

Migration, landscape dynamics, and fishermen livelihood: A case study at East Kalimantan

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Abstract. This paper argues for the interrelationship between migration process, dynamics of landscape structure, and sustainable livelihood based on an in-depth study in East Kalimantan, known as a hub of oil and gas and mining industry as well as plantation and housing area for fishing communities. Using anthropological approach, data was collected using a range of methods including observation, GIS-based spatial mapping, household survey, focus group discussion (FGD), and in-depth interviews. Findings of this study showed that the long process of landscape change has affected community livelihood due to differential resource allocation. Intensive migration occurring alongside rapid industrialization has not only increased competition between different interest groups, but has also changed local spatial configuration. Nonetheless, findings also highlighted integration between different interest groups which has also influenced livelihood. Such process is a form of ‘smart’ response in showing community resilience and ability to share living space by minimizing conflicts.

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1. Introduction

In the study of development and mining, there is a recent trend to look at the ways in which mining has affected economics, socio-cultural, politics, and environment (Horsley, Prout, Tonts, & Ali, 2015). At mining areas, there is a strong interrelation between internal migration, spatial transformation, and the flow of household lives. Internal migration has also affected housing patterns (Rees et al., 2017), where disparity between places becoming an important factor in migration flow as distance gradually lost its appeal in the migration process (Wajdi, Adioetomo, & Mulder, 2017). It is important to understand migration from the ways in which characteristics and the macro-context of migration feed into each other (Wajdi, Mulder, & Adioetomo, 2017). The macro aspect is a determinant of migration process (Parella & Petroff, 2019). In the context of Indonesian internal migration, labour migration to and from agricultural area has increased significantly. Simultaneously, land acquisition has transformed agricultural area in such a large scale into industrial farming and forest (Kelley, Peluso, Carlson, & Afiff, 2020).

The environmental change and its adverse effects had already had an impact on the migration decisions, although this mainly concerned internal migration (Hillmann, Okine, & Borri, 2020). The ability to migrate is therefore not only dependent on economic capability but also on the socio-ecological context of the place in which people live (Mallick, 2019). It is crucial to examine landscape production and reproduction process, especially at mining areas, to examine translocal livelihood model as a link and conceptual

framework of migration and development study (Aghaei, Tavakolinia, Kalantari, & Fanni, 2020), especially at coastal areas where is 7.5% of the total population of Indonesia depends on their lives (Camila & Saraswati, 2020). In Indonesia, research on migration and landscape has found different process and time on each variants of landscape acculturation (Rizqyani, Rahma dan Marsoyo, 2020). State organized and spontaneous population movement have been part of development program of Indonesia governments (Côté, 2014) and well-documented as part of the reconfiguration of state-citizen relations (Nguyen & Locke, 2014). This is aligned with the thinking that landscape transformation is not only related with physical, but also symbolic, cultural, and political change (Fernandez, 2011). Land use /land cover change of an area in space is the outcome or as a result of natural and socio-economic factors and how man make use of it in a particular time and space (Adebayo, Otun, & Daniel, 2019). This is further proof about the social characteristics of landscape, whereby space is produced and reproduced through collective human agency (Rouse, 1991), and the ways in which migration produces spatial privatization (Zhang, 2014), urban-rural translocal landscape (Etzold, 2014).

In the context of this paper, the landscapes created economic power such as mining activities is strategically placed to discuss fisherman community livelihood. There has been an increased number of studies looking at the relation between mining and welfare (Fleming & Measham, 2015). In this paper, spatial formation is traced from migration history

and economic expansion process – two important determinant factors in the formation, transformation, and imagination of physical and social space. It is important to investigate the kinds of socio-spatial dimension which is produced due to large-scale mining industry (Devenin & Bianchi, 2019), the negative impact on food security (Wegenast & Beck, 2020), to social relation and livelihood assets control (A. J. Bebbington & Bury, 2009), the transformative role of livelihood to village households (Ofosu, Dittmann, Sarpong, & Botchie, 2020), for both men and women, especially women bargain on patriarchal society (Tiernan & O'Connor, 2020) (Lahiri-Dutt, 2011). Sustainable livelihood requires participation and social capital development. It is important to place landscape study in the context of human spatial manifestation in searching for footing in life (Cihanger, 2018).

To understand space as a product and context of action – that is produced, rather than given, it is productive to conceptualise physical space to be inherent with the quality of social space. Further, it is impossible to separate this conceptualization from an understanding of time and subjective and symbolic meaning (Radović, 2016). The study which this paper is based on took such framework as a point of departure alongside sustainable livelihood approach that centralizes context, livelihood resources, livelihood strategies, and institutional processes (Lu & Lora-Wainwright, 2014). In livelihood approach, resources are referred to as 'assets' or 'capitals' (A. Bebbington et al., 2008) and are often categorised between five or more different asset types owned or accessed by family members: human capital (skills, education, health), physical capital (produced investment goods), financial capital (money, savings, loan access), natural capital (land, water, trees etc.), and social capital (networks and associations) (Ellis & Allison, 2004). In conceptualizing space, space is positioned as something to be transformed by people initially through constant use. That is why the livelihoods are seen as important drivers of landscape change (Batterbury, 2001). This is in line with the ways in which Foucault discussed space, "space is fundamental for communal life" (Aghaei et al., 2020), and Lefebvre's work, "humans create the space in which they live, thus space is produced and reproduced through human intentions. Space is a complex social construction based on values and socially produced meanings, ... space is a medium of social relations and a material product that can affect social relations" (Farmaki, Christou, & Saveriades, 2020).

