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ENHANCING CAPACITY OF LOCAL COMMUNITY TOWARD AGRICULTURAL DROUGHT IN PLOSO VILLAGE YOGYAKARTA BASED ON VULNERABILITY ASSESSMENT

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ABSTRACT

This paper reveals the capacity enhancement efforts for local community and assessing their vulnerability level regarding the drought event in Ploso Village of Gunungkidul Regency – Yogyakarta Special Province. The vulnerability assessment was conducted to measure the impact of agricultural drought and also focusing on enhancing the community's absorbing capacity, buffering capacity and local response capacity. The village drought vulnerability assessment was conducted by using indicator-based calculation towards 50 head of households of Ploso Village as the assessment samples. Absorbing capacity enhancement was conducted by facilitating and educating local farmers to conduct organic farming as well as increasing their local response capacity by focusing on rainwater harvesting, while buffering capacity enhancement is conducted by empowering the housewives for creating alternate household income The disaster preparedness community is created as the center of intervention to educate local people about drought disaster and preparing the local teenagers to become future focal points in their area.

Keywords: ***Capacity; Drought; Farmers; Housewives.***

ABSTRAK

Penelitian ini menunjukkan upaya peningkatan kapasitas untuk masyarakat lokal dan penilaian kerentanan masyarakat tersebut terkait kekeringan yang terjadi dikarenakan ketidakcukupan dari sumber daya air yang dilaksanakan di Dusun Ploso, Kabupaten Gunungkidul, Yogyakarta. Penilaian kerentanan dilakukan untuk mengetahui dampak dari kekeringan pertanian dan juga berfokus kepada meningkatkan *absorbing capacity, buffering capacity* dan *local response capacity* dari masyarakat lokal. Penilaian kerentanan kekeringan dilakukan dengan perhitungan berbasis indikator kepada 50 orang kepala keluarga sebagai sampel penelitian. Peningkatan *absorbing capacity* dilakukan dengan memfasilitasi serta mengedukasi petani lokal untuk melakukan pertanian terpadu ramah lingkungan dan juga mempromosikan untuk pemanenan air hujan, sementara peningkatan *buffering capacity* dilakukan dengan memberdayakan para ibu rumah tangga untuk mendapakan penghasilan alternatif diluar pendapatan utamanya. Kelompok siaga bencana dibentuk sebagai pusat dilakukannya intervensi untuk mengedukasi masyarakat lokal terkait bencana kekeringan dan mempersiapkan pemuda lokal untuk menjadi *focal point* dalam kebencanaan.

Kata Kunci: ***Ibu Rumah Tangga; Kapasitas; Kekeringan; Petani.***

INTRODUCTION

Drought

The world is forced to confront a rapidly growing impact of disasters. Many factors that cause an increase in the vulnerability of a society/community are escalating and combined with an increase of hydro-meteorological hazards events related to climate change (Westen, 2011:2). Westen added that the impact of this hazardous event can be massive, particularly in developing countries, therefore the government have to incorporate risk reduction strategies in development planning at different levels. Jaspers et al (2012) in Daniele et al (2013: 87) have described South and Southeast Asia as region where approximately one-fifth of the total inhabitants of the world live, making it both the most populous and densely populated geographical region in the world. It is estimated that more than 20 million people have been affected by drought in 2015, though this figure is likely to be significantly lower than the reality, as drought is not well recorded (UNESCAP, 2015: 7).

Drought is one of the hydro-meteorological events that indeed unique. According to Pereira et al (2002) in Moreira et al (2007: 67), drought can be categorized both as disaster and hazard due to its less predictable characteristic as well as considering its termination, frequency, and severity. Pereira stated that drought can be a hazard because it is a natural event with unpredictable occurrence, and it's also a disaster because it corresponds with the failure of the mitigation efforts, disrupts water supply to the natural and agricultural ecosystems as well as to other human activities. The water availability is an essential component of welfare and productivity. Currently, 1.3 billion people do not have access to adequate supplies of safe water and 2 billion people do not have access to adequate sanitation (Westen, 2011: 36).

