Shrimp Aquaculture Versus Mangrove in Indonesia:

Power Contestation, Environmental Degradation, and A Coevolutionary Environmental History in the Ujung Krawang (Muara Gembong) Mangrove Protected Forest

A Research Paper presented by:

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Major:
Agrarian, Food, and Environmental Studies (AFES)

in partial fulfilment of the requirements for obtaining the degree of
MASTERS OF ARTS IN DEVELOPMENT STUDIES

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The Hague, The Netherlands
December, 2017

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List of Abbreviations

AIESEC	: *Association Internationale des Étudiants En Sciences Économiques et Commerciales* (French) International Association of Students in Economics and Management
BKLHD	: *Badan Pengendalian Lingkungan Hidup Daerah* (Bahasa Indonesia) Regional Environmental Agency
GRPKH	: *Ganti Rugi Garapan Pemangku Kawasan Hutan* (Bahasa) Land Use Compensation for the Forest Stakeholder
G30S	: *Gerakan* 30 September 1965 (Bahasa) 30 September Movement
Intam	: *Intensifikasi Tambak* (Bahasa) Ponds Aquaculture Intensification
LPC	: *Lembaga Pemasyarakatan* Cipinang (Bahasa) Prison House of Cipinang
LPT	: *Lembaga Pemasyarakatan Terbuka* Open Jail
Nasakom	: Nasionalis, Sosialis, dan Komunis (Bahasa) Nationalism, Religious, and Communism
NICA	: *Nederlandsch Indië Civil Administratie* (Dutch) Netherlands-Indies Civil Administration
NJOP	: *Nilai Jual Objek Pajak* (Bahasa) Sale Value of Tax Objects
PBB	: *Pajak Bumi dan Bangunan* Land and Building Uses Tax
Perhutani	: *Perusahaan Hutan Negara Indonesia* (Bahasa) State Owned Forestry Enterprise
REDD+	: Reducing Emissions from Deforestation and forest Degradation plus Conservation
RT	: *Rukun Tetangga* (Bahasa) Neighborhood
RW	: *Rukun Warga* (Bahasa) Hamlet
Savemugo	: Save Muara Gembong
SKB	: *Surat Keputusan Bersama* (Bahasa) Joint Decree
SKD	: *Surat Keterangan Desa* (Bahasa) Village Statement Letter
Supersemar	: *Surat Perintah 11 Maret* The Order of March 11th in 1966

Abstract

Political ecology has been able to critically examine the debate around mangrove ecosystem and prolific intensive shrimp aquaculture. This approach has shown the negative impacts of such practices—in terms of generating social conflicts, environmental hazard, and impoverishment of coastal communities—through an 'interdisciplinary understanding' used to complement the analytic tools. Yet, it did not clearly bind with coevolutionary studies which also concerned with the interrelated issues of environmental change, social, and economic. This study is intended to indicate the need of incorporating a coevolutionary framework into this approach in order to understanding the more complex social forces in extensive shrimp farming area.

Life history interviews is employed as the main research technique, apart from participant observation and secondary data collections. The objective is to obtain thorough information about the environmental and social (including political and economic) transformation of a particular village which is located in the (mangrove) protected forest of Muara Gembong, Indonesia. It was a productive extensive aquaculture area (shrimp and milkfish farming) for a few decades. A greater attention is therefore given to narratives about the past in chronological order: pre-productive, productive, and post-productive periods. The result of this research reveals the power contestation over the protected area, mangrove depletion, and coevolution between the environmental change and social dynamic in the Ujung Krawang protected forest.

Relevance to Development Studies

Today, shrimp aquaculture is said to be a promising economic activity in the Global South which has abundant mangrove forest like Indonesia. There have been ongoing debates between mainstream economists and environmental scholars about these issues. While the first keep promoting it with the support from international development agencies in order to boost the Growth Domestic Product (GDP), foreign exchange, and paying the debt to developed countries; the latter group believes that the economic profit is less beneficial compare to the negative impacts caused by shrimp farms.

Moreover, most political-ecological studies, so far, have focused on the current impacts of intensive shrimp production. Many have emphasized conflicts, accumulation by dispossession, women movements, enclosures, etc. Meanwhile, the 'classic' concepts of political ecology—in shrimp farm industry—such as accumulation by dispossession and the 'tragedy of enclosure' are not sufficient to understand the situation of extensive shrimp farms and the vanished mangrove ecosystem. Very few political ecology studies, have looked at the reciprocal relationship of social and ecological systems of shrimp farming exhaustively, *before* the productive period, what happens *afterwards* and somewhere in between. This is the theoretical-empirical contribution of this study.

Keywords: political ecology, coevolutionary environmental history, extensive shrimp aquaculture, mangrove ecosystem, environmental degradation

1 Introduction

This research is an analysis which attempts to uncover the intricate situation of aquaculture practices in an Indonesian case study. It focuses on stories about what happens beyond the over-exploitation of marine commodities which takes place in mangrove wetland and causes environmental degradation.

In this study, I will show that mangrove loss due to aquaculture, particularly traditional shrimp and milkfish farming, cannot be seen in a simple single frame like mainstream economists often do by accusing population growth (Gowdy 1994; Longo et al. 2015) following (neo)Malthusian theories or simply by assessing a principal-agent problem as in a previous study in Muara Gembong (see Ambinari et al. 2015). In contrast to this, the present study intends to provide substantial evidence showing how complex the real situation in extensive aquaculture is. Along the text, I will give more emphasis on shrimp farming as it is Indonesia's main aquaculture commodity[1], hoping that it will be able to portray the phenomena around this issue. However, I will try not to simplify the coastal socio-ecological picture of my case study and keep the nuances.

1.1 Shrimp Aquaculture and the Environmental Degradation

Shrimp aquaculture is considered as destructive of mangrove ecosystems (Sano 2000; Martinez-Alier 2002; Escobar 2008; Ilman et al. 2011; Veuthey and Gerber 2012; Chowdury et al. 2013; Kusumawati and Bush 2015). It has caused 5-10% of the global loss of mangrove habitat (Boyd and Clay in WWF 2016) and negative impacts on water quality (Ilman et al. 2011; WWF 2016). In addition, "experience has shown that intensive shrimp farming, which may reach a production of 10-15 tons/ha year, will often generate pollution and disease problems" (Kautsky et al. 1998).

In one hand, Indonesia is a world leading shrimp producer together with China, Thailand, India, Brazil, Bangladesh, Vietnam, Ecuador (WWF 2017). Mangrove ecosystem has played significant role to produce prawn in Indonesia. Basically, it is not only important in terms of economy such as the shelter of marine species breeding (Ilman et al. 2011) but also in ecological perspective such as carbon sequester, protecting coastal area from strong wind and coastal erosion (Alongi 2012).

On the other hand, Spalding as cited in Ilman et al. (2011) reported "Indonesia's mangroves cover 30,000 km^2 [or 3 million ha], 21% of the global total mangrove area". Accordingly, it is known as the largest mangrove forest in the world which is suitable for shrimp farming (WRI in Barbier and Cox 2004; KKP in Ilman et al. 2011). However, the World Bank announced that Indonesia has used 350,000 ha mangrove area for shrimp aquaculture in 1998 and it was the largest amount in the world (Hempel and Winther 2003). The following study conducted by Ministry of Forestry as cited in Ilman et al. (2011) reveals 50% mangrove depletion was also contributed by shrimp farming. Currently, the Forestry Agency of the West Java Province (2016) notes only 2.4

[1] worth >45% of total aquaculture revenue or $1.5 billion annually (Ministry of Marine Affairs and Fisheries in Ilman et al. 2016)

million of mangrove forest are left out of 9 million ha which has been caused by shrimp and milkfish aquaculture.

1.2 Research Problem and Focus

Many studies have pointed out the disadvantages of shrimp farming which far outweigh the benefit in economic terms. Martinez-Alier (2002); Sastranegara et al. in Sastranegara et al. (2003) and Kompas (2017a) utter the 'impoverishment' of coastal residents who lost their livelihood *during* and *in post-productive* commercial shrimp farming respectively. Other studies have showed that shrimp aquaculture creates social and environmental damages in mangrove area where it takes place (Sano 2000; Chowdury et al. 2013; Kusumawati and Bush 2015).

Moreover, the study of shrimp and mangrove conservation conducted by Martinez-Alier (2002) and Veuthey and Gerber (2012) discuss the commercial shrimp aquaculture which has destroyed mangrove ecosystem and created 'social and environmental enclosures' around the world. This 'tragedy of enclosure' then threatens food security of local dwellers who used to depend on mangrove to support their lives. Therefore, the ownership transfer of mangrove forests to the private property of shrimp growers caused dispossession of local residents and tended to create social conflicts.

On top of that, the intensive shrimp farms are basically productive for 5 consecutive years only (Buckley 2011; Barbier and Cox 2004), even though "shrimp is the most valuable traded marine product in the world today, with the farmed shrimp industry growing at a rate of 10 per cent annually" (WWF 2017). It means shrimp farming requires land acquisition over and over to maintain the production. Eventually, this land expansion creates environmental degradation in developing countries which causes ecologically unequal exchange (Veuthey and Gerber 2012) as reflected in the discussion of Indonesian case earlier.

Drawing on Longo et al. (2015), this study would like to show the important of understanding historical and socio-economic contexts of ecological tragedy[2]. Therefore, I argue that the complete puzzle about the previous and subsequent stories to the prolific period of shrimp aquaculture in general are as vital as the productive time. The pre-productive period will explicate the origin of social and environment conditions and the trigger events of shrimp farming such as the political, economic conditions and policies. Meanwhile, the latter periods will elucidate the transformation and the difference of mangrove ecosystem and social systems in pre-productive, productive, and post-productive periods. Nonetheless, scholars in this field have not adequately discussed the practice of extensive aquaculture which has been done by individuals not companies and paid attention to the current situations only.

[2] These authors proposed 'the tragedy of the commodity' as response to Hardin's thesis of tragedy of the common. They discussed modern fishery and aquaculture practices and provided several case studies. However, it does not give room for traditional/extensive aquaculture especially shrimp farming.

To fill the research gap, I conducted field work in in a mangrove protected forest[3] in West Java in which there was productive and extensive shrimp farms. Tiger shrimp—Indonesia's main export, apart from Vannemei shrimp—is produced massively in this province and it becomes the biggest exporter of this particular type of shrimp in Indonesia (Ministry of Marine Affairs 2014). According to the preliminary findings, I came to know that shrimp aquaculture had been done for at least 47 years now by the people come from other regions along North Java Sea: Serang (Banten Province), Cirebon (West Java Province), and Brebes (Central Java).

The shrimp farms are located in the protected or conservation forest which initially clear from massive economic activity like aquaculture and settlements. "In 1949, the Government of Indonesia had purchased private lands located in the northern coastal area of Bekasi Regency with an area of 9,311 ha, so that the land changed its status to the state land" (Integrated Study 2005; Savemugo 2016). The objective was to protect the downstream (estuary) of the Citarum and Bekasi rivers; to make it as greenbelt in preventing flood and erosion (which is happening now); and to provide charcoal for residents of Jakarta and the surrounding areas. Nevertheless, today people cannot rely on the farms anymore because of the environmental degradation in this coastal area—which causes flood and sinking of the land and some houses—but many households remain in the village until now.

During the last few years, there were some external groups which were concerned about the people's well-being in this village and which started some social and environmental projects. For the time being, there is one group that is still working with local people to make a better living (environment) in Pantai Bahagia village, Muara Gembong. This group is better known as Savemugo (Save Muara Gembong). It consists of young and energetic urban people from Bekasi and Jakarta.

Savemugo's activities mainly focus on mangrove ecosystem preservation. It usually shares the current condition of coastal erosion and infrastructure in the village through its social media accounts such as website, *facebook* page, and *instagram*. It also offers 'eco-tourism' package to plant mangrove(s) and visit endangered species of *Lutung Jawa* in Pantai Bahagia, Muara Gembong.

1.3 Research Objective

This study aims to explore the social and political contexts which have driven the shifting of economic activities as well as the environmental change in a village which used to be a productive extensive aquaculture. Hence, this study offers a coevolutionary environmental history understanding of the complex aquaculture practice in the mangrove wetland which belongs to the Ujung Krawang (Muara Gembong) protected forest.

1.4 Research Questions

General Research Question:

[3] The official name is Ujung Krawang but it is well known as Muara Gembong protected forests to indicate the sub-district where it belongs to

How did the socio-ecological situation of Pantai Bahagia village evolve over the past 47 years?

Specific Research Questions:

(1) How were the socio-ecological conditions of the village before the emerging and during traditional shrimp farming around the village? What did trigger it?

(2) How are the current socio-ecological conditions of the village, after the sharp decline of aquaculture production? What are the problems?

(3) How are local people responding to the problem of coastal erosion and how has the livelihood dynamic going?

