Local Community Resilience in the Context of Global Climate Change: A Case from Maluku Indonesia

Subair Abdullah

Ambon Islamic State University, Indonesia
*Corresponding Author: bairbone1976@gmail.com

Abstract

This study is a vulnerability and at the same time resilience study using qualitative method. The study aims to identify the locality of the climate change phenomenon, analyze vulnerability and appraise community resilience. The method used is the ‘historical case method’, a study method combining the historical-sociological method (structural history) and sociological history (process history), a qualitative method under the umbrella of the constructivism paradigm. The study results in several findings. Climate change significantly has caused resilience in communities that depend on natural resources. Vulnerability triggered by the negative impact of climate change can be reduced by adaptation so the community will be resilient even with limited resilience due to the high dependency on natural resources. The most important factor in creating community resilience is local institutions' role that facilitates the adaptation. The success of climate change adaptation is determined by the existence and functionality of these local institutions. The stronger and rooted the local institutions the bigger the opportunity for success for the community in adapting to climate change. On a contrary, the weaker and “isolated” the local institutions, the less opportunity for success.

Keywords

Climate Change, Vulnerability, Adaptive Capacity, Adaptation, Local Institution, Community Resilience

1. Introduction

Adaptation is an act taken to reduce vulnerability and to increase resilience (Smit and Wandel 2006) and adaptive capacity is the capacity to realize the action. In a social system, adaptive capacity can have conscious and intentional characteristics. It is enhanced by the existence of local institutions and network that learn and keep knowledge and experience, create flexibility to solve problems without sacrificing the ability to handle and adapt to future change (Armitage 2005, Holling and Meffe 1996, Nelson et al. 2007). Adaptive capability highly influences community resilience and regions from the impact of climate change (Adger 2006, Adger et al. 2005). It means that the quantity of loss or damage perceived caused by climate change is highly influenced by the ability to adapt to climate change.

A common way to examine climate change is through meteorological observation. With a relatively new way, this study is a study on vulnerability and at the same time on resilience using qualitative methods. Traditionally, social studies on climate impact on social-economic system have not been approached from the resilience perspective; however, they have been applied in a way parallel to ‘vulnerability approach’ (Maguire and Cartwright 2008). The social resilience approach is the most important approach related to issues of global climate change at present (Bahadur et al. 2010). Generally, social analysis with a vulnerability perspective focuses on negative aspects or a community’s weaknesses (Walker et al. 2002). Conversely, the resilience perspective approach is equal in terms of vulnerability in the society (not labeling the whole community as “vulnerable”) and resources and adaptive capacity allowing the community to overcome vulnerability and manage the change in positive ways (Maguire and Cartwright 2008, Resilience Alliance 2007).

2. Methodology

The research location was in Asilulu village (negeri), Leihitu Subdistrict, Central Maluku regency and it was determined purposively. The method used in the research was the ‘historical case method’, a sociological study method combining two methods, historical sociology (structural history) and sociological history (process history). Therefore, the research is not only static research but it became a sociological study about social history with the main theme being the social change dynamic, including economics and politics. Implicitly, the method is a multi-disciplinarian one, involving sociological, ecological, anthropological and economic sciences. The method is qualitative research under the umbrella of the constructivism paradigm, a paradigm emphasizing that research is to be...
conducted in a free world to capture natural phenomenon as it is and thoroughly without intervention and manipulation by researchers. Data collection was conducted using hermeneutic and dialectic methods for about two years (April 2010 – June 2012), using participating observation, focus group discussion, in-depth interview, and library study. Data was analyzed using qualitative data analysis method.

3. Results and Discussion

3.1. Phenomenon Locality and Climate Change Effect

The fisherman community in the research location has felt ecological change including an increase in sea level, storm intensity and high tide, the change of fishing grounds and harvest season disorders. Before interaction with the researcher, fishermen had not been exposed intensely to information about climate change. Some of the fishermen stated that they have heard about it through mass media but they did not receive any scientific explanation. Researchers captured the understanding based on adaptation change in fishermen livelihood and analyzed adaptation alternatives available.