Bordi and Sutera (2007: 3) explain that drought is a relative terms. It means that whatever the definition, drought cannot be viewed solely as physical phenomenon but also considered in relation to its impacts on society. In the terms of Chief Regulation of Indonesian National Disaster Management Authority No.8 -2011:4, drought can be defined as the insufficiency of water for the needs of life support, agriculture land, livelihood and environment. Agricultural drought is the drought that happened during cultivation process of crops; paddy, corn, soybean, etc. According to Dickerson and Dethier (1970) in Dipayana (2012:461), drought is the significant decrease of rainfall from the normal condition in certain period of time with large scope of impact. The American Meteorological Society (1997) in G. Rossi et al (2007:3) stated that drought can be divided into four categories based on its definition and types, namely meteorological drought, hydrological drought, agricultural drought, and socio-economic drought. The meteorological drought usually indicated by the rain season which starts abnormally. The agricultural drought is emerging when the soil moisture is no longer able to supplies plant needs in a certain time period. This type of drought usually is the further impact of meteorological drought. The hydrological drought is related to the water supply insufficiency of upper and lower surface which influenced by the decreasing level of rainfall in long period of time, while the socio-economy drought is related to the availability and demand of several economic deed towards the elements of meteorological, hydrological and agricultural drought.

The characteristic of drought is totally different with the other natural disasters. Drought is a sudden-onset disaster. The impact of drought itself can be seen when the land productivity of crops is decreasing or even failed. The failure of crops' harvesting could impact community productivity which related to the income obtained from agricultural sector. This kind of circumstances potentially happened in urban area (UNESCAP, 2015: 5).

Fatchurohman et al (2013:93) added that drought also caused by the area lithological drought, as what commonly occurred in *Gunungkidul* due to the karst landscape that developed into a dry surface. Ploso Village as the research location is one of the areas which

impacted by the lithological drought. This drought is conditioning the research area to have no other water resources than underground river existed in Cerme Cave. Santosa (2016: 132) explains that based on the hydrology system, water resources can be divided into two types; diffuse/fissure and conduit type. The conduit type is the type of water resources that emerge from the underground river of a cave. Cerme Cave is the example of conduit type water resource existed in research location (Ploso Village). Cerme Cave has been the life support for local people of Ploso Village in fulfilling their needs of water resources. The local government has created a distribution system to run this water for the daily needs of the villagers. The pipeline system was build from the inside of Cerme Cave to distribute water of its underground river to permanent tank which continuously distributed to each of houses in the research location. Unfortunately, the availability of single water resources in this village is indeed insufficient to covers the daily needs and agricultural farming activities which impacted the local people who mostly live as farmers.

Capacity, Vulnerability and Community Development

Hagelsteen and Burke (2016: 43) inform that according to the three world conference on Disaster Risk Reduction (DRR) held in Yokohama, Kobe, and Sendai, Japan, it is identified that capacity development for DRR is a substantial efforts to reducing disaster losses. Hagelstan and Becker (2013: 2) believe that the effective capacity development for disaster risk reduction has to maintain a clear purpose. It means that capacity assessment consist of asking basic question, e.g. why capacitate, capacity for whom and what (UNDP, 2008; Hagelstan and Becker, 2013), and it is important to be careful that the changes in one community might cause resistance and even worse create tensions amongst groups in society. However in fact, many DRR initiatives are undertaken without a proper capacity assessment (Hagelsten and Becker, 2013: 8-9). The report on EU-funded Capacity Development for Hazard Risk Reduction and Adaptation (CATALYST) programme from Daniel et al (2013; Scott and Few , 2016: 4) emphasis that capacity development for disaster management has to heightened the 'vulnerability' of certain community or social groups, therefore the drought vulnerability assessment was conducted to gain information regarding the impact of drought event towards local people of Ploso Village to invent strategies for enhancing this community capacity.

