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Social capital for flood disaster management: Case study of flooding in a village of Bengawan Solo Riverbank, Tuban, East Java Province

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ABSTRACT

This study aims to describe the effectiveness of social capital in the management of flood disasters in Bengawan Solo Riverbank area in Plumpang, Tuban and the problems faced in managing the flood. The flood occurs every year during the rainy season from October to April due to the rising water level that overtops the riverbank. Though occurs annually, the timing cannot be predicted precisely. The impacts of the flooding are: a) submersion of farm lands and houses; b) damage of public facilities (schools, village roads, places of worship, village offices, etc.); and c) disruption of social and economic activities of the villagers. Dealing with the flood and its impacts would have to be a collaborative endeavor of multiple stakeholders. One of the important strategies for managing flood is strengthening social capital. For this reason, a qualitative study was conducted from January to July 2019 in a village of which the river runs through and is severely affected by the flood. The research data were collected through observation, interviews, focused group discussions, and a review of documents related to the problem of flooding. The study finds that social capital in flood disaster management includes a) social capital for preventing flood impacts; b) moment of flooding, and c) recovery from the impacts of the flood. Social capital in each stage of flood disaster management involves several stakeholders, including the villagers, people from outside the village, government, and private sector. Social capital for managing flood is necessary to strengthen the collaboration between stakeholders and researchers on flood management evaluation.

1. Introduction

According to East Java Regional Disaster Management Agency (*BPBD-Badan Penanggulangan Bencana Daerah*), in 2018 floods occurred in 38 districts and cities in East Java. Flooding is common in the rainy season. One of the areas prone to river flooding is the riverbank of Bengawan Solo River, including the villages in Plumpang Sub-district.

The villages in Bengawan Solo River Basin are grouped into Bengawan Solo Upper Watershed, Madiun Sub-watershed, and Bengawan Solo Downstream Sub-watershed. Madiun Sub-watershed has an area of 6072 square kilometers and the Bengawan Solo Sub-watershed downstream has an area of 3755 km^2. Being a downstream or estuary area, Bengawan Solo River deltas became densely populated settlements forming the delta cities in East Java, namely Bojonegoro, Tuban, Lamongan, and Gresik (https://id.wikipedia.org/wiki/Bengawansolo). These areas of Bengawan Solo estuary is subject to river flooding, especially the city of Tuban. A number of villages in Plumpang Sub-district of Tuban suffer from annual flooding due to the overflow of Bengawan Solo River. Water overflow commonly occurs in the rainy season due to high rainfall both upstream and downstream. The following Graph 1 indicates rainfall in the Sub-district of Plumpang.

As Graph 1 shows, the highest rainfall occurred in December and January. In those months, several villages in the Plumpang Sub-district of Tuban Regency which is close Bengawan Solo River are flooded. The time of the flooding alternates according to rainfall conditions in the upstream area. It shows the changing climate conditions. In the rainy season of 2018–2019, river flooding in the villages of Plumpang Sub-district occurred in March 2019, which last for 10 days.

According to the research team from the Research Technology and Management Center of Bengawan Solo Riverbanks, during rainy season, people living downstream of the Bengawan Solo Riverbanks face the problem of river flooding. This river flooding is exacerbated by the damage due to the malfunction of the recharge area, especially in upstream areas (Wonogiri to Ngawi), and the high rainfall. The increase in

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runoff is related to the narrowing of the forest cover or tree crops and inadequate distribution of forests. Even though the 1999 Law on Forestry states that forest area in the watershed should be at least 30%, the forest area in Bengawan Solo watershed is only 24%. Judging from the size of the downstream area (Ngawi to Gresik), it would be ideal to have more catchment zones in the upstream area. (http://jateng.tribunnews.com/2016/01/21/cer-transporter-penyebab-sungai-bengawan-solo-banjir-di-daerah-hilir).River flooding along Bengawan Solo riverbank results in physical and non-physical losses. However, according to the villagers, the flood also carries mud that fertilizes plants. This is indicated by rice yields of approximately 10 tons per hectare. Rice productivity has exceeded productivity in general, which usually reaches six tons per hectare.

One of the villages in Plumpang Sub-district that is affected by the flooding is Kebomlati Village. Flooding in this village occur every year during rainy season. It is not easy to predict the volume of the floods because it requires comprehensive flood management. Flood management consists of efforts to prevent and deal with floods and post-flood recovery. Solving the problem of flooding is an endeavor that requires collaboration of multiple stakeholders. Participation and cooperation of these stakeholders in one network is called social capital. Therefore, the question addressed in this study is "How effective is social capital in the management of flood disasters in Bengawan Solo Riverbank area in Plumpang, Tuban? What are the problems faced in flood disaster management?"

2. Literature review

2.1. Flood disaster

Floods generally occur all of a sudden. Sometimes, there are warnings, but the time window is usually very small. Water moves quickly, and it is difficult to control. It possesses a major threat to the lives of humans and the infrastructure. In river areas, flooding is often accompanied by mud. As a result, flooding occurs in high-risk areas such as areas that have experienced environmental damage. There are several factors that determine the vulnerability of disaster impacts, namely: a) high poverty rates; b) unsustainable development patterns, and c) poor economic condition (Amy et al., 2006). To reduce the impact of flood damage, disaster management is needed.

Flood disaster management can be divided into three categories. First, before a disaster occurs, prevention and planning can be done to reduce and minimize disaster risks. These include making maps of disaster-prone areas, planting trees, reforesting, as well as providing counselling and increasing public awareness of disaster-prone areas. Planning is based on previous experience or learning from other regions. The aims are a) to minimize disaster risk to prevent casualties and damage to infrastructure, b) to manage community resources, and c) to train community members in disaster-prone areas. It is disaster mitigation which is a series of efforts to reduce disaster risks, both through physical development and the effort to increase awareness and capacity building to face the threat of disaster (in Article 1 paragraph 6 of PP No. 21 of 2008 concerning the implementation of Disaster Management).