1.5 Research Limitation

Due to the short period of fieldwork, the data did not allow me to cover the following issues:

1. The perception of the stakeholders that do not have any representative/office in the village (the government agencies, *perhutani* (State Owned Forestry Enterprise), and other visitor's groups) because of the bureaucracy in Indonesia which usually takes so much time. However, secondary data was gathered to represent those perspectives of the environmental issues and activities in Pantai Bahagia village.
2. The condition of entire area of Muara Gembong because it is a very large sub-district and protected area. Unfortunately, the terrain is hard to reach also.
3. The current situation after President Joko Widodo launched social forestry[4] program in Muara Gembong on November 1st, 2017 which distribute legal land use right for 35 years to people who already live there from generation to generation.

[4] The objective of this program is to create well-being of 'the forest safe-guards' and encourage them to protect the forest as well as generating their income (REED Indonesia 2017)

2 Theoretical Framework

The main theoretical approach to this study is linked to the political ecology of shrimp farming and mangrove. Robbins (2011) clearly put across how this approach would be able to elucidate the politics of environment-related problems in terms of theories and practices.

> "Political ecology, a field that seeks to unravel the political forces at work in environmental access, management, and transformation ... politics is inevitably ecological and that ecology is inherently political ... research in the field can shed light on environmental change and dynamism, thereby addressing not only the practical problems of equity and sustainability, but also basic questions in environmental science" (p: 3).

This study departs from the environmental degradation issue in Muara Gembong protected area but it will move to discuss conservation narratives in the area for the past 47 years. I argue that political ecology is the appropriate approach to this study because it is a holistic approach which able to 'unravel' environmental problems not only focus on the political aspect but unfolding other aspects thoroughly from pre-productive, productive, and post-productive period of shrimp farming.

Neumann (2005) contends that political ecology is mainly a combination of cultural ecology and political economy which forms the relationship between humans and environment and "... perhaps more than any other field, is particularly suited to positing an interdisciplinary understanding of nature-society relations". Therefore, it has strong connection with several other fields. For this purpose, I propose to incorporate coevolutionary studies into this lens. Basically, 'coevolutionary' also concerns about the environmental change with more emphasis on societies and economic aspect which I believe is the outstanding framing picture of shrimp aquaculture nowadays.

2.1 Power and the Environment

The contemporary political ecology is needed to "analyse the complex social, economic, and political relations in which environmental change is embedded" (Neumann 2005). Hence, it recognizes "the plurality in positions, perceptions, interests, and rationalities in relation to the environment" (Paulson in Veuthey and Gerber 2012). It also goes along with social theory which claims that nature is socially constructed. 'The idea of social construction of nature is a term commonly employed to stress the role of representation, discourse and imagery in defining and framing our knowledge of nature and the natural". (Neumann 2005: 47). It argues that nature is an integral part of social, economy, and political relations. Thus, I believe the social ties with environmental change that lies on socio-ecological coevolution is strongly needed.

In addition, political ecology approach will also provide understanding of power contestation among stakeholders especially *Perhutani*, Local Government officials (village, regency, and provincial levels), Ministry of Agriculture, Ministry of Environment and Forestry, and the Presidents of Indonesia that have different interests over this particular mangrove area. It will help to examine the key actors who play significant roles in the decision making (Neumann 2005; Veuthey and Gerber 2012) of shrimp aquaculture development and mangrove conservation over time in Pantai Bahagia village, as well as who

has/have not been involved. Hence, it is essential to reveal the significant actors who have changed the environment and livelihoods in Pantai Bahagia in three different periods of time.

Substantively, it also had been influenced by political economy "to focus on the role of the state, particularly in fuelling accumulation among dominant classes and in structuring land and resource access through laws and policies" (Neumann 2005: 42). The forefather of political ecology was expert on "probing how the politics of access to and control over land and resources were related to environmental change" (Neumann 2005). In other words, it is able to examine the individuals or groups that have power over land and resources in the farms either directly or indirectly.

The P*erhutani* is the official body which has task to preserve the mangrove forest because it is part of the Ujung Krawang protected area. The initial idea of conservation forest followed the western perspective about wilderness and biodiversity that have to be preserved by separating human and nature (Neumann 2005). It argues that human existence causes environmental degradation while the local governments' officials have different objective which cause the land conversion in order to boost economic sector in coastal area.

Neumann also argued that it is "crucial, both to understand the extent and nature of environmental change and to explain how current geographical, social, and political relations and conditions came to be" (p: 42). In other words, this approach would able to explain many aspects that are interrelated. Moreover, political ecology also has robust connection with environmental history because this perspective is also able to investigate the changes and dynamics on particular environmental issues. It includes "the historical analysis which has been integrated to the conduct of political ecology research" (Neumann 2005: 6). This idea is similar to Gowdy (1994)'s argument, a prominent coevolutionary economist, who "emphasises the important of history, scale, hierarchy, and ecological context to human activity". Accordingly, I argue that a coevolutionary environmental history study needs to be undertaken to narrate the interconnected aspects around aquaculture practice and environmental change over 47 years in Muara Gembong protected forest.

2.2 Ownership Rights

This study will also critically assess the property rights over the land and other resources as well as who has power to control the access. This has affected the environmental degradation in the area and the emerging of environmental conservation movement nowadays. In this regard, political ecology has an ability to discuss the 'broader system' (who are the winners, the losers), which has been influencing the environmental change in the village (Robbin 2011). Neumann (2005) explained it further as follows:

> "a key concern of political ecology has been to analyse the ways in which the structure of property rights at various scales (e.g., the state, community and household) influences access to resource and land … how property rights are defined, negotiated, and struggled over among different social groups … and how this help to explain pattern of development and environmental conservation and degradation" (p:102)

In addition, the shifting status of the land has caused disputes between the central government, ministries, local people, and other stakeholders which have interests over a protected forest in Muara Gembong. Three out of four property regimes by Bromley (1992) will be occupied to explain the different perception of many actors. These perceptions are based on private property, state-owned land, open access property rights that they hold.

2.3 Coevolutionary Environmental History

Coming to the main framework, I will elaborate the necessity of this concept that is to investigate the ongoing interactions between the social forces, like political and economic dynamics, and environmental coevolutions in Pantai Bahagia. "At an epistemological level, coevolution offers a powerful logic for transcending environmental and social determinisms and developing a cross-disciplinary approach in the study of socio-ecological systems" (Kallis and Norgaard 2010). Moreover, coevolutionary studies challenge the mainstream notion of development today while offers alternative dealing with development notion. The consistent progress in economic growth, it is argued, has been causing "the brink of environment disaster and has generated vast increases in economic inequality" (Gowdy 1994).

Meanwhile, Norgaard (1994) argued development as "…a process of co-evolution between social and ecological systems" instead of something progressive and deterministic. He follows the perspective of environmental historians who see environment not only as input resources—able to be controlled for various purposes: development, colonialization, trade—which have been transformed by science but it also has been shaped by "…social forces which have changed the structure of society and hence how people interact with environmental systems" (p:31).

Although, these prominent coevolutionary scholars published different books[5] but they agreed on the coevolutionary process which is discussed in three types of human economies, namely hunting-gathering, agriculture, and industrial economies. The first party – hunter-gatherers – was considered as the long run sustainable way of living which contrast with the mainstream economists' representation of "terrible fate". Some economists even claimed that hunter-gatherers were the culprit of game animal extinction and biodiversity loss due, among other things, to their nomadic way of life. Meanwhile, Gowdy (1994) argues that "peasants seem to be at the forefront of assault on biodiversity"; they also exacerbated power relations based on property ownership.

The market system—in its latest forms—is arguably another important cause of environmental degradation today. "The market mentality, market incentives and the market value system will let them to sacrifice environmental

[5] Betrayed development by Norgaard tells about the "alternative framework for revisioning development" as foundation of ecological economics (Kallis and Norgaard 2010) meanwhile, Gowdy (1994) gave more emphasis to coevolutionary economics field

sustainability for immediate economic gain" (p.75). It is a result of "impersonality of the market on the environment" like in the case of the Amazonian forest, as noted by Stephen Bunker (as cited in Gowdy 1994).

Farther on, coevolutionary acknowledges the impact of population explosion in the world today. In contrast with modern views that see it happens because of the transformation of technology, environment, social organization, and knowledge. "The coevolutionary view emphasizes an increasingly important and frequently more complex, interaction between people and their environment" (Norgaard 1994:36).

Drawing on those assumptions, this study will examine the coevolutionary environmental history in Pantai Bahagia. The coevolutionary mechanism that is employed in this study is called 'bio-social coevolution' which "refers to reciprocal influence between social evolution and non-human biological evolution" (Kallis and Norgaard 2010:692). This perspective would give a worthwhile contribution to understand the environmental degradation in an area used to be shrimp producer through its environmental history. Kallis and Norgaard (2010) said that it is typically political ecology study but coevolutionary understanding could help to add some nuances to the environmental problem and development notion. It suggests to have diversity in production instead of increasing interaction or simply limiting interaction to regional and global market.

3 Methodology

This study is following Amartya Sen's (1980) arguments about descriptive researches. I decided to conduct a descriptive analysis research because it will be able to satisfy "the multiplicity of motivations" which I will explain in the reflexivity section. Another rationale is because the existing research reports which discuss the Muara Gembong protected forest did not involve the historical and political aspects thoroughly (See Fatchiya 2008; Ambinari et al. 2015; Akliyah 2016). I argue that those factors are essential to explain the driving factors which trigger mangrove depletion and the biodiversity loss in a post-productive aquaculture.

3.1 Qualitative Interviewing

In the previous studies of shrimp and mangrove conservation, Martinez-Alier (2002) used participant observation in the mangrove preservation's joint action together with Green Peace and a local grassroot group, called *Fundecol* in Muisne, Ecuador. In the same study area, Veuthey and Gerber (2011) also used direct and participant observation and interviews in order to elucidate the rationale behind the enclosure movement in intensive shrimp farming and mangrove conservation area.

Following Martinez-Alier's (2002) and Veuthey and Gerber's (2011) research approach, I have conducted the second fieldwork for 3 weeks at the end of July and early August 2017. It utilized the same research technique in order to uncover the history as well as current stories in post-productive shrimp farming because participant observation enables to 'open things up', and access to 'all kinds of data" (Bernard 2011: 265-269).

3.2 Life History Interview

Drawing on Cole and Knowles (2001), the primary data has been gathered through life history interviews that is the main research technique apart from participant observation and secondary data collection. these contemporary life history promotors suggest the fluid relationship between the researcher and the persons being researched. Therefore, Cole and Knowles prefer to call them as research participants not research subjects to avoid hierarchy relationship among them.

This research technique has been able to unfold the environmental history in Pantai Bahagia village, Muara Gembong thoroughly for the past 47 years. Suarez-Ortega (2013:) defines life histories "as a conversation/narration technique and are involved in reconstructing processes of development or learning, based on the use of narrative, orality, or writing" (p:191). Therefore, it could connect so many aspects of personhood, from the psychological to the individual's experience of macro-societal events, such as war, economic crisis, natural disaster etc."[6].

In this regard, I also follow the statement of Lieblich & Josselson (1993) who refer life history technique "to answer the question of how people endow

[6] lecture notes of Qualitative interviewing session 4, 2017

their own lives, or specific moments of their lives, with meaning, showing interest in subjective issues". However, life history puts it in the context of broader system so that it will examine the influences of certain contexts such as religious practices and influences, political situations, and educational background (Cole and Knowles 2001).

In so doing, I have conducted life history interviews toward 4 key informants who have been living in Pantai Bahagia village for at least 47 years. I have chosen them based on broad range of characteristics in order to represents different point of views. The first informant is a woman who came from Central Java, possess more than 50 ha ponds, and had 12 employees and many outsource labours during the productive ponds. Second, another woman who came from Karawang[7], West Java. Third, an 84 years old man who became a neighbourhood leader *(Rukun Tetangga/RT)* for 31 years. Lastly, a landless man who becomes a member of mangrove reforestation movement in the village (See Appendix 1).

I also conducted interviews to their partners in order to understand the context better. Cole and Knowles (2001) contend that it is important to gather additional information from other people who have strong relationship with the key informants. "The point of asking others for contextual information is not to corroborate or validate what the participants have said but to enhance understanding through the provision of information from yet another perspective" (p.84).

In addition, I had in-depth interviews of other inhabitants to enrich the information such as youth, elder citizen, ex-dwellers, savemugo volunteers, *pokdarwis*[8], and current neighbourhood leader. Secondary data was also gathered to complement the primary data collected. In this method, it recognizes the role of journalistic accounts and other forms of publications which are important as academic papers (Cole and Knowles 2001:62). Therefore, I have cited several medias and publications from NGOs which covered the issues around shrimp farming, mangrove ecosystem, and Muara Gembong protected forest.

