

Kerentanan dan Kelentingan Nafkah Rumah tangga Pedesaan: Sebuah Tipologi yang ditarik dari Studi Kasus Petani dan Nelayan Skala Kecil di Indonesia

Rural Livelihood Vulnerability and Resilience: a Typology Drawn from Case Studies of Small-Scale Farmers and Fishermen in Indonesia

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ABSTRACT

Various studies on rural household livelihood systems have been carried out in Indonesia to explain the level of household livelihood vulnerability in both farming and fishing communities. The livelihood of small-scale farmers and fishermen is usually vulnerable due to climate and non-climate pressure. This desk study compares the results of studies on livelihood vulnerability from various theses, dissertations and scientific journal articles with a similar topic of study. A case study analysis is used to figure out a comparative picture of small-scale farmers and fishermen households in responding to the pressure as well as making adaptive actions to survive. The weakness of this study is that the conclusion cannot provide evidences as a basis for deriving generalization. Rather it only provides an initial description of the socio-economic responses as shown by small-scale farmers and fishermen in reacting to ecological pressures. This study comes up with a typology of pressure faced by small-scale farmers and fishermen households. There are four types of stressor that are identified, i.e., climate variability, capital farm expansion, rural-infrastructure development, and economic actor competitions. In responding to livelihood vulnerability, most of small-scale farmers and fishermen build their resiliency by using resources under the controlled household system while others use external sources.

Keywords: household, livelihood vulnerability, resiliency, rural community, small-scale farmers, small-scale fishermen

ABSTRAK

Berbagai studi tentang sistem nafkah rumah tangga pedesaan telah dilakukan di Indonesia untuk menjelaskan tingkat kerentanan nafkah rumah tangga baik pada komunitas pertanian maupun perikanan. Nafkah petani dan nelayan kecil biasanya rentan karena tekanan iklim dan non-iklim. Studi pustaka ini membandingkan hasil studi tentang kerentanan nafkah dari berbagai tesis, disertasi, dan jurnal artikel ilmiah dengan topik penelitian serupa. Analisis studi kasus digunakan untuk mengetahui gambaran komparatif dari rumah tangga petani dan nelayan skala kecil dalam menanggapi tekanan serta dalam membuat tindakan adaptif untuk bertahan hidup. Kelemahan penelitian ini adalah bahwa kesimpulan tidak dapat memberikan bukti sebagai dasar untuk digeneralisasi. Sebaliknya, studi pustaka ini hanya memberikan deskripsi awal dari respon sosial-ekonomi seperti yang ditunjukkan oleh petani dan nelayan skala kecil dalam merespon tekanan ekologis. Studi ini menghasilkan tipologi tekanan yang dihadapi oleh rumah tangga petani dan nelayan skala kecil. Ada empat jenis stresor yang diidentifikasi, yaitu, variabilitas iklim, perluasan pertanian modal, pembangunan infrastruktur pedesaan, kompetisi aktor ekonomi. Menanggapi kerentanan nafkah, sebagian besar rumah tangga petani dan nelayan skala kecil membangun ketahanan mereka dengan menggunakan sumber daya di bawah kendali sistem rumah tangga sementara yang lain menggunakan sumber eksternal

Kata kunci: rumah tangga, kerentanan nafkah, kelentingan, masyarakat pedesaan, petani skala kecil, nelayan skala kecil



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INTRODUCTION

Agriculture in a broader sense is an important source of livelihood for most people living in rural areas. Approximately, 2.5 billion out of three billion population living in rural areas of developing countries are farm households, 1.5 billion of which exist in small-scale farming household around the world (World Bank 2008). As the amount of population increases, the opportunity to grab gainful economic activity also tightens. Tightened competition among those running for productive economic opportunity causes a depressing social pressure on most of rural farm household businesses of developing regions. Making a living becomes very tense, since competition, contravention and social-conflict over source of living among citizens are getting more susceptible to emerge.