Social vulnerability refers to social-economic and demographic factors that affected the resilience of a community. Socially vulnerable areas tend to be affected severely and find difficulties to recover whenever dealing with disaster (Flanagan, 2011: 1). The social-economic vulnerability assessment encompasses the perception and viewpoint of human life which associated with social status, beliefs, social norms and etc. Economic vulnerability assessment encompasses income and assets related from the smallest scale of household, to communities, local, even national scope (De Leon, 2006: 14). Flanagan (2011: 4) has classified some indicators that can be used in social-economic vulnerability assessment, those indicators are; social-economic status (income, poverty, and education), household composition, disability, and settlement. Renaud (2006: 120) explain that the environment can be divided into various components, such as air, land, soil, vegetation and water (groundwater, surface water, coastal waters, etc). These resources play different roles depending on the type of hazard or threat considered. Therefore the environmental vulnerability assess from the availability of groundwater resources used by local community whether it sufficient of insufficient. Papathoma-Kohle (2011: 646) stated that most of the researcher with natural sciences and/or technical background defines physical vulnerability as the degree of impact damage towards element at risk. Birkmann (2006) in Fuchs (2009) in Kappes (2011: 578) argue that physical vulnerability should be more towards physical environment that describing the degree of resistance to the impact of natural hazards. In that order, the physical vulnerability indicators should be related to

the existing environment created as a resistant towards incoming hazards or event.

In the term of core understanding; vulnerability, capacity and resilience are also connected respectively, the low capacity of one community will shows the high level of vulnerability and the efforts to enhance capacity is an indication to create resilience community (Daramola et al, 2016:133). Sundnes et al (2014:24-36) in 'Guidelines for Research and Evaluation of Global Health Cluster' mention that resilience is the combination of three type of capacities namely 'absorbing capacity', 'buffering capacity' and 'local response capacity'. Sundnes continues to explain that absorbing capacity is the ability to absorb pressure from an event without having damage and the mitigation process is a kind of activity that increases absorbing capacity to sustain disaster exposure. The absorbing capacity can be strengthened by or through improved planning, the development of contingencies, training of personnel for response, education, etc (Sundnes and Birnbaum, 2003: 51). Some researchers such as Dow (1992), Cutter (1996), Clark et al (1998) and Wu et al (2002) in Rygel et al (2006: 744) defining absorbing capacity as the form of 'resistance' (the ability to absorb the damaging impacts of a hazard and continue functioning), which is also considered as the part of 'disaster coping ability'.

Buffering capacity is the ability of a community to withstand the damage of a disaster event and remain functional even in exposed condition (Sundnes et al, 2014:25). Sundnes and Birnbaum (2003:51) consider buffering capacity as the ability of a society to minimize the change in an essential function for a given change in available resources (goods and/or services). The examples of buffering capacity are regulations for the use of water, regional planning, coordination, control, etc. The last type of capacity describe by Sundnes is 'local response capacity' which defined as the ability to interfere the further deterioration of a disaster by supplying the needs that could refresh the function of a community to pre-disaster condition. The form of 'local response capacity' can be done by stocking food supplies prior to dry season (local initiation) or disaster relief in the emergency response crisis (external intervention).

Timmerman (1981) in Alexander (2013:2712) believe that resilience is the form of buffering capacity in the community to make them invulnerable to disaster. The Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR) has emphasizes the need to build capacity against disaster as one of the guiding principles for the framework (Scott and Few, 2016:2). Walker, et al (2013; Scott and Few, 2016:3) defines 'DRM (disaster risk management) capacity building' as:

> *'efforts to strengthen the competencies and skills of a target organization, group or community so that the target could drive DRR efforts, or in broader sense development, in a sustainable way in the future'.*