During the interview, I used 'conversational style interviews' which enabled me to engage with the research participants (Cole and Knowles 2001) and made room for two-way communications. In this way, I felt the informants were more overt than formal interview. I came to their houses several times with a note book, like a normal student, to take notes during the interviews. Yet, the interviews were fluid with casual manner as if I am their neighbours who wanted to talked about something has happened in/and around our neighbourhood.

In the first meeting, I was accompanied by my research assistant to get better connection with the informants and started with light questions or general research questions regarding the village today and in comparison, with the

[7] an area next to this protected area. It was the same region before the administration area of the village belongs to the current regency: Bekasi

[8] *Pokdarwis* is established by the Ministry of Tourism and Creative Economy Republic of Indonesia in 2007. It aims to empower a group of local people that promote (sustainable) tourism in their region.

past. In the latter interviews, I prepared list of follow up questions based on the previous meeting with each informant. These questions reflect the specific research questions that I have mentioned in the first chapter.

3.3 Reflexivity

I dedicate a special reflexive section in this study because, like in any other kinds of qualitative research, life history emphasizes that researcher is the main 'instrument' of the research (Cole and Knowles 2001). Therefore, I need to convey my stance point as a researcher as well as what was shaping and driving my interest(s) to conduct this research.

> "The importance of understanding the personal history-based origins of our interest [as a person and researcher] in a particular research topic and the prior experiences, preconceptions, values, beliefs, and social location that help to grind the research lenses we wear" (Cole and Knowles 2001: 89)

In this research paper, my curiosity emerged because I did not obtain sufficient knowledge regarding poverty, inequality, and livelihood in coastal areas during my bachelor training, in spite of Indonesia being one of the largest archipelago countries in the world. Indonesia has 17,508 islands and 95,181 km coastline or nearly one-fourth of the world's coastline (WRI in Ilman et al. 2011). Nonetheless, I found the tragic condition of fishermen community in Cilincing, North Jakarta – who live in poor settlement and environment – when I did a study visit in the neighbourhood in 2012. Since then I got interested in participating various activities regarding maritime issues to get myself closer with them such as Youth Forum of East Asian Seas Congress in South Korea.

The decisive moment came when I was participating on a research internship project at the Graduate School of Frontier Science, University of Tokyo in 2013. In the early days of the program, one of the International Office staffs approached me to get familiar with the participants I guess, but she was asking unexpected questions when we talked about sushi. She had never been to Indonesia and opened the conversation about prawn. I guess it is because I was working at the Atmosphere and Ocean Research Institute during the program and I come from Indonesia, one of big shrimp exporters to Japan. She thought that Indonesians eat shrimp as much as Japanese and she also assumed that it must be really fresh compare to what I ate in Japan.

Unfortunately, my experience was the opposite: I really like the shrimp in the *sushi* or *tempura* (Japanese shrimp fries) because they were really fresh and completely different compare to the shrimps that I usually eat in Indonesia. But I was not surprised because it is common knowledge that shrimp or other commodities that are being exported must comply certain standard and have high quality. Thus, I delivered such responses to emphasize that the best quality of shrimps is exported and we, Indonesian people, consume the rest of it.

The following year, a friend of mine had participated in an environmental conservation project in Pantai Beting, Muara Gembong, Bekasi. He did voluntary activity to restore mangrove ecosystem in the village with Savemugo. In the beginning of the establishment of this group, I helped my friend to apply for fundraising and other technical supports. I did not visit nor was an official

volunteer because it is far away from where I lived in. The area is also quite difficult to be reached as there is no public transportation to get there and it takes at least 4 hours by vehicle albeit it is very close to North Jakarta geographically (only an hour by fisherman's boat). However, I kept myself updated through observing the social media that they have such as website, facebook, and instagram accounts.

Then, one day I visited Muara Gembong with a traveling platform, called Blacktrailers (now its official name is "Jalan-jalan baik") which promotes responsible traveling among urban youths. It was my second time to join the trip with this trip organizer. This organization routinely provides the concept of "traveling with value" to different destinations. In 17 August 2016, it intended to commemorate Independence Day of Indonesia with meaningful activities: planting mangrove and having fun with the kids in the village library.

During the trip, I started to talk with local people and the volunteers of Savemugo and conveyed my intention to come back conducting research. I have better understanding about the environmental condition when I stayed for 4 days in the village and interviewed several persons during the latter visit. In the first visit, the local person took me and other participants from Muara Gembong sub-district office to the village by boat. We enjoyed the morning as well as twilight journey on the boat as we can see beautiful sunset. It also provided beautiful scenery along the Citarum river and some settlements in distance.

On the contrary, a local person picked me up in the same point with a motorcycle instead of boat - in the second visit, at night - passing through steep and bumpy dirt lanes along the river which often could not be used when flood (high tides) is coming. It was dark and all I could see was the lane in front of the motorcycle or the lamps when we were passing residential areas, very limited street lighting. The different treatment has made me realize that in the first visit I really enjoyed the trip because I was treated as a 'tourist'; the second and third visits were those of a researcher who already know the actual condition in the village.

Nonetheless, it was relatively easy for me to engage with people in the village since the first meeting. I was born and grew up in rural setting for 18 years. It was really helpful to let them speak a lot more as we have the same identity; a villager. In addition, I have worked as a social researcher at the centre for sociological studies in my previous university for 3 years. I also obtained research training from sociology department for 4 years. Those experiences brought me conducting research in many regions in Indonesia. Most of them were located in rural and remote areas.

Given the fact that I belong to one of the best universities in Indonesia, it always makes a smooth way for me to introduce myself to the local authority and research participants. In the first visit, I also introduced myself to Savemugo representative and the neighbourhood leaders the way I used to do in the previous research projects. They even seemed more exciting because I chose this topic as part of project accomplishment to obtain master degree somewhere in the Netherlands. I could see the excitement from their eyes and how they helped me from the first fieldwork until this research report making.

I got such good relationship with those people because I have built rapport for quite long period of time. I have visited the village three times in total and keep contact with them since August 2016. Cole and Knowles (2001:145) notes the important of rapport building as follows,

> "At the heart of life history research is the relationship between the researcher and the person[s] being researched. … A good rapport … facilitates an openness to explore the experience and to concreate meaning".

During the research design process, I have tried to start intensive communications with Savemugo via personal email and *whatsapp* in order to gather some valuable information for writing the proposal. Then I re-contacted local residents who being part of Savemugo in order to make appointment and preparation for the upcoming fieldwork.

In the second fieldwork, I stayed in the same house in Beting hamlet as the previous one. I chose the hamlet because it is the farthest neighbourhood where had been the most profitable shrimp production and becomes the target program of Savemugo. The house owner was one of prominent figures in the village who owns 8 ha ponds but the house is currently occupied by his son, daughter, and son-in-law who actively participate in Savemugo activities. Meanwhile, he came back to live in his homeland after the severe coastal abrasion which damage his ponds. I think it is a strategic place to gather information from many perspectives and broad range networks that they have, including the chance to have interview with the village leader. During the fieldwork, I observed as well as participated in their activities such as attending the annual meeting of Savemugo in the city, *gogo* (collecting shrimp. mollusc and fishes in the abandoned ponds), providing foods for visitors, and was assigned to be a translator when they had foreign visitors from AIESEC program. Those activities made me easier to engage with many people and obtain depth information as one of the members of family acted as a gate keeper.

Besides, my status as a student who is studying abroad has given easier way to conduct interviews in the second fieldwork. I got the trust even from the first interview. Only one informant who was hesitant to talk a lot in the first meeting. On my way to go to Blukbuk hamlet with the gatekeeper, I saw an interesting activity where the mollusc collectors gathered and about to scale the commodities to a middleman and a lady middleman. I decided to stop by and got down from the motorcycle to start the conversations. Unexpectedly, the gate keeper was joking to the people that they were going to be interviewed by an investigation journalist. I did not know why he made such joke which I am aware would make them feel afraid to share stories. But, I immediately said that it was not true and told them that I am just an ordinary person who had been staying in the village for several days to accomplish my master degree project.

Then they started to answer my questions but not the middlewoman. She only gave short answers even though I did probing for several times. I also realized that the interview setting is not appropriate to ask about the price because the collectors would easily hear the conversation. Cole and Knowles (2001) note "… different settings prompt different memories or evoke different responses or questions" (p:75). So, I decided to conduct another interview with her in her house. I went there with a woman who lives next to my house farm and she introduced myself as a girl who is pursuing master degree abroad.

Her presence and statements convinced her to tell the stories and the actual price of the commodities and how much she earns profit.

Another factor which helped me to have relatively easy engagement is because of my identity as a Muslim girl who wears *hijab* or headscarf. All the residents are Muslims and most of the women also wear *hijab*. This positionality has allowed me to better understand the social context in the village as we share almost the same values especially when they relate to religious rules and views. I have even noticed that there was an odd condition where there are two big mosques in a hamlet and some other small mosques (*Mushalla*). I never found such condition as Mosque is used as a place to gather people performing prayers, learning together, or any other religious activities. It should not be intended to make frictions in a neighbourhood as what I see in Pantai Bahagia. There are two hamlets which have two big mosques as a result of power contestation between two pond owners in each hamlet.

Furthermore, it was quite easy for me to make contact either with men or women actually but the patriarchal culture in rural Indonesia (also happened during my fieldworks) made me feel uncomfortable somehow as a girl who has not get married. I mostly got teasing and intimidating questions from men about personal life. I decided to hide the fact of my 'personal life' status because it has nothing to do with my research topic and objective. Otherwise, they will keep talking about it and making jokes around which would not enable me to use the time effectively.

In this occasion, I also would like to share my preconception, before conducting fieldwork, that the low rate of education in the village would be one of the factors of mangrove depletion in the village as the previous studies conducted by Fatchiya (2008) and Akliyah (2016) had discussed. Then, I found that it is not a significant factor but is rather one of the negative impacts of productive shrimp farming when everyone in the family had to work for producing the shrimp and milkfish every day, without day off. They also had a perception that education is not important as the yield of aquaculture was even multiple times higher than working in industrial sectors in the city which require certain level of education.

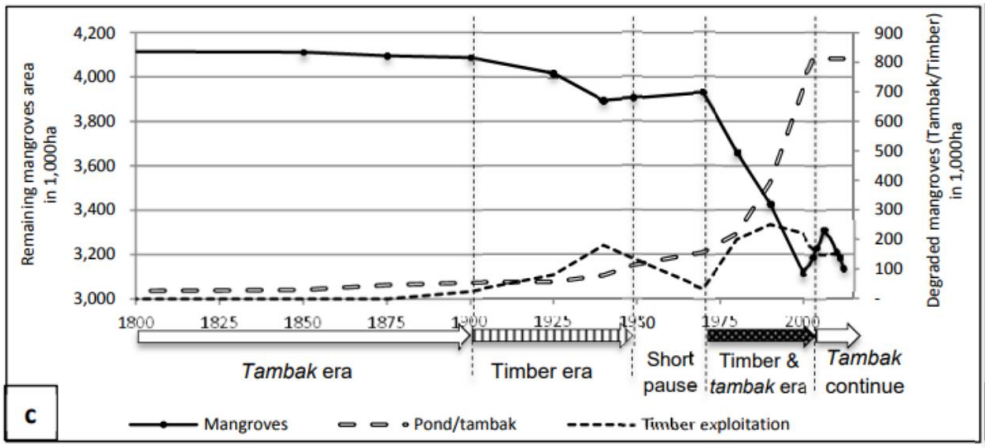
4 Results and Discussion: The Coevolution of People and Mangroves Ecosystem

This chapter will explore the environmental history coevolution of Pantai Bahagia by tracing its social and ecological systems which eventually have shaped the environmental change around the village. It will be divided into three chronological narratives: Pre-productive aquaculture (-1969), productive period (1970-2002), and post-productive period (2003-present) in order to and highlight the interrelationship between the environment and social context in this mangrove wetland. Through Political Ecology lens, my study is able to identify the social, economic, and political situations which have triggered the environmental degradation in this protected area.

4.1 Brief Environmental History of Mangrove Forest and Shrimp Farming in Indonesia

There are dichotomy perspectives about the emerging of aquaculture practice in Indonesia. Ilman et al. (2016) claimed that it was started since Majapahit kingdom in 1800s and later on based on the notes of Dutch East Indies General who noted it was promoted by Islamic saint in Java. However, another author conteded that it has existed since the Dutch colonial rule in the mid of 1900s in West Java (FAO 2017) even though the aquaculture area had been determined (Setiani 2010).

Figure 1. Mangrove and Shrimp Production Trend in Indonesia



Source*: Ilman et al. (2016)*

The figure has proved that despite of the different point of views, those authors agreed that aquaculture/*tambak* era has been done long time ago but the spike was just being begun in 1970 when Soeharto promoted development agenda through the exploitation of mining and other resources. Accordingly, Indonesia was the world leader of shrimp farming during 1970-1984 (Veuthery and Gerber 2012).

