

items	type of culture	
	polyculture	monoculture
density per compartments (ind/m^2)		
number of seeds released per crop per compartments		
total number of seed in all pond area per crop		

Notes:

6.18 Seed

a. Sources of seed : [ ] wild, where …… [ ] hatchery, where ……

b. How is the availabity of seed nowdays? [ ] enough [ ] not enough
c. What causes ? ……..
d. What is the survival rate ? ……..%
6.19. participating worker

source of worker	on farm	off farm
family		
- adult		
- child		
not from family		

6.20. How do you harvest the shrimp and other products? ……..
6.21. Do you have fishing gear as well? [ ] yes [ ] no
6.22. If yes what type of gears do you use? (tick more than one)
[ ] trammel net [ ] mini trawl [ ] push net (dari) [ ] others, specify ….
[ ] gill net [ ] trap (belat) [ ] tidal trap (togo)
6.23. Give reasons why do you go to fish?.....

VII. Production and market
7.1 How much shrimp or fish do you produce per crop?

main species	size	total (kg)	selling price at farm (Rp/kg)	Does the buyer come **on-farm** (1) or does he bring it to the **market** (2)?
tiger shrimp				
milk fish				
spotted shrimp				
crab				
fish ……..				

Notes:

7.2. How is the revenue sharing per crop?
a. ……..% owner ……% worker/caretaker
b. others, specify ……
7.3. How far do you get market for shrimp? ……. km
7.4. Where do you sell the shrimp?
[ ] ponggawa in village [ ] local market [ ] sell door to door
[ ] market in T Redeb [ ] collectors outside Berau [ ] others, specify …
7.5.If you sell to ponggawa, what relations between you and buyer?
[ ] buyer is pond owner [ ] pay debt
[ ] buyer pays for pond operation [ ] relatives [ ] others, specify …
7.6. Before starting farming, do you have any other economic activities to earn money?
[ ] yes [ ] no
7.7. If yes, what activities you do?
[ ] kiosk [ ] boat making [ ] shrimp pond culture
[ ] fuel selling [ ] agriculture [ ] crab culture
[ ] food stall[ ] trading [ ] services
[ ] others, specify ……..

VIII. Financial assets access
8.1. Do you have loans? [ ] yes [ ] no
8.2. If yes, who is the money lender?

[ ] relatives [ ] cooperative [ ] government, program.....
[ ] ponggawa [ ] bank [ ] others, specify ……

8.3. For what purposes you lend?
[ ] tambak/working capital loan
[ ] buying household things
[ ] buying motorbike
[ ] pay back debt
[ ] buying jewelry
[ ] others, specify ……..

8.4. How do you perceive the degree of access to get loan?
1---------2----------3---------4----------5
Very difficult Very easy

8.5. Do you have relationship with ponggawa? yes [ ] no
8.6. If you have loan from ponggawa, how is the pay back procedure?
[ ] cash
[ ] pay in installments, how much..... for period .....
[ ] harvest cutting, how much ..... for period.....
[ ] others, specify ……..

8.7. How important is it to keep good relationships with ponggawa?
1---------2----------3---------4----------5
Strongly not important Very important

8.8. What benefits do you get from having relationship with ponggawa?
[ ] getting loan [ ] securing marketing
[ ] raising social status [ ] others, specify ……..
8.9. Do you have any relationships with other ponggawa? [ ] yes [ ] no
8.10. If yes, to what purpose ……

IX. Physical assets access

9.1 How is your frequency of using road transportation?
[ ] regular, to ……..
[ ] frequent, to ……
[ ] occasional, to ……

9.2 How is your frequency of using water transportation?
[ ] regular, to ……..
[ ] frequent, to ……
[ ] occasional, to ……

9.3. How do you perceive the access of transportation to shrimp market?
1---------2----------3---------4----------5
Very difficult Very easy

9.4. How do you perceive the access of using tambak landing site in this kampung?
1---------2----------3---------4----------5
Very difficult Very easy

9.5. How do you perceive the access of using tambak landing site outside kampung?
1---------2----------3---------4----------5
Very difficult Very easy

9.6 . How do you perceive access for getting information about tambak ?

1---------2----------3---------4----------5

Very difficult Very easy

9.7. What kind of media you are using?

[ ] television [ ] radio [ ] others, specify ……

[ ] news paper [ ] leaflet/brochure

X. Social aspects

10.1. What importance do neigbors have for you? .....

10.2. If not relatives, are your neighbors more important than relatives?

[ ] yes [ ] no reason .....

10.3. Who is more helpful when you need assistance?

[ ] relatives (from male side (mention) .....; from female side.....)

[ ] Bos [ ] caretaker [ ] friend [ ] neighbor

Please give an example the assistance you have experienced.....

10.4. What organisations or groups do you or your relative follow?

[ ] fishery union [ ] cooperative [ ] NGO

[ ] religious organisation [ ] youth organisation [ ] political party

[ ] others, specify ……..

XI. Local rule

11.1. Is there any specific local rule for tambak development in your community?

[ ] yes [ ] no

11.2. If yes, what kinds of such rules?

[ ] taboos [ ] local agreement

[ ] prohibitions from fore father [ ] others, specify ……

11.3 What are these local rules? ……..

.....