Most fishermen moved their boathouse to the area next to their house because their previous boathouse, which is behind their house, had been flooded by sea water. In another location, villagers' yards are flooded with seawater, whereas beforehand it was a dry beach where they raised boats to the mainland. Now, a wall (local language called talit) has been built on almost all beaches near villagers’ residents to protect against waves. Fishermen stated that if there is no talit, seawater probably will be entering their houses or roads. They felt that, recently, hard winds with tidal waves often occurs. In 2010, storms and waves destroyed three houses and carried them away to the sea.

Extreme weather also often happens in the middle of the sea and relatively hard to be predicted. This differs from fishermen's traditional knowledge. Fishermen have to be more careful than previously because sailing risks have increased. Sometimes they have to choose between sailing and not sailing to avoid danger. They use such terms as ‘angin tar karuan’, ‘angin seng ada hidup’ or ‘angin ancur sekali’ to describe unpredictable wind directions and “ombak su jaha’t” to describe ‘uncontrollable’ high tide. Terms for extreme weather include “mati akal” or “ka laut berarti cari mami”. They feel they cannot handle the waves because the direction and characteristics are relatively new for their knowledge and experience. Types of waves at present are described by fishermen with the term of “katong seng tahu angin itu arah dari mana”. The term “biar ikan makan bagaimana lai, katong seng barani, and Itu perahu bisa terbalik’ describe that the change is beyond their navigation knowledge and experience.

For the last few years, fishermen feel that their knowledge and prediction of seasonal patterns is often wrong. Throughout their lifetimes, they have known only two seasons: west and east seasons with a transition season counted based on Masehi (Christ) calendar. Every season is understood with a different wind and weather pattern. Now, they are complaining about seasonal disorders in which the west season symptoms happen during the east season or the reverse. Weather and storms seem to be no longer following the pattern, but instead happen randomly. “Katong sekarang seng bisa memperkirakan musim lai”, that is how they call the situation.

In addition to wind season change, fishermen also feel the fish harvest season has shifted. Usually, in order to determine the time to sail and location of fishing grounds, they will be guided by a “seasonal calendar” made by “the elders”, who are old fishermen considered very experienced and having broad knowledge on sea. There is a belief from generations that fishing is highly dependent on the right time or known as tanoar. For the last 5-7 years, predictions about the seasonal calendar is sometimes irrelevant to the sea condition. Now, tanoar sometimes is forward or backward by 1-2 months. In the last three years (2009 – 2011) more fishermen were not sailing because of seasonal disorders and increasing storm intensity.

Another change is the location of fishing ground that goes further out to sea. Seven years ago, fishermen only need one hour to find tuna fish migration and started fishing, but now they have to spend around three hours to get to the fish migration.

Climate change has decreased fisherman’s catch triggered by difficulty in determining seasons and fishing areas. It has caused an increase in sailing costs, especially cost to chase season. Fishermen stated that weather change is unpredictable when they were in the middle of the sea, sometimes forcing them to sail back to the land even though they haven't caught anything. Usually, harvest season lasts for three months and the frequency of sailing is every day (except for Friday) for the whole season. For the last 10 years, on average, fishermen only sailed 15 times per month, with the season lasting less than three months. Even during “harvest season” in 2011, fishermen did not sail at all because of long periods of extreme weather. Less opportunity to sail and the increase of operational costs have implications to fishermen' dependency on wholesalers. From a social structural aspect, a wholesaler (collector) receives high status as a local entrepreneur within a community, and a fisherman becomes the client will be increasingly depressed with higher dependency on a wholesaler as his patron.

3.2. Community Vulnerability on Climate Change

Using concept of coping range from Jones et al (2004), vulnerability is being understood as a situation where climate change is beyond a critical threshold. It means that the climate conditions are beyond their ability to be overcome. Coping range is a situation where climate change can be handled by adaptation and the existing adaptation ability.

In this research, vulnerability is seen from two aspects: first, vulnerability to the social-economic system of the
community caused by external factors, which is the direct impact of climate change; second, vulnerability caused by internal factors as the remaining potential impact that cannot be handled by adaptation. Vulnerability analysis is conducted by analyzing three vulnerability components: exposure, sensitivity and adaptive capacity (IPCC 2007).