The following year, milkfish became popular commodity in Pantai Bahagia. In my perspective, this is a real example of the *Intam* (aquaculture intensification) program which was launched by the Ministry of Agriculture in 1984. As a result, it becomes the massive destruction of mangrove areas which spread over 12 provinces (Mongabay 2014).

The exacerbated condition can be found in Ilman et al. (2011) that 40% of 750,000 ha East Kalimantan mangrove in less than a decade converted to shrimp ponds which caused the disappeared small islands in this province. Sustainable Fish revealed another eye-opening report.

> "The island of Kalimantan has only recently become a major contributor to Indonesian shrimp production, with farming output of the province of West Kalimantan jumping almost six-fold from 2012 to 2013's crop of 39,092 metric tons. The increases in production have come at the cost of mangrove habitats—West Kalimantan reportedly lost 7,000 hectares of mangroves due to the recent farming expansion" (Nicole 2016)

In fact, this drastic depletion to gain lucrative shrimp business has been argued causing impoverishment of local communities instead, as discussed in chapter one.

The characteristic of coastal residents who easily accept new dwellers have been claimed as one of the reasons why most of pond owners come from other regions (Mangobay 2014; Rusdianti 2012). Mangobay also reported that shrimp production in Indonesia has relatively low resistance in the beginning phase. This phenomenon is contrast with the findings in Ecuador (Martinez-Alier 2002; Veuthey and Gerber 2012). It happens because one third of shrimp aquaculture in Indonesia occupied state-owned mangrove forest (Forestry Agency of West Java 2016), which is under the supervision of the Ministry of Forestry and Environment (Ilman in Kushumawati and Bush 2015). On top of that, "the administrative decentralization of the Indonesian [since 2000] has reduced the enforcement of national forest regulation" (Kushumawati and Bush 2015) which eventually cause mangrove depletion.

4.2 Pre-Productive Aquaculture (1947-1969)

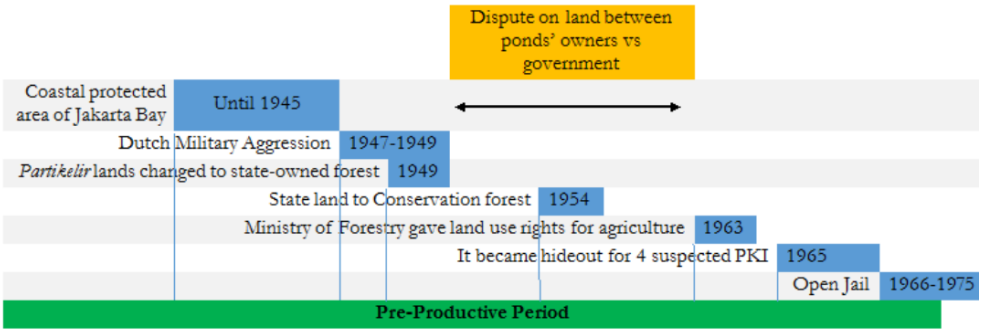
Before I explain further regarding the findings, I have to describe the administrative levels that will help you easily follow the stories below. In Indonesia, we have several levels of administrative area. They begin from the lowest level which is called neighbourhood (RT/ *Rukun Tetangga*). Each neighbourhood consists of several households, meanwhile several neighbourhoods belong to a hamlet or *kampong*. Those hamlets are part of a village administrative and it followed by sub-district and district/regency level. Each of those administrative area has a leader who rule the area and responsible to the leaders in the upper levels.

4.2.1 How Come Many People Live in the Protected Area?

In this section I will exemplify the role of growing population that affects the environmental condition which has been argued by Norgaard (1994) as a complex relationship "…between people and their environment" (p:36). This study took place in Pantai Bahagia village which is located in the Ujung Krawang protected forest. Officially, it is recognized as a proliferation village in 1978 and was part of the next village: Pantai Bakti (RPJM Desa 2015). It occupied 3,010 ha or nearly one third of the forest.

I will explain it further through the following timeline:

Figure 2. People and the Environmental Change



Source: *Author's Elaboration (2017)*

According to life history interviews, I found three driving factors that eventually created residential area in this protected forest. Those reasons below will depict the "politics of access to and control over land and resources [that] were related to environmental change" (Neumann 2005). **First**, the political situation was the pivotal factor. After the Independence Day declaration in 1945, Indonesia had to encounter the Dutch military aggression in 1947 and the second wave happened in 1948. There was a military camp of the *Netherlands-Indies Civil Administration* (NICA) in an area of Pantai Bahagia. People saw the flag of the Netherlands which was slightly different from the Indonesian flag.[9] The flag was a sign that there was NICA armies who wanted to fight the national army of Indonesia while doing guerrilla around this forest. Later on, this area became well known as *Muara Bendera* hamlet which literally means 'the flag of estuary' where NICA put the flag.

This heroic place can be traced from a prominent Poet in Indonesia, Chairil Anwar, who wrote a poetry about the dead of thousands of people in this area to fight for the Indonesian's sovereignty which titled *Karawang-Bekasi*. Geographically, the Ujung Karawang protected area is located in a frontier of two regencies: Bekasi and Karawang. Ujung Karawang means "at the edge of Krawang".

From the stories above we can see that it is undeniable that there were some people who already occupied the area, although it was actually part of coastal protected area of Jakarta Bay before 1945 (Setiani 2010). Then, the first president of Indonesia, Soekarno, bought *particuliere landerijen*[10] from Chinese decent (Integrated Study 2005) after the Netherlands armed force went home in 1949. Such lands were promoted by the Dutch ruler who created clientelism between the land managers and the labourers during the occupation in all part of the country. Therefore, the government of Indonesia issued a law number 1 in 1958 to stop such practices[11].

In 1954, the Ministry of Agriculture issued an Executive Order number 92/Um/1954 to change the status of the state-owned land to the Ujung Karawang protected forest (Integrated Study 2005). It was followed by the borders'

[9] It consists of three colours: red, white, and blue while the Indonesia's has two colours only: red and white.

[10] It is a Dutch phrase which means 'eigendom' in Dutch or property/ownership to the land.

[11] According to the law, the land managers have more power to lay off the village leader, forced labor, holding levies, etc.

measurement in the next three years and set 10,482 ha as the total are of the forest. However, the government did not provide any information to the residents regarding the changing status of the land. So, the absence of the Dutch army and government were understood as freedom for local people who live in Bekasi and Krawang regencies to keep utilizing that area as living resources. They have treated it as if it was an open access resource for their main livelihoods. Thus, it caused dispute between the government and the people who have constructed ponds' aquaculture since 1950s (Fatchiya 2008).

The Ministry of Forestry responded in 1963 through a letter to the Head of the Agrarian Directorate, Head of Plantation Service, and Head of the Department of Forestry which announced that people who have cultivated state-owned forest, lands, and plantations were given land use rights for agriculture. (Setiani 2010). This letter became the reference that legitimizing private ownership in the conservation forest.

Initially, this protected forest area was fully covered by mangrove forest so that it became a hideout of four people who hid from the authoritarian regime of Soeharto. They had different political view with the government which had been trying to get rid of communism view as part of the 3-fold ideology of *Nasakom* (Nationalism, Religious, and Communism) which had been promoted by the previous president. As we have known, Soeharto was a former military general who used military forces to impose any government programs. The communist party of Indonesia (*Partai Komunis Indonesia*/PKI) was targeted to be swept away by the army of Indonesia and the members became the main target to be shot or being jailed by them. Therefore, they tried to confront the government attack after the accidents in 30 September 1965 which is called G30S PKI[12] and followed by *Supersemar*[13] 1966, led by General Soeharto. They also got out of their villages to save their lives. This protected forest then became one of the safe places to stay.

Long story short, these inhabitants became the first ponds' developers in the lust mangrove forest. They came from the coastal regions in Serang (Banten province) and Brebes (Central Java) and had growing shrimps in their home lands. Therefore, it attracted many fellow residents who followed their path to build ponds or start the job by becoming labour in the shrimp ponds.

Second, in 1966, the government built an open jail for those who were going to be released in the next few years. It is located nearby Citarum river which now is called Blukbuk hamlet. The local people called it LPC (*lembaga Pemasyarakatan* Cipinang) because it was under the big prison house in Cipinang, Jakarta. Unfortunately, nobody could explain the reason why the jail

[12] Many historical perspectives about this event but Indonesian history curriculum says that it was PKI's Coup movement on 30 September 1965 by killing 7 generals.
[13] The Order of March 11th was a letter signed by President Soekarno to Soeharto as the Indonesian army commander in order to any actions overcoming the chaotic situation during 1965-1966 after G30S. Later on, it became the instrument of transferring executive power to the New Order of Soeharto.

was built in the village and existed until 1975 only. I also did not obtain additional information from academic journals, news in media, government documents, nor other forms of secondary data about the existence of this 'strange' jail.

Accordingly, all the information regarding LPC I gained from the primary data[14]. Many people conveyed that they were afraid to make interaction with the prisoners because most of them were jailed due to murder cases and came from the easternmost part of Indonesia who have different skin colour and religion with them. Although the ex-convict informant stated that they were actually really nice people, he understood that it was quite difficult to get along with local residents for them. Local inhabitants are Muslims and not allowed to consume wild animals and pork. Meanwhile they believed in Christ who do not have the same view about this particular issue.

However, the informant stated that all the 30 prisoners were living in relative harmony. Each of them was given 2 ha lands to be cultivated. They planted crash crops and sell them to the market or shared with local inhabitants. In this open jail, the convicts were able to get out of the jail anytime as long as the warder let them go for a while. During his imprisonment, he even went to Jakarta to visit his family.

Another dispute arose when everybody was released. The tension was caused by the lands which were left became source of seizure among local inhabitants. In this point, LPC officials and the forestry department should have arranged this transition to minimize the existed conflict around land issue. Unfortunately, no single government officials that took it over and let people grabs the lands for their own purpose. Meanwhile, many of ex-convicts came back home to their regions and some decided to get married with local residents and live in the village until the rest of their lives. This decision became the reason of increasing population in this protected area.

Lastly, migration from other regencies is another reason why this protected area becomes a populous region. It was under the program of local transmigration which attracted many people came to the forest and cultivate it (Integrated Study 2005). During the fieldwork, I did not gain information regarding local transmigration. All people acknowledge migrants but did not know about this program. I only obtained limited information from the oldest daughter of a man who was suspected to be part of the communist party. She conveyed that her parents came to the area with a local transmigration program.

Nevertheless, when I triangulate the data with her sister and other residents, they were unsure about it. I was unable to collect additional information about whether this program did exist or not because only few people who heard the rumour but never found in person.

Despite of the uncertainty about transmigration existence, it is easy to find people from different ethnic background in this village. The most noticeable is the language which is a mixture of Betawi (Jakartan's ethnic/the first residents

[14] However, I still have remaining questions on my head such as why it was built there for few years, only murder cases, only men convicts who were given sort of freedoms (compare to the 'normal' prison) and going to be released in 5 years?

in the area), Javanese (from Brebes, Cirebon, and Inderamayu), Sundanese (Karawang and Bekasi), and special Javanese dialect for Serang people.

In the beginning, people lived along the Citarum river but going to the forefront for working in the farm and caught fishes for livelihood. Meanwhile, many people from Karawang, Cirebon and Inderamayu—who caught fishes and shrimps by building some non-permanent houses near by the sea—only stayed for few days and left the family members in the origin villages.

The only reason why they moved was the abundant yield from the forest, sea, or ponds. After they realized that it was very easy to get the foods in the area, then they decided to move and live in with their families in the forest. This decision of migration—likewise been practiced by hunter-gatherers—had caused, to some extent, environmental change (Gowdy 1994) which will be discussed in the latter section. Today, at least 7,726 people live in 8 hamlets in this village (RPJMDesa 2015).

4.3 The Productive Period (1970-2002)

Neumann (2015) argued that political, economic, and social problems are interrelated with environmental change. The stories above have highlighted the growing population in a state-owned land due to the political situations. The government policies also had affected the changing status of the forest which caused dispute and legitimation for cultivating the land. The next sections will unfold the impulse of massive ponds' construction as result of the previous regulation, growing population and capital investments. Private ownership and development policy in Soeharto era also brought impacts for further social tension and inequality. Thus, those transformations caused drastic mangrove loss in this protected forest.

4.3.1 No More Being Mangrove Dependent Society

As I discussed above, shrimp aquaculture construction has caused sharp mangrove loss around Indonesia, so does in Muara Gembong. Suwargana (2008) notes that mangrove ecosystem in Pantai Bahagia accounted for 34.89 ha in 1990. In the early stage of shifting livelihood from catching fish in the mangrove forest to shrimp aquaculture—after granted tenure in 1963—people started to massively cut down the mangrove trees in their 'private lands' to build the ponds.