Hakaloba et al (2016:273) explain that within the disaster response and research sectors, there is increasing recognition of the value of community-led initiatives that facilitate emergency management, risk reduction and community resilience. According to Nguyen et al (2013) in Qasim et al (2015:100), resilience is the capacity of rural households to cope with, adapt to, and benefit from disasters. Still in Qasim (2015:101), Hayes and Goonetilleke (2012) explain that the efforts to build resilient communities enhance the ability to minimize the effects of future disaster events, and during the flood disaster of Pakistan the marginalized (women, children, disable) groups are mostly affected (Gumbo (2006), Gwimbi (2009), and Takao, et al (2004) in Qasim et al, 2015:102), therefore thus communities should be the focal points in dealing with the challenges associated with shocks and stress of disasters.

IFRC (2010:8) also found that in pre-disaster condition, women is a focal points which actively ensuring the needs and safety of their family, therefore women is consider an important actors to receive capacity enhancement in the efforts of increasing resilience towards disaster. Cutter et al (2010) in Daramola (2016:133) explain that in the process to

measuring resilience, 'single-sector employment dependence' or the dependencies in one livelihood sector has to be made as the main focus because this variable is important in determining the relevancy of resilience assessment towards research's target. Scott and Few (2016:5) also explain that the issue of disaster capacity building that centralized on gender in terms of differential access to resources, skills and decision-making power and as well as in the terms of the different strengths, skills and leadership qualities that women and men can bring to collective action is growing. This issue has been emerged in some disaster risk literatures, as what also exposed by Enarson and Chakrabarti (2010: Scott and Few, 2016:5) which highlight that gender mainstreaming is an effective strategy towards achieving disaster risk reduction and mitigating post-disaster gender disparity. Based on the following literatures, this research was conducted to identify community vulnerability and enhance community capacity by empowering them to achieve resilience in facing drought event.

Methods

This research was using mix method with sequential exploratory design. In an study with exploratory design approach, qualitative data is first collected and analyzed, and the discovered conditions are used to drive the development of a quantitative instrument to explore the research problem in further analysis (Creswell and Plano Clark 2011; Teddlie and Tashakkori 2008; Onwuegbuzie, Bustamante, and Nelson 2010). There are three phases of analysis in this research design which firstly performed through qualitative phase, followed by quantitative phase and finished with integration phase that correlates both qualitative and quantitative phases to acquire findings in exploratory qualitative manner (Creswell and Plano Clark 2011). Fields surveys and participatory mapping were conducted to obtain specific study area information, including spatial information such as administrative boundaries, roads, public facilities and households' condition which unavailable in governmental data. This data then presented in spatial information which become the reference in distributing quantitative instrument (questionnaire) through the determined samples. The research area was determined by referring to the event of drought in Yogyakarta Province. Gunungkidul Regency was one of the most affected area of drought disaster during the research period. Ploso Village was selected as the research location by considering the purpose of this study which aimed to enhance the capacity of local community affected by disaster through vulnerability assessment analysis. In order to enhance the capacity, there has to be certain areas that available to be developed, namely local livelihood (agriculture sector), and tourism potential. Ploso Village conceives both criteria as the area that vulnerable to disaster (annual drought) and as an area with the availability of development targets. There are two phases of identification and actions conducted in this research. First is identifying the vulnerability of local community towards annual drought event, and the second is enhancing local community capacity to being prepared against disaster. In this study, several tools or instruments were used in order to collect data, both primary and secondary data as well as analyzing/assessment processes.