Traditional small-scale farming activities that are normally relying on very conventional technology to live are often seen as vulnerable to any devastating factor. Under a very high pressure of uncertainty and vulnerability, a slightest disturbance can lead to destructive and long-lasting business instability. In a less equitable social-economic system, the vulnerability of the livelihood will get even much worse as the access to natural resource is limited. Therefore, a social-economic system of farming household becomes more vulnerable when the system is exposed more obviously by poverty, limited access to resources, social force to marginalization and inequality. Level of technology, education and infrastructure definitively determine the degree of vulnerability of the livelihood of the farm households. Having more types of capital may determine how deep the household preparation is to face the pressures and difficulties. Capital that refers to landholding, machinery, and money is an asset or resources that are necessary to produce agricultural goods efficiently and effectively. But, it may also be used as a basis for classifying social stratum of the farm households in the society. Owning asset and resources can also determine resilience status of farm household in terms of how strong the adaptive capacity that they could perform in the face of difficulty, instability and vulnerability (Hinkel 2011).

On the other hand, ecological vulnerability may be seen as a diminishing capacity of an ecosystem to support a household to live normal or decreasing capacity to speed up recovery. Ecological vulnerability may also be regarded as the capacity of coping mechanism to face difficulties. It is also meant as a decreasing capacity to resist from bad impact of anthropogenic or non-anthropogenic pressures (Metzger et al. 2006). Climate variability and climate change have made the vulnerability of an ecosystem even more serious. It stimulates an increasing social-economic pressure on the living system of farming households and fishermen households in Indonesia (Wichern et al. 2019). The report of Intergovernmental Panel on Climate Change (IPCC) in 2014 revealed that increased temperature at about 1°C - 2°C will be followed by the disappearance of biodiversity world-widely (IPCC 2014). Several sources of livelihood, like rain-fed agriculture and seasonal work in agriculture, are very sensitive toward climate change. From the study of Gornall et al. (2010), one knows that precipitation is a key influencing factor for traditional agricultural production and may cause massive significant alteration in the long-term production when the rainfall changes considerably. Still, many studies also show that the changes on the amount of population and climate stimulate simultaneously the increasing of vulnerability of rural livelihood. Several studies on the vulnerability of the livelihood relating to climate change have also been done in the fishing communities in some developing regions. As the climate change is closely related to the rising of sea level, changing of wind's direction and speed, high tide and coastal flooding, it has a direct effect on the structure of the community whose livelihood depends largely on the oceanic ecosystem. The incident of extreme weather that disturbs the fish catching operation has impacts on the decreasing of fish availability, the changes on fish migration flow, and the disappearance of nets and even boats (Badjeck et al. 2010; Senapati and Gupta 2017).

Basically, the agricultural activity is vulnerable toward risk and uncertainty of various characters, whether it is biophysics, abiotic, climate, environment, biotic (e.g., pest, disease), and economic. The scale of the impact of climate change on rural household livelihoods will mostly be determined by the large livelihood that is exposed to harmful environment, the adaptive capacity of the household to resist from devastating threats and the sensitivity of each household in responding to the threats. Livelihood is the basic concept to understand the relationship between climate variability and vulnerability. Livelihood approach focuses on the context of the livelihood built by the farmers or

fishermen in using livelihood capital, institutions, livelihood strategies (the selection of asset compilation and its activity), and calculating the livelihood impact (Scoones 2015). The level of vulnerability and the endurance of rural households to resist from devastating forces coming into their livelihood include some dimensions, i.e., biophysics, economic, and sociocultural. The complexity of interconnection between those dimensions as well as the scale of business enterprise that the farmers or fishermen organize will determine the degree of vulnerability to tolerate while increasing the livelihoods' endurance (Ekblom 2012). The livelihood endurance may be understood as the capacity of the system that keeps the livelihood functioning despite external forces and changes that make a system vulnerable (Speranza et al. 2014). In the last decade, Turner (2010) wrote that vulnerability research tends to emphasize the threats and sensitivity as well as adaptive capacity of some element of society. Climate change or combined ecological pressures between environmental and socio-political factors may come over the issue of livelihood vulnerability.

The concept of livelihood capital is based on the assets of the household that may be able to mobilize. The peculiar characteristic of livelihood approach that put center gravity of livelihood capitals (Bebbington, 1999) is its emphasizing on the ability of poor agricultural community in using combination of those capitals to survive ecologically in under-pressure rural areas. Even the poorest families they have a set of following livelihood capitals : 1) Natural capital: natural resource stock or local environmental wealth (including water, wind, soil, forest resources); 2) Social capital: social resources such as personal network, group membership, trusty connection, access toward a broad community's institution; 3) Human resources: including formal and informal education, local ecological knowledge, the ability to work, and good health; 4) Physical capital: including productive asset managed by household (soil, equipment, livestock) also communal asset that they have the access to it (road, communication infrastructure like radio broadcast); 5) Financial capital: usually the asset that mostly is exchanged including cash saving, the availability of credit, or regular remittance and retirement (Ellis 2000; Scoones 1998).