This continuous aquaculture production without giving attention to mangrove becomes the major factor of "the brink of environment disaster" because market system always demands for economic progress (Gowdy 1994). Barbier and Cox (2004) notes that, in the case of Thailand, the more assessable mangrove ecosystems to Bangkok, the more it is devastated for shrimp farming constructions. In Indonesia, the export ports are also located in big cities including (North) Jakarta. Hence, the market auction is really close to this production area. Since early aquaculture development, the shrimp growers had preferred to sell the yield to Cilincing, North Jakarta even though it took 7 hours by traditional fisherman boat—before getting familiar with motorboat— instead of sending to urban area in Bekasi where this area belongs to.

Another factor is illegal logging in the area which likely common phenomena in Indonesia.

> "As with terrestrial forests, so too the mangrove forests are logged, both legally and illegally. Legal logging is usually carried out by timber companies that hold concessions (HPH) while illegal logging is normally done by members of the public. This has led to the deforestation and degradation of mangrove forests" (Ilman et al. 2011:7)

Moreover, Longo et al. (2015) claimed that anthropogenic is the origins of ecological crisis in the world. In Indonesia, nearly 50% mangrove forest has degraded due to anthropogenic activities such as aquaculture, agriculture, logging, mining, settlements, etc. (Eddy et al. 2017). The political contexts above mentioned and the abundant resources in the mangrove forest had attracted more people coming to this village and create residence.

Besides, the economic value of mangrove trees also attracted people to fell them. "Mangrove tree is well known as durable timber that is why many people were looking for it" (Personal conversation, 2017). Ilman et al. (2011) also note the benefit of mangrove as high-quality charcoal for coastal communities in Indonesia, apart from the market demand of the wood. This argument is in accordance with the initial idea of Soekarno to provide charcoal for the people[15] (Integrated Study 2005).

In addition, the mangrove trees have plenty benefits such as providing timber, firewood, docks, railway bearings, medical materials, and wood for furniture (Eddy et al. 2017). In this case, the people used to make boat and house's furniture such as cupboard, door, window, etc. As the time goes by, they also sold the trees to landlubbers. At this time, the tributary was full of water so that the logs were labelled and carried by the stream flow to the landward. It was taken to avoid being arrested by *Perhutani*.

Nonetheless, it was hard to obtain more information about this topic because it is considered as a crime. No one was willing to share who was practicing nor give more detail information. "Illegal logging has been defined by the government as a 'national problem' because it happens in almost all of Indonesia's provinces and has clearly led to environmental degradation and national loss" (Ilman et al. 2011). I see this topic was kind of traumatic issue among the dwellers because some of the labours in shrimp ponds were caught due to felling the mangrove trees for ponds' maintenance. Meanwhile, the lumberjacks were never being arrested.

From this point, it seems to me that the woodman might be a powerful person(s) in the village that people either afraid of, respect to, or it was rather collective actions and considered as something 'normal'. In spite of the lack of primary data that I have, we still can see that the people did not considered the crucial existence of mangrove forest. They thought of short term economic income for their lives without considering other species which need to live with it. I will elaborate such perception better when it comes to silvofishery[16] topic.

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[15] before the government of Yudhoyono introduce gas as fuel for cooking. Nowadays, every household has converted to gas utilization including people in Pantai Bahagia.
[16] It is a sustainable aquaculture system which maintain the mangrove existence around the ponds (silvofishery 2017)

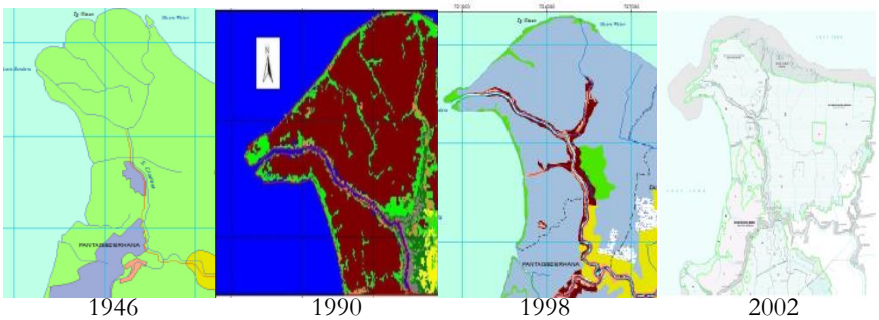
It is important to note that I did not found any legal logging activities or stories during the fieldworks nor I obtained any literatures which telling about the concessions in Muara Gembong. Therefore, I conclude that those anthropogenic activities are the main reason why a particular forest which used to be a main living resource for Bekasi and Krawang residents turns to be occupied by settlers. The land access shifting then triggers biodiversity and mangrove loss in this area that has led to tipping point of coastal erosion.

4.3.2 ´Little Tsunami´

As it has shown and will be elaborated along this chapter, the massive mangrove deforestation for ponds and logging indicated the limited law enforcement in this protected forest. It is another proper depiction why the mangrove forest has gone and alter coastal erosion in early 2000. It indicates what Kallis and Norgaard (2010) mentioned about the bio-social coevolution. The environmental change happened because of the social factors have emerged and simultaneously transformed the forest to be shrimp ponds. As a result, it has made growing population who exploit all resources and caused environmental degradation (See appendix 3). This argument is supported by Ilman et al. (2011) study that "in the last two decades, most of the conversion and over-exploitation has occurred not because of any lack of or conflict between policies/legislation … but simply because of the weakness (or absence) of law enforcement" (p:38). Many policies and legislation have been provided to regulate this issue in Indonesia but the unsynchronized policies create confusion for regional governments to implement it (Ilman et al. 2011). "…neither policy could be applied in the regions because of the lack of coordination of information and the differences in perception between the forestry and fisheries sectors concerning this policy." (Soewito in Ilman et al. 2011)

Power contestation between forestry agency and local government staffs in the case of Muara Gembong—to collect money for their own pockets—will also be discussed in the following part. They use the position and formal regulations to conduct wrong action as if the acts were represented their institutions where they work for.

Figure 3. The Environmental Change in Muara Gembong



Source*: Setiani (2010); Suwargana (2008); Integrated Study (2005)*

The above maps have portrayed how a protected forest in Muara Gembong has changed drastically. The green color in each map indicates the mangrove cover, while other dominant colors represent aquaculture conversion. Unfortunately, there is no study which shows the condition in the early period of productive shrimp farming but those researches discuss the sharp decline since

1990. I also pick a map in 1998 to exhibit the remaining mangrove during the most profitable period of shrimp farming due to financial crisis in Asia 1997 and the chaotic political situation in Indonesia the following year. Then, Integrated Study (2005) reported that the shape has changed due to coastal erosion and sedimentation as indicated by grey color. Based on data in 2002, the coastal erosion has reached 211.80 ha meanwhile sedimentation was 1,190 ha.

On the one hand, the people (settlers and investors from outside the village who have financial capital) put efforts to work on the so called 'private' lands and thought that they have right to destroy the mangrove forest in the name of livelihood. Then the disaster has gradually stopped their efforts earning profit in the conservation forest. Initially, the coastal erosion has come in early 2000, the ponds by the beach were struck by strong waves and it broke the dikes. By the time, the destruction got larger and larger until the pond owners gave up making up the dikes.

In 2005, there was strong waves coming to this village and destroyed 99% of ponds in Beting hamlet and some other hamlets next to it such as Gobah and Blukbuk. The water reached most of neighbourhoods in Pantai Bahagia so that the shrimps and milkfish swept away. All furniture's and household´s utensils like television and fridge were floating due to the huge waves. They considered that it was a little tsunami because a real tsunami struck Aceh in the previous year but fortunately no one was died here. In the study of Ilman et al. (2011), natural disaster like tsunami was mentioned as another cause of mangrove depletion. However, this area is geographically safe, there is no slabs or sea troughs which able causing tsunami.

On the other hand, some people claimed the land subsidence due to seismic activity by a state-owned company (Pertamina) in 2006—which has an office next to this sub-district—is the proper reason of coastal erosion. It was the second attempts after it was done in 1980s. Even though Pertamina contended that it did not find sufficient amount of oil to be extracted, some people blame Pertamina for the severe coastal erosion afterwards. Today, the coastal erosion has ruined a neighbourhood in RT 5 and damages 1 km ponds from the initial beach. Hence, many people moved out of the village and left the houses.

4.3.3 Diverse Opinions about Coastal Erosion

This section will discuss the different perceptions about mangrove among Pantai Bahagia residents. On the one side, pond owners see mangrove as something not useful, unprofitable and reduce the shrimps and milkfish production. Meanwhile, the earlier inhabitants only exploited the resources but keeping most of the mangrove forest. They know the mangrove benefits for their livelihood and the breeding place for many species.

On the other side, there is a group of young residents that understand the harmful of cutting mangrove. These people are the supporters of Savemugo in the village who are the member of *Pokdarwis*. This describes what Paulson (in Veuthey and Gerber 2012) discussed that there will always be "plurality in positions, perceptions, interests, and rationalities in relation to the environment". I found different arguments telling the reasons why it happens:

- Village leader argued that the only driving factor was the sand extraction in Pakis Jaya village (Karawang regency) which is located next to Beting hamlet. This massive extractive was done by a corporation from 2000 to 2002 and it affected the wave pattern. Then it broke the cape in pantai Bahagia which was fending off sea current from the east.
- Many medias covered Pantai Bahagia in relation with global warming issues such as the raising of sea level (DAAI TV, Merdeka.com, BBC Indonesia etc.).
- Meanwhile, all key informants indicate different points of views. Some said the underground bombing (seismic) became the reason of raising sea surface level. Another informant who actively participated in mangrove reforestation argued that the greedyness of ponds owners was another important aspect that cause the coastal erosion. This argument is supported by the village secretary that has the same opinion. Above all, all key informants contend that cutting off the trees was the main reason of coastal erosion in the village.
- In addition, few people argue that the rapid growth of industry in this Regency especially Cikarang industrial district has negative impact to the village due to factories waste that is thrown to the sea. Similar issue is also related to waste disposal from industry in Jakarta which was carried by a ship and thrown in the Java sea.

4.3.4 Power Contestation over a Protected Forest

Moving to the land issue, the following sections will further discuss about the different perceptions between the inhabitants and *Perhutani* –about the land's function –as the representative of Ministry of Forestry to rule the forest. Meanwhile, the people insist to utilize it for economic purposes especially shrimp ponds. Basically, the shrimp aquaculture practice in Pantai Bahagia was different compare to the normal shrimp farming because the shrimps were provided by nature. In early 1970s the ponds had started to be built in order to harvest more *udang alam* or literally translated as 'natural shrimps'. They just need to make dikes and manage the water flows manually. The farmers did not need to buy the seeds/baby shrimps, woof, fertilizer, nor the chemical stuffs for producing the shrimps and other fishes.

The number of people who move to the seafront—which now is called Beting hamlet—was increasing. People have occupied the lands and an enclave area of 1,000 ha has existed when the forestry management was transferred from forestry bureau to *Perhutani* in 1978 (Bisnis Indonesia 2013). Before the transition, a forestry bureau staff encouraged people to entitle the rest of mangrove wetland which were not occupied. Another pond owner informant stated that 5 ha of his land were 'given' by the mafia and gave a little amount of money for him to get a land use right letter which he considered as a tenure right.

Unfortunately, no informant was willing to share the exact amount that they spent to get the land use letter. All of them said that it was just *uang rokok*

(cigarette money), a common phrase in Indonesia which is usually used to describe that there is no standard of squeezing transaction because the money would fill the private pocket.

Later, another central government's policy was implemented when all the lands had been occupied as private lands. In 1984, the ministry of agriculture issued aquaculture intensification (*Intensifikasi Tambak/Intam)* agenda which provided training and financial capital as well as introducing fertilizer to the pond owners. However, the ex-middleman informant conveyed his disagreement to the standard training materials that did not applicable to the land contour in Muara Gembong.

Previously, the pond owners only look after the natural shrimps in the ponds but such program had attracted them to grow tiger shrimp and milkfish in the same ponds (polyculture). In addition, they keep in touch with their relatives who live in their home lands and the demand from the fish market in Cilincing were the significant factors which promoted another commodities production. So, they tried to adopt the successful story to grow them in Pantai Bahagia.

I also had interviewed a permanent labour during the productive shrimp farming and he claimed himself as the first promotor of tiger and milkfish aquaculture in Pantai Bahagia. He was a banker who married a daughter of pond owner in Cirebon, West Java. He decided to quit the job because the wife-side family demanded so. He admitted that aquaculture gave much more money compare to his initial job. Thanks to the capital loan from his parents-in law which made him an expert. Basically, he is a fast learner that obtained various aquaculture trainings. As he divorced with the first wife, he decided to move out but kept working on ponds.