In this study, migration is positioned as a crucial determinant for landscape change to be understood within the context of economic, socio-cultural, and other spatial formation processes related to industrialization research (Lin & Gaubatz, 2015). Furthermore, for fishing communities, out-migration is a common phenomenon (Aburto, Thiel, & Stotz, 2009). Meanwhile, the theoretical and paradigmatic debate are focused on various issues related to integration, border, and differences between migrants and host communities (Martínez-Conde, Boteman, Leal, & Montenegro, 2020). This paper will discuss the link between migration, landscape transformation, and fishermen livelihood. First, the ways in which migration affect landscape dynamics will be discussed. In the second section, the contestation between physical/ecological, economy, and socio-cultural space as well as integration process of incoming migrants in the social life of such space will be explored. Finally, by describing local fisherman livelihood,

the process in which production of space occurs will be explained.

The approach used in this article is political ecology. Political ecology is a research approach that addresses nature–society phenomena. "political ecology attempts to understand the complex relations between nature and society through a careful analysis of what might call the forms of access and control over resources and their implications for environmental health and sustainable livelihoods" (Tran, 2020:163). Referring to Peluso (1992: 51), this approach first review actions related to local community resources and then connect them both with their local social networking networks and with the broader political-economic arrangements. Political ecology generally refers to an analysis of the economic-political environment that combines several discussions of the actions of resource users and their relation to the broader processes that make up the social and physical environment in which they act. Political ecology emphasizes the social relations in which actors are embedded and that influences the way they use the environment rather than the collective human-environment interaction of a set of individuals. Political ecology assumes that a larger social structure and political-economic process will influence the actions of local resource users. Political ecological research has consistently shown that beneath the apparent abstraction lie sets of socio-ecological relations, struggles and injustices. It's needed a better understanding of these relations, struggles, and injustices (Loftus, 2020). This paper demonstrates how political ecology perspective with its mixmethods approach can contribute to the study of landscape transformation, particularly in the context of a well-known host society experiencing a lengthy process of migration and makro-economic such as industrialization.

2. The Methods

Methodologically, political ecology studies has been dominated by qualitative methods and case studies (Svarstad & Benjaminsen, 2020), although there are trends to using mixed-method. This paper is based on an in-depth case study of a community in East Kalimantan Industrial Zone, i.e.: Handil Baru and Sanipah Subdistrict (Figure 1).

Using mixed-methods approach, this study employed several different quantitative and qualitative data collection methods. First, observation was used to look at the social and physical landscape of the study site. Second, in-depth interviews were conducted with 20 informants using life-history approach to gain insights into individual migration stories, spatial transformation, and various forms of livelihood. Third, conducted 10 focus group discussion (FGD) in the two villages. FGD was conducted with youth leaders, male and female fishermen, and fishing community leaders. Fourth, GIS used to shows spatial transformation due to oil and gas company, migration process and livelihood change. To getting quantitative data, the study employed household survey. The sample for this survey was 250 households, consisting of 108 households in Sanipah and 142 in Handil Baru. The survey was conducted to gather data on household consumptions, productivity of catch of fish, earnings, and fishing gears – both owned and used.

Data was analysed using mixed-method sequential analysis. The data collection and analysis used allowed researcher to get both the breadth and depth understanding of the study topic. The study design also allowed triangulation

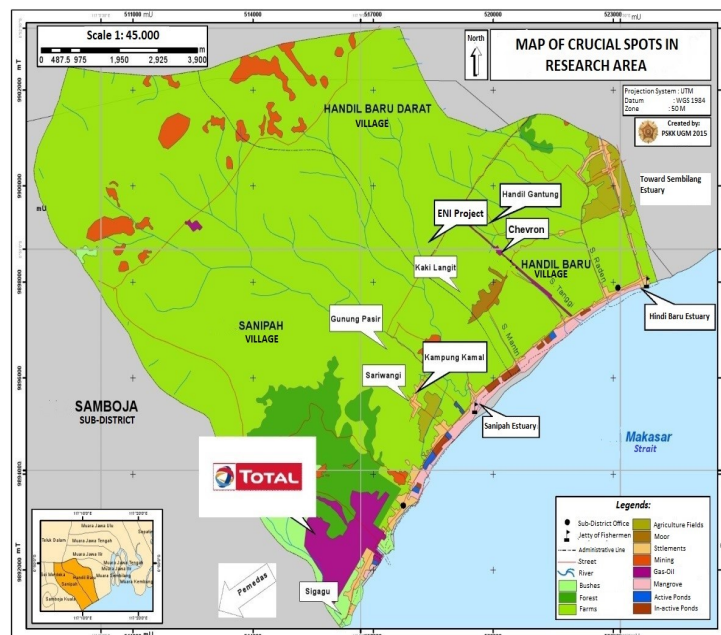


Figure 1. Map Handil Baru and Sanipah Subdistrict

which seeks to gather complimentary yet distinctly different data on the same topic which can then be integrated for analysis and interpretation. The benefits of this model lies in its sensibility. As Almalki argues, it makes intuitive sense to gather information from different sources, utilising different methods, which work together as an efficient design (Almalki, 2016).