Second, there are strategies, efforts, and actions for dealing with disasters as part of the effort to minimize the risks of flood disaster. At this stage, the focus is on disaster relief efforts and anticipation of damage. Strategies for handling floods are related to conditions of social vulnerability at the individual and community level. Pressure on social vulnerability at the individual level is related to lack of resources, power relations, poverty, and marginalization. Social vulnerability is determined by the distribution of income, access to resources, and diversity of economic assets [1]. Communities affected by flooding consist of various gender, class, religion, and race. Intersectionality of various groups can increase the ability of populations to prevent, respond to, and recover from floods [2]. Third, the recovery from the impact of the flood disaster to restore environmental and community conditions.

According to Kundzewicz and Takeuchi [3]; the problem of flooding is related to geographical, socio-demographics, and political factors. A natural disaster mitigation strategy is an effort to increase water storage in catchments, for example, the idea of "catching rainwater" to increase water storage at the ground or underground level in order to increase infiltration. Further, Kundzewicz and Menzel [4] mention that measures to reduce natural flooding include a) formation of wetlands and nature conservation to form aquatic habitats to replenish groundwater; b) afforestation to reduce erosion, improve water quality, and create new habitats; and c) removal of tightly closed surfaces thereby increasing water storage capacity. Besides that, it is necessary to apply a strategy to reduce the impact of floods, namely a) building infrastructure for flood defense, such as dams and dykes, to control and divert floods; b) increasing the capacity of the channel to expedite floodwaters; c) controlling water sources through watershed management, for example creating terraces, managing vegetation-afforestation, and avoiding deforestation; and d) increasing water storage with wetlands.

Montz and Grunfest [5] recommend that: a) an increase in understanding of social processes related to flood problems such as flash flood warnings, specifically the response phase, should be emphasized, and b) the necessities of life to reduce vulnerability, to meet sustainable economic and social goals, should be provided. Because of these reasons, the collaboration between hydrometeorology and social science is needed to overcome flash floods. Successful strategies in flood disaster management require collaboration among a number of stakeholders in the flood area, stakeholders outside the village, private institutions, and government agencies. These cooperation and participation of stakeholders for a common purpose is regarded as social capital. Social capital has an important role in various strategies to deal with disasters. Mobilizing social capital is needed so that the community can survive before assistance comes from outside [6].

2.2. Social capital in flood disaster management

The previous section mentions that stages in flood disaster management include a) prevention efforts towards reducing the impact of flood disasters; b) response or handling when flooding occurs; and c) recovery from the impact of flood disasters. Each stage of the flood disaster management activities requires cooperation and participation of a number of stakeholders as social capital. According to Bourdieu [7]; social capital is a set of resources in a social network recognized together to achieve shared goals. Meanwhile, Putnam, et al. (1997) argued that social capital consists of trust and norms that govern a network to increase the efficiency and collective initiative of social organizations accumulated in an area, affected by local government and private institutions. Furthermore, Xinjia, et al. [8] said external and structural social capital collaborations to strengthen organizational resilience in disaster mitigation are important.

According to Foxton and Jones [9]; social capital consists of several dimensions, namely civic participation, social networks and social support, social participation, reciprocity and trust, and views of the local area. Woolcock and Narayan [10] define social capital as the norms and networks that allow collective actions. According to Putnam [11]; there are at least three forms of social capital namely bonding, bridging, and linking social capital. Bonding social capital is described as a relationship between individuals in a group that is characterized by strong ties so that trust, motivation to work together, and support, help to meet needs. Bridging social capital refers to social relations between individuals to work together with other individuals or groups that are heterogeneous to provide benefits. Usually, social relations are weaker than bonding social capital. Linking social capital is described as the relationship between individuals in power structures intended to get support from formal institutions. In relation to flood management, there is an intersection (combination) of the three forms of social capital called hybrid social capital. Rustinsyah [12] added that in disaster mitigation, hybrid social capital, which is a combination of bonding,

bridging and linking social capital, is crucial.

Fukuyama [13] argued that social capital is necessary for successful development, but a strong law and basic political institutions are necessary to build social capital. According to the World Bank, more and more evidences show that social capital is very important for the community to prosper and develop sustainability [14]. Likewise, Joshi, and Misa Aoki [15] stated that social capital determines the success of implementing government policies related to disaster recovery.

Social capital for flood management starts from preparation or prevention in an effort to reduce the impact of floods, during floods, and in the recovery from the flood disaster. The following Table 1 presents the concept of social capital in flood disaster management.

Table 1
Social capital in disaster management.

No	Stages in flood disaster management	The form of social capital in flood disaster management
1	The preparation phase for prevention or reduction of the impact of floods	1 Bonding social capital is how individuals in the community believe; are motivated so that social cohesion appears; and are willing to cooperate in receiving and disseminating information aimed at groups or individuals for flood preparedness activities. 2 Bridging social capital consists of efforts to disseminate information to build awareness about disaster risk. 3 Linking social capital consists of the role of organizations outside the village (government and private) in providing information, training, policies, implementation, and early warning, specifically as prevention of the effects of floods in the area. 4 Hybrid social capital is an intersection or combination of bonding, bridging, and linking social capital
2	The response time phase in handling flood disaster	1 Bonding social capital consists of the identification of flood impacts, mental and physical rescue during emergencies, and offer of support to other parties outside the village to help with flood impacts 2 Bridging social capital consists of how to accommodate volunteers from the area to help deal with the effects of floods. 3 Linking social-capital consists of how the emergency response committee handles floods such as seeking support and assistance from government and private institutions (companies, NGOs, stakeholders) and others. 4 Hybrid social-capital is an intersection or combination of bonding, bridging, and linking social capital
3	The recovery phase	1 Bonding social capital includes emotional and mental behavior and action of society members to support or cooperate to recover from flood impacts 2 Bridging social capital consists of spreading information about work or livelihood for survival, assistance from outside the village (neighboring villages, private sector, etc), and hoping to get attention and assistance when recovering from the impact of disasters 3 Linking social capital includes forms of assistance, namely subsidies from the government to repair damaged houses and facilities due to flooding. 4 Hybrid social capital is an intersection or combination of bonding, bridging, and linking social capital