In Muara Gembong, he met a land owner who put the trust on him. So, he did several experiments how to efficiently growing tiger shrimp and milkfish which are valued higher. After several failures, he realized that this needed different treatment such as water salinity, temperature, and few steps to grow the seeds which no one understood in the village. The farmers could not fully follow the normal procedure because of the different land contour which impossible to be dried before farming the milkfish or tiger shrimp. He found out his own way to grow them in the same ponds without drying the land. However, he put some fertilizer like the normal aquaculture. The successful experiment then followed by other shrimp growers. They relied on the water or irrigation from the sea by making a waterway in each pond and 10 small rivers around the ponds. The water is the main source of 'natural shrimp's seeds.

This polyculture enabled them to grow many commodities in a pond. The shrimps were able to live with milkfish. Meanwhile other species like crab, freshwater fishes (*mujair, gabus, belanak*, etc) were considered as pests by the pond owners in the productive period. It was claimed will molest the primary commodities (milkfish, Vannemei and tiger shrimp) yields.

In 1985, Perhutani took an action with Bekasi Regent to save half of the mangrove ecosystem in the Ujung Karawang or 5700 ha when many people has built settlement in this forest. They committed to do mangrove reforestation and promote silvofishery. This system needs the balance between man-

grove and the ponds (Setiani 2010) but it was reported that only 150 ha mangrove planted. Whereas, Ilman et al. (2011) indicate the weightiness of mangrove existence in aquaculture practices.

> "Maintaining mangrove forest around an aquaculture area is one of the best ways of controlling and eliminating pollutants, considering that aquaculture tends to use manufactured food pellets and various kinds of chemicals, both as pesticides and for other purposes" (p:19).

Initially I found this term from the document of contract between a land cultivator and *Perhutani*. It came out again when I interviewed the field chief of Savemugo. He stated about this system as the result of meeting with Ministry of Environment and Forestry this year.

In fact, silvofishery has been promoted long time ago by Perhutani in Segara Anakan mangrove protected forest, Central Java (Ilman et al. 2011). However, I only found a pond owner who implemented this system. He is a young man who moved out from the village due to the unproductive ponds. I interviewed him during his visit to his relatives who still prefer to stay in Patai Bahagia. He claimed that his parents were one of the big pond owners in the village and he was trusted to manage the ponds.

This young man obtained a diploma before working for few years in Japan. During his stay in Japan, he learned from his Japanese colleague about aquaculture and applied it when coming back to Pantai Bahagia. He even said with a proud that he planted mangrove around his ponds. He kept growing the mangrove although all the people opposed his idea but he believed in what he was doing.

> "here, people believe that mangrove is something which would disturb the shrimps and milkfish space to live. Its root makes the ponds getting smaller. Second, mangrove leaves will attract many birds to come, while the birds are claimed will eat the baby milkfish and shrimps. In fact, the yield was going up when I have mangrove trees around the ponds before the dikes broken due to the coastal erosion. But, look! You would not find mangrove covered the ponds like mine, right?" (Personal Conversation, 22 July 2017)

He has to admit that the ponds cannot be treated as a normal aquaculture practice as I have discussed previously. So, he kept growing the shrimps and milkfish the way it used to be. Unfortunately, his ponds still got struck by the coastal erosion even though they are covered by mangrove but only little mangroves in the seafront.

4.3.5 Land Dualism: Claims on Land Ownership

I will now explore the different perceptions between the residents, local government officials, and Perhutani as stated by Neumann (2005) in the earlier section. During the fieldwork, all informants recognize the land ownership belongs to the *Perhutani* but none of them knows that it is part of a protected area or biodiversity conservation forest which supposed to clear from any economic activities. Meanwhile, all of them also acknowledge private ownership until now. Therefore, Fatchiya (2011) contended there was conflict of interest between the aquaculture farmers in Muara Gembong and the *perhutani* (regarding mangrove ecosystem). The first party assumes that mangrove ecosystem's

function is to make living through aquaculture ponds and its firewood. Meanwhile *perhutani*—which has authority since 1978—has obligation to oversee those residents' activities.

Indeed, the land status makes them confuse because they have two different documents from the forestry agency and local government (village administrative). Bromley said that "property rights indicate who has the *legitimate authority* to act predetermined manner" (p:9). In fact, the village and Sub-District chiefs started to create recognition of land ownership letter (*Surat Keterangan Desa*/SKD) in 1992. It becomes a prove of private land ownership acknowledgement. SKD is printed on one page of A4 paper size and bold cartoon paper. It informs the land size, borders, and the land owner. In the bottom of the letter, the owner, village leader, and district leader put signatures. However, they fully understand that this letter does not has value in legal term because the land belongs to forestry agency but they registered the lands anyway. Even so, this letter has been used for the evidence of land trading.

The following year, the residents received Sale Value of Tax Objects (NJOP) from the local government and tax office in 1992. It means they have to pay the Tax Collection of Land and Building (PBB) annually. In order to get the NJOP, people need to make SKD first which will able to state the house spacious and its boundaries.

On the contrary, Perhutani created another policy in 1998 (Fatchiya 2008) through Plantation Cooperation Agreement, Maintenance, Protection, and Utilization of Brackish Forest Land program. It regulates the Imposition of Indemnification of Forest Area Use (GRPKH). "Under national law, the mangrove forest is part of production forest are (*Kawasan Budidaya Kehutanan*) falls under the ownership of the state through the Ministry of Forestry who issues user permits" (Ilman in Kusumawati and Bush (2015). People called the document from Perhutani as a "script" or a contract. It consists of 11 pages agreement in A4 papers which contains the roles and responsibilities of the cultivators and Perhutani as forestry administrator.

It seems to them that Forestry agency official encouraged people to execute building ponds. Everybody was allowed to cut off the trees and manage the land after asking permission of the forestry staff. In contrast to SKD, this agreement is valid for two years only, could be renewed, and has fix price per metre cubic but my informant said that people always pay voluntarily likewise "uang rokok" in SKD case. Nonetheless, the payment is considered as compulsory part of the contract between 'land manager' and the 'agent'/Perhutani (Fatchiya 2008). Another important issue is regarding mafia of The Land Agency (*Badan Pertanahan*) of Bekasi Regency who offered land tenure right or land certificate. Hundreds of people have submitted the documents and an administrative fee IDR150,000 or $13 per certificate. He claimed that it will change the Perhutani-owned land to legal status so that it will legalize the private land ownership. In fact, he is gone with the money.

Next, many speculators have come to this village and bought the abandoned ponds. Once I got this information, the immediate question that I asked was "why do they want to buy the lands that have become the sea?". Around 1 km from the initial beach, it is full of water and just looks like ocean. The former neighbourhood leader responded, "nobody understands here but surely

the government staffs have already known the development plan in 10 years prior to the execution" (Personal Conversation, 29 July 2017). He also contended that the buyers are government official's relatives and entrepreneurs who live outside the village and most of them are urban people. Such phenomenon is in line with previous studies in Thailand where pond owners or investors usually come from other regions in suburb or urban area (Vandergeest et al. 1999; barber and Cox 2004).

Then, other informants, especially who have attachment with savemugo, shared clearer arguments. The speculators believe that this area will be transformed as an industrial area like port and a new town of Pantai Makmur as proposed by the Regent of Bekasi to Ministry of Forestry in 2002. Unfortunately, it was rejected through the Integrated Study report which argues that the biodiversity in this particular forest is precious and cannot be changed to another place. For instance, it becomes the transit point for birds from Australia which want to fly to other parts of the world and it is the house of many endangered indigenous species like *lutung jawa* (Integrated Study 2005).

Private property and market are claimed the reasons of animal extinction around the world (Gowdy 1994: 81). "Of all the environmental crises facing modern humans, perhaps the most serious of all is the loss of biodiversity" (Wilson in Gowdy 1994). It is clearly happened during the productive shrimp farming in Pantai Bahagia when the forest had been transformed as aquaculture ponds and owned by individuals. All the yields are sold to urban market in Cilincing, Jakarta and it was exported through this auction port during the productive period.

The description above has elucidated the power contestation on property rights at the grassroots level between actors who have different perceptions and interests (See appendix 2), a fact that eventually led to the environmental change in the village. Ideally, the *perhutani* position –with its task to preserve the environment – is to save the mangrove ecosystem and its biodiversity. It means that it goes sometimes against the economic desires of the people to destroy mangroves and extract all the resources. Meanwhile, Neumann (2005) stated that "property rights are defined, negotiated, and struggled over among different social groups". This battle has been taken by the local government officials that trying to fight for people's right in occupying the land privately although many mafias took advantage for fulfilling their own pockets. Finally, the central government just granted it through social forestry program. I will elaborate it in the next section.

4.4 The Post-Productive Period (2003-2017)

Despite of the different perceptions among actors in the grass root level, the mangrove depletion does exist in the protected forest as reported by BBC Indonesia (2017) below.

Figure 4 Mangrove Depletion in Muara Gembong

Source: *BBC Indonesia (2017)*

In responding to the environmental problem in Muara Gembong, the Regent of Bekasi proposed to the Minister of Forestry in 2013 concerning forest land use to transform it into the New Town of Pantai Makmur. It will be changed to be industrial areas, warehouses, settlements, ports, tourism, commerce, and services). This plan then attracted many speculators purchasing the abandoned ponds and houses. This proposal was also a reason why an integrated study was conducted as stated by one of the researcher of this study (Personal Conversation, 6 August 2017).

The study report which was published in 2005 becomes the legal basis to reject the proposal but allocate nearly half of it (± 5,170 ha)as a production forest area (*Hutan Produksi*). The Ministry of Forestry issued a Decree Number 475/Menhut-II/2005 dated December 16, 2005 to regulate it (Setiani 2010).

On the contrary, the Governor of the West Java province enacted Regional Regulation Number 2 in 2006 which intended to preserve the mangrove ecosystem in Muara Gembong. It was supported by President Yudhoyono in 2008 who created the Presidential Executive Order Number 64 in order to integrate spatial planning of seven areas around this place (Setiani 2010).

Next, another conservation scheme was initiated by Ministry of Environment which promoted social forestry program since 1999 but the reformation era did not allow such a program to be implemented (Ministry of Communication and Informatics 2017). In 2007 to 2014, this ministry has tried to carry it out but only 449,104.23 ha of state land have been distributed (REDD+ Indonesia 2016). Therefore, it has started to be running again by REED+ and the Ministry of Environment and Forestry of Indonesia. President Joko Widodo has also started talking about it in December last year as part of his 9-priority agenda/*Nawacita* (Kompas 2017b). This scheme is intended to be implemented in 12 provinces and give the land use right for people who live in state-owned forest. The idea is to make them welfare and give them incentive as a forest guard (REDD+ Indonesia 2016). Recently, the current president visited Muara

Gembong and launched the program as the result of Savemugo's advocacy that will be elaborated below.

4.4.1 Environmental Advocacy

During the unproductive ponds period, there is an environmental group which invested time and energy to conserve mangrove ecosystem, starting in 2013. The members are young educated persons from Bekasi and Jakarta. They try to preserve the biodiversity in the area through mangrove reforestation and preserving the endangered animals such as *Lutung Jawa* and the birds.

The environmental degradation and economic issues become the concern of this urban environmental group. Savemugo (2016) officially launched its focus on eco-tourism since 2013 in order to support the people in Pantai Bahagia particularly restore the coastal greenbelt function of mangrove in this particular place as the intention of President Soekarno when purchased the private lands. Savemugo has attracted visitors, mostly from urban areas in West Java and Jakarta, companies, as well as government agencies' attention to do social and environmental activities in Pantai Bahagia village such as philanthropy, health, education, build the infrastructure (a motor boat, public toilet, replace the bridge to Lutung Jawa conservation, mosques' renovation), or preserve the Lutung Jawa and mangrove reforestation.

Over the past few years, Savemugo has approached many government officials in Bekasi Regency to get their attentions about the urgent actions for mangrove ecosystem in Muara Gembong such as Regional Environmental Management Agency (BPLHD) and Tourism Agency. However, the external relation person of savemugo said that they did not receive good signals, until he got the contact of an expert in the Ministry of Environment and Forestry who supported his ideas and the team.

Then, he went to the State Secretariat, on behalf of Savemugo, with the intention to ask the current president Joko Widodo to visit Muara Gembong. He argued that if it is successful, everybody must put their eyes on Muara Gembong and its environmental problem. He stated the previous actions taken before taking this big step, "we have taken bureaucracy ways to attract local government officials taking action but not succeed, so we decided to take the shortcut way" (personal conversation, 12 August 2017). Even though the State Secretariat did not grant the request, he kept following it up to the Ministry of Environment and Forestry which is responsible for this issue. So far, Savemugo had been invited three times by the minister of Environment and Forestry with the representatives of Perhutani. After the first visit, the minister came to Muara Gembong with the team. Meanwhile, in the last meeting, it was announced that the president will visit Muara Gembong in October 2017 and it turned out, he came and launched social forestry program in Muara Gembong on November 1st 2017.