3.Result and Discussion

The Rise and Transformation of Landscape, Migration Process and livelihood

As shown in Figure 2, Migration Dynamics, Landscape Change, and Livelihood in the Study Sites (1930-2015), this studies confirm that the migration process has impacted the physical landscapes dynamic (Kelly, 2011). Qualitative data show that spatial transformation could be divided into three time periods. The first period occurred during 1930-1950. The first migration occurred in the 1930s. Historically, Handil Baru and Sanipah have been the destination for Bugis from South Sulawesi and Banjar people from South Kalimantan, and they identify themselves as 'urang' Banjar (Hawkins, 2000). The first physical landscape transformation could be traced back to this period in time when the community, led by the migrants, worked to construct human-made river (*handil*, in Banjar language). They did so by dredging the big trenches in the swamp areas so that the water could be streamed directly to the sea. These *handil* could be categorized into four depending on its size, i.e.: *anjir* (biggest *handil*), trench (*handil*), moat (*parit*), and gutter. The water managed through *handil* was governed for plantation and farming use.

In 1935, people from Buton came to Handil Baru and Sanipah; most of whom worked as coconut tree climbers and coconut peelers. Until recently, the majority of Buton people in the study sites still work in coconut plantation. The development of *handil* has been one of the pull factor of in-migration until 1955. Such physical landscape transformation has changed the constellation of social landscape, particularly in relation to leadership. Through the lens of toponym, it was

evident how the physical landscape has changed according to the influence of migration. In particular, some of the *handil* were named after Bugis figures, such as Sei Tanggi and Sei Mantri – two close figures to Sei Raden which was the name of the first migrant neighborhood. In Sanipah, one of the neighborhood was named after Sei Wajo, the majority of Bugis people. Housing areas flourished around *handil* areas. They were concentrated in river and *handil* track near farms. This was partly due to the functional purpose of river for both irrigation system and coconut harvest transportation.

The second period of migration in the study sites occurred in 1950-1990. This period was marked by a number of significant events. By the end of 1950s until the beginning of 1960s, the land people (*orang-orang darat*)—or the people who lived in the hill—started to develop shifting farms for rice field (*ladang berpindah*). This period was also marked by increasing migration of Bugis (Vayda, P and Sahur, 1985) people to Handil who then provided labours for farming and plantation. Similarly, this period was also characterized by the mass migration of Bugis people to Sanipah. As told by migrants like La'atu – a Buton elder in Sei Raden, he came to Handil in 1958 and started working in coconut plantation in 1971. At the same time as, coconut plantation began to grow in the study sites, people in Sanipah started to rely on fishing economy. *Bagan* fishermen has been a strong feature of this community, particularly in the great years of 1960-1970s. The success at this period was marked by increasing number of fishermen families who went for Islamic pilgrimage as well as development of new tradition of returning home to Sulawesi.

A different process of physical and social landscape occurred in 1974-1975 when capitalist economy had entered the villages. Total Company began its operation in Sanipah after a survey in 1968. In the same year, a wave of new voluntary in-migration began as people of Javanese descent migrated to the villages. In 1973, the company opened job opportunities for local community. However, local people were not interested as they earned better money from working in the plantation. This is difference result with Dharmawan and Nissa, (2020), that large scale capital expansion that cause landscape and ecosystem change into

the small-scale farming households. In addition, between 1970-1980s some people chose to collect woods in the forest. This was the period when large-scale logging occurred to be exported to Japan. The local community called it 'truckflood' (*banjirkap*) to refer to the many trucks coming inside the villages to transport the logs.

This second period was also marked by commodification of clove and pepper farming in the 'land' area. Nonetheless, a bushfire in 1982 destroyed some areas of coffee, pepper and clove plantation. In the aftermath of this bushfire, since 1985 farmers had started to plant coconut again. The state also began to show its presence through farmers group which dominated around 150 hectare of land. Some farmers then chose to plant rubber. In the 1980, VICO (Virginia Indonesia Company) – contracted by BPMigas – began its exploitation in Muara Jawa. Their pipes passed through both Handil and Sanipah. Five years later in 1985, Total Company worked on road asphaltting in Sanipah and Handil II. This new road infrastructure has made it easier for some families in Handil Gantung (RT 12 HandilBaru) to move closer to the roadside. One elder in Handil Gantung said there were only five families who up until the time of fieldwork still lived in this inside area of community (*orang dalam*). Other people moved and built their houses outside Handil Gantung close to the roadside although they still relied in farming activities inside HandilGantung. These families also transformed coconut plantation into rain-fed ricefields (*sawah tadah hujan*). This was the beginning of the development of farming lands in Handil Baru Muara and Handil Darat. In addition to agricultural economy, fishing ponds also began to rise as a new economy for people in Sanipah and Handil. One

of the first person to open such fishing pond was H.Sirajuddin who moved from Sanipah to Handil. This change demonstrates that physical landscape transformation also brings with it a form of social division in the way people describe *orang dalam* (inside people) and *orang pinggir* (roadside people).