This article will analyze deeply the vulnerability that has happened recently in the small-scale farmers and fishermen households. The analysis concentrates on the assessment of social economic situation of those households affected by pressures that affect the livelihood vulnerability and form adaptation strategies as well as mechanisms or organization of livelihood capitals to survive. This article is done through analyzing some results of studies on small-scale farmers and fishermen households in some developing regions. Specifically, this article aims to answer these questions:

1. How can the typology of stressors threaten the survival of small-scale farmers and fishermen livelihood system?
2. How is the form of strategy of survival and adaptation mechanism undertaken by both small-scale farmers and fishermen households?
3. How do the small-scale farmers and fishermen households build livelihood resilience so that they are able to keep surviving?

METHOD

Desk studies were carried out to compare various research results focusing on the topic of livelihood vulnerability. The sources of data are selected from master thesis as well as some articles of scientific journals on the topic of livelihood vulnerability. A case study analysis is added in order to give more detailed picture on the typologies of livelihood vulnerability and resiliency of small-scale farmers and fishermen households from different ecological settings. With that illustration, the analysis provides the form of stressors, risk, response as well as adaptive action done by rural household to react to threat and vulnerability. The weakness of this study is that the result of this study cannot be drawn into a single generalization to be applied into all types of farmers and fishermen communities of all developing regions.

This article gives, however, a preceding illustration about social economic actions as undertaken by small-scale farmers and fishermen households to survive, setting aside the social stratification of the

farmers and fishermen as they could not be compared to each other. Six research results from the Master thesis of Abdurrahim et al. (2014), Amalia et al. (2016), Wahyuni (2016), Azizi et al. (2017), Wiyata (2018) and Nissa et al. (2019) have been used as the basis of the analysis.

RESULTS AND DISCUSSION

The analysis of stressor types of social-economic-ecology

Vulnerability is usually to be mentioned in a negative sense and is defined as the degree to which a system is susceptible and is unable to cope with adverse effects of climate change (Adger 2006). In the center of this idea is the presence of three basic parameters, i.e., the stress to which a system is exposed, its sensitivity, and its adaptive capacity of the system to return to its original status. At this point, adaptive capacity may be defined as the ability of a system to adjust to actual or expected climate stresses, or to cope with the consequences of disturbance (Shah et al. 2013). Vulnerability can therefore be defined as the exposure of individuals or collective groups to livelihood stress as a result of the impacts of ecological change that stresses on the livelihood system of a social group (Adger 1999). The major stressor of vulnerability to a social group is therefore mostly due to climate or ecological pressures, but in many studies, stressors of change are not limited only to ecological change.

In terms of social vulnerability, Singh et al. (2014) pointed out that an economic exposure toward external instability rising from economic openness may cause vulnerability to a certain social group. Meanwhile, the concept of economic endurance is used to refer to the ability of social group to resist from any threat as induced from economic policy (stability of macroeconomic, market efficiency, governance and development) and to recover from any negative effect of instability. In most cases, type of stressor that is often faced by small-scale farmer households of tropical region is frequently closely related to land or ecological-landscape changes. Landscape change could stimulate livelihood-system instability. In this regard, Amalia et al. (2016) identified some stressors that could increase the degree of vulnerability of the livelihood of small-scale farmer households such as the changes of micro-to-macro ecosystem due to land conversion, ecological landscape change, environmental destruction activities, climate variability and change as well as natural disaster that come over the farmers. The change on ecological landscape as meant by Amalia et al. 2016 is particularly the change as caused by the expansion of massive and large scale agricultural investment such as palm oil plantation cultivation covering quite huge areas that later causes various issues of land cover change, water and soil pollution, the decrease of the binding capacity of the soil to water, the disappearance of biodiversity, the disappearance of forests cover, land degradation, environmental-related social conflict, and land-tenure conflict as well as socio-cultural disturbances. Wiyata (2018) pointed out that most of small-scale farmer households are faced with the issue of decreasing of agricultural landholding size that lead to increasing economic risk and bad impacts on livelihood, decreasing land productivity, increased land scarcity, farming-related cultural shift and declining biodiversity as well as unemployment and multiple employment that may devastate their socio-economic status. In fact, small-scale farmers use land not only as a source of livelihood but also as an intergenerational asset to secure economic stability and social status of future generation in the society (Mabe et al. 2019).