The first step in vulnerability analysis is analyzing potential impact by looking at explanation and sensitivity levels. Potential impact is the threat of climate change impact, which is a combination of exposure and sensitivity describing the whole loss that might occur due to climate change. Exposure is the extent to which climate change intersects with a community’s lifestyle and livelihood or ecosystem (IPCC 2007). Sensitivity is the impact of climate change including the impact of long-term seasonal pattern change, short-term bad weather events, and disasters related to climate change (IPCC 2007). Adaptive capacity shows the ability of a system to adjust to climate change.

Asilulu village is located in the northern coastal area of Ambon Island where about 90 percent (86.2 percent) of the working age population work as fishermen or depend on the coastal and sea resources, whether as fishermen, fishery businessman or fishery labors (Monograph data of Asilulu Village 2010). It means that almost all community livelihoods depend on climate conditions. For the last ten years, fishermen have undergone several things related to climate change. First, the change in the seasonal wind and rainy season period: it has shifted by more than one month. The onset of season is no longer the same, and the ability of the community to predict the season is unreliable. Second, severe weather events that destroy property and are life threatening have happened almost every year. The most recent and the worst events were in 2011 when three houses were swept away by waves in Batu Lubang village. Third, area flooded by seawater caused by the highest tide or the increase of sea level has increased every year in the last ten years. According to the fishermen, the sea level has risen at least three meters in that period. Community vulnerability is increased by the local culture interpreting fishermen’s work as the main livelihood for generations, a heritage from their ancestors that should be preserved. This interpretation means the community has no livelihood alternative to be thinking of, even though they are in the crisis.

Results of analysis of fishermen community vulnerability at the research location can be described as follows. First, climate change has greatly influenced community livelihood because of dependency on natural resource “friendliness”. Second, in one season of community livelihood activities, fishermen face problems for one or more seasons. The main problems faced by fishermen are unpredictable storms, longer bad season for fishing and shifted fishing grounds further out to sea, beyond fishermen's cruising ability. Third, the influence of climate change on the community’s peace of soul is highly related to their concern of high risk and unpredictable sailing. It is not just fishermen who are concerned about their sailing risk, but also their families, since there is much information about accidents at sea that cost lives because of extreme weather. Fourth, the high influence of climate change on fishery natural resources, including fish movement patterns that are unpredictable, wrong predictions about the type of bait the fish like because sometimes the fish like another type of bait, and dangerous, strong winds and high tides, even if fishermen know the position and type of bait the fish like. Fifth, bad weather has destroyed property and caused accidents for the last ten years.

Another vulnerability factor is the problem of food security. Results show that this sector has not yet been exposed to climate change; however, how the sector contributes to community vulnerability is worth pointing out. In Asilulu, as in many other regions on Ambon Island, there are no fields to plant rice and even cornfields are very rare. Most of the yards are stony, not fertile. Asilulu villagers live in coastal areas and small islands like Lain Island and Kasuari Island. Their main profession is fishermen. Land geographical conditions are only suitable to plant crops like cassava (local language: kasbi) because the land is very dry. Therefore, these two commodities have become their main food.

Change in food pattern consumption from sago and cassava to rice began when the government started to apply their policy of green revolution by increasing mass rice production; therefore, rice was so cheap and the position of sago and cassava as the main food started to be replaced by rice. Even though rice production and its area continue to grow, based on national food insecurity map (2009) issued by Food Security Agent, Maluku Province is included in a region with serious food insecurity with a high deficit category, which is the worst indicator. It is due to the imbalance ratio between production and consumption levels. Based on the discussion in a study about food security in island regions, conducted by National Food Security Agent and Food Security Agent of Maluku Province in Ambon, May 13, 2011, Maluku is included in the food insecure category not because it has actually happened, but because the main food variable used is rice, cereal and tubers and it does not accommodate the local population's main food in Maluku, which is sago and its various processed foods.