11.4. Who does look after or control whether people adhere to the rules? ……

11.5. Are there any sanctions for anyone who breaks the rules? ……

11.6. Do you think local rules are effective for tambak management?

[ ] clear and effective

[ ] clear but not so effective

[ ] neither clear nor effective

11.7. How can they be improved? …….

XII. Perception

12.1. Do you think mangrove is essential for life?

1---------2----------3---------4----------5

Strongly not important Very important

12.2. What are benefits of mangrove?

[ ] coastal protection

[ ] place for hosting marine species [ ] for pond development

[ ] source of construction material [ ] source of firewood [ ] don't know

12.3. What factors are influencing shrimp pond income?

[ ] pest and diseases [ ] soil characteristics [ ] water availability

[ ] water quality [ ] presence of mangrove [ ] don't know

12.4. How is your ponds income in the last 5 years?

[ ] decrease [ ] increase [ ] stable

12.5. Since when it decrease or increase? Year …….
12.6. If decrease, what factors caused?
[ ] higher operational costs
[ ] decreased production
[ ] lower price of harvested shrimp
[ ] low of farmers bargaining power against bos
[ ] lack of shrimp quality control
[ ] others, specify ……..
12.7. If increase, what factors cause?
[ ] price of shrimp harvest getting higher
[ ] easier market access
[ ] pond technology being developed
[ ] others, specify ……..
12.8. What constraints are affecting to further pond development?

[ ] pest and diseases	[ ] pollution	[ ] low production
[ ] lack of capital	[ ] water supply system	[ ] marketing
[ ] pond leakage	[ ] theft	[ ] shrimps die
[ ] price of inputs	[ ] seeds die	[ ] others ……

12.9. To what extent is being a farmer play a role for your sustainable family livelihoods?
1---------2----------3---------4----------5
Strogly not important role Very important role
Reason: ……..
12.10. Do you think that being a farmer is a good way to make a living in the future?
[ ] yes [ ] no
12.11. Do you have plan to opening ponds? [ ] yes [ ] no
If no, what is your reason? [ ] no capital [ ] no land
12.12. If yes, how large of tambak do you want to open?
[ ] > 10 ha [ ] 5-10 ha [ ] 3-5 ha [ ] 0.5-2 ha
12.13. Do expect to invest for better tambak development in the future?
[ ] yes [ ] no
12.14. Do you want your children following you to be afarmer? [ ] yes [ ] no
12.15. If not, what kind of job do you expect for children in the future?.....

Thank you for your answers and have a better livelihood.

Summary

During the last quarter of a century the global concern about the sea level rise and marine biodiversity decline have contributed to the call for integrated coastal management. Environmental issues such as global warming and climate change have become predominant in the public media. But political and policy interests leading to the call for integrated coastal management primarily serve land-related technical and macro-economic goals. The social-economic resilience of the coastal population, the existing social and environmental differentiation within and between fishers' communities, their access to coastal resources and livelihood diversification are mostly ignored. The relative marginalization of coastal livelihoods and the need to better understand the effect of human interaction on the marine and coastal environment also strengthened the call for social scientific research on coastal resources. For example, on the effects of trans-national trade networks and administrative decentralisation on resource exploitation and the competing claims about the marine resources between fishers and conservationists. While zoning as the administrative boundary marking of marine space is increasingly shown to be ineffective (Chapter 6) there is a need for integrative policies addressing the rapid social transformation of the coastal areas.

This thesis described the dynamics of coastal fisheries and aquaculture based livelihoods in the coastal frontier of Berau. As a part of the Wageningen funded INREF-RESCOPAR research programme its particular focus was on shrimp production, but neither small-scale fishery nor extensive pond farming appeared to be solely oriented toward shrimp.

Chapter 2 maps out the different concepts used and presents the methodological issues involved in the study. In the first part of this chapter the main concepts of livelihood, agency and social interface are discussed from an actor-oriented perspective. In order to understand the dynamics of the everyday life of the people the concepts of resilience and patronage as the *habitus* of Bugis society are presented as well. This is followed by a discussion of decentralisation, fisheries co-management and the establishment of the Marine Protected Area, as the study of the every day life of fishers and pond farmers needs to be well

contextualized. The second part of the chapter presents the study design and the research strategy including the methods and techniques applied to collect and analyse the data.

The research was conducted in the coastal area of the Berau district of northeastern Kalimantan, Indonesia where fishing and pond aquaculture are the main livelihoods of the coastal people. The study area was located in three villages of the Berau Delta namely Kasai, Teluk Semanting and Pegat Batumbuk. The research was designed to combine both qualitative and quantitative methods. It is a bottom-up study of the ways of making a living by the individual and institutional actors who are involved in fisheries and pond aquaculture at multiple social scales using actor an actor-oriented approach. Ethnographic methods were applied and a survey of 196 households was done interviewing fishers of different gear classes, as well as pond owners and caretakers. Two Focus Group Discussions were carried out inviting different fishers and pond owners. During these discussions participants were asked to construct a participatory map for fishing and for pond farming. Chapters 3 and 4 discuss the empirical data of the everyday lives of fishers and pond owners, respectively. Chapter 3 shows that there is no single or homogeneous type of livelihood in coastal Berau. Instead, there is a diversity of fishery-based livelihoods according to the five main gear classes that are distinguished among the fishers themselves and consequently used in the survey. The everyday life of fishers also shows that their livelihood is embedded in political-economic patronage networks constructing or contesting values, interests and forms of knowledge of individual and institutional actors.

Fishing practices in the coastal frontier of Berau are influenced by the Bugis *habitus* of patronage networks between the boss or trader (*punggawa*) and the dependent fishers. The fishers of Bugis origin have in-depth knowledge of the tidal system and seasonality, and make use of the lunar calendar to plan their fishing trips. Loans are provided by the punggawa who himself depends on the delivery of the produce; thus interdependency characterises the hierarchical power relation between punggawa and fisher. I also investigated the shrimp trade conducted between patrons. This is particularly interesting because relationships between patrons are seldom included in the discussion of patron-client systems.

Livelihood trajectories of different fishers from various classes show that as social actors, whether rich or poor, they have the agency to search for better livelihoods. The patrons usually do not go out at sea, and much of the decision making is done by the dependent fishers on the boats. Changing fishing gear over

a life time, taking a variety of fishing gear into the boat for a trip, dealing with the seasons and having practical knowledge to access good fishing grounds in the rich coastal waters are important strategies developed by the fishers in Berau.