Meanwhile, decreasing level of agricultural productivity may also be a stressor of change. It causes small-scale farmers to give a certain treatment toward the soil in order to produce a high rate harvest based on the target of production. Instead, the application of chemical substances causes the declining of environment quality, especially the soil. The soil became very critical and farmers took action to make a land conversion by selling the land. Land conversion affected not only landscape change but also deteriorated the entire natural asset of farmers' livelihood system. This situation will in the long run affect significantly the level of farmers' welfare status. As the landscape changed into non-agricultural uses area, the availability of sufficient land and water for farming became seriously affected. Farmers' livelihood system was destabilized by land conversion activity making agriculture-based livelihood become critically vulnerable and endangered (Wiyata 2018)

Wahyuni (2016) and Abdurrahim et al. (2014) stated that climate variability is the most important stressor influencing livelihood system of small-scale farmer households. The impacts of climate variability are temperature changes, rainfall fluctuation, and wind changes. Rainfall fluctuations are usually driven by the phenomena of El-Nino and La-Nina. El-Nino causes drought in some area, while La-Nina causes a certain area to have more precipitation causing flood and the outbreak of diseases. Eventually, the climate variability can affect seriously the farmers' welfare status due to high unpredictability of farming harvest. Unpredictable rainfall causes detrimental effect on farming economy such as crop failure or early harvesting, the decreasing of agriculture productivity, and ends with the decline of the farmers' farm-income. Any economic loss suffered by small-scale farmer households may destabilize the stability of their economy. Living becomes very susceptible to collapse. This situation is in line with Adu et al. (2018) who pointed out that climate change has a very significant impact on the livelihood of small-scale farmers household especially because most of them rely very much on the rainfall regulated by climate.

Meanwhile, the fish catching operation relies a lot on ocean's climate condition. Ecological stressors cause small-scale fishermen livelihood gets highly vulnerable (Senapati and Gupta, 2017). This is because most of them are limited in mastering technology as well as having sufficient physical and financial capital to support fishing operation. It is known that small-scale fishermen in many developing regions are very sensitive and less adaptive because of their inability to use modern navigation technology (e.g., Geographic Positioning System) and other states of the art of fishery-technologies. The impact of climate change usually stimulates a very reactive response from the fishermen. The usual response to show is intensifying fish catching that may lead to overfishing and instability of spatial division of fishing capture areas among fishermen. The increased competition and contravention among fishermen are obvious to happen. Azizi et al. (2017) said that unpredictable weather condition can be a serious stressor of livelihood vulnerability for small-scale fishermen since it can bring them in difficulties of doing fish-catching operation. The majority of small-scale fishermen household have only a small boat, so it will be very dangerous for them to do fish catching in a bad weather, high tide, and strong wind. Therefore, many of them choose to stop sailing until the weather is conducive. Many small-scale fishermen are jobless during the bad weather. They have no other skills or expertise, and this will bring to the decrease of daily income and the fulfillment of their daily needs. The higher the exposure to unpredictable weather the more the possibility of the small-scale fishermen to have a very serious livelihood vulnerability. Gravitiani et al. (2018) added that climate change has a bad effect on people living in coastal regions. When the sea level is up, it will often cause tides, flood, and abrasion that may bring a livelihood of small-scale fishermen more distressful and vulnerable. Islam et al. (2014) added that climate phenomena such as cyclone, tidal fluctuation, and salinity intrusion could be another pressure to the coastal community. Sudharmo (2016) in Nissa et. al (2019) stated other stressors faced by small-scale fishermen households. These are natural resources mismanagement problem related to fishery such as overfishing and ocean environmental damage that leads to detrimental effect on fishermen main income sources. From these above-mentioned thesis and research, four types of dominant stressors of livelihood vulnerability can be categorized as presented in Table 1.