Source: Wooclock and Narayan [10] concepts adapted by researchers

3. Research method

3.1. Research area

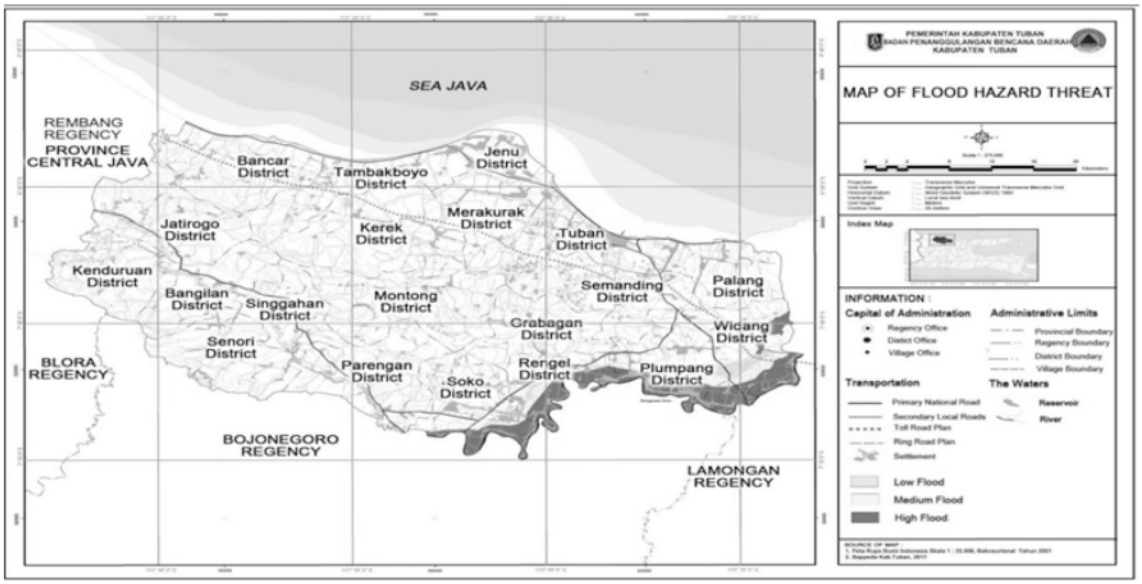
This study was conducted in Kebomlati Village, Plumpang Sub-district, Tuban Regency. The village is located along the banks of the Bengawan Solo River. In the rainy season, the village is flooded due to the overflowing river and becomes one of the most impacted areas. The geographical condition of Tuban Regency causes the area to be disaster-prone. Various potential disaster risks include river flooding, tidal flood, earthquake, landslide, drought, wild fire, and tsunami. These potential disasters are scattered in all parts of Tuban Regency and take place within various periods in a year. During dry season, some Tuban areas experience drought and forest fire. During rainy season, other areas experience river flooding, tidal flood, and landslide. Fig. 1 presents the area of Tuban Regency that are prone to flooding.

Kebomlati is one of the villages in the Plumpang Sub-district of which the majority of the population depend on agricultural sector. There are two kinds of agricultural land in Kebomlati Village: rice fields and crop fields. Rice fields are located in the center of the village, while crop fields are located rather to the sides. Rice planting season is twice a year, within the period of April/May–August and September–January. Irrigation for rice plants from the Bengawan Solo River is managed by HIPPA- *Himpunan Petani Pemakai Air* (Water User Association). It was in the September–January period that the area is prone to flooding. Villagers are worried that they might experience crop failure. Such failure would be devastating since the majority of the population depends on agricultural sector. In the rainy season, fields are planted with horticulture and secondary crops. *Tegalan* or moor is planted with horticultural plants while open yards around the settlement are usually planted with fruits, bananas, ornamental flowers, and others. According to the village monograph data in 2018, Kebomlati Village covers an area of 129 ha, which are divided into a) rice field covering 59 ha, b) dry land covering 40.52 ha, c) *bengkok* land or village land (freely leased to village staffs as compensation for their services) covering 16 ha, and d) land for public infrastructures and facilities including government office buildings, burial sites, school buildings, village roads, high voltage electricity poles, and sport fields totaling 13.48 ha. During the flood, most of these areas of the village are submerged, except the dry land area which is higher in elevation, and houses which have been raised 1–1.5 m above the ground.

The population of Kebomlati village is 3843 people, consisting of 1927 males and 1916 females. Most villagers depend on agriculture for their livelihoods. In addition, some farmers have other economic activities, such as breeding duck, ranching cattle, running small businesses (producing cornstarch, snacks, and garments), fishing in Bengawan Solo River, and opening small groceries or convenient stores.