Chapter 4 presents the multiplicity of pond (*tambak*) based livelihood in the Berau Delta. Indonesia has a long history in aquaculture. It is hard to know exactly about the beginning of tambak culture, but it is generally believed that brackish water fish ponds had their origins on the island of Madura or in East Java. From the life histories of the social actors involved in extensive pond farming we can learn that the coastal frontier of Berau is considered an open access area for Bugis migrants. In this frontier mangrove land has become a social-political arena of the village head and secretary, the punggawa in his various roles as pond owner, boss and shrimp trader, the caretakers of the ponds, field officers and other government staff. Farmers opened tambak by constructing the type of ponds they knew in Sulawesi, but in Berau where there is more space, the pond owners prefer to develop bigger pond areas over time, while the caretakers engage in credit dependencies to open their own ponds. Extensive ponds thus become a tool to lay claims to land in a social arena as actors negotiate, cooperate and contest their different interests.

Patronage networks between punggawa, pond farmers and shrimp traders play an important role in tambak based livelihood. Caretakers of a pond and their patrons/pond owners are mutually dependent upon each other, because caretakers are heavily indebted to their patron and depend on loans provided by him but the patron or boss in turn depends on their them for the quality and quantity of pond production.

The results of the survey conducted among the pond farmers in Pegat Batumbuk show that polyculture appears to be preferred above monoculture of shrimps. About 50% of the respondents moved out of fishing into aquaculture as the primary basis of their livelihoods. Intervention by outsider entrepreneurs who started investing in the Berau Delta also has been influential in their decision to engage with tambak farming. Another finding is that since farmers are certain that a tambak based livelihood has brought them more stable or even better livelihood conditions. They also believe that pond farming is sustainable, particularly polyculture of shrimp and fish, hence they are eager to expand their tambak area. Another important finding is that the majority of the farmers (77.3%) in Pegat Batumbuk saw tambak as their future livelihood. They have their own indicators

of good practices in pond aquaculture and they can recognise white spot virus as well as other environmental problems that may kill the shrimps in the pond.

By further contextualising the findings on coastal livelihoods this thesis aims to provide the necessary social scientific knowledge basis for policy making and the implementation of integrated coastal development in the Berau Delta - which is part of the Berau Marine Protected Area. The designation of Marine Protected Areas (MPAs) in Indonesia has been accelerated over the past two decades in line with international biodiversity conservation commitments and to secure a basis for decentralised fisheries resources management. The Berau Marine Conservation Area in northeast Kalimantan is one of them. It was established in 2005 by a decree from the district head with strong support from international environmental NGOs such as The Nature Conservancy (TNC) and the World Wildlife Fund (WWF), as well as national and local NGOs.

Chapter 5 investigates how the formal establishment of the Berau Marine Protected Area (MPA) or Marine Conservation Area (MCA) as it is locally called, and governmental boundary marking and zoning affected fishers' livelihoods through processes of social inclusion and exclusion. One of the major problems fishers experienced was the presence of outsider fishers (*andon*). Chapter 5 draws attention to the position of small-scale artisanal outsider fishers who have the legal right to access the coastal waters anywhere in Indonesia, including the resource rich fishing grounds in the Berau Delta. In practice this goes at the expense of local fishers, whose activities are confined within the marine conservation area. Moreover, the decentralised district government legitimises outsiders' fishery activities on the condition that these andon pay for a fortnight's fishing permit which contributes to the regional income (PAD). Confusing governmental policies make the MPA boundaries highly permeable. Not only are the interests of the district government opposed and contradictory to the interests of sustaining the MPA by the international environmental organisations, they also oppose the interests of the local fishers. Therefore, the latter regard the presence of andon as both illegal and illicit.

Chapter 6 examines how the locally embedded government institution named Pokmaswas affects, and is affected by, the everyday dynamics of fishers' and government officials' interactions, and how the contestation of social values, knowledge, interests and power regarding the coastal resources management of the MPA in the political-economic network of key social actors influence the effectiveness of Pokmaswas as a surveillance institution.

Based on the study of the life trajectories of the village elite I was able to unravel the political-economic network that enabled Pokmaswas members to access local political power. Their interest in accessing power largely contributed to the ambiguity of their monitoring of outsider fishers who entered the Berau waters, not for the purpose of marine conservation but for the purpose of raising district revenues. Moreover, Pokmaswas has challenged the trust of their fellow local fishers by excluding local mini-trawlers from the coastal waters, while at the same time attracting outsiders. Ever since its establishment in 2005 the development of the MPA in Berau has thus been hampered by value contestations of the major social actors in this coastal frontier area.

Finally Chapter 7 presents the main conclusions of this study with regard to the research questions. This chapter starts with the discussion of the dynamics of coastal fisheries and pond based livelihoods in the Berau Delta. It is followed by the discussion of the case of andon outsiders and their access to fishing grounds in Berau and the role of Pokmaswas in the management of coastal resources. This chapter particularly discusses how this study can contribute to improve the concept of social resilience based on the empirical findings in coastal Berau. I have not embraced the definitions and approaches to socio-ecological resilience (Chapter 2) because of their underlying assumption of a social system 'bouncing back' to its original shape and status. I have learned to see the dynamics of social development through time and space, using an actor-oriented methodology. Both fishers and pond farmers in Berau do indeed show social resilience against environmental stress, for example by strategically engaging in patronage networks that allow them to continue with pond farming or to shift from fisheries to pond culture.

Social resilience means livelihood diversification and active participation in the political-economic networks built by fishers and pond owners in Berau. Social resilience is not seen as the property of an individual or a group of actors. Resilience is an emergent property of the interface between actors and their social, economic, political, physical and material environment. Social resilience is neither the quality of a single actor, whether he is a farmer or fisher, a powerful shrimp trader or pond owner or district head; it is partly the outcome of historical interactions and experiences like the Bugis migration into Kalimantan, the cultural institution of patronage that is pervasive in the development of all coastal areas of Kalimantan, the recent political-administrative decentralisation and the coming into power of the district government of Berau and, finally, of the ecological

knowledge and financial support contributed by the international environmental organisations.