Since the beginning of human inhabitance, rice was not Maluku’s local food. In addition to unsuitable geographical conditions, rice is not the result of Maluku’s local wisdom that friendly to nature. Forcing rice to be the main food and sago and cassava to be excluded from Maluku’s community has resulted in a condition that put Maluku in a high food insecurity category. Making rice consumption a habit and replacing sago as the main food surely will bring vulnerability impact to the community’s food security. If there is chaos in rice production in Java and Sulawesi and/or transportation disturbance due to extreme weather, it will disturb food security stabilization in this area. Access from provincial city to regency and islands around them will be difficult because it has to use sea transportation that highly depends on weather conditions. In certain seasons, extreme weather is dangerous for sailing; therefore, it is very rare for
perintis boats to sail. If crop failure happens on the island, it is certain that the local population will undergo a food crisis. Food insecurity in Maluku might be caused by many factors, but the main factor is the availability and distribution of food. It will be a different story if the local population maintains local foods in abundance, such as sago, cassava and fish.

Considering the above description of community exposure and sensitivity, it can be said that risk potential of climate change on the socio-economic system of the community is high. Community dependency on sea resources that comprised almost 90 percent of the work age population make this exposure dimension cover almost all of the fisherman communities. Meanwhile, the environmental change rate is beyond fishermen’s knowledge and skill, gained over generations. This situation makes fishermen sensitive to climate change impact.

After analyzing risk potential, the next step will be analyzing adaptive capacity. Results from analysis on community adaptive capacity are described in several aspects of community ability or social power, as follow.

**First**, the community has a strong social network as a source for social support. Asilulu people have strong kinship bonds. Everyone is part of one clan (marga), and every clan has its own position in the community’s socio-system and government inherited over generations. In Asilulu, power allocation and distribution is closed in nature, because it is only conducted through mata rumah. Therefore, in a traditional society, every clan/family or mata rumah has known their position and title in the negeri (village) governmental structure. Thus, everyone who is assigned and selected in its title in negeri governmental structure is an important figure in the community. Also, migrant populations exclusively inhabiting petuaman area also have strong kinship bonds. In addition, the fact that the whole population is Muslim is a strong factor for the existing social network formulation.

**Second**, community has high togetherness and tolerance feeling in conducting various activities including fishery. People in Asilulu have relationships, tradition and traditional institutions believed to be inherited from their ancestors for generations and it has been effective in arranging the community’s life until now. Tradition and institutions contain rules about a community’s activities conducted through tradition to help each other. Relationship and tradition are pela and gandong masohi, badati, maano, and makan masuri. The highest responsible person for all traditional relationship and institutions is the King and the operational is delegated to Soa Chief. The king, as community’s leader, is strict when giving punishment and sanction to people who disobey the rules of negeri government. Because of the king’s firmness and authority, everyone is submissive and obedient to the king’s rules. This is the role of the king and staff members of negeri government in development activities.

**Third**, the community has a resource management platform based on the view of the inseparable relationship between human and nature and human and God. One example of this platform is the natural preservation system (sasi, maintenance, conservation). In addition, there is the term ‘tiga tungku,’ which means a system consisting of governmental institutions (the king is an indigenous stakeholder in the village or negeri), educational institutions (teachers) and religious institutions (mosque institutions). The relationship relevance of the tiga tungku platform gives meaning that participation is a base for community development.

**Fourth**, harmony is high in the community. This indicator is related to the harmony among fishermen in conducting fishery activities. This harmony is better because almost every fisherman has no differences in the ownership of fishing tools such as boat, nets and bait with similar condition in all fishermen. Besides, due to a better fishery resources potential, no competition exists that can trigger conflict among fishermen.

**Fifth**, people have wisdom related to food that has always protected the Asilulu people against starvation or malnutrition. Pro-climate local foods are gained from the abundance food in the research location and in Ambon Island, in general, which include sago, fish and cassava (local language: kasbi). The sago tree in Maluku is naturally grown without any cultivation activities from local population. In addition to sago, cassava is also an important commodity in Maluku because it is the main food for most of the inland population. Besides, cassava, ecologically, is a food crop that is able to adapt and produce well using simple technology. Several local food types processed from both commodities are various sago and cassava processed foods called kasu (masori) or ‘suami. Sago is consumed as the main food. Sago can be processed into various foods, from snacks to main foods. Processed food from cassava in Maluku is known as suami or kasu (masori).

**Sixth**, fishermen have perseverance in developing their fishing business. Traditional and religious values are the basis of their work ethic and perseverance. Fishing is seen as an inheritance from their ancestors that should be maintained by any means. Working as a fisherman is not only to earn a living for the family but also to continue their ancestor’s tradition.