The link between migration, landscape transformation, and livelihood quality can be seen in Figure 2. The description of the study sites show that the community has experienced a long history of social, political and economic transformation along with migration.

The third period of physical landscape change (1990s to present) was marked by the biggest transformation of local landscape due to the huge of migration, especially since the 1997 economic crisis (Timmer, 2010). This also brought about decrease in the community welfare. Sea abrasion has changed people preference of living near the sea to living on the roadside. It has also decreased the production of fishing ponds which caused many shrimp and fish ponds to suffer from low result.

In 2004, there was a newly-built and cemented road in HandilBaru or what is known as '*semenisasi*' program. With this road infrastructure, people who had moved to the roadside moved back to the village they used to live previously. They were also encouraged to move back and build houses in the inside village because new farming lands were opened near HandilGantung. At the same time, Chevron opened its operation in HandilBaru. However, with another company in the area, various cases emerged, including conflicts over land acquisition and over the use of the newly-built road as well as demands for jobs like it

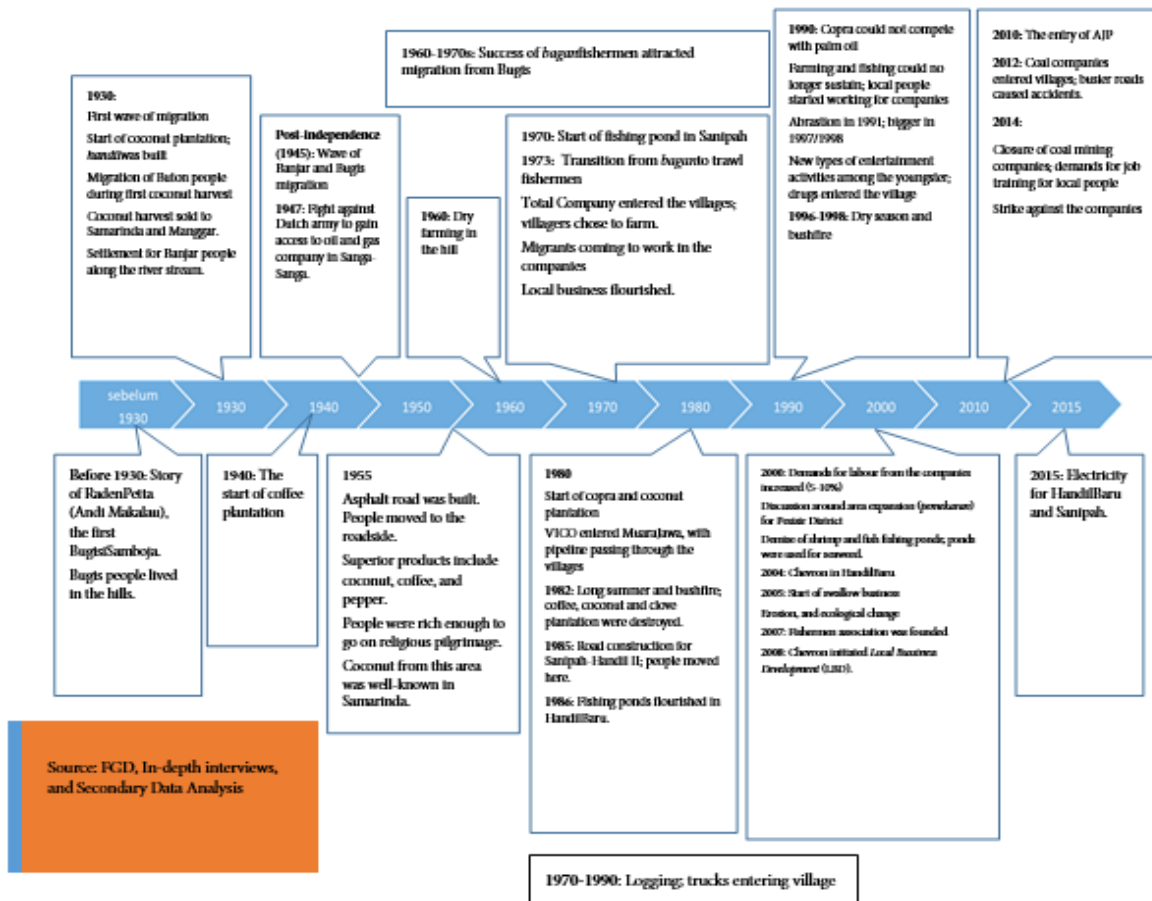


Figure 2. Migration Dynamics, Landscape Change, and Livelihood in the Study Sites (1930-2015)

happened years previously.