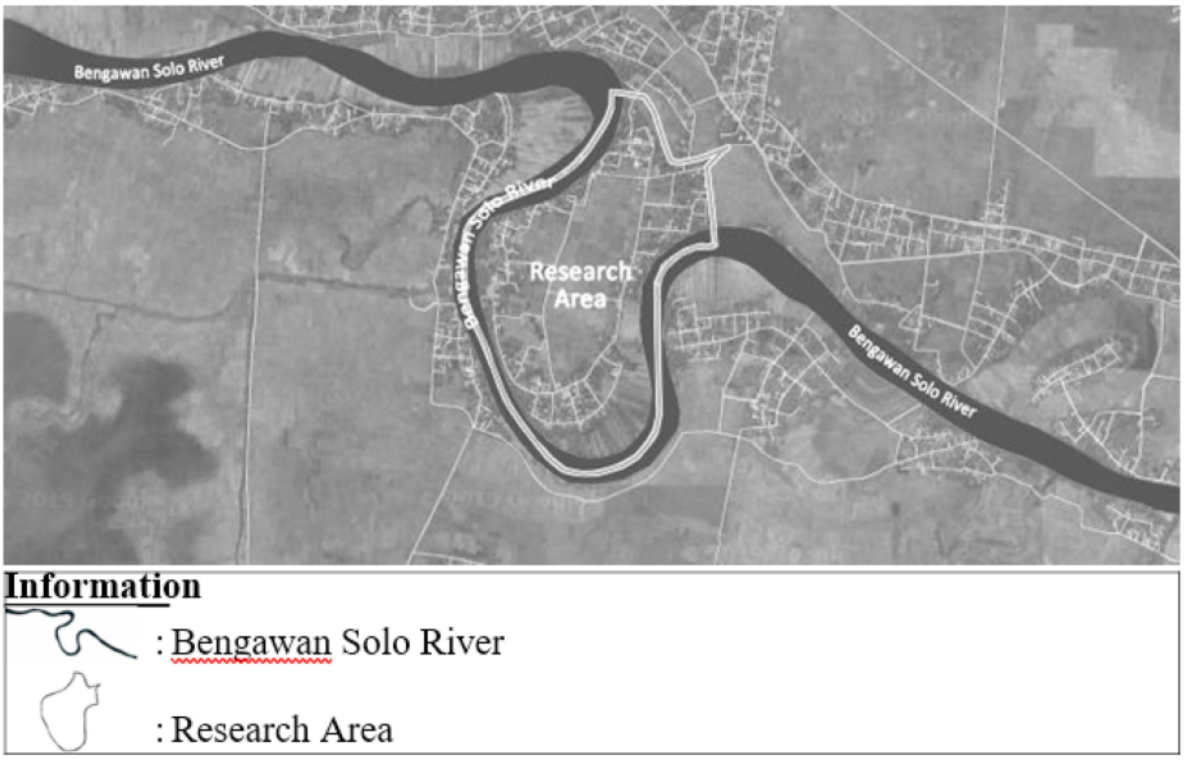
The welfare levels of the villagers vary along the years. Before 2007, Kebomlati village has the highest poverty rate in Plumpang Sub-district as an impact of seasonal floods and droughts. However, since 2007, *HIPPA* has managed agricultural irrigation by utilizing water from Bengawan Solo River using pumps. This water management allows farmers in this village to grow rice. Rice planting takes place twice a year. However, if a big flood occurs in October, rice plants of the second planting season will not be able to be harvested because they are submerged in water.

According to village monograph data in 2018, Kebomlati Village has a low level of welfare compared to other villages in Plumpang Sub-District. It can be seen that 607 families (56% of the population) are categorized as very poor. They are usually senior members of the population who work as plantation workers and live in houses with dirt floors and woven bamboo walls. Another 420 families (39%) are poor



Source: bpbd.tubankab.co.id, adapted by researcher (2019)

Fig. 1. Tuban Regency Flood Area Source: bpbd.tubankab.co.id, adapted by researcher (2019).



Source: maps.google.com, adapted researcher 2019

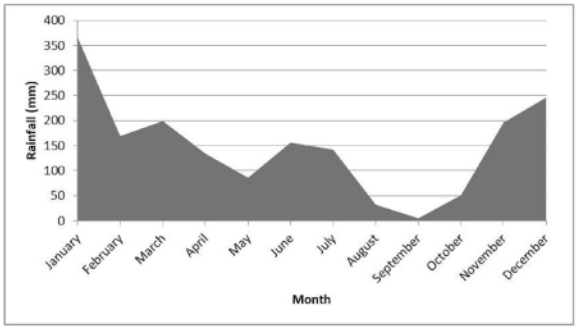
Fig. 2. Kebomlati Village as Research Area Source: maps.google.com, adapted researcher 2019.

families, usually young families who are in the process of moving towards prosperous families. Both husband and wife mostly work as plantation workers, construction workers, fishermen, and the likes. Furthermore, a small proportion (5.7%) are categorized as prosperous families level II and only 0.27% are categorized as prosperous-plus families. They usually live in permanent housing, are landowners who also work as civil servants, own small businesses (groceries or garment manufacture), and own livestocks.

Kebomlati Village (Fig. 2) is the area most severely affected by river flooding from Bengawan Solo River. The timing and volume of floods in this village are not easy to predict. Flooding in this village results in physical and non-physical losses. Data on the impact of floods in this area are based on reports from the collaboration of BPBD officers and local village government. In addition, the research also makes use of flood hazard maps derived from satellite imagery [16,17]. Table 2 shows the impact of flooding in Kebomlati village.

Flash floods in 2019 occurred in March and lasted for almost 10 days, submerging 59 ha of rice fields. When the floods occurred, fortunately the rice field had been harvested so that farmers were saved from losses. However, up to 45 ha of upland farms were also submerged in water. At the time, the upland fields in this village were planted with horticultural crops (cucumbers, eggplants, string beans, and others) and corn plants. At the time of flooding, the plant age was only one month, so there was nothing to harvest yet, costing many farmers great losses. For example, Kas (46 years of age), a farmer who planted corn on his 1.2 ha field, suffered a loss of five million rupiahs because he had spent money on labor wages, chemical fertilizer, seeds, and others. Likewise, there were other farmers who planted 3 ha of vegetables and suffered a loss of 19 million rupiahs.

Flood disasters have an impact on the activities of villagers. Among others is their economic mobility. The social conditions of the villagers are disrupted because their yards and the village roads are flooded. If they need to go somewhere out of the village, they must take the boats owned by fishermen who charge them 5000–7000 rupiahs per person. The most difficult case is when someone dies; it is difficult to do the funeral. Therefore, burial usually takes place in a neighboring village. Another impact is the disruption of works of the village officials whose homes are far the village. Next impact is the difficulty experienced by middle school and high school students whose schools are located outside the village. Villagers who keep cows are also forced to raise the cowshed at least 1 m from the ground to avoid being submerged. They also experience difficulty in finding grass for their cattle feed, forcing them to go out of the village to look for grass. The last impact is the occasional black outs, rendering it difficult for the villagers to do their daily chores and activities.



Graph 1. Rainfall in the Plumpang sub-district, Tuban Regency Source: Monograph s ub-district of Plumpang, 2018.

Table 2
Impact of the bengawan solo river flooding in Kebomlati village.