**Seventh**, fishermen have the skills, ability, cooperation and strong motivation to handle climate change problems related to their livelihood. In Maluku, Asilulu fishermen, over generations, have become known as experienced fishermen in sailing. Asilulu people are also known as reliable traditional boat builders. Besides their skill in sailing, they also have other life skills, especially in wood or stone crafts and planting. Almost all adult men in Asilulu have craftsmanship; therefore they can make or renovate their own house. Apparently, masohi tradition as explained before has shaped men in this area to feel responsible to learn craftsmanship.

**Eighth**, Asilulu has a healthy residential environment, a variety of natural resources and healthy and sufficient water sources. The residential area in Asilulu is neatly arranged following the shoreline with well-taken care woods behind it.
Clean water facilities in Asilulu consist of a pump well, dig well and public hydrant, which is a communal clean water service through a piping system where a unit includes a water reservoir equipped with a tap.

Ninth, fishermen have knowledge and experience in facing previous environmental change. Fishermen in Asilulu inherited sailing knowledge over generations. Sea ecological change happens in slow motion and over a long time, giving opportunity to fishermen to develop technology for adaptation to change. Fishermen in Asilulu are relatively open to new technological innovation and always innovate their knowledge on sailing; therefore today’s knowledge is the result from experience accumulation and knowledge adoption from outsider re-modified to be suited with their traditional character and social system.

After discussing risk potential level and adaptive capacity, community vulnerability can then be assessed. Even though the potential of climate change risk to the fishermen community is high, research analysis results show that high adaptive capacity is able to reduce the risk potential. The implication is that it can be said that community vulnerability to climate change impact is in the medium category. In other words, climate change impact is within the coping range of village community system; it means that the community is still able to handle it; thus fishermen will not undergo significant loss.

Research results show that, in reality, fishermen are exposed to climate change impact as written in climate change science. The exposure emphasizes on fishermen livelihood system to the level that restrain activities to earn a living. However, with adaptive capacity owned by fishermen, exposure and pressure from climate change impact can be reduced so that fishermen are still able to continue their livelihood system even with different ways and system as part of adaptive action. This, in turn, implicates vulnerability reduction as a whole.

3.3. Social Resilience as the Result of Successful Adaptation

Social resilience perspective is another method used in existence resilience studies. Social resilience is understood as community capacity to overcome disturbance or change and maintain adaptive behavior. Social resilience has economical, political, spatial, institutional and social dimensions (Adger 2000). A resilient community is a community that able to perceive change or pressure in positive ways and able to maintain the core function as a community even if they are under pressure (Maguire and Cartwright 2008:3).

Social resilience is different from individual resilience when it is concerning institutional, economic and social dimensions of a community. Social resilience is also different from ‘ecological resilience’. Social resilience admits one’s power to learn from one’s experiences and consciously combine it into one’s interaction to social and physical environment, not as a vulnerable system as in the conception of ecological resilience. The social resilience view is important because it admits that a community itself can form ‘trajectory of change’ and plays a central role in the level and type of impact caused by the change (Maguire and Cartwright 2008:5).

The study uses the concept that sees resilience in the context of climate change built through intervention analysis of climate change adaptation. In this case, the resilience definition refers to the coping range concept from Jones et al. (2004) that adaptation is needed to the same extent as coping range, overcome the increasingly high vulnerability triggered by negative impact of climate change. Resilience is a situation where the adaptation conducted is able to extend the coping range beyond the extent of community vulnerability to the negative impact of climate change. It is a new definition proposed by this dissertation. The term “situation” in resilience is a situation where a community is able to overcome disturbances or changes while continuing to function regularly. This definition is a “synthesis” of the resilience concept of Folke (2006), Manyena (2006), Resilience Alliance (2009), Carpenter et al. (2001), and Nelson et al. (2007).

Adaptation is needed to extend the coping range, and overcome the increasingly high vulnerability triggered by negative impact of climate change; thus, resilience is a situation where successful adaptation extends the coping range beyond the community vulnerability zone after being exposed to climate change impact.