Vulnerability Assessment

According to Lowe (2010: 118), bias on vulnerability research usually happened because of its dynamic characteristic that depends on indicators, methods and parameters in assessment process which later determine its level on high, medium and low. The effort to decides on what characteristics of a population or place that represents the factors of social vulnerability also in some matter of time become an obstacle of vulnerability analysis (Cutter, 2003;Lowe, 2010: 143). This research is considering the term of 'vulnerability of places' by Wu et al (2002; Rygel et al, 2006: 744) which seen vulnerability as pre-existing condition and both a biophysical risk and a social response within a specific geographic domain. Referring to Westen (2011: 5-4) and ISDR (2004), the vulnerability in this study was divided into four main sub-factors, namely the social, economic,

physical and environmental vulnerability. The concept used as a basis in assessing vulnerability is the PTVA (Papathoma Tsunami Vulnerability Assessment) model of Papathoma-Kohle and Dominey-Howes (2003) that modified by Kappes (2011: 580). Kappes express 'the indicator-based vulnerability assessment methodology for multi-hazards', as the slight modification of past PTVA model. Determination of the study area, identification of the relevant hazards and acquisition of hazard information is the first step of this model, followed by determination of vulnerability indicators and collection of the data and weighting of factors and vulnerability assessment which resulted in the effect of hazard interactions on the overall vulnerability. This research is using the concept build by Kappes (2011) with slight modification of its multi-hazards perspective to one particular hazard.

The primary data is obtained through a closed-type questionnaire, field surveys and participatory mapping. Fields surveys and participatory mapping were conducted to obtain specific study area information, including spatial information such as administrative boundaries, roads, public facilities and households' condition. The closed-type questionnaire is used to obtain specific villagers information in determining their current condition when facing drought event. The population size, from which the sample was taken, is $n = 187$ head of households. The sampling is performed by using simple random sampling through collecting the samples in nine Hamlets of Ploso Village. Such a method is based on the consideration that all the population is homogeny (all is affected by drought). As a result, 65 questionnaire fillings were conducted from 11 to 16 November 2016, which 50 were considered to be valid for further analysis (the sample size $n = 50$ head of households, representing 26.73% of the affected household population with 10% approximate margin error) which presented in Table 1. The results of vulnerability assessment towards 50 samples are presented in the analysis unit (scale) of Hamlets.

Table 1. Distribution of Questionnaires towards the Head of Households in Nine Hamlets of Ploso Village

Hamlets of Ploso Village	Valid Sample
1	8
2	5
3	6
4	4
5	7
6	5
7	4
8	5
9	6
Total	50

Source: Data Collecting (2016)

The vulnerability indicators were determined according to selected literatures and research area condition. Table 2 shows the research variables for vulnerability assessment.

Table 2. Vulnerability Research Variables

Aim	Variable	Base Indicators	Literatures Source
Assessing the level of Vulnerability	Social Vulnerability	- Education - Vulnerable Group - Social Value - Social Relation	Flanagan (2011), De Leon (2006)
	Economic Vulnerability	- Livelihood - Poverty/Income	Flanagan (2011), De Leon (2006)
	Physical Vulnerability	- Owned water reservoir during dry season - Owned water reservoirs during rainy season	Papathoma-Kohle (2010) Birkmann (2006) Kappes (2011)
	Environmental Vulnerability	- the availability of groundwater resources during dry season - the availability of groundwater resources during rainy season	Rygel (2006), Renaud (2006)

Source: Literatures Study (2016)

Each vulnerability sub-factors owned several base indicators. Those base indicators have different weights, in the sense that the contributions of each indicator are relatives to the research location. This weight is depended on two factors; the priority of user (the purpose of study can influence the weighting of the factors), and the type of hazard (Kappes, 2006: 581). The qualitative assessment of the relative importance for the vulnerability towards hazard is provided in Table 3.