No	Impact of the flood in Kebomlati Village	Description of area affected
1	Rice Field submerged in water	Total affected area: 59 ha
2	Upland fields submerged in water	Total affected area: 45 ha
3	Village roads submerged in water	Almost all village roads
4	House yard submerged in water	Almost all house yards
5	Residential area	Most houses, except those raised up to 1.5 m from the ground
6	Public facilities submerged in water (school buildings, Mosques, village offices)	Almost all part of these facilities
7	Mud sediment from the river	Mud fertilizes the land and increase crop productivity. Most buildings and all village roads are covered in mud.

Source: Kebomlati Village office notes and observations 2019

3.2. Data collection and analysis

The research took place during the dry season (May–October 2018) and the rainy season (October–April 2019). The qualitative approach used in this research is expected to produce rich, contextual, and valid data so that the data can be used to answer the research questions. This approach is applied to explain how people, in relation to an event, (for example how to identify the effectiveness of social capital practices in flood disaster mitigation management) can, therefore, be identified from the life experiences of individuals [18] involved in handling flood mitigation and those affected by floods.

Therefore, data were collected through observation, interviews, reviews of documents related to flooding issues, and focused group discussion. The data collection was carried out through several stages. The first stage was a series of interviews with several stakeholders related to flood disaster management programs such as village head and officials, district head and officials, and Tuban District Disaster Management Agency. It was intended to obtain general information about disaster mitigation management and its impacts. The second stage was in-depth interviews with villagers affected by flooding. The interviews focused on topics regarding the effects of flooding and the efforts made to deal with the flooding. It was intended to obtain information about disaster management and villagers' response to the impact of the flood. The third stage was collecting data from official records, previous studies, books, publications, journal articles, reports, and local newspaper articles about rehabilitation and recovery efforts in the area. The fourth stage was the focused group discussion (FGD). Focused group discussions were conducted twice after the flood in the village office attended by village secretaries, disaster response volunteers, villagers, school teachers, hamlet heads and officials, and PKK (Family Welfare Empowerment, whose members are women of the village) officials.

To analyze the qualitative data, the Atrride-Stirling's [19] framework was employed. In the first stage, transcripts from recordings, notes, observations, and FGD were prepared. Some recordings were in Javanese language and Bahasa Indonesia. Second, codes or labels of the data were made. According to Miles Huberman (1994), codes are labels that contain transcript segments used to identify key concepts to answer research questions. The coding was done when data saturation had been reached. This means that no new concept was found. The third stage was to develop a code structure to produce reports according to the research theme. Furthermore, after the themes had been identified, an analysis was done to answer the research questions.

4. Result and discussion

Kebomlati is a village in the Plumpang Sub-district most severely affected by flooding. Flooding in Kebomlati village occurred in March 2019 for approximately 10 days. Floods in this area occur during the rainy season, but the time of the flood is unpredictable. Geographically,

Table 3
Planning and prevention for reducing the risk flood disasters.

No	Type of social capital	Activities
1	Bonding social capital	1. The appeal of the village head to the villagers to raise the house 1–2 m above the village road 2. Urging villagers to prepare necessities for supplies during floods. 3. Building interaction and good communication between community members through religious activities involving all members of the family 4. Preparing facilities for dealing with floods (for example, fishermen prepare boats, buoys, etc.) 5. Participation of villagers in the assembly instruction at the village, RW (Association of Residents), and RT (Association of Neighbors) 6. Togetherness in initiating rice planting to strengthen cooperation in economic and social activities
2	Bridging social capital	1. Local Government and stakeholders who are members of the WhatsApp Group provide information to the village residents to prepare themselves for the flooding. 2 Together with BPBD, disaster volunteers in the village conducted a river survey during the dry season, aiming to: a Knowing the prone points (fissures) on river banks b Conducting improvements in river conditions to reduce the impact of floods 3 Community members together with religious organizations Nahdatul Ulama and Muhammadiyah repair fissures along the Bengawan Solo riverbanks to prevent flooding.
3	Linking social capital	1 Residents and village officials gather at the village office to participate in training on mitigating flood. The training was organized by the BPBD of Tuban Regency, and includes: a Dealing with floods b. Developing "disaster-resilient villages" c. Getting assistance in facing flooding impacts 2 BPBD recruits residents to become disaster volunteers. They are then trained by local governments to become a professional disaster volunteers. The program aims to make sure: a The availability of professional human resources (disaster volunteers) as partners in handling flood disasters b. The availability of human resources as partners in providing current information about the condition of the volume of water in Bengawan Solo River, reporting on the condition of the disaster area, and helping the community to manage flooding 3. Promotion of "disaster-resilient villages" to prepare villagers in facing flood disaster
4	Hybrid social capital	1. All stakeholders, including villagers, government, and private sectors, are participating in building a flood retaining embankment 2. Creating WhatsApp Group to coordinate flooding management 3. The appointment of disaster volunteers in the level of villages, sub-districts, and districts

Source: Research Data, processed by researchers, 2019.

the residential area and agricultural land of Kebomlati Village are surrounded by Bengawan Solo River.

4.1. Social capital and flood disaster management in Kebomlati Village

Flood related disaster management is divided into three stages: a) planning to prevent and reduce the risk of flooding; b) responding to the effects of floods; and c) recovering. Social capital in each stage of flood disaster management consists of bonding social capital, bridging social capital, linking social capital, and hybrid social capital.