Table 1. Typology of stressors of livelihood vulnerability and their impacts on the survival of livelihood system of small-scale farmers and small-scale fishermen households, 2019.

Stressor Type	Impact toward household	Impact toward the entire livelihood systems	Impact toward village	Vulnerability (6 studies)
The expansion of large-scale oil palm plantation in rural landscape (Amalia et al. 2016)	Economic vulnerability among local small-scale farmer households increases as they are marginalized by the expansion of large-scale oil palm plantation	All farmer's households are vulnerable as they cannot do multiple-farming activities to support survival. They become economic parts of large scale agricultural-industrial activities.	Income structure of the small-scale farmer households are shifting from multiple sources of farming-income to a community with more singularity of non-farm income.	Medium impact on livelihood vulnerability
Infrastructure and housing development in rural landscape (Wiyata 2018)	Farmer households are switching their livelihood into informal economic sector (public transportation drivers, street vendor sellers, parking man, etc)	All small-scale farmer households are doing multiple employment to support survival strategies.	In the long-run, as farming activities become less important, then rural agricultural villages disappear, Rural landscape becomes more urbanized.	It is rated as the greatest impact on the farming livelihood vulnerability because there is no longer continuity of the last livelihood system. Farming has been fully stopped, in the long run.
Climate variability (Wahyuni 2016 & Abdurrahim et al. 2014)	Agriculture income as main source of livelihood for small-scale farmers is totally disturbed and is declining due to harvest loss and crop failure. They, who suffer from the impact of climate variability, choose to do out-migration or mortgage their land to survive.	Small-scale farmer households are taking advantage of side-job from informal sector, artisanal activities, simple technician or casual workers in sewing, or sending the members of the household to go abroad for job via international migration.	Less impact. They are still living in the village and doing farming-activities but with non-farm activities.	Medium level of impact on the livelihood vulnerability.
Climate variability & tight competition among small-scale fishermen actors in the same niche (Azizi et al. 2017 & (Nissa et al. 2019)	Small-scale fishermen households reorganize the work of family members to do in more economically beneficial (when possible, to work outside fishing). For rather large-scale fishermen household, they move their fish-catching location to another place to seek other opportunities to survive.	There is no change in the livelihood system. They tend to stay on fishing economy but with more distressful ecological pressures.	No big impact of such a change. They remain to work as fishermen but living become more distressful.	Low level of impact on the livelihood vulnerability.

Sources: Analisis study from Amalia et al. (2016); Wiyata (2018); Abdurrahim et al. (2014); Wahyuni (2016); Azizi et al. (2017); (Nissa et al. 2019)

There are various types of stressor faced by small-scale farmers and fishermen households but among others, the space is the ultimate factor determining whether or not the livelihood is destabilized. Land is primary source of small-scale farmer livelihood for farming whose ownership (property rights) as well as the land-boundary is somewhat much clearer as compared to fishermen. The boundary of waters or ocean which is openly accessible and is commonly owned by many fishermen has made a problem of competition, contravention and resource conflict among them. All fishermen can access the ocean equally in which no one is able to exclude the other from the sea. Something that makes similar for both farmers and fishermen is the natural resources. Both social groups are highly dependent on natural resources. Any stressor arising from land or ocean can be a disastrous to their livelihood system.

Livelihood Vulnerability Index

To measure the degree of livelihood vulnerability, one is using livelihood vulnerability measurement or index. Since livelihood vulnerability is a condition when an individual or a household is undergoing disturbance, pressure and shocking toward the source of livelihood, the continuity of the livelihood is seriously threatened (Hahn et al. 2009), so it should be able to be calculated. The calculation and the analysis of livelihood vulnerability of this study used index value of LVI as formulated by IPCC (Intergovernmental Panel on Climate Change) to value how deep the vulnerability of livelihood is as caused by ecological change. Gravitiani et al. 2018 stated that LVI-IPCC is an alternative method as the proxy to count how serious the livelihood vulnerability of a community is due to climate change. Based on the IPCC et al. (2014) to measure vulnerability one needs to take into account three main parameters, namely: exposure, sensitivity, and adaptive capacity. Thus, this LVI-IPCC has a composite characteristic meaning that the value of vulnerability is revealed from the result of exposure value minus adaptive capacity value that later on, it is multiplied with sensitivity value. The values of LVI-IPCC calculation between farmers and fishermen have been done by several researchers (Table 2).