In anticipating increase in sea level, there are adaptive strategies used. First, by building a tidal wave wall (local language: *taliti*) that directly holds the increase in sea level, tidal wave and rob. The *taliti* is built entirely by governmental projects. Second, fishermen built *para-para*, which is a boathouse when they did not sail to anticipate tidal waves with potential to strike their boats. *Para-para* is made between *taliti* and the shoreline from small pieces of wood that are resistant to sea water.

Climate change impact accepted by the fishermen community has triggered some reactive adaptation, among others: (1) strategy to chase season, which is a strategy that has been applied since a long time ago. The difference for today’s application is that seasonal knowledge and calculation applied in form of seasonal calendar was an accurate guide; however, nowadays this calendar is no longer accurate. Today, fishermen put their trust more to wholesaler. Every wholesaler usually has fishermen in every area in Maluku and the development in mobile phone technology has reached remote areas that facilitate the information distribution. (2) fishermen form fishing operation groups, which are formed by fishermen who sail in group consisting of 4 – 5 boats. The aim is to combine various knowledge and experience to determine fishing grounds, appropriate type of bait and preparation to help each other when disaster comes. (3) In situations where all the known fishing grounds cannot be accessed because of bad season or extreme weather, fishermen choose not to sail and turn to non-fishing activities, especially, planting,
motorcycle driver for transportation, or become workers in the city. The exception is in Batu Lubang village, where fishermen turn to catch basic fish for daily needs. Therefore, every fisherman has two type of fishing boats, a fiber boat equipped with engine for far fishing (especially for tuna fish) and a *semang* boat or *kole-kole* for fishing in shallow waters.

To overcome fishing grounds that shift further to the middle of the sea, since the 1990s, fishermen have changed the traditional boat to a fiber boat that moves fast to cut tuna fish migration movement and back to mainland if storms threaten. In order to adapt to sea conditions with high tide and strong wind, fishermen have developed fishing techniques using kites that are suitable for fishing at sea with high tide and strong wind. The principle behind the use of kites is to make bait like live baitfish playing in the water. The use of kites is very effective, according to fishermen statements, especially when fishing in the old fashion way is impossible due to the current situation.

Climate change impact risks in bringing crisis impact to fishermen livelihood system. In this case, fishermen strengthen their social network as their social support source. Social support is especially gained from collector institutions. Until now, climate change impact is still tolerable by fishermen due to capital and production capital supports in the implementation of chasing season strategy. Lastly, fishermen give all their inability in facing changes that threaten their livelihood and even their lives to the power of God. It is not an expression of giving up but it is called *tawakkal* (placing trust in God), surrendering themselves to God for their maximum effort. Here, religious institutions have a major role as the community spiritual counselor and to give motivation to increase fishermen’s well being.

From all adaptation strategies conducted as described above, fishermen communities are able to overcome climate change impact, especially through network modification and local institutions. Collector institutions are the source of social support as “social reserves” in times of crisis caused by the negative impact of climate change. In other words, to this limit, adaptation conducted by fishermen communities is able to extend the ‘coping range’ so that it reduces vulnerability and increases resilience. This condition makes fishermen communities in this location resilient to climate change. So far, the communities are able to overcome disturbances or changes and maintain their adaptive behavior.

### 3.4. Community Resilience and Local Institution Role

One important thing to be underlined in this study is that all adaptation practices studied (especially from UNFCCC database on local adaptation strategies from more than 40 countries reviewed by Agrawal 2008) depend on the success of special institution management – adaptation cannot happen in institutional emptiness. Institutional and social factors also play key roles in shaping the extent to which village households and communities are vulnerable to different environmental risks. Understanding how these institutions function in relationship to climate and their impact is the core component in designing positive intervention that is able to influence adaptive capacity and adaptation practice for poor communities.

A strategy to maximize local institutions as social capital is conducted by all fishermen in Asilulu Village. The capital here means the *patron-client* institution formed from social network between fishermen as clients and wholesalers as patrons. The social network is a social structure formed from nodes (generally individual or organization), bonding with one or more specific relation type such as value, vision, idea, friends, heredity, etc. Social network analysis views social relationships as nodes and bonds. Nodes are individual actors within the network, while bonds are the relationship among the actors. There can be many types of bonds among nodes. Research in various academic fields have shown that social networks operate on many levels, from family to state, and hold important roles in determining ways to solve problems, to run an organization, and to the degree of individual success to reach goals. In its simplest form, a social network is a map of all relevant bonds among studied nodes. The network can be used to determine social capital of individual actors. This concept is often depicted in social network diagrams, creating nodes as points and bonds as the lines connecting them.