The Regional Disaster Management Agency (BPBD-*Badan Penanggulangan Bencana Daerah*) of Tuban Regency is a non-departmental government agency that is responsible for carrying out disaster management in its area. The government made a regional regulation as a guideline in disaster management. In carrying out its duties, Tuban BPBD refers to Article 9 of Law No. 24 of 2007 concerning Disaster Management. The authority of the Regional Government in disaster management must establish regional policies which align with regional development. Then, it is updated with Regional Government Regulation No. 10 of 2014 concerning Disaster Management. The regional regulation explains the duties, authorities, roles, and rights of each party such as the Government of Tuban Regency, Tuban BPBD, international institution, and the people of Tuban Regency in relation to disasters. In carrying out its activities, BPBD of Tuban Regency has three divisions, namely: a) Prevention and Preparedness, b) Emergency and Logistics, and c) Rehabilitation and Reconstruction. These three divisions handle tasks according to their respective fields. In addition to the three divisions, the Tuban BPBD also has several task forces namely a) the Rapid Reaction Team under the control of the Emergency and Logistic Division, b) the Operations Control Center, and c) the Data and Information Center; both of which are under the auspices of the Prevention and Preparedness Division. Regional BPBD is guided by the policies of the National Disaster Management Agency (BNPB-*Badan Nasional Penanggulangan Bencana*).

Flood disaster management in the area is guided by the Regional Regulation of Tuban District Number 10 of 2014 concerning Disaster Management. Disaster management is a collaborative endeavor that involves many stakeholders. Disaster management in this area is coordinated by the regent who appoints BPBD as the executor. A breakthrough made by Tuban BPBD to accelerate the dissemination of information related to flooding is *Si Cepat* application. *Si Cepat* is a mobile application which provides information, reporting, and disaster relief features. *Si Cepat* was launched in 2018 and is still being developed to be accessible by all people of Tuban Regency. Using this application, reporters can report disaster events by uploading them directly to the application so that Tuban BPBD officers can respond in a timely manner. Social capital is needed in handling flood disaster in this region as highlighted by the following tables (see Table 3).

Social capital plays an important role in the effort to prevent the impact of flood disaster in the region. There are three forms of social capital: bonding social capital, bridging social capital, linking social capital, and hybrid social capital. Bonding social capital is to prevent the impact of flood risk by appealing to the villagers to raise their houses 1–2 m above the village road. Most houses in this village have been raised 1–2 m. Only a small number of villagers' houses have not followed the appeal because of socio-economic conditions.

The second is approaching villagers to prepare themselves physically and mentally, for example preparing food supplies and building good interaction between community members. For this reason, villagers are active in religious activities at the RT level that involve every member of the family once a month. Meanwhile, religious activities in RW level only involve the RT administrators. These religious groups also have other activities that can build community togetherness such as saving and loan activities. Savings and loan capital comes from the members who are obligated to pay a monthly capital of 50,000 rupiahs. The accumulated capital may then be lent to members with a 3% monthly interest. The profits from savings and loan activities are used to buy household appliances, provide financial assistance to sick members, provide funeral services, and the likes. Religious organization in the village collects donations from its members, of which 70% is managed by the organization, and the remaining 30% is managed by religious organization at the sub-district level.

The third is preparing the infrastructure to deal with flooding (e.g. fishermen preparing their boats to provide transportation service). This boat preparation is especially notable in Ngablak hamlet, of which some of its residents are fishermen who have boats. There are approximately 15 boats owned by these fishermen. During the flood, these boats are used to transport villagers. Boat charges range from 5000 to 7000 rupiahs per person per trip.

The fourth is calling villagers to prepare food supplies (rice, side

dishes, and others). The villagers followed the appeal by providing side dishes (salted fish), rice, cooking oil, and so on. To get salted fish, residents in the village do not experience any difficulty since some of the villagers work as fishermen.

Bridging social capital is an effort to spread information outside the village (government, private sector) in order to build awareness about disaster risks and care for flood victims. The stakeholders do this by, first, creating a WhatsApp Group consisting of stakeholders in the Bengawan Solo River flood mitigation. There are 4 WhatsApp groups related to flood disaster mitigation: a) SRBB-*Sekretariat Relawan Bencana Banjir* (Secretariat of Flood Disaster Volunteers) consisting of 256 people, involving all elements in BPBD and volunteers in Tuban Regency; b) Disaster Info Tuban with 238 members consisting of BPBD, relevant government agencies (Social Service, Environmental Service, Forpimcam (District Leadership Forum)), and disaster volunteers; c) Volunteers in Plumpang Sub-district with 73 members consisting of Forpimcam, village officials affected by floods, and sub-district volunteers; and d) *Destana-Desa Tangguh Bencana* (Disaster Resilient Village) with 10 village members and Kebomlati village volunteers. In addition, there is a Facebook page about Kebomlati village, which shows the condition of Kebomlati Village during floods. The WhatsApp group members are officers at BBWS (*Balai Besar Wilayah Sungai* – River Basin Center) of Bengawan Solo River, officer in the upstream area namely the Gajah Mungkur Reservoir in Wonogiri (Central Java), the Head of Kebomlati Village and its staff, volunteers based in Plumpang District, Koramil (*Komandan Rayon Militer* – Commander of Military Rayon), Kapolsek (*Kepala Polisi Sektor*–District Police Chief), and Head of BPBD of Tuban Regency. The WhatsApp Group is important in accelerating and facilitating the exchange of information about water conditions in the upstream area and other issues related to flooding (for example rainfall conditions and weather in areas along the Bengawan Solo River). Second, the regional government, represented by BPBD, conducted river surveys during the dry season. These surveys were conducted twice in the dry season with the aim of knowing the condition of the river (riverbank damage and river shallowing due to garbage). The surveys were conducted using three boats belonging to BPBD and were coordinated by BPBD employees with the assistance from local village officials and volunteers. River surveys in 2018 recorded nine fissures with an average length of 30–60 m and a width of approximately 40 cm and a depth of 40–70 cm. Tuban BPBD subsequently repaired the fissures to reduce the impact of Bengawan Solo River flooding.