This study has shown the relevance of addressing the social resilience of the coastal communities in Berau against resource degradation, not in terms of their vulnerability but in terms of their agency. In fishery based livelihoods social resilience is strengthened by patronage networks between punggawa and dependent fishers, and depends upon the integration within regional decentralised political-economic networks beyond or across formal institutions, including Pokmaswas and the district government. Meanwhile in tambak based livelihoods social resilience is likewise affected by patronage networks between the punggawa and pond owner/caretaker or shrimp trader, and their networks.

On the other hand, we may speak of a weaker social resilience to explain why fishers' communities for instance do not resist against outsiders fishers' intrusion and degradation of marine resources. Weak social resilience of the coastal communities in the Berau Delta may depend upon three main factors: 1. Cultural perceptions of environmental change; 2. Conflicting interests between the main actors in the network and; 3. Lack of leadership or conflicts of interest between the village elite and the majority of fishers. In the case of Pokmaswas as an embedded government institution for resources surveillance weak resilience can be explained by the fact that this resource co-management institution was externally imposed or 'embedded' rather than generated on the basis of local organisational initiative. Hence, there was no local ownership, and conflicting interests erupted concerning the exclusion of the small-scale fishers from the village (Chapters 5 and 6).

The findings of this study contribution to science in furthering our understanding of the social and ecological resilience of the Berau Delta and the furthering of the interdisciplinary debate and policy making concerning fisheries and pond aquaculture in the coastal areas in Indonesia in general. It is one of the very few social science studies on coastal fisheries and aquaculture based livelihoods in Indonesia using an actor-oriented approach. Using this approach has provided me with an in-depth view of the everyday social, economic and cultural dynamics at the multiple scales of households, coastal villages, the boats at sea with their crew, and government agencies. It enabled me to move beyond the statement that coastal livelihoods are complex by teaching us how complexity works.

Secondly, this study relates livelihood diversification to the debate on social and ecological resilience. It does not suffice to construct a general model of social-

ecological resilience assuming one coherent coastal system or coastal population. This research clearly shows that we need more detailed social-economic information about the different human-nature interactions, whether through the uses of different gear or the establishment of extensive ponds or otherwise. The scientific relevance of this study also lies in viewing political-economic patronage networks as an element of social resilience because they determine who has the power to decide and who does not. The findings about the vital role of the Bugis punggawa in the coastal development in Berau and the pervasiveness of the cultural institution of patronage provide an input to policy making.

There are other contributions to policy making on co-management. First, empirical findings of tambak culture show a preference for polyculture. International and national economic interests, on the other hand, are more oriented to a rational, industrial type of intensive shrimp aquaculture and certification of its product for the global market. Such contextualization of shrimp policy is needed, to ensure that local interests are included in coastal development. Moreover, policy making should be transparent about the differences of 'local interests' between the regional and village elites, and the political-economic network of punggawa from village to district and provincial levels.

Finally, decentralisation appears to have little to do with co-management between the state and fishers' communities. It rather legitimizes extensive claims to land and coastal resources exploitation by inter-island entrepreneurial elites in collaboration with local government officials and politicians.

Ringkasan

Selama seperempat abad terakhir perhatian dunia mengenai kenaikan muka air laut dan menurunnya keanekaragaman hayati laut telah berdampak terhadap perhatian untuk pengelolaan pesisir secara terpadu. Isu-isu lingkungan seperti pemanasan global dan perubahan iklim telah mendominasi di media-media publik. Namun kepentingan politik dan pemerintah untuk memperhatikan pengelolaan pesisir secara terpadu lebih ditujukan kepada tujuan-tujuan teknis daratan dan ekonomi makro. Ketahanan sosial ekonomi *(social-economic resilience)* dari masyarakat pesisir, perbedaan-perbedaan sosial dan lingkungan di dalam dan antar masyarakat nelayan, akses mereka terhadap sumberdaya pesisir serta diversifikasi penghidupan masyarakat sering diabaikan. Marjinalisasi relatif atas penghidupan masyarakat pesisir dan kebutuhan atas pemahaman yang lebih baik terhadap pengaruh interaksi manusia atas lingkungan pesisir dan laut juga memperkuat perhatian untuk penelitian ilmiah sosial pada sumberdaya pesisir. Sebagai contoh, pengaruh jaringan-jaringan perdagangan dan desentralisasi administratif atas eksplotasi sumberdaya dan adanya kompetisi perebutan hak terhadap sumberdaya laut antara nelayan dan pelaku konservasi. Sementara itu zonasi sebagai penandaan batas-batas administrasi ruang laut semakin tidak efektif (Bab 6) dan menunjukkan suatu kebutuhan atas kebijakan yang menyeluruh untuk mengatasi perubahan sosial yang cepat yang terjadi pada wilayah-wilayah pesisir.

Tesis ini menggambarkan dinamika-dinamika penghidupan masyarakat pesisir berbasis perikanan tangkap dan budidaya tambak di wilayah frontir pesisir Kabupaten Berau. Sebagai bagian dari program penelitian yang didanai INREF-RESCOPAR dengan fokus pada produksi udang, diketahui bahwa tidak satu pun baik perikanan tangkap skala kecil maupun budidaya tambak ekstensif yang berorientasi hanya pada produk udang saja.

Bab 2 mengkaji beberapa konsep yang digunakan dan menyajikan aspek-aspek metodologi dalam penelitian ini. Pada bagian pertama dari bab ini konsep-konsep utama penghidupan masyarakat, agensi dan perpaduan sosial *(social interface)* didiskusikan dari perspektif orientasi aktor. Dalam rangka untuk memahami dinamika-dinamika kehidupan sehari-hari dari masyarakat konsep-konsep ketahanan dan patronase sebagai *habitus* dari masyarakat Bugis juga disajikan.