The year 2005 saw swallow business in the study sites. Many Chinese-descent from Semarang bought lands and constructed big building for swallow business in various areas. Most of them constructed buildings to be used as swallow breeding grounds in the farming area near RT 8-9 HandilBaru. A number of local people tried to follow suit by starting swallow business. In the same year, a land erosion occurred through the length of Chevron pipes due to lack of trees and ditch around them. This landslide entered the plantation and caused river deposition which made the water murky. This raised the anger and complaints from many people, especially those in Handil Gantung (Handil Baru RT 12) whose farms were the most affected.

On the other hand, a new company –AlamJayaPersada (AJP)– working in palm oil started their operation in Sanipah and HandilBaru in 2010. The company, AJP, rent a 600 hectare land from ‘Karya Bersama’ farmer group in the form of cultivation rights *Hak Guna Usaha* for 25 years. The composition of profit share was 65% to 35%. The company got 65%, while the farmer group earned 35%. This 35% profit share then was distributed to all the members.

Further physical landscape transformation was caused by coal mining. In 2012, several coal mining was opened in Muara Jawa and Samboja which increased the traffic along the road of Samboja-Muara. In the two years since the company opened, the road became increasingly busy with trucks loading coals. In 2014, a new rule was imposed in response to environment and social damage caused by the mining. As a result, many of the coal minings were closed.

Physical/ecological Change, economy activities, and socio-cultural space

Figure 2 shows the changes brought by migration to the livelihood. In addition, such landscape transformation is also linked to community livelihood. The dynamics of landscape structure and path was influenced by migration and expansion of large-scale economy power.

This research found that the oil and gas as well as coal mining in the study sites have also shaped new complex dynamics in the community relation and socio-economic activities. Between the two villages, Sanipah was the first to experience the impact of oil and gas company when Total entered the village in 1970. Since then, there have been many changes in the village due partly to in-migration of company workers and ban of *bagan* boats. However, the village also saw

a new kind of economy with the many shops, food stalls, rent (housing), and other businesses near Total Company (in Sigagu). Meanwhile, as previously mentioned, Chevron opened in HandilBaru in 2004. Smaller in scale than Total, the impact was not as big. People in HandilBaru still relied on both fishing and plantation, while newcomers were not interested to move in.

The ways the economy in HandilBaru and Sanipah thrived were evident in the land usage. In what followed, land use in HandilBaru was listed based on its location. (a) HandilBaru near sea shore was dominated by four groups of fishermen, particularly in HandilMuara (RT6 and RT7). One fishermen group was based in Sei Raden. In addition, in this area, there were a number of abandoned fishing pond, except for one in RT7 which was recently developed for cango-cango seaweed breeding ground. (b). Central HandilBaru north of main road was mainly used for coconut plantation. There were a number of rain-fed ricefields and swallow business in RT8 and RT9, and (c) Inside HandilBaru was mostly dominated by rubber and palm oil plantation. In KolongLangit near Chevron (RT12), there were some vegetables and fruit farms, with eight vegetable farmer huts. Most of these farmers came from Bayuwangi. One farmer said he was from Kalimantan Tengah. A different pattern of land use was seen in Sanipah, as followed: (a) In the east part of Sanipah (Sigagu near Total Company), many of the people opened their business or worked for the company. (b). In the middle of Sanipah, majority of people worked as farmers, and (c). In the west part of Sanipah (SanipahMuara), many of the people worked as fishermen.

Fisherman Livelihood change

The household survey demonstrate that the majority of fisherman households in both study sites originated from Bugis, Banjar, Java, Buton, and other regions in Indonesia. The big four of the ethnic population pattern similar with major ethnic groups which living at the neighbor province (South Kalimantan), i.e., Banjarese, Dayak, Malay- Javanese, Buginese, and Banjarese people are dominant (Putri, et.al., 2019). This highlights the fact that the villages were dominated by newcomers. The landscape changes as an impact of the migration process have been affected the livelihoods of fishermen. Based on the survey from those age 15 or above, there were 23 different jobs. For those working as fishermen, there were five different categories, such as *trawl*, *rakang*, *merawai*, *rengge*, and *belat*. The majority of

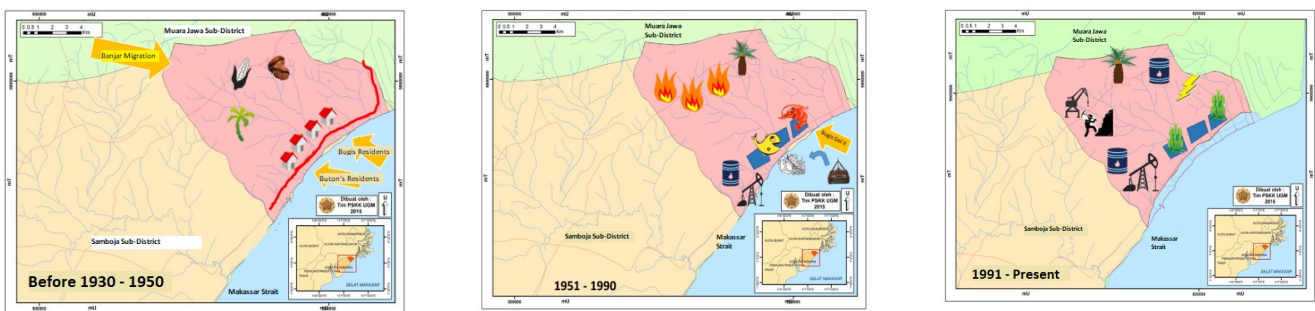


Figure 3. Map Spatial transformation due to oil and gas company in 2015

Source: (Setiadi, Yuliono, Agus & Satiti, 2017)