Kebomlati villagers are mostly members of the *Nadhatul Ulama* Religious Organization and the rest are part of the *Muhammadiyah* religious organization. Those who are members of the *Nadhatul Ulama* Religious Organization are part of the *Amil Zakat Infaq* Institute and the *Lembaga Amil Zakat Infaq dan Shadaqoh Nahdlatul Ulama* (LAZISNU). Members of the Nahdatul Ulama organization in the village voluntarily collect money at the head of the village organization. The funds are used for villages and deposited to organizations at the sub-district level. From this amount, 30% were handed over to LAZISNU at the sub-district level and 70% were managed by organizations in the village. At the sub-district level, funds are used to provide assistance in social activities in villages, Plumpang sub-districts such as repairing the banks of the Bengawan Solo River and other social assistance. Meanwhile, the management of social funds in the village provides assistance in social activities (for example, if someone dies helped by a pack of cigarettes containing 10 packs and 10 doses of aqua). Likewise, the Muhammadiyah Organization or LAZISMU *(Lembaga Amil Zakat Infaq dan Shodaqoh Muhammadiyah*–Amil Zakat Infaq and Shodaqoh Muhammadiyah Institution) members give sadaqah in the form of money. Members of NU religious organization are larger than that of Muhammadiyah organization so that the funds collected at LAZISNU are greater than LAZISMU. According to LAZISNU management records in the village, the average fund collected by LAZISNU member in the village is approximately three million rupiahs per month.

The form of linking social capital consists of a network of organizations (private, government) with individuals, organizations from outside the village to provide training and information to prevent and reduce the risk of flooding impacts. Some activities related to these efforts are training by BPBD of Tuban Regency to villagers and village officials about how to deal with floods and building a Disaster Resilient Villages; procedure to get help due to being affected by the disaster. The training were carried out in the dry season around July for two days at the village office on Saturday. Those present received transportation, lunch and guidebooks.

The next activity is the recruitment of disaster volunteers by BPBD. They are then trained by local governments to become professional disaster volunteers. Disaster volunteers are expected to show: a) availability of professional human resources (disaster volunteers) as partners in flood disaster management, b) availability of human resources as partners in activities. The benefits of having disaster volunteers are: a) providing current information about the condition of the volume of water in the Bengawan Solo River; b) reporting on the condition of the disaster area in its working area; c) helping the community and the committee in handling flood disaster. The volunteers are residents of Tuban Regency who joined the Joint Secretariat Forum. They voluntarily coordinated with each other to help with disaster management. A volunteer forum was formed to assist the work of the Tuban BPBD. Volunteers are in charge of reporting on disaster events, helping with disaster management and recovery. Volunteers who live in disaster-prone areas avoid false disaster reports by certain individuals. The volunteers of BPBD often receive false information about disaster events. As a result, the Tuban BPBD who came to bring disaster equipment to the location was deceived.

Farmers also minimize the severity of floods by building semi-permanent dikes. Impermanent dikes are made by stacking sacks filled with sand. This embankment is done in mutual cooperation by the owners of the fields and coordinated by the village. This embankment is made in the area between settlement and rice fields.

4.2. Stages in handling to minimize the risks a flood disaster

Before the flooding, volunteers and village officials called on villagers to be on the alert. The call was made because it received information from *BPBD* that the water level in the upstream area is quite high and can potentially cause the flood. Furthermore, the regional government and *BPBD* formed a flood management committee in accordance with the regional regulations. The committee is chaired by the Tuban regent, as the operational head of the Tuban BPBD, District Police Chief, Commander of Military Rayon, and head of the district; assisted by the village head, village staff, and volunteers in the area. The committee immediately carried out the task of dealing with the impact of the flood disaster in the area.

The forms of social capital are bonding, bridging, linking and hybrid social capital as a form of social capital in dealing with flooding, are shown in the following Table 4 which indicates the response in handling to minimize the risks a flood disaster.

Before floods occur, the government formed a committee to call for emergency response. Emergency response calls are spread through WhatsApp group, an application service. *Si Cepat* is a mobile application that has information, reporting and disaster relief functions. *Si Cepat* was launched in 2018 and is still being developed to be accessible to all residents of Tuban Regency. The way it works is that reporters can report disaster events and can be uploaded directly to the application so that the Tuban BPBD officer can carry out the task quickly. When floods occur sometimes the electricity is turned and after the mobile phone does not work. That means to get ready to face the flood disaster by preparing their needs such as placing goods in a higher place, storing food needs and others. There are four WhatsApp Groups related to the SRBB disaster (Secretariat for Flood Disaster Prone).

The Flood Disaster Management Committee consists of the Regent of Tuban as stipulated in the 2014 Disaster Mitigation Regulation. The

Table 4
Social capital in handling to minimize the risks a flood disaster.

No	Form of social capital	Activities
1	Combination or intersection of bonding, bridging and linking social capital called hybrid social-capital	1. Villagers, village officials, disaster volunteers help the Committee to call for "Emergency Response through WA groups or direct communication to villagers to prepare for floods by preparing their needs such as putting things in a higher place, storing food needs and others. There are four WhatsApp Group related to the SRBB disaster Secretariat for Flood Disaster Prone, Disaster Information, District, Disaster Resilient Village 2. The regional government, through the Disaster Committee chaired by the BPBD, established Flood Relief Post in the village so that flood management can run smoothly. The post operates 24 h in charge of handling flood victims (distributing food aid to villagers, providing infrastructure (buoys and others), evacuating disaster victims, and seeking help from the government or the private sector. 3. Villagers cooperate to reduce the risk of flooding such as making flood retaining embankments made of sacks filled with sand arranged on the roadside so that water does not overflow. 4. Fishermen, especially from Ngablak Hamlet, who have boats can operate their boat to help with flooding such as renting boats to residents in need. Some of them also sell food around the village. 5. The committee identifies physical and non-physical losses of flooding. 6. The committee seeks employment information outside the village for male residents affected by the flood) Empowering TAGANA – *Taruna Siaga Bencana* (Disaster-Aware Youths). 7. The committee always makes every effort to seek help to deal with flooding.

Source: Research Data processed by researchers, 2019

committee and members are assisted by a number of government and private stakeholders. The tasks of the committee are: a) to build disaster flood posts in villages that operate 24 h during a flood; b) to identify the impact of floods, gather aid and distribute aid to residents affected by flooding; and c) to prepare facilities, infrastructure (inflatable boats, buoys, etc.) and other activities related to flood management in the area. To deal with the disaster in Tuban Regency, every year the government provides a budget. However, the budget provided by the government is sometimes insufficient because natural disasters in Tuban Regency are quite numerous, varied and unpredictable. For that, disaster management committees mobilize funds from various sources (individuals and institutions private and government.