Barnes (1954 in Sunarti et al. 2009) states that every common individual enters various social groups that are available in a community and is intertwined in social bonds based on kinship, neighborhood and friendship elements. Those social networks can take place among those who have or do not have corresponding social-economic status. Further, Barnes states that every individual has the same opportunity to have relationships or not to have relationships with some people. Everyone sees oneself as the center of one’s own network. The social bond formed is a tool to bridge relationships among network members. In a community that is not too complex, the relationship can be more intensive. The bonds of kinship, neighborhoods and friendship networks are not exclusive in nature. Within those networks, social relationships and membership go beyond territorial borders (borderless) and certain community existence.

Fishermen in Asilulu use social networks as social support sources. In one sociological encyclopedia, social support is defined as emotional and informational support or material support given by others or social environment to individual having difficulties or problems. Safarino (1996) defines social support as pleasure, attention, reward, or aid received by individuals from others, whether individuals or groups. Gotlieb (1985 in Sunari et al. 2009) state that social support is a natural act, an environmental resource related to social interaction. Social support is needed by fishermen during crises, such as livelihood crises, due to the impact of climate change.

This research identifies two kinds of social support received by fishermen in this dissertation context. *First*, instrumental support which is support given by wholesaler in
form of a direct assistance instrument, credit assistance for fishing tools, and loan assistance for fishing operational costs. Sometimes fishermen receive loan assistance for daily household needs during long periods of bad seasons. Usually, for this type of assistance, the relationship between fishermen and collector (wholesaler) is also a kinship relationship. Second, informational assistance, which is support that comes from fishermen networks in other places about areas of high fish concentration, the beginning of dead fish season, type of bait the fish like, weather and storm information and other information related to fishermen's livelihood system. This information assistance allows individual receivers to gain knowledge from others. Results from observation in the research location show that the informational network is spread from one fisherman to another through wholesalers as intermediaries. Usually, all information needed by fishermen about their livelihood system is held by the wholesalers. This might be one of the reasons why every fisherman who wants to sail should gain permission from the wholesaler where he has affiliation.

In this case, local institutions are like in intensive frame providing choices of specific practices of adaptation for households and fishermen communities. Strong institutional norms affecting tuna fish fisherman reduce a household's ability to migrate or to engage in diversification. Fishermen who receive full support from the collector never think about migrating, whether in terms of job migration or spatial migration because sailing needs a huge amount of money and collectors are ready to bear the costs. As a result, bad seasons will be shorter, and a household's needs during the bad season can be covered by savings they have set aside during harvest (dead fish) season. It means that fishermen have not thought about job diversification to bring them out of a crisis caused by climate change impact.

Closer social networks facilitate communal resource unification. Wholesalers who are native citizen (orang negeri) related more to fishermen from native citizen too. Kinship relationships (family or clan similarity) make wholesalers as “fathers” who unite fishermen communities from the same family or clan. In this situation, the wholesaler institution is not only as a market for fisherman but also as “social reserve” during social-economic crises caused by climate change impact. Assistance received by fishermen is not limited to credit for fishing tools procurement, but also for consumptive assistance and other support needed to adhere to the livelihood.

4. Conclusions

Fishermen's understanding of climate change is merely based on experience and is not from theoretical knowledge about climate change itself. Vulnerability triggered by negative impact can be reduced by adaptation. So far, the community can be seen as resilient enough, but with limited resilience because of high dependency on natural resources. Adaptation seen as reactive adaptation, in fact, is plan adaptation considering climate change is a phenomenon happening in a long period and gradually.

The important factor in creating resilience conditions (even though limited) is the role of local institutions to facilitate adaptation. The success of adaptation to climate change is determined by local institutional existence and function. The stronger and more rooted the local institution, the greater the chance for the community to be successful in adapting to climate change. On the other hand, the weaker and more “isolated” the local institution, the smaller the chance for the community to be successful in adapting to climate change. This view requires that in the formulation of adaption policy, the community should form the base for program formulation and adaptation policy decision-making.

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