Table 2. Comparison of LVI-IPCC mean-values between small-scale farmers and small-scale fishermen households of case studies, 2019

	Exposure	Adaptive Capacity	Sensitivity	LVI-IPCC	Mean Value
Small-scale farmers household					
Amalia et al. (2016)	0.83	0.53	0.61	0.18	0.039
Wahyuni (2016)	0.313	0.520	0.355	-0.022	
Adu et al. (2018)	0.349	0.384	0.314	-0.011	
Small-scale fishermen household					
Gravitiani <i>et al.</i> (2018)	0.353	0.378	0.297	-0.007	-0.017
Azizi et al. (2017)	0.46	0.49	0.43	-0.013	
Nissa et al. (2019)	0.51	0.56	0.55	-0.03	

Sources: Amalia (2016); Wahyuni (2016); Adu et al (2018); Gravitiani et al. (2018); Azizi et al. (2017); Nissa et al. (2019) processed

It is generally believed that the degree of livelihood vulnerability of small-scale farmers household is usually considered to be lower than that of small-scale fishermen household (Table 2). This is because the level of uncertainty of the fishermen's livelihood is higher than that of the farmers. The impact of climate variability or climate change on small-scale fishermen's livelihood is usually believed to be more distressful as compared to small-scale farmers. The analysis of these case studies ultimately showed that the livelihoods of small-scale farmers are surprisingly more vulnerable as compared to that of the small-scale fishermen.

Based on the study of Shah et al. (2013) the value of LVI will be spread between -1 to +1. When the LVI is -1, it means that it has the lowest livelihood vulnerability. While, if the value of LVI shows

+1, it means that it has the highest livelihood vulnerability or the most dangerous one. The LVI calculation of Table 2 shows that small-scale farmer livelihoods have mean-value of LVI = 0.039. With this figure, they are actually more vulnerable as compared to what happened with the livelihood vulnerability index of small-scale fishermen which has mean-value of LVI = - 0.017. This calculation reverses general belief that the livelihoods of small-scale farmers are usually much more resistant or resilient as well as much stronger compared to that of the small-scale fishermen.

The cause of high livelihood vulnerability of small-scale farmer households in the case study of Amalia et al. (2016) from East Kalimantan is mainly because of high exposure of the expansion of large-scale oil palm plantation with less adaptive capacity to small-scale farmers. Drawing from the case study of Wahyuni (2016) from Nusa Tenggara Timur, it is found that longer-time of drought exposure caused by climate variability on paddy farm as well as sensitive landscape of porous land has made the livelihood vulnerability of the small-scale farmers become very high and serious. This is in line with Adu et al. (2018) that stated corn small-scale farmer household in very drought area is usually more vulnerable toward climate change rather than any other type of farming household.

Meanwhile, the livelihood vulnerability index of small-scale fishermen household of the research of Gravitanian et al. 2018 as drawn from the fishermen household in south coast of Java, Yogyakarta has shown a mean-value of LVI-IPCC of -0.007. Likewise, drawing from the case study of Nissa, et al. (2019) it is also found that small-scale fishermen households in the Regency of Tegal, Central Java have less degree of livelihood vulnerability. Both studies found that having a high adaptive capacity in the form of social institution and social group or association (as usually strongly taking place in the fishermen community) may cause the capacity to adapt to a devastating pressure become much higher. Thus they became much more resilient. Higher capacity to adapt can effectively neutralize exposures and sensitivity. Therefore, it can be concluded that small-scale fishermen household is not always more vulnerable than small-scale farmers one.

Typology of strategy in responding to vulnerability

In studying strategies of responding to the vulnerability, the households of small-scale farmers and small-scale fishermen have been divided into different strata. Both social groups of low stratum mostly utilize social capital in order to respond to the devastating stressors that they face. Meanwhile, the small-scale farmers or small-scale fishermen of upper stratum prefer to utilize either physical or financial capital to neutralize stressors of livelihood vulnerability. The difference lies on the human resources capital where small-scale farmers household usually have more skills rather than just farming, so when they undergo high vulnerability in agriculture sector, they would switch their economic activities into a non-farming economic activities to survive (Amalia et al. 2016; Wiyata 2018)