Since then, he felt many progresses coming, progresses that did not happen when savemugo was approaching the government officials one by one. Surprisingly, some savemugo members who I interviewed conveyed peculiarity of those institutions which invited savemugo to their offices. The statement came out again during Savemugo Annual Meeting which took place in Bekasi

Tourism Agency office on Sunday, 6 August 2017, "it is odd that they invited us to present the current conditions in Muara Gembong, why don't they just come and visit by themselves if they are really want to know the real condition?".

Therefore, Wardhani (2011) considered that ecotourism of mangrove park is the best way to educate people and enhance people's awareness to restore mangrove forest in Indonesia. In 2016, Savemugo claims the velocity of money in this village through such program has reached IDR 453,599,000 (US$ 33,584). This program was initiated by Savemugo through social media and operated by the local NGO (Elkail) for the first year. Then, the local people did protest to Savemugo because they were not involved in any activities. They argued that there was no local person who was involved to be part of the mangrove reforestation team. In addition, there was financial issue when 'mangroving'[17] was managed by Elkail, regarding the money collected for *Lutung Jawa* conservation which disappeared. Savemugo and the community did not mention explicitly that it was corruption but the money never came back albeit the in-charge person is still there.

4.5 Ecological and Economic Coevolution in Mangrove Protected Forest

This last part will points out the evolving of social system as a result of environmental change and in turn, how this transformation affects mangrove ecosystem in Pantai Bahagia. It will be elaborated in three forms of social evolutions: the emerging of population, the enactment of various policies, and the livelihood dynamics.

I have discussed in the early section that all the informants were witnessing many wild animals such as tiger, monkey, snake, pig, crocodile when mangrove still covered this protected area in pre-productive aquaculture. It also provided many types of fishes because the water was not salty like nowadays. In addition, the land was fertile to grow paddy fields and fruits without any chemical fertilizer. They also very easy to find fishes, crabs, and shrimps every day but they did not have any knowledge to catch the shrimps yet. Then, the transfer of knowledge came from the new comers who worked on shrimp ponds in their home lands. This is the turning point when the settlers have changed the main livelihood in the village and drastically converted mangrove forest to aquaculture production.

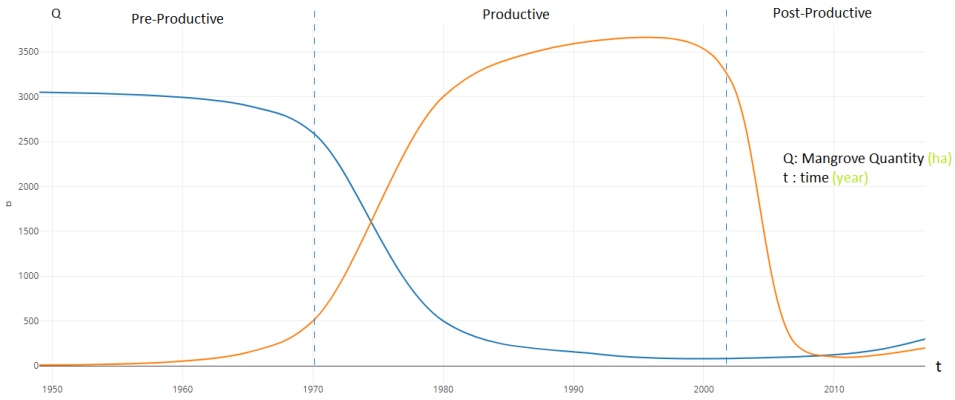
Previously, the earlier inhabitants regarded the dense forest as an open access where they could rely on. They used to catch crab and gain 1-ton freshwater fishes every day or only need few hours to put a net in the river. The informants contended that it would be sufficient for living in the next few days. The fishes were very cheap and difficult to be sold because everybody could easily obtain the same amount every single day.

In the productive period, the resource was still being exploited but the pond owners only focus on shrimps and started to look at milkfish potential since 1985 after the *Intam* promotion. In the early stage of shrimp farming, the

[17] Local term to indicate mangrove planting activities

shrimp price was IDR10,000 or $0.80/kg. The peak price had reached during financial crisis in Asia in 1997 and few years afterwards. No wonder it was called 'dollar village' by outsiders. During the crisis, Indonesia encountered unstable political and economic situations particularly in Jakarta but all the informants expressed the happiest moment at that time instead. This situation clearly portrays the mainstream notion of development which tends to see environment as a "resource pool" for economic growth (Norgaard 1994).

Figure 5 The Coevolution of Mangrove Forest and Shrimp Production



Source: *Author's illustration based on primary data; Setiani (2010); Suwargana (2008)*

The graph above shows the significant mangrove loss as a result of massive aquaculture development during 1970 to 2002 as promoted by Soeharto era. Therefore, many residents recognize the Soeharto regime's merit who promoted shrimp export. The shrimp price in Indonesia soared up until three times due to the devaluation of IDR exchange rate (Ilman 2016). However, the glory was not last long in Muara Gembong due to coastal erosion afterwards.

Another vantage point of crisis for the villagers were their ability to go pilgrim. Thus, such 'developmentalism' policy was deemed able to boost the price and their incomes like in Soeharto era. However, the continuous shrimp production eventually caused severe coastal erosion that "was stimulated by the incentive of rocketing shrimp prices as a result of the Asian monetary crisis and weak law enforcement" (Ilman et al. 2011:33). Accordingly, the worst mangrove conversion period in Indonesia happened between 1998 to 2001 due to the financial crisis (Ilman et al. 2016).

As the increasing commodities that needed to be deliver to Cilincing every day, some middle men own motor boat in 1988. This technological invention is also argued one of the factors of social and environmental evolutions (Gowdy 1994) because it has impacted, to some extent, to the aquaculture production and caused the commodity price to become even higher. Although there was resistance from the sailing boat owners to shift the transportation mode, the farmers prefer motor boat because the short period of transporting time makes the shrimps and fishes are still fresh.

Later on, the post-productive period shows the devastated ecosystem which urged some people to leave the village. Thus, it impacted to the private ownership for ponds. Some pond owners sold the unproductive ponds to speculators and some keep them abandoned. Nonetheless, all the ponds are

occupied by some people who decided to stay. They explore other marine species that fulfil urban-commodities such as oyster and other molluscs. Such job just emerged when the ponds have completely destroyed by coastal erosion.

In contrary, Veuthey and Gerber's (2012) study in Muisne, Ecuador showed that the collection of biotic resources in the mangroves was the primary job before the invention of shrimp farming industry. It is also said as 'feminine work' which I could not observe this here. Meanwhile, such practice is conducted by Pantai Bahagia inhabitants when the environment is already depleted. Previously, they considered that shrimp and milkfish are the only precious commodities. Pond owners thought other fishes were pest which would affect shrimp and milkfish productions. The pond owners always disinfected before putting baby milkfishes in the ponds so that other species would be drunk and died. In this process, the pond-less people would come to collect those unwanted species.

It is noteworthy that the role of external social factor has also affected the shrimp production. The investors from urban areas who have financial capital to build or rent the ponds and hire local people working on the assigned ponds are crucial like a political ecology study in Thailand by Vandergeest et al. (1999). They have power through the capital possession to degrade the mangrove ecosystem for ponds development. Their jobs ranging from businessmen, government official relatives, and agriculture bureau pensionary. Most of them never live in the village, so they just gave full trust to the labours. It is common phenomena when a man is hired to be a labour, it will be a household job. The wife and children will automatically help the household head working on the brackish farms. For migrant labours, pond owners will provide a non-permanent house next to the assigned pond. A labour usually worked for a-5 ha-pond.

Meanwhile, the internal social actors are assessed below. I have examined social classes which happened during the productive farming. On top of the list was boss or pond owners who became middlemen too. These people had financial capital to influence others as I discussed in the reflexivity section. They used to donate on religious matters such as building and renovate mosque as well as giving financial contribution to religious activities (*Maulid Nabi, Isra' Mi'raj* etc.). I had interviewed an ex-boss who said that her ponds could send the 80 until 100 kg shrimps every day. The yield has able to go hajj with his husband in 1992 and umra in 2003. It is a common phenomenon in a productive shrimp farming area where the shrimp growers have hajj title in front of his names (Sano 2000; Manumono 2008) and the people call them such way. They also sent the sons and kids to pursue higher education and become successful persons now. She and her husband also invested his money to buy two houses in Cikarang, Bekasi and her husband's home town in Serang, Tangerang which they referred as villa. She also has a car which I never found in this village because the terrain is not wide enough for a car. So, she parks the car in the 'villa'. Another investment that she made is agriculture farm in another sub-district. She bought it unintentionally because her labour let her know that someone was selling it. "If only I knew that this [coastal erosion] is going to be happen, I will prefer to allocate the money to agriculture farming" (Personal Conversation, 28 July 2017).

The second strata have been occupied by middlemen. These people do not have ponds but working on commodities trading from pond owners to middlemen in Cilincing. They also provide financial and equipment supports for fishermen, shrimp growers, as well as pond-less people. According to my interview with a middleman who has been working for 25 years, he has 50 people who work with him. He used 'cooperation' term to explain the relationship with them.

During the productive ponds, he provided money or other equipment supports to the land owners who live in the village or to the labour for whom did not live there. He claimed that it is transparent when he wrote down the debt. They will pay it every day (for shrimp growers and fishermen) and in milkfish harvest time (every three months) by selling the commodities to him all. Then he will deduct the yield to the debt.

He said that it is possible to cut off the relationship if someone does not feel comfortable to work with him but he/she must pay all the debt first. In this case, he does not give different prices for this patronage relationship. As a patron, he applies the normal prices to his clients or non-clients.

However, I found different situations when the local people were dealing with middlemen in Cilincing. The pond owner informants conveyed that the price of commodities will be deducted 7% if they did not have debt but it will be higher up to 10% commission when they have debt. In another case, it did not apply when they have family relation.

Then, the pond-less people sat on the third level of the social status. These people did not own pond but they occupied a house and small farm around their houses. All the property size is less than 1 ha. During the productive period of shrimp farming, it was divided into two types: permanent and temporary labour. The permanent labours were people who do routine activities for pond owners every day to buy the tiger and milkfish seeds, fertilizers, shrimp harvesting, shorting out based on the size, scaling, and shouldering to the boat as I explained previously. Meanwhile the temporary ones were hired on demand. Their jobs were ranging from building ponds, harvesting, rebuild the dikes, and cutting off mangroves. This has shown how the social status for the capital holders had affected land-less people to destroy the environment for the sake of livelihood

However, in post productive period, the social strata are not applicable anymore because the pond owners and the boss are no longer having power to cultivated the lands nor cutting off mangroves. But it also does not necessary mean that environmental conservation being conducted right away because it just started in 2013 when savemugo creating the movement.

Generally speaking, all the pond's owners are not originally from Bekasi Regency. Most of them are from a district in Tangerang which previously work on shrimp farming as well. Then, people from Inderamayu and Cirebon have just started to come last two decades, mostly as fishermen. People called them 'Javanese', which indicates their ethnicity.

On the other side, the landless people have mixed jobs (*serabutan*) to survive. In 2000s, they, mostly women, went abroad to have a job in middle east as immigrant workers for few years. But most of them have come back and

stay in the village and some men are planning to work in other islands such as Borneo island.

During interview with a land-less pond worker, she said that it was easy to earn money because many species can be yielded. Her husband was a temporary labour. In off seasons, the temporary labour used to catch fishes and crabs were abandoned by shrimp growers. However, at the end of 1990s, the economic situation was getting harder so that her daughter has to be a migrant worker (TKI) with other village residents. She has been working for 20 years now. Most of the TKI are women and worked in Hong Kong and United Arab Emirates countries such as Saudi Arabia, Kuwait, and Oman. Therefore, many ex-TKI are able to speak Arabic and/or English.

Meanwhile, the rest of people who insisted to stay are working on the abandoned ponds. They take anything which has value for the market in Cilincing. The middle men have contacts of Beting people and will inform them how much demand of certain commodity in the early morning. The amount is based on demand from Cilincing. During the fieldwork, *simping* (a flat shell mollusc) is the primadona of the people, they seek for it from 8 am to 2 pm every day. Each person could collect 100 kg and earn IDR 90,000 or $ 6.5 each day.

The description above has clearly clarified the market based driven of the urban and probably export oriented which keeps going on even when the ecosystem has degraded a lot. It is a depiction of "… market mentality …[has] let them to sacrifice environmental sustainability for immediate economic gain" (Gowdy 1994:75). Then it raises my concern if this does not be halted, it might create the second wave of biodiversity loss as what has been discussed by Longo et al. (2015) "when overfishing occurs, fishing operations will often simply target a different species to continue profit-oriented activities" (Longo et al. 2015:35). As has been noted, this study of coevolutionary environmental history is therefore, important to understand the reciprocal interrelations between the environmental transformation and social system adjustments.