Selanjutnya diikuti dengan diskusi mengenai desentralisasi, pengelolaan perikanan kolaboratif dan pembentukan Kawasan Konservasi Laut, karena penelitian mengenai kehidupan keseharian dari nelayan dan petambak perlu dikontekstualisasikan secara baik. Bagian kedua dari bab ini menyajikan desain dan strategi penelitian termasuk metode dan teknik yang digunakan untuk mengumpulkan dan menganalisis data.

Penelitian ini dilaksanakan di wilayah pesisir Kabupaten Berau bagian tenggara Kalimantan, Indonesia dimana penangkapan ikan dan budidaya tambak merupakan penghidupan utama masyarakat. Lokasi penelitian adalah di tiga desa di Delta Berau yakni Kasai, Teluk Semanting dan Pegat Batumbuk. Penelitian ini dirancang untuk mengkombinasikan baik metode kualitatif dan kuantitatif. Ini merupakan studi dari bawah ke atas tentang cara-cara individu dan aktor-aktor institusi untuk membuat penghidupan dari penangkapan ikan dan budidaya tambak pada skala-skala sosial yang beragam dengan menggunakan pendekatan orientasi aktor. Metode ethnografik dan survey terhadap 196 rumah tangga dilakukan dengan mewawancarai nelayan dari berbagai kelas alat tangkap yang berbeda dan pemilik serta penjaga tambak. Dua Diskusi Kelompok Terfokus (FGD) dilaksanakan dengan mengundang nelayan yang memiliki alat tangkap berbeda dan pemilik tambak. Selama diskusi-diskusi ini berlangsung peserta-peserta diminta untuk membuat peta secara partisipatif untuk peta penangkapan ikan dan peta untuk budidaya tambak. Bab 3 dan 4 mendiskusikan data empiris dari kehidupan keseharian masing-masing dari nelayan dan petambak. Bab 3 menunjukkan bahwa tidak ada satupun tipe atau homogenitas penghidupan masyarakat di pesisir Berau. Sebaliknya, ada keragaman penghidupan masyarakat berbasis penangkapan ikan berdasarkan 5 kelas alat tangkap utama yang ditentukan oleh nelayan sendiri dan secara konsekuen digunakan dalam survey. Kehidupan keseharian nelayan juga menunjukkan bahwa penghidupan mereka melekat di dalam jaringan patronase politik dan sosial yang membangun atau mengkontestasi nilai-nilai, kepentingan dan bentuk-bentuk pengetahuan dari individu dan aktor-aktor institusi.

Praktek-praktek penangkapan di wilayah frontir pesisir Berau dipengaruhi oleh *habitus* jaringan patronase Bugis antara bos atau pedagang pengumpul *(punggawa)* dan nelayan terikat. Nelayan-nelayan Bugis memiliki pengetahuan yang mendasar mengenai sistem pasang surut dan musim penangkapan, dan menggunakan kalender bulan untuk merencanakan pergi melaut. Pinjaman modal disediakan oleh punggawa yang sekaligus bergantung pada hasil produksi,

sehingga saling ketergantungan ini menjadi karakter relasi kekuasaan antara punggawa dan nelayan. Saya juga menginvestigasi perdagangan udang yang dilakukan antar bos. Secara khusus hal ini menjadi menarik karena hubungan antara bos jarang dimasukkan dalam diskusi mengenai sistem patron-klien.

Jalur-jalur penghidupan berbagai nelayan dari kelas-kelas yang berbeda menunjukkan bahwa sebagai aktor sosial, apakah kaya atau miskin, mereka memiliki agensi untuk mencari penghidupan yang lebih baik. Bos biasanya tidak pergi melaut, dan lebih banyak mengambil keputusan yang selanjutnya dilaksanakan oleh nelayan terikat pada saat menangkap. Pergantian alat tangkap selama sejarah kehidupan nelayan, tersedianya alat tangkap yang lebih variatif di kapal pada saat melaut, kemampuan menghadapi musim-musim penangkapan dan memiliki pengetahuan praktis untuk mengakses wilayah penangkapan yang baik di perairan yang kaya akan sumberdaya, merupakan strategi-strategi yang penting yang dikembangkan oleh nelayan-nelayan Berau.

Bab 4 menyajikan multiplisitas penghidupan masyarakat berbasis tambak di Delta Berau. Indonesia memiliki sejarah panjang dalam budidaya tambak. Tidak mudah untuk menentukan secara pasti kapan budidaya tambak pertama kali dipraktekkan, namun secara umum diketahui bahwa tambak ikan pertama kali ada di Pulau Madura atau di Jawa Timur. Dari sejarah hidup aktor-aktor sosial yang terlibat dalam budidaya tambak ekstensif kita dapat memahami bahwa wilayah frontir pesisir Berau adalah wilayah dengan akses terbuka bagi migran-migran dari Bugis. Wilayah frontir mangrove telah menjadi sebuah arena sosial-politik bagi kepala desa dan sekretarisnya, punggawa dengan berbagai posisinya sebagai pemilik tambak maupun sebagai boss dan pedagang pengumpul udang, penjaga tambak, dan petugas lapangan serta staf pemerintah lainnya. Pembudidaya membuka tambak dengan cara membangun tipe tambak yang mereka sudah ketahui saat masih di Sulawesi, namun mengingat masih luasnya lahan untuk tambak di Berau, pemilik tambak lebih suka untuk membangun tambak dengan ukuran yang besar seiring perjalanan waktu, sementara penjaga tambak terikat dengan bergantung kepada hutang untuk membuka tambak mereka sendiri. Tambak-tambak ekstensif selanjutnya menjadi sebuah alat untuk membuat klaim lahan atas suatu arena sosial karena aktor-aktor bernegosiasi, bekerjasama dan bersaing karena adanya perbedaan kepentingan.