Table 3. The vulnerability indicators for drought hazard and their relative importance
(Dark Green: very high important, Olive Green: high important, Light green: fair important, Very light green: low important)

Indicators	Weights			
	10	15	25	50
Social Vulnerability				
Education				
Vulnerable Group				
Social Value				
Social Relation				
Economic Vulnerability				
Livelihood				
Poverty/Income				
Physical Vulnerability				
Owned water reservoir during dry season				
Owned water reservoirs during rainy season				
Environmental Vulnerability				
the availability of water resources during dry season				
the availability of water resources during rainy season				

Source: Modified from Kappes (2006)

Vulnerability levels for every indicator are classified into three levels of vulnerability (high, medium, and low). The classifications scoring for every base indicator were done by referencing to the Chief Regulation of Indonesian National Disaster Management Authority No. 2 of 2012. UNDRO (1984) in Papathoma-Kohle (2011: 646) concluded that in most studies, vulnerability assessment is perceived as ''the degree of loss to a given element, or set of elements, within the area affected by a hazard. It is expressed on a scale of 0 (no loss) to 1 (total loss)". The classification scoring of vulnerability index used in this research is shown in Table 4.

Table 4. Vulnerability classification index for base indicators

Class	Score
Low	0 - 0,333
Medium	0,334 - 0,667
High	0.668-1

Source: Modified from Chief Regulation of BNPB No.2 (2012)

Capacity Enhancement

As the follow up action of the of vulnerability assessment of *Ploso* Village that will reveals the level of vulnerability of its sub-factors, the capacity enhancement was conducted in order to enhance community capacity towards disaster. The capacity enhancement was focused on two local targets; farmer, women. These targets were chose due to the context and type of capacity enhancement selected for this area related to drought disaster (buffering, absorbing, and local response capacity). In order to conduct capacity enhancement, PRA (Participatory Rural Appraisal) was implemented after the vulnerability assessment. Chambers (1992; Cavestro, 2003) explains that PRA is intended to enable local communities to conduct their own analysis and to plan and take action. PRA has been famous as methodology of learning rural life and their environment from rural people. It also requires the related researchers or field workers to act as facilitators to help local people conduct their own analysis, plan, and take action accordingly (Cavestro, 2003). PRA is used as the approach of this research to discover the main problems faced by the community during drought which resulted in three efforts to

enhance their capacity towards organic farming, forming disaster prepared group, and creating alternative income for family level from women.

Aside from the explanation above, Alam and Ihsan (2012:31) reveal that the PRA application has also been used for disaster prevention program as the method to develop disaster response strategies. PRA techniques could be used to investigate various issue related to disaster such as Mapping, Transect Walks. Agriculture, Livestock, Forest, etc.

RESULT AND DISCUSSION

Vulnerability Levels of *Ploso* Village

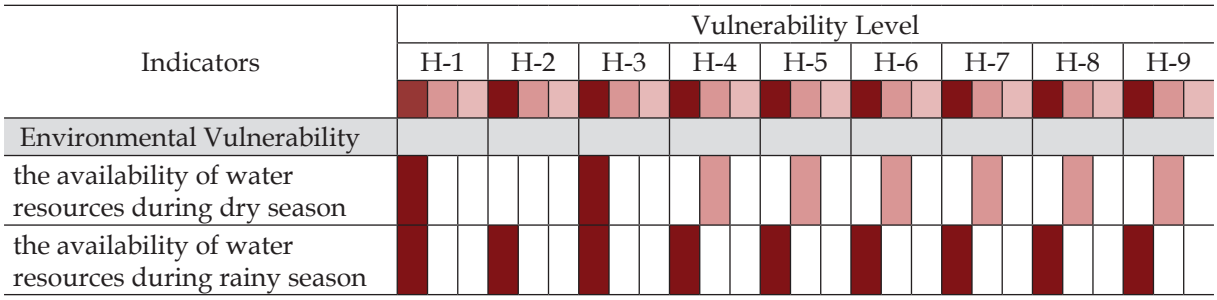
The indicator-based assessment results of vulnerability with its related parameters show dynamic vulnerability level. Table 5 shows the results of each vulnerability indicator assessment for each hamlet in *Ploso* Village while Table 5 also sums up the vulnerability levels for each sub-factor. The social vulnerability for the whole nine hamlets is at high level, while only Hamlet-1 who is at medium level of economic vulnerability. The levels of environmental vulnerability show high level for the whole hamlets. The physical vulnerability is the only sub-factor that shows variety of vulnerability levels with only Hamlets 2, 3, 7, and 9 who at high levels while the rest are in the medium levels. The weighting of each vulnerability sub factors were performed by concluding the assessment result in nine hamlets of *Ploso* villages which shown in Table 5. Table 5 also reveals that the result of index calculation indicating high-level of vulnerability in almost Nine Hamlets of *Ploso* villages. The socio-economic vulnerability showed the highest influence. Based on these findings, the socio-economic vulnerability has a higher weight compare to the environmental and the physical vulnerabilities.