In addition, the committee empowers disaster volunteers. The formation of disaster volunteers is in accordance with the Regulation of the Head of the National Disaster Management Agency No. 17 of 2011. For this reason, the Tuban government has recruited more than 500 volunteers spread across all villages in Tuban Regency. For the Kebomlati village area, there are five disaster volunteers. To improve the professionalism of volunteer works, they received training in handling disasters. The volunteers formed WhatsApp Group at the village, sub-district level with stakeholders in the Bengawan Solo Riverbank. The volunteers monitored the water level in Karangnongko area, Bojonegoro. If the water level has reached more than 8 m, the embankment in Kebomlati Village is unable to hold water and floods. The volunteers assisted the committee's activities such as seeking assistance for flood victims. The assistance is in the form of basic food, from school alumni in Kebomlati Village, NGOs, and neighboring villages. Assistance from international institutions, the central government, and private companies are usually channelled through BPBD if Tuban Regency to the village government). In addition, the committee was assisted by TAGANA-*Taruna Tangguh Bencana* … TAGANA is a program from the Tuban Regency Social Service which is responsible for helping to deal with disasters. TAGANA usually makes a public kitchen to provide food to help disaster victims.

Therefore, when flooding, all elements from the village, outside the village, private sector, government, individuals groups are mobilized to deal with disaster. When flooding occurs, the form of social capital which emerges is hybrid social-capital, which is a combination of social-capital bonding, bridging social capital and social-capital linking. The form of activity that describes the hybrid social-capital involves all components to collaborate, which include stakeholders from the village, outside the village, government and private sector who are mobilized to deal with flooding.

After the flooding was over it turned out that food aid, facilities (buoys) for villagers were still available at the village office, and there were no fatalities. It shows that the handling of floods in Kebomlati Village is quite responsive although the impact of flooding on physical damage results in material losses for villagers and needs further treatment so that the impact of material losses can be reduced. The form of post-disaster flood recovery is in Table 5 below.

Forms of social capital in disaster recovery such as bonding, bridging, and linking social capital are interesting. Bonding social

Table 5
Social Capital in flood Disaster Recovery.

No	Form of social capital	Activities
1	Bonding social capital	1. Mutual cooperation of villagers to clean houses, improve public facilities (village offices, mosques, schools, etc.) 2. Mutual cooperation to make *bronjong* (overflow-retaining embankment) into the 125 m long Kebomlati village settlement. There is *bronjong* access to village roads that can be traversed when flooding. Activities in making *bronjong* are a) Villagers work for one month and are not paid; b) Villagers provide voluntary food assistance to workers; c) Village government coordinator in the work. 3. Farmers in the village jointly prepare the land for making rice seedlings.
2	Bridging social capital	The social Service Tuban Regency through TAGANA (*Taruna Siaga Bencana* – Disaster Preparedness Youth) provides food aid in the form of instant noodles, but only for the maximum of a week. Some NGOs sometimes send food aid (instant noodles) to the village.
3	Linking social capital	1. FORPIMCAM-*Forum Pimpinan Kecamatan* (sub-district leadership forum) raises funds to companies in the vicinity to get material assistance The Regional government, BPBD provides assistance with piles to make *gabion* or retaining embankments by the river. Get material assistance (sand and stone) from private companies in the District of Plumpang. 2. The Bengawan Solo River Management Board in Bojonegoro Regency provides material assistance. 3. Assistance from friends and relatives outside the village 4. Assistance from Nahdatul Ulama and Muhammadiyah Religious Social Organizations
4	Hybrid social capital	The combination of the bonding, bridging, and linking social capital

Source: Research Data, 2019

capital is conducted by villagers. During the March 2019 flood the village office, school, village road and mosque were submerged in water; so much mud entered the building. Mutual cooperation activities were carried out by villagers. First, villagers work together to clean houses and repair public facilities (village offices, mosques, schools, etc.). Cleaning houses and village roads are carried out by villagers who are nearby. Mutual cooperation to clean village offices and mosques carried out by village officials along with other villagers, in particular, for cleaning the elementary school building which is carried out by teachers, students, and parents of students. Second, the making of "Gabion" or flood retaining embankments along the Bengawan Solo River along 125 m length. For labor and food donations, the villagers work in rotation and are not paid for about one month, while for the material assistance from the company, the Tuban BPBD (Regional Flood Disaster Management Agency) stakes as the coordinator for making *gabion* is the village head and his staff.

During the post-disaster recovery there was food aid from the government (specifically from the Social Service), NGOs outside the village provide food aid (instant noodle) for just a few days. In addition to villagers personally receiving assistance from outside the village (such as social organizations, DPRD *(Dewan Perwakilan Rakyat Daerah* – Regional People's Representative Assembly*)* member represented the area. Individual villagers also received assistance from social organizations, such as school alumni. For example, one of the sports teachers at the elementary school in Kebomlati village gets help from junior high school alumni who is part of the WhatsApp group. Food aid was then distributed to neighbors as much as one RT consisting of 38 households. Next, the villagers become members of the religious organizations, either NU or Muhammadiyah. For this reason, they received food aid from these organizations at the sub-district level.

In May 2019 the flood is over and farmers began preparing rice hatcheries. Hatcheries are centred on agricultural land that is rented together. Seeding time is approximately one month. The price of renting a 3 by 50 m land of rice hatchery is 200,000 rupiahs; thus, the farmers in this village can start planting at the same time. At the time of planting in this village, farmers in the village have a high level of activity. But there is no confirmation yet regarding material assistance form the government to villagers who suffer losses due to flooding.

5. Conclusion

Kebomlati village is part of Plumpang Sub-district, which is most severely affected by flooding because it is located in Bengawan Solo River basin. Flooding in Kebomlati Village recurs every year. Floods occur in the rainy season due to the overflow of the Bengawan Solo River. However, the timing and volume of the