Jaringan-jaringan patronase antara punggawa, pemilik tambak dan pedagang udang memiliki peran yang penting dalam penghidupan masyarakat berbasis tambak. Penjaga tambak dan bos mereka/pemilik tambak saling bergantung satu

dengan lainnya, karena penjaga tambak memiliki hutang dari bos dan bergantung pada pinjaman yang disediakan oleh bos namun sebaliknya bos juga bergantung pada mereka atas kualitas dan kuantitas produksi tambak.

Hasil survey terhadap petambak-petambak di Pegat Batumbuk menunjukkan bahwa mereka lebih menyukai polikultur daripada monokultur udang. Sekitar 50% dari responden berpindah dari perikanan tangkap menjadi budidaya sebagai sumber penghidupan mereka. Intervensi dari pengusaha luar wilayah yang memulai berinvestasi tambak di Delta Berau telah mempengaruhi keputusan masyarakat untuk mengembangkan budidaya tambak. Hasil temuan lainnya adalah petambak yakin akan penghidupan berbasis tambak karena telah memberikan penghidupan yang stabil bahkan lebih baik bagi mereka. Selanjutnya mereka juga percaya bahwa budidaya tambak adalah berkelanjutan, khususnya polikultur udang dan ikan, sehingga mereka berkeinginan untuk memperluas tambak. Temuan penting lainnya adalah mayoritas petambak (77.3%) di Pegat Batumbuk melihat tambak sebagai masa depan penghidupan mereka. Mereka juga memiliki indikator-indikator sendiri atas praktek-praktek budidaya yang baik di tambak dan mereka dapat mengenali virus bintik putih dan masalah-masalah lingkungan lainnya yang dapat membunuh udang di dalam tambak.

Dengan lebih lanjut mengkontekstualisasikan hasil-hasil penelitian pada penghidupan masyarakat pesisir tesis ini bertujuan untuk memberikan dasar-dasar pengetahuan ilmiah sosial yang dibutuhkan untuk perumusan kebijakan dan implemantasi pembangunan pesisir terpadu di Delta Berau – yang merupakan bagian dari Kawasan Konservasi Laut Berau. Pembentukan Kawasan Konservasi Laut (KKL) di Indonesia telah diakselerasi selama dua decade terakhir sejalan dengan komitmen konservasi keanekaragaman hayati secara global dan untuk menjamin suatu dasar desentralisasi pengelolaan sumberdaya perikanan. Kawasan Konservasi Laut Berau di wilayah tenggara Kalimantan adalah satu diantaranya. KKL ini dibentuk pada tahun 2005 melalui Keputusan Bupati Berau dengan dukungan penuh dari Lembaga Swadaya Masyarakat (LSM) lingkungan internasional meliputi The Nature Conservancy (TNC) dan The World Wildlife Fund (WWF), serta LSM nasional dan lokal.

Bab 5 mengkaji bagaimana pembentukan formal Kawasan Konservasi Laut Berau sebagaimana secara lokal disebut demikian, dan bagaimana penentuan batas dari pemerintah serta zonasi mempengaruhi penghidupan masyarakat nelayan melalui proses eksklusi dan inklusi sosial. Satu diantara masalah utama bagi nelayan lokal adalah kehadiran nelayan luar *(andon)*. Bab 5 memberikan

perhatian kepada posisi nelayan luar skala kecil yang memiliki hak legal untuk mengakses seluruh perairan di Indonesia, termasuk wilayah penangkapan yang kaya di Delta Berau. Dalam prakteknya, hal ini menjadikan masalah bagi nelayan lokal yang memiliki aktivitas penangkapan yang dibatasi oleh wilayah konservasi laut. Selanjutnya, pemerintah kabupaten melegitimasi aktivitas penangkapan nelayan luar dengan persyaratan bahwa nelayan luar ini membayar untuk izin penangkapan dua mingguan bagi kebutuhan pendapatan asli daerah. Kebijakan pemerintah yang membingungkan ini menyebabkan batas-batas KKL menjadi sangat mudah ditembus. Hal ini bukan hanya kepentingan dari pemerintah kabupaten yang bertentangan dan kontradiktif dengan kepentingan untuk menopang KKL oleh organisasi-organisasi lingkungan internasional, namun hal ini juga bertentangan dengan kepentingan nelayan-nelayan lokal. Oleh karenanya mereka memandang kehadiran nelayan andon baik sebagai sesuatu yang illegal dan sebagai sesuatu yang tidak diperbolehkan.

Bab 6 mengkaji bagaimana institusi lokal bentukan pemerintah yang dinamakan Pokmaswas mempengaruhi, dan dipengaruhi oleh, dinamika keseharian dari interaksi-interaksi nelayan dan staf pemerintah, dan bagaimana kontestasi nilai-nilai sosial, pengetahuan, kepentingan-kepentingan dan kekuasaan menyangkut pengelolaan sumberdaya pesisir KKL di dalam jaringan politik-ekonomi aktor-aktor sosial kunci mempengaruhi keberhasilan Pokmaswas sebagai suatu institusi pengawasan.

Berdasarkan penelitian dari sejarah hidup elit-elit desa saya dapat mengungkapkan jaringan politik-ekonomi yang membuat anggota-anggota Pokmaswas mampu mengakses kekuasaan politik lokal. Kepentingan mereka dalam mengakses kekuasaan sebagian besar mengakibatkan ambiguitas pemantauan mereka terhadap nelayan luar yang masuk ke perairan Berau, bukan untuk tujuan konservasi perairan laut namun untuk tujuan penerimaaan asli daerah. Selanjutnya, Pokmaswas telah meragukan kepercayaan anggotanya dari nelayan lokal karena melarang nelayan mini-trawl lokal menangkap di wilayah pesisir, sementara itu pada saat yang bersamaan menarik nelayan luar untuk datang. Bahkan sejak pembentukannya pada tahun 2005, pembangunan KKL Berau telah dihambat oleh kontestasi-kontestasi nilai dari aktor-aktor sosial utama di wilayah frontir pesisir ini.