From Table 4, the indicators from each vulnerability sub-factor are accumulated to acquire the level of vulnerability for each hamlet. From the Table 5 it can be concluded that the entire Nine Hamlets are at the high level of social vulnerability and environmental vulnerability. Hamlet-1 is the only household at medium level of economic vulnerability. The Hamlets 1, 4, 5, 6, and 8 are at medium level of physical vulnerability while Hamlets 2, 3, 7, and 9 are at high level of physical vulnerability. The vulnerability levels per sub-factors of *Ploso* Village's Hamlets are summarized in Table 6.

Table 5. The Vulnerability Levels per Indicators of *Ploso* Village's Hamlets

H: Hamlet

Indicators	Vulnerability Level								
	H-1	H-2	H-3	H-4	H-5	H-6	H-7	H-8	H-9
Social Vulnerability									
Education									
Vulnerable Group									
Social Value									
Social Relation									
Economic Vulnerability									
Livelihood									
Poverty/Income									
Physical Vulnerability									
Owned water reservoir during dry season									
Owned water reservoirs during rainy season									



Source: Assessment Result (2016)

Note: High Medium low

Table 6. The Vulnerability Levels per Sub-factors of *Ploso* Village's Hamlets

Hamlet	Vulnerability Level			
	Social Vulnerability	**Economic Vulnerability**	**Physical Vulnerability**	**Environmental Vulnerability**
1	High	Med	Med	High
2	High	High	High	High
3	High	High	High	High
4	High	High	Med	High
5	High	High	Med	High
6	High	High	Med	High
7	High	High	High	High
8	High	High	Med	High
9	High	High	High	High

Source: Primary data processing (2016)

The Capacity Enhancement of *Ploso* Village

Absorbing Capacity

In order to increase farmer group capacity towards drought event, the organic farming is conducted by promoting self-made EM (Efficient Microorganism) for paddy agriculture. The concept of effective microorganism (EM) was developed in 1971 by Professor Teruo Higa, University of the Ryukyus, Okinawa, Japan (Higa and Wididana, 1991; Lindani and Brutsch, 2012: 120). The past research has shown that inoculation of the soil/plant ecosystem with EM cultures can improve soil quality, soil health, the growth, yield and quality of crops (Higa and Parr, 1994; Lindani and Brutsch, 2012: 121). When EM cultures are applied to soil, they stimulate the decomposition of organic wastes and residues thereby releasing inorganic nutrients for plant uptake. Foliar application of EM appears to suppress the occurrence of plant diseases and facilitates the uptake of simple organic molecules that can increase plant growth and yield (Wididana and Higa, 1994: 2). The concept of EM's utilization for agriculture then developed by many sectors, such as government and NGOs. The Council of Community Empowerment of Muhammadiyah issues the EM utilization for agriculture module known as '*pupuk kocor*' (fertilizer used by pouring it into the paddy plant) which used by the researcher in this study as the basic material to educate local farmers to conduct organic farming.