The above-mentioned adaptation strategies do not apply to small-scale fishermen. Most of them do not have any other skills than sailing. In case of economic crisis, shock, emergency or calamity, small-scale fishermen tend to do overfishing. When the bad season comes, most of fishermen cannot do anything than sailing. What they have is social institution and social association established on the principle of kinship that guarantees to survive. Therefore, they will be together in helping each other in order to survive. In contrast, according to Nissa et al. (2019) the power of social capital owned by small-scale fishermen household is also effective enough to increase their social-economic status. However, most type of social capital is usually used in time of difficulties of critical situation. This study identifies three types of strategy of the small-scale farmers or small-scale fishermen households in building livelihood resilience to struggle for survival (Table 3). Ocean, fish resources, ship and catching tools are important assets for small-scale fishermen's survival or in building resilience. Land and other economic resources are important assets for small-scale farmer households to get resilient (see Table 3).

Table 3. Typology of strategy of small-scale farmers and small-scale fishermen household in responding livelihood vulnerability (drawn from six case studies), 2019

Type of Adaptive mechanism/ Strategy	Small-scale farmers household	Small-scale fishermen household
Social	Lower stratum or small-scale farmers: developing local social-institution such as patron-client, <i>bawon</i> , <i>ikut-tandur</i> or generally known as sharing for harvesting. <i>Upper stratum</i> : building affiliation in farmer association management	Lower stratum: Utilizing social bond existed in the society (kinship, neighborhood) or patron-client relationship. Upper stratum: Building affiliation in the fishermen group (to join a larger business group)
Economy	Lower stratum: selling asset (livestock, jewelries, electronic), working in non-farm sector or multiple employment, migration (casual labour). Upper stratum: mortgage (field), vehicle renting (truck, pickup), family member migration (civil servant, another static jobs)	Lower stratum: Re-organizational of work in the household or family but they stay in fishing economy. Upper stratum: selling asset (electronic, jewelries).
Ecology	Lower stratum: hunting, catching fish in the river. Upper Stratum: applying planting management of agricultural activities.	Lower stratum: no action, just resignation. Upper stratum: move to a much greater distance of fishing location by using more financial capital they reserve.
Technology	Lower stratum: no action, because technology is costly. Upper stratum: irrigation maintenance, digging deep-well for irrigation, when drought.	Lower stratum: no action, just resignation. Upper stratum: doing an adjustment to the capacity of the machinaries and catching tools to get more fish.

Sources: Analysis from the case studies of Amalia et al. (2016); Wiyata (2018); Abdurrahim et al. (2014); Wahyuni (2016); Azizi et al. (2017); Nissa et al. (2019)

Tanner et al. (2015) and Quandt (2018) define livelihood resilience as the capacity of all people across generations to sustain and improve their livelihood opportunities and well-being despite environmental, economic, social, and political disturbances. Livelihood strategy is carried out by combining owned livelihood capital. The case study of Nissa et al. (2019) showed that livelihood strategy can be performed by activating one of the owned livelihood capitals in order to maintain resilience. Either small-scale farmer or small-scale fishermen households have a surviving mechanism to escape from any stressors of vulnerability by using livelihood assets or capitals when the crisis strikes. By doing so, resilience is built.

The endurance of every household to survive from crisis reflects the level of resilience owned by that household. The higher the level of vulnerability toward livelihood or income does not always mean that the resilience level of the household is getting lower. When the stressors of livelihood strike make the livelihood become vulnerable, the household usually builds strategies to survive that makes them resilient. The source of resilience can be from the internal and external factor of the household. Based on the six studies used as the basic analysis of this research, it is found that several sources of small-scale farmers and small-scale fishermen household resilience may be identified in the Table 4.