Terakhir Bab 7 menyajikan kesimpulan-kesimpulan utama dari penelitian ini yang terkait dengan pertanyaan-pertanyaan penelitian. Bab ini memulai dengan diskusi tentang dinamika-dinamika penghidupan masyarakat berbasis perikanan

tangkap dan tambak di Delta Berau. Selanjutnya diikuti dengan pembahasan tentang kasus nelayan andon and akses mereka ke wilayah penangkapan di Berau dan peran dari Pokmaswas dalam pengelolaan sumberdaya pesisir. Bab ini secara khusus mendiskusikan bagaimana penelitian ini dapat memberikan kontribusinya untuk memperbaiki konsep ketahanan sosial berdasarkan hasil penelitian empiris di pesisir Berau. Saya tidak mengambil definisi dan pendekatan-pendekatan dalam ketahanan sosial-ekologis (Bab 2) karena asumsi mendasar mereka mengenai sistem sosial yang 'kembali' ke bentuk dan status awal. Saya memperoleh pemahaman saat melihat dinamika-dinamaika pembangunan sosial melalui waktu dan ruang, menggunakan metodologi orientasi aktor. Baik nelayan maupun petambak di Berau tentu saja menunjukkan ketahanan sosial menghadapi tekanan lingkungan, sebagai contoh dengan strategi teribat ke dalam jaringan patronase yang memungkinkan mereka meneruskan budidaya tambak atau berpindah dari usaha penangkapan ke usaha budidaya tambak.

Ketahanan sosial memiliki arti diversifikasi penghidupan dan keikutsertaan aktif dalam jaringan politik-ekonomi yang dibangun oleh nelayan dan petambaak di Berau. Ketahanan sosial tidak dilihat sebagai properti dari individu atau kelompok aktor-aktor. Ketahanan adalah suatu properti yang muncul dari hasil perpaduan antara aktor-aktor dan lingkungan-lingkungan ekonomi, politik, fisik dan material. Ketahanan sosial bukanlah kualitas suatu aktor, apakah dia nelayan atau petambak, bukan pedagang udang yang kuat atau seorang Bupati; melainkan ia merupakan bagian dari hasil interaksi dan pengalaman historis seperti migrasi Bugis ke Kalimantan, institusi kultural patronase yang melekat dalam pembangunan seluruh wilayah pesisir Kalimantan, desentralisasi politik-administratif terkini dan masuk ke dalam kekuasaan di Pemerintah Kabupaten Berau dan, terakhir, pemahaman ekologis and dukungan dana yang diberikan oleh organisasi-organisasi lingkungan internasional.

Penelitian ini menunjukkan hubungan dari mengatasi ketahanan sosial masyarakat pesisir di Berau dalam mengatasi degradasi sumberdaya, bukan dalam arti kerentanan namun dalam arti agensi mereka. Dalam penghidupan masyarakat berbasis perikanan tangkap ketahanan sosial diperkuat dengan jaringan patronase antara punggawa dan nelayan terikat, dan tergantung dari integrasi di dalam jaringan desentralisasi politik-ekonomi daerah di luar atau lintas institusi-institusi formal, termasuk Pokmaswas dan Pemerintah Kabupaten. Sementara itu pada penghidupan masyarakat berbasis tambak ketahanan sosial demikian juga

dipengaruhi oleh jaringan patronase antara punggawa dan pemilik tambak/penjaga atau pedagang udang, dan jaringan mereka.

Di sisi lain, kita dapat menyatakan suatu ketahanan sosial yang lebih lemah untuk menjelaskan mengapa masyarakat nelayan sebagai contoh tidak menolak atas intrusi nelayan luar dan atas degradasi sumberdaya laut. Ketahanan sosial yang lemah dari masyarakat pesisir di Delta Berau dapat bergantung dari tiga faktor utama: 1. Persepsi kultural atas perubahan lingkungan; 2. Kepentingan-kepentingan yang bertentangan antara aktor-aktor utama di dalam jaringan dan; 3. Kurangnya kepemimpinan atau konflik-konflik kepentingan antara elit desa dan mayoritas nelayan. Pada kasus Pokmaswas sebagai institusi bentukan pemerintah untuk pengawasan sumberdaya ketahanan sosial yang lemah dapat dijelaskan dengan fakta bahwa institusi pengelolaan sumberdaya kolaboratif ini secara eksternal dibebankan atau 'dilekatkan' daripada menciptakan suatu dasar bagi inisiatif organisasi lokal. Oleh karenanya tidak ada kepemilikan lokal, dan konflik-konflik kepentingan meningkat menyangkut proses eksklusi nelayan skala kecil dari desanya.

Hasil temuan penelitian ini memberikan kontribusi kepada ilmu pengetahuan untuk pemahaman kita selanjutnya tentang ketahanan sosial dan ekologi di Delta Berau dan selanjutnya tentang perdebatan interdisiplin dan perumusan kebijakan menyangkut perikanan tangkap dan budidaya tambak di wilayah pesisir secara umum di Indonesia. Penelitian ini adalah satu diantara sangat sedikit studi ilmu sosial tentang penghidupan masyarakat berbasis perikanan tangkap dan budidaya tambak di Indonesia yang menggunakan pendekatan orientasi aktor. Dengan menggunakan pendekatan ini telah memberikan saya sebuah pandangan yang mendalam mengenai dinamika penghidupan sosial, ekonomi dan kultural sehari-hari pada skala-skala yang bertingkat dari skala rumah tangga, desa-desa pesisir, kapal-kapal nelayan di laut dengan nelayannya, dan lembaga pemerintah. Hal ini membuat saya untuk melangkah ke luar dengan pernyataan bahwa penghidupan masyarakat pesisir adalah kompleks dan penelitian ini mengajarkan kepada kita bagaiman kompleksitas itu bekerja.