5 Conclusion and Reflection

This research provides evidence for a better understanding of an ecological tragedy caused by aquaculture (particularly shrimp) production in a conservation forest in Indonesia. It is an attempt to respond mainstream economic analyses which—supported by international development agencies—often represent the lucrative shrimp business in terms of GDP growth and frequently blame population explosion for the potential environmental damage.

In this paper, political ecology has helped to identify many significant actors, events, and policies that trigger the environmental degradation in Pantai Bahagia. Unlike the previous studies on intensive shrimp farming—which clearly show the significant contribution of shrimp industry to mangrove loss and impoverishment—the extensive shrimp aquaculture is naturally dealing and related with many people and probably more complex social systems. Therefore, this study suggests to incorporate coevolutionary environmental history framework to this approach for its ability to trace the environmental change in relation with its social contexts exhaustively.

It is also noteworthy, life history interviews have enabled me to explore the environmental history of the Ujung Krawang forest in three phases. First, in the pre-productive shrimp farming when it was covered by mangrove ecosystem, abundant resources and many wild animals. So, people really depend on the mangrove. Second, productive shrimp farming, the ponds construction began in 1970 as a result of some regulations in the previous period which triggered private property possession as well as dispute with the government. The peak was happened when financial crisis struck Asia in 1997. The devaluation of IDR currency had benefited the aquaculture farmers and they considered that it was the heyday even though, the mangrove condition was decline sharply during this period.

In post-productive shrimp farming, the ponds cannot grow shrimp nor milkfish due to severe coastal erosion. In this period, the land owners do not have property right upon their ponds as everybody can take advantage from the abandoned ponds. Contrary to Veuthey and Gerber's (2012) study, the biotic resources have just been considered having economic values after the 'little tsunami' struck the area in 2005 and many pond owners left them abandoned.

In this occasion, I also want to highlight that, in each period, there was shifting job as relation to the amount of mangrove. In the first period, the lush mangrove forest was treated as an open access property. Then, the massive aquaculture constructions, in order to fulfil the market demand, led to mass mangrove eradication. Meanwhile, in the post-productive period, an urban external group has promoted eco-tourism in the village. This program aims to restore the ecosystem through mangrove reforestation while giving economic benefit for local people. This is the turning point of economic activities which were primarily related to marine commodities and now some of them engage with environmental services. Likewise the biotic resources that are still being exploited to fulfil the urban demand, the 'customers' of eco-tourism remain from urban area too.

Another Savemugo merit is related to its environmental advocacy via social media platforms and approaching to government officials at regional and

national levels. Recently, the current president granted the request to visit Muara Gembong and launched social forestry. Accordingly, further research is needed to explore the environmental and economic conditions after the implementation of such policy. Virtually, the program seems to encourage people to actively cultivate the ponds by providing financial support and off taker from state-owned enterprises (Antara News 2017) while there is no explicit information regarding conservation program during the launching. If it did not deliver properly, the earlier mistakes might recur.

From this study, we can learn that integrated environmental policy and law enforcement from the state are vital to manage conservation forest sustainable. Local people participation is also important to ensure program's sustainability. It is crucial to educate the people how important mangrove ecosystem, apart from the economic benefit as initiated by Savemugo. Hence, I would suggest another study that focuses on the post-productive period with emphasis on savemugo because I did not cover it roundly due to time constraint. Even so, in this research, I am still able to draw a reflection of Savemugo presence in this area. I mesmerised the endurance of the members to fight for the environment that has been able to attract many stakeholders to aware of the urgent condition of environmental change in Muara Gembong. However, I have few notes on program evaluation and am certain that they keen on improving it for the sake of environmental and social well-being in the future.

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Appendix 1. Informants' Characteristics

No	Key Characteristic	Past Profession	Age	Gender	Address
1	Pond owner	Middleman's wife	62	Female	Beting
2	Pond-less	Temporary labour	59	Female	Gobah
3	Ex-convict	Neighbourhood leader for 31 years	86	Male	Blukbuk
4	Chief of farmers' group for *mangroving*	Labour	58	Male	Beting

Appendix 2. Perceptions and Interests of the Stakeholders over the Muara Gembong Protected Forest

Year	Actor	Policy	Objective	Impact	Mangrove Cover
Pre-Productive Shrimp Farming					
1949	President (Soekarno)	Purchased *particulier land*	transformed it to a state-owned land	n/a	n/a
1954	Ministry of Agriculture	Executive Order No 92/Um/1954	Changing its status to be a protected forest	Social tension/ dispute because people did not recognize the changing status	n/a
1957	Government	Border arrangement	The borders are clear		100%
1963	Ministry of Agriculture	A letter to the Head of the Agrarian Directorate, Head of Plantation Service, and Head of the Department of Forestry	the plantation, forestry and other lands which are controlled by the state and have been cultivated by the people shall be used as agricultural land which will be distributed to the people who work on it	Legitimate the private ownership of people who have been cultivating the state-owned land	
Productive Shrimp Farming					
1978	The Forestry Bureau	handed over the management of the area to *Perhutani*		It has been occupied by the people and there was an enclave area of 1,000 ha	
1984	Ministry of Agriculture	Aquaculture Intensification (*Intensifikasi Tambak/ Intam*)	Boosting shrimp and aquaculture products by providing financial capital and training		
1985	Perhutani and Bekasi Regent	A Joint Decree (SKB)	Committed to afforestation of 5,700 ha and Promoting silvofishery	150 ha mangrove reforestation only	
1992	Local Government and Tax Office	Issued the Sale Value of Tax Objects (NJOP)	Tax Collection of Land and Building (PBB)	As if it was a form of recognition of private property	

1993	Village and Sub-District Chiefs	Issuing land certificate from the village	Recognition of land ownership that have been cultivated	Proof of private land ownership	
1998	*Perhutani*	Plantation Cooperation Agreement, Maintenance, Protection, and Utilization of Brackish Forest Land. it is also regulated the imposition of Indemnification of Area Use Forest (GRPKH)	Cultivators are tied with the agreement	Double levies as cultivators have been charged by local government (village). So, people refused to pay it.	
1999	Ministry of Forestry	Launched Social Forestry Program	To make welfare people who live around and in the state-owned forest	Political situation after reformation did not allow this program going well	
2002	The Regent of Bekasi	Proposed to the Minister of Forestry concerning forest land use to be built into the New Town of Pantai Makmur	Would like to transform it to be industrial areas, warehouses, settlements, ports, tourism, commerce, and services)	Many speculators purchasing the abandoned ponds and houses	
2005	Minister of Forestry	Decree Number 475/Menhut-II/2005 dated December 16, 2005	area of ± 5,170 ha changed its function to become Production Forest Area.	Bekasi Local Government has not followed up by providing other areas as forest substitutes to be converted	6.51%
2006	Governor of West Java Province	Regional Regulation Number 2	Conserving the mangrove forest	Making confusion at the grass root level	
Post-Productive Shrimp Farming					

2007	Ministry of Forestry	Promoting Social Forest	To make welfare people who live around and in the state-owned forest	Only 449,104.23 Ha state land has distributed	
2008	President Yudhoyono	Presidential Executive Order Number 64	Integrating spatial planning of seven areas around this place	Reinforcing the previous policy in order to preserve mangrove ecosystem	1.7%
2013	Savemugo	Eco-tourism	Biodiversity Conservation through mangrove reforestation and preserving the endangered animals such as *Lutung Jawa* and the birds	Got resistance because it was not involved local people	
2015	President (Joko Widodo)	Merging Ministry of Environment and Ministry of Forestry	Efficiency	REDD+ Agency has been included under Ministry of Environment and Forestry	
	UNDP Indonesia REDD+ & Ministry of Environment and Forestry	Putting attention back to Social Forestry Program	Involving local people as forest guard as well as the subject of development and giving them incentive through this program	This program has been listed in the national strategic plan (RPJMN) period of 2015-2020	
	Mafia of Land Agency	Creating land certificate	Legalizing land ownership of the people' houses and ponds	Many people handed over money but got hooked	
2017	Coordinating Minister for the Economy	Social Forestry Program		Giving 35 years contract of tenure right for people	

Source: *Author's elaboration based on primary and secondary data collections; Integrated Study (2005); Fatchiya (2008); Setiani (2010)*

Appendix 3. Bio-social Coevolution in Pantai Bahagia

Events		Social Impacts	Livelihood Dynamic	Commodities	Yield	Prices		
Year					/day	commodi-ties/kg (IDR)	Ponds/ha	Rice/kg
Pre-Productive Shrimp Farming Period								
1947	The Dutch Military Aggres-sion	Base camp of Indone-sian Armed Forced and doing guerilla	- Subsistence Economic: catching fishes with nets - Agriculture: rain-fed rice field	- *Gabus* fish - Crabs - shrimp was non-tradeable yet	1 ton /person - Once in a year	25 25		
1949	Dutch recognized Indonesian Sovereignty	Transforming *par-ticulier land* as a pro-tected area					n/a	n/a
1958	Establishment of Ministry of Agriculture							
1965	G30S PKI							
1966	Open Jail (LPC) was estab-lished (the branch of Cipinang in Jakarta) with 30 convicts	-	- Cash crops such as ba-nana and cassava		subsist-ence			
Productive Shrimp Farming Period								
1970	The Kick off shrimp farming in the world	-	- Pond owners: Shrimp Farming - Pond-less households: la-bor and biotic resources gath-erer - fishermen - Migrant workers	- Vannemei prawn - *Gabus* fish - crabs, fishes	-10kg /ha -20kg /day	1,200		250
1975	LPS closed as all the prison-ers had released	- Population in-creased as some ex-con-victs decided to marry local		- Fishes and squid			50,000	250

		people and live in - 82 ha abandoned lands became a source of contention among the inhabitants						
1978	Perhutani was established under Ministry of Agriculture							
1982	- The first seismic from a state-owned oil company (Pertamina) - Water intrusion begun							
1985	Beginning of milkfish culture			- Tiger prawn		70,000	500,000	250
1992	- getting tax object number and tax bill (NJOP) annually - Electricity got into the village	If land owners have NJOP, then pond's purchasing will follow the price standard of Tax Object Sales Value (NJOP) [which is higher than without it]		- vannemei prawn - milkfish - Tilapia fish (for pond-less)		50,000 12,000 5,000		
1997	At the edge of Soeharto regime - Asian Financial crisis - Unstable Economic Situation in Indonesia	-		- Tiger prawn - vannemei prawn - milkfish - Tilapia fish (for pond-less)		150,000 100,000 12,000 9,000		300-500

	- Coastal Erosion had appeared and broke the ponds near by the beach							
1998	High inflation and Habibie became the president	- IDR currency was devalued up to 90% to USD						500
2000	- The second seismic activity - Sand mining in Tanjung Pakis, Karawang (next to Ujung Krawang protected area) - decentralization	-						3500
2002	- The erosion was getting large and the pond's dikes were easily broken by the waves	-	- Vannemei prawn		30-50 kg			5000
2003	Bekasi Government planned to create a new town and business district - Speculators came in and bought the abandoned ponds, up to IDR4,700/m2 or $0.30							
2005	- Integrated study made a report that							8000

	the protected forest has biodiversity which cannot be replaced (*rislah*) to another area - KLHK changed half of the protected area's status to be a production forest	- Land permits should be issued by *perhutani* only						
Post-Productive Shrimp Farming Period								
2007	'Little Tsunami' or the peak of coastal erosion	-	- Shrimp farming - *Gogo* (collecting any biotic resources in the abandoned ponds - Fishermen - Labor of factories in Cikarang	- Vannemei prawn - Seaweed - Mollusks, oyster, shellfish, mussels, and crabs	300gr /ha	50,000 3,000	Rent fee: 10,000,000 /year	
2008	Financial Crisis							10,000
2013	Savemugo started mangrove reforestation			- Recreational fishing -				
2014	Savemugo has involved the inhabitants in the program and created a farmers group and Pokdarwis	-	- Eco-tourism (mangrove reforestation, visiting a sedimentation beach,	- Baby shark - Crabs		50,000–60,000 40,000-250,000		

			tour guide, boat rent, catering, processed food of mangroves)	- Mussels - oysters -	- 6 - 7 kg - Any number	-9,000 -1,000		
2017	- Pokdarwis is officially approved and supported by Sub-District Leader and Tourism Agency - Get greater attention from Ministry of the State Secretary, Ministry of Environment and Forestry, then they were invited to had meeting twice with *Perhutani*			- *Simping* - Oysters - Mussels	- 80-90 kg - 6 - 7 kg - Any number will be bought anyway because it is hard to find nowadays	900 1,000 10,000		12,000

Source: *Author's elaboration based on primary and secondary data collections; Integrated Study (2005); Fatchiya (2008); Setiani (2010)*