fishing households in HandilBaru relied on *rengge* (86.7%) work, while the number of *rengge* in Sanipah was significantly lower (10.1%). In Sanipah, the majority of fishermen were *belat* fishermen (31 people from 87 people in fishing sector) due to lack of supporting infrastructure in the area. In Sanipah, there was a lack of adequate docks for fishing fleets. On the other hand, there were more *rengge* fishermen in HandilBaru (104 from a total of 144 people working in fishing sector) because the quality of dock infrastructure was more adequate.

As illustrated in Table 1 below, the majority of fishermen was *rengge* (66 % or 124 fishermen from a total of 187 fishermen) in both villages. This was followed by *belat* fishermen (21% or 40 fishermen). The remaining worked as *troll* (trawl) fishermen (7%), *rakang* fishermen (4%), and *merawai* fishermen (1%). Table 1 below shows a comprehensive picture of the composition of fishermen in both villages. The local response to such landscape transformation was quite drastic. As they were increasingly marginalised in the constestation, production and reproduction of landscape, fishermen tried to change their livelihood strategy. As an informant from Sanipah, Mahyudin, said:

“This has been a very bad time for fishermen. Many have already changed jobs. Some who did farming on the side, now they do farming as main job. Many now rely on farming. To be *belat* is becoming a side-job. Also, some fishermen now work in that palm oil company. Do you know why this is happening now? It’s because those oil and gas companies mark the sea as theirs. There are so many special areas, and fishermen are not allowed caching fish at the areas.”

With the challenge of limited sea-scape, many fishermen turned to different fishing gears and technologies. However, this has not been helpful to improve their welfare. There were many ecological changes, such as estuaries becoming shallower, narrower, and frequently changed direction which made it difficult for fishermen to enter. Fleets going under in the estuaries has also become frequent occurrence. These

ecological changes caused a significant decreased in the catch. Many fishermen chose to leave the fishing sector. As AbadulDjamil, the chairman of Karya Bersama Association, said: “*being a fisherman is hard nowadays. You go out to the sea at midnight, but then it’s so difficult to even pass through the estuaries due to sand dune*”. This has drastically affected the economy of this fishing community. In 1989, there were about 300-400 boats, but nowadays, due to the river silting up, many boats were neglected as they could not go to the sea.

For the few fishermen who stucked out, changing fishing gears and system were not always good for them. The use of trawl by some fishermen caused difficulty to be more selective in their catch. In the end, trawl was treated as enemy for *belat* fishermen and those fishermen working near the shore as its usage drove fishes away from the shore. Some fishermen even used explosives to increase their catch. However, such practice had detrimental effects for the sea ecosystem, including the effects for fish and coral reefs. Similar to the use of trawls, the use of explosive caused rifts between groups of fishermen. Aside from strategies involving the use of fishing technologies, many family members of fishing households became increasingly involved in sea fisheries economy activities, as Table 3 illustrates:

In fishing economy, women were actively involved in various activities. The first of such activities involved fixing net. A woman could fix three nets each day with each net priced at Rp35.000 to Rp45.000. Second, women were also involved in salting and drying fish. Many salt small shrimps which were then sold to fish collectors or to small shops selling vegetables and fruits. A portion of these salted shrimps was kept for household use. Doing this activity could increase the benefit of nearly 200% from the cost of raw materials. Rich fishermen diversified their business by developing fishing ponds for shrimps and milk fishes to *cango-cango*. These rich fishermen had access to land on the seashore. Operating fishing ponds was their adaptation strategy in response to ecological change and commercial companies. These *cango-cango* were profitable because they were not vulnerable to ecological change of the sea.

Table1. Comparison of Fishermen Type in Study Sites

Main job	Sanipah		HandilBaru		Total	
	Number	Percen-tage	Number	Percen-tage	Number	Percen-tage
Fishermen <i>belat</i>	31	46,3	9	7,5	40	21,4
Fishermen <i>rengge</i>	20	29,9	104	86,7	124	66,3
Fishermen <i>merawai</i>	1	1,5	0	-	1	0,5
Fishermen <i>rakang</i>	3	4,5	5	4,2	8	4,3
Trawl fishermen	12	17,9	2	1,7	14	7,5
Total	67	100,0	120	100,0	187	100,0