Kedua, penelitian ini berhubungan dengan diversifikasi penghidupan masyarakat untuk perdebatan mengenai ketahanan sosial dan ekologi. Tidaklah cukup untuk membangun suatu model umum ketahanan sosial dan ekologi dengan mengasumsikan satu sistem wilayah pesisir atau masyarakat pesisir yang koheren. Penelitian ini secara jelas menunjukkan bahwa kita membutuhkan lebih detil informasi sosial-ekonomi tentang perbedaan interaksi-interaksi manusia-

alam, apakah melalui penggunaan alat tangkap ikan yang berbeda atau pembangunan tambak-tambak ekstensif atau yang lainnya. Relevansi ilmiah dari penelitian ini juga pada pandangan atas jaringan-jaringan patronase politik-ekonomi sebagai suatu elemen ketahanan sosial karena hal ini menentukan siapa yang memiliki kekuatan untuk memutuskan dan siapa yang tidak. Hasil-hasil penelitian mengenai peranan penting dari punggawa Bugis pada pembangunan pesisir di Berau dan kehadiran institusi kultural patronase ini memberikan input untuk penyusunan kebijakan.

Ada kontribusi-kontribusi lain untuk penyusunan kebijakan atas pengelolaan kolaboratif. Pertama, hasil empiris dari budidaya tambak menunjukkan suatu preferensi untuk polikultur. Kepentingan internasional dan ekonomi nasional, di sisi lain, lebih berorientasi kepada rasionalitas, kepada tipe industri budidaya udang secara intensif dan kepada sertifikasi produk untuk pasar global. Dibutuhkan kontekstualisasi kebijakan budidaya udang, untuk menjamin agar kepentingan lokal dimasukkan dalam pembangunan pesisir. Lebih jauh, penyusunan kebijakan seharusnya transparan mengenai perbedaan-perbedaan 'kepentingan lokal' antara elit-elit daerah dan desa, dan jaringan politik-ekonomi punggawa dari level desa ke kabupaten dan provinsi.

Akhirnya, desentralisasi kelihatannya sedikit berkaitan dengan pengelolaan kolaboratif antara masyarakat nelayan dan negara. Desentralisasi lebih kepada melegitimasi klaim-klaim ekstensif atas lahan dan exploitasi sumberdaya pesisir oleh elit-elit pengusaha antarpulau yang berkolaborasi dengan staf-staf pemerintah lokal dan politisi.

About the author

Bambang Indratno Gunawan was born on September 14th, 1970 and grew up in Samarinda, East Kalimantan, Indonesia. He completed a bachelor degree in Fisheries from Lambung Mangkurat University in Banjarmasin in 1993. From 1994 onwards he became a lecturer at Mulawarman University. He obtained a master degree in the field of Regional and Rural Development Planning from Bogor Agricultural University (IPB) in 1999.

In 2003 Bambang was a visiting researcher at the Tokyo University of Marine Science and Technology sponsored by the Japan Society for the Promotion of Science, and in 2004 the German Academic Exchange Service granted him a scholarship in the Special Programme of Young Indonesian Marine Science and Geoscience Researchers within the SPICE (Science for the protection of Indonesian Coastal marine Ecosystems) project which enabled him to do research in the field of social science at the University of Bremen. In 2006 he visited Wageningen for the first time to attend the Participatory Fisheries Management Course organized by the International Agricultural Centre (IAC, now Centre for Development Innovation).

Bambang started a sandwich-PhD program at the Rural Development Sociology (RDS) group of Wageningen University in 2007 as a member of the INREF-RESCOPAR project on *Rebuilding resilience of coastal populations and aquatic resources: habitats, biodiversity and sustainable use options* funded 50:50 by INREF and RDS. He will continue to teach and supervise bachelor students at the Department of Social and Economics of Fisheries, Faculty of Fisheries and Marine Science. He will also be involved in the Coastal Management Postgraduate Program of the Faculty of Forestry at Mulawarman University in Samarinda, East Kalimantan, Indonesia.

Completed Training and Supervision Plan

Name: Bambang Indratno Gunawan

PhD candidate, Wageningen School of Social Sciences (WASS)

Name of the activity	Department/Institute	Year	ECTS*
Project related competences			
RDS advanced research seminars	WUR	2007, 2010, 2011	2
RESCOPAR research seminars and workshops	RESCOPAR	2007, 2009	6
MARE Conference IV (participant)	WUR/UvA	2007	1
Competencies for Integrated Agricultural Research	CERES	2007	1
Open Science Meeting IV (KNAW)	Bali, Indonesia	2007	1
Sociological theories of rural transformation (RDS 30306)	WUR	2010	6
General research related competences			
Orientation courses	CERES	2007	5
Presentation tutorial	CERES	2007	5.5
Information literacy, including EndNote Introduction	WGS	2010	0.6
Techniques for Writing and Presenting Scientific Papers	WGS	2010	1.2
Career related competences/personal development			
'Current issues on shrimp based livelihoods in coastal Berau of East Kalimantan Province'	International Borneo Conference IV, Mulawarman University	2008	2
'Shrimp fisheries and aquaculture based livelihood opportunities in Berau, Indonesia'	International MARE Conference V	2009	2
'Making a living in the coastal frontier of Berau, Indonesia'	International Coastal Zone Aquaculture, RESCOPAR-MANGROVE, Can Tho	2010	2
'Controlling fisheries resources for whom? Political networking and conservation in the Berau MPA, Indonesia'	International WSFC Conference, Bangkok	2010	2
'Collaboration or contention: Disentangling the dynamics of social actors in the Berau Marine Protected Area, Indonesia'	International Seminar on 3rd Southeast Asia Update, Leiden University	2011	3
Total (minimum 30 ECTS)			**40.3**

*One ECTS on average is equivalent to 28 hours of course work