The farmers in Ploso Village is being educated and informed regarding this organic farming through regular meetings and practical work. The researchers also create manual book of '*pupuk kocor*´ as the guideline for farmers to learn the organic farming

in advance and being able to use or practice it for further activities. The regular check and meeting by researchers is conducted to maintain farmers' interest towards organic farming in Ploso Village. Aside from that, according to the vulnerability assessment conducted in Ploso Village, it was discovered that the environmental vulnerability towards Nine Hamlets is at high level. One of the reasons of this high level of vulnerability is that during rainy season the Ploso's Villagers have never harvest the rain water. Most of the villagers (64% of samples) do not own permanent tank for rain water. Some villagers usually use non permanent tank for rain water, which is ineffective and cannot be utilize for harvesting rain water as supply for drought season. Therefore the transformation of villagers' behavior during rainy season is important. Resulting from the regular meeting and discussion with the villagers as PRA implementation effort, the researchers are able to educate the villagers to understand the importance of rain water harvesting through the information provided from the vulnerability assessment result in spatial analysis (vulnerability map). The vulnerability map shows the villagers the real condition of them in facing drought event, and through this information, the researchers invite the villagers to harvest rain water in more efficient way. Figure 1 shows the info-graphic created as information for rain water harvesting in Ploso Village.

This info-graphic is used as the information for villagers to promote the importance of rain water harvesting. The info-graphic is printed in poster size and set in several locations in Ploso Village to remind local people regarding this matter to overcome the drought season that has been given problem for them through many years.

Aside from inviting and urging local community to harvest rain water, the disaster preparedness community is also formed as Local Response Capacity. This community is responsible to always remind people in Ploso Village to use efficiently use water during the drought event and harvesting water in rainy season. Aside from that, this community is aimed as the village representative that will connect with local government, NGOs, or private sectors regarding future programs or activity conducted for disaster prevention management, disaster preparedness training, etc.

Figure 1. Rain Water Harvesting Method Simplified for Ploso's Villagers

Buffering Capacity

Cannon et al (2003: 5) explain that livelihood and resilience (asset pattern and capitals, income and exchange options) is one of the complex characteristics of a person which related to their social vulnerability in disaster context. Cannon continues to explain that the development work resulting from vulnerability identification should be aimed to protect and reinforce livelihoods in such a way that people are able to become more resilient to hazards, and be better protected from them. In this research, the main condition that shows major livelihood of the community is as a farmer inflicting the new idea

to develop another livelihood for the women in order to support the head of the family. By using local food resources, women in this village are supported to produce local snacks which can be sold as an alternative earning for their family in order to dismiss the condition of single-sector dependencies as what also explained by Cutter et al (2010) and Daramola (2016) in their research.

'Jogcer' is the product that being developed by the researchers in order to create marketable local origin food. In the process of Jogcer's creation, the women in Ploso Village are joining the local group named 'Ploso Manunggal' that created by the research to ease the development process. Through this group, the researchers are educating the local women in producing healthy food, as well as conducting management process for trading activity while the legal process for this home industry is in process.

CONCLUSION

The community capacity enhancement is indeed necessary to prepare local people towards disaster. Towards this activity the vulnerable people would be more able to withstand the severe impact of disaster, especially as discussed in this research that the three types of capacity are required to be enhanced which are including the absorbing capacity, buffering capacity, and local response capacity. Regarding the existence of annual drought event in the research location, enhancing the local community capacity through an integrated farming will be an effective effort to stand against drought because the lack of water resources and the unavailability of non-permanent water tank for alternative water resources can be dismissed by efficient use of local resources which require less water material. Therefore, the main livelihood would still able to run normally without getting disrupted by the natural condition (drought). In the time when the main livelihood able to stand against natural condition, an issue regarding households' income will be minimized and as a result, through the capacity enhancement; the local community incomes will improve due to the addition of local business encouraged by housewives. However, the capacity enhancement should not be conducted through single phase alone. The continuous activities to sustain local people passion to be empowered are very important. Therefore, the researchers have to simultaneously maintain meetings and discussion with the target area and provide them supports continuously. Aside from that, the participation of local institution should be emphasized, the role of Department of Industry and Commerce in providing revolving grant fund for local community would be a massive support for further development of local-initiated business.

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