Source: Survey by CPPS UGM, 2015

Table2. Change of technoculture in fishing community

Type of technology	No. of personnel	Cost (million)	Outcome	Supporting tools	No. of tools	Site of catch	Note
Fishing rod (<i>merawe</i>)	1	< 1	Fish	-	1	Seashore and high sea	
<i>Bubu</i>	1	<1	Fish, crab, shrimp	-	1	Seashore	
Trap (<i>Juluk</i>)	1	1,5	Fish, crab, shrimp	Nets installed on wood		Seashore	Indigenous technology
<i>Belat (tarik, putar dan serok)</i>	1	7	Fish, crab, shrimp	Nets installed on wood semi-permanently	1	Seashore and tidal	Originated from Sulawesi; initially causing conflicts hence the usage requires permit
<i>Rakan</i>	1	1	Crab	Bamboo and iron	1-5	Sea	Historically, <i>rakan</i> was introduced by people from Malaysia with different model and then brought by Bugis from North Kalimantan (Nunukan)
Rowboat	1	5-6	Small fish and shrimp	Net/ <i>rengge</i>	1	Seashore	
Machineboat	1-2	11	Small fish and shrimp	Net/ <i>rengge</i>	2-3	Highsea	
<i>Bagan</i>	4-6	10-15	Fish, shrimp	Net, lamp	1-2	seashore	Introduced in 1973 after ban of trawl net (see below)
Trawl boat	4-5	75-100		Dual machine boat with floodlight ('Devil Eyes')	Big net, <i>began cungkil</i>	Highsea	Not permitted for less than 20 miles from the shore

Source: Qualitative Data, 2015.

Table 3. Women's Activities and their Contribution to Family's Economy

Profession	Activities	Cost of materials (Rp/kg)	Benefits (Rp)	Reason
Collectors (<i>penjuluk</i>)	Buying fishermen catch	17.000/ kg	3.000/kg	Dredging activities of the oil and gas companies
Peddlers (<i>penggandeng</i>)	Fish and seafood sellers by the way	500.000/day	200.000/day	Gaining trusts from the fishermen
Dried fish maker (<i>pembelah</i>)	Making dried salted fish	2.000,00/kg	10.000 to 15.000, per kg	Obtaining fish free of charge
Net fixer	Fixing fishermen net		35.000 to 45.000	Many fishermen had this trouble

Source: Survey by CPPS UGM, 2015.

From the six active fishing ponds, the majority (four) was used for seaweed (*cango-cango*) while the remainings were used for milkfish (*bandeng*) and shrimps. The one fishing pond used for milkfish was owned by Agus (shown as Fishing Pond 1 in the figure), while that of shrimp was owned and managed by Sea and Fisheries Office (shown as Fishing Pond 6).

Fishing ponds for seaweed are shown in the pond number 2,3,4 and 5 on Figure 3. Based on this map, pond 2 was owned and managed by Hj.Abdul Latief, while pond 3 was rent by Ambo (from Kuala) but was managed by two other people: Riyan and Irwandi. Pond 4 was owned by Hj.Madein, but was rented out to some people from Kuala. An elderly, known as MbahWongso, owned pond 5. Mbah Wongso owned 6 ponds, four of which were used to breed *cango-cango* and the rest was used for fish, i.e. carps and parrot fish.

As the figure showed, the majority of *cango-cango* fishing ponds were not managed by its owners but by wage workers. The common profit share system between owners and managers were 70:30. This meant the people who managed the fishing ponds (including those who harvest and covered all operational cost) could get 30% of the profit. While the owners got significantly bigger share, they also provided the capitals, including ponds and seaweed seeds. A number of people involved in these fishing ponds had their own strategy of combining seaweed with milkfish in one pond considering milkfish as natural pesticide. Milkfish feeds from weeds or midew around the seaweed. By combining the two species in one pond, mutual symbiosis was achieved.

Spatial transformation not only affected the sea and its surroundings, but also the land. With the presence of large-scale plantation and oil and gas companies, particularly with their dredging activities and pipeline instalment, the land was transformed by erosion and floods. Water in the surrounding rivers and trenches which used to be clear have increasingly become muddier. When there was high tide, the muddy water entered the *handil*. In turn, this scraped away the soil which then piled up near the rubber and coconut plantation.

Muhtadin, a high school teacher as well as rubber farmer, explained: "In biology, we know that those scraped soil [peat moss] is high in acid. So, with all these high acidic soil, we are left with dying rubber trees. Even the whole forest could be killed." Similar condition occurred in coconut plantation.

The changes brought by spatial transformation to the community livelihood also affected the social landscape. Many fishermen experienced a significant change in the ways they dealt with daily subsistence. In the beginning, fishermen relied on *punggawa* (the Buginese middlemen) as key actors in the Mahakam Delta (Persoon & Simarmata, 2014: 50) who then hired them as workers. Being workers, these people were guaranteed with capital as fishermen. It was common for these workers to get fishing gears, fuel, and maintenance of the machine and boats. In 2014, the Ministry for Sea and Fisheries provided 100 million rupiahs for each fishermen groups to be used as savings and loans. The program aimed at reducing fishermen's dependency on *punggawa*. Four groups in Handil Baru succeeded in getting this fund, and two in Sanipah. However, according to group leaders, it was difficult to manage the fund due to many bad credits. It was suspected that many fishermen held the misconception that the money given to them was not loan, but grant.