Table 4. Sources of small-scale farmers and small-scale fishermen households resilience, drawn from six case studies, 2019

Type of Household	Sources of resilience from the inside of the household	Sources of resilience from the outside of the household
Small-scale farmers	1. Agricultural sharing activity.	1. Building dam or irrigation with the help of government assistance.
	2. Patron-Client (<i>bawon, kelompok kerja tandur</i>).	2. Utilizing subsidy when buying chemical fertilizer.
	3. Kinship and neighborhood bonding.	3. Utilizing government policy on farm price (floor price – ceiling price).
	4. Utilizing knowledge about agricultural engineering and plantation.	4. Utilizing food aid for the poor.
	5. Utilizing skill outside the agriculture sector.	5. Utilizing back up from non-governmental organization (NGO).
	6. Utilizing livestock and other livelihood assets to get resilient.	6. Utilizing subsidized credit for farming from the government.
Small-scale fishermen	1. Food sharing activity.	1. Utilizing insurance for health maintenance.
	2. Using patron- client (partnership) institution.	2. Utilizing subsidy from the government when buying fuel.
	3. Utilizing kinship and neighborhood bonding.	3. Utilizing aids facilities (cold storage, catching tools and boat's machines) from the government.
	4. Utilizing knowledge on weather condition.	4. Utilizing food aid from the government.
	5. Livestock and other livelihood assets ownership.	5. Utilizing local cooperative.
	6. Reorganizing of household's work.	

Sources: Analysis of case studies from Amalia et al. (2016); Wiyata (2018); Abdurahim (2015); Wahyuni (2017); Azizi et al. (2017); Nissa et al. (2019)

The degree of readiness to face the aggressiveness of stressors of livelihood vulnerability among households of both small-scale farmers and small-scale fishermen is different. The majority of small-scale fishermen who have no other skills than sailing are forced to keep on surviving without doing any changes in their livelihood system. Meanwhile small-scale farmers household do economic shifting in their livelihood system to get resilient.

Actually, rural communities whether they are farmers or fishermen are not easy to get collapse, and their economy is not easy to be destroyed because of crisis, since they have climate smart strategies such as agricultural diversification activities, food-security mechanism, and doing non-farm job (Wahyuni 2016). Typology of readiness in facing vulnerability that occurred among households both small-scale farmer and small-scale fishermen must be different. The majority of small-scale fishermen households who have no other skills than sailing are required to keep survive inflexibly; meanwhile small-scale farmers households are more flexible to adjust their economic activities in land by shifting activities on land as the landscape allows them to do farming activities.

CONCLUSION

This study results in several conclusions. At least there are four types of stressors faced by small-scale farmers and small-scale fishermen households in maintaining the livelihood. The stressors are not always in the form of climate change as usually emerged in the studies of livelihood vulnerability. They are: 1) Large scale plantation or large scale capital expansion that cause landscape and ecosystem change into the small-scale farming households; 2) infrastructural development that causes land conversion; 3) climate variability that causes unpredictability of seasonal agricultural planting and harvesting; and 4) the emergence of sharp competition or contravention as well as social conflict between actors that create social-tension between those trying to get survival in a common-space of waters. These four stressors have threatened the livelihood system of small-scale farmers and/or small-scale fishermen households in certain rural areas that have been analyzed so far. However, the impacts of those stressors of livelihood vulnerability on the constitution of the households are different. It is known that there are some direct impacts of the livelihood vulnerability stressors such as shifting in economic activities, decreasing

household income level, and household re-organizational of resources and economic operation for survival.

The livelihood strategy of small-scale farmers and small-scale fishermen households in facing livelihood vulnerability stressor can be identified into four strategies; one of those that is often used is building social strategy. The second is building economic strategy such as income diversification strategy. The ecological strategy is also important. The last one is technological strategy. The social strategy is shown when the households utilize social structure as capital or tool for survival. Economic strategy usually uses resources reallocation among the household members to survive. The ecological strategy is performed by either by expanding land or exploiting natural resources for farmers while it is expanding to a new area of fishing for fishermen. A technological strategy is carried out by exploiting natural resources by using more proper technology, such as adjusting the catching tools of fishermen every different season as well as improving ship capacity when they want to sail much farther.

From this study, it can also be concluded that the source of both small-scale farmers and small-scale fishermen households resilience comes from inside and outside of the system. Small-scale farmers use patron-client relationship, kinship and other social-bonding, so they are able to handle the livelihood vulnerability to survive. The source of their resilience coming from outside of household is positive policy-intervention from the government. The source of resilience coming from inside for small-scale fishermen is social-connection that was built a long time ago as well as a form of social-ties and networking-relation between ship-owner and its casual-workers. The source of resilience coming from outside for fishermen is almost the same as farmers that is like subsidies aid and security mechanism like health insurance. By this, it is actually good for both farmer and fishermen to have various sources of resilience that can reduce and neutralize vulnerability.

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