There have been an independent attempt to get out of such dependency. In a focus group discussion with 15 fishermen in Kelurahan Handil Baru (May 1st 2015), it was said many fishermen chose to be in debt to fishing gears shops and local grocery stores. For them, being in debt to the fishermen association was more difficult than having debt to the shops and *punggawa*. Being in debt to the association brought more pressure due to the fixed payment due date. On the other hand, being in debt directly to shops or *punggawa* was deemed easier because of the flexible instalment payment. They could negotiate the amount and time of instalment payment.

Various forms of jobs and ways of earning money to cover household expenses and improve household economy and welfare. The net income per month among the

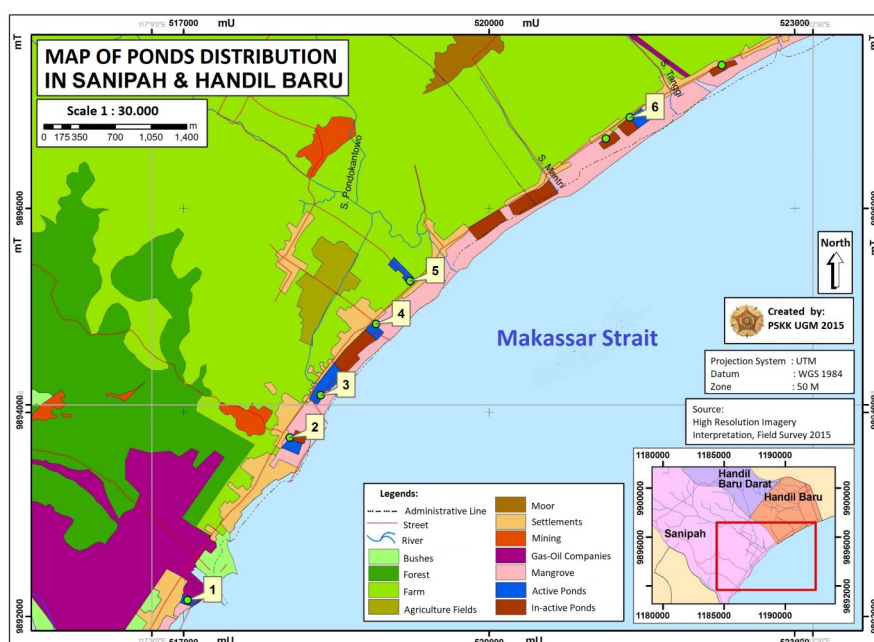


Figure 4. Map of Fishpond Distribution in Sanipah and HandilBaru

community varied. The majority of households (37.2% or 93 households) in both sites earned Rp750.000 or less. Seventy-three households (29.2%) earned a monthly net income of Rp 5.000.000 or more. This demonstrated a relatively large income gap between fishermen households. Such income discrepancy highlighted the many fishermen households that worked as subordinates of *punggawa* or big fishing bosses. It's indicated that the traditional patron-client relation which used to be a kind of all-encompassing relation, is gradually turning into a more capitalistic one with less social strings attached (Persoon & Simarmata, 2014:50). As an impact, fishermen's welfare decreases, and a part of them stagnant..

The majority of households in both villages earned Rp500.000 (54.4% or 136 households). Those with the lowest average of net income consisted of 87 fishermen households, 13 working in other jobs in fishing sector, and 36 working in non-fishing sector. Of this 136 households, 87 earned a little less or similar toRp500.000. This showed that family members working in fishing sector earned less or similar to Rp500.000. Meanwhile the households with the highest net income earned Rp 2.000.000 (19.6% or 46 households). Among these households, 38 relied on fishermen earnings, 4 working in other jobs in fishing sector, and 7 non-fishing sector. The rest of households (65) earned a net income between Rp500.001,00 to Rp2.000.000,00 with the details as followed:51 relied on fishermen earnings, 7 working in other jobs in fishing sector, and 7 non-fishing sector. That data showed that landscape change has been impacted fishermen livelihood significantly.

Conclusion

In this paper, I have argued that the lengthy process of landscape transformation caused by migration have affected large-scale change to the local community livelihood due to the imbalance of resource control. Such process was also influenced by expansion of large economic power such as the growing number of companies. Eventually, this has impacted in the ways in-migration has become increasingly intensive alongside the rapid growth of industrialization. Such growing rate of in-migration has also brought about changes to both the physical and social landscape, as evident in the illustration of group conflicts. What has emerged as a response is various forms of integration processes between different interest groups. Such response was strategic in the way it has allowed various groups to not only survive, but also share living space by minimizing conflicts. This study has contributed to the growing scholarship in migration and its link to economic (Effendi & Manning, 2018), the role of migration and resettlement in shaping land acquisition, tenure and resource control in East Kalimantan (Elmhirst, Siscawati, Basnett, & Ekowati, 2017) and socio-cultural, and diverse forms of spatial formation process within the context of industrialization (Lin & Gaubatz, 2015). In this paper, I have also demonstrated that "space is fundamental in communal life"(Aghaei et al., 2020). Losing over spatial formation and transformation means losing over livelihood resources, which further decreases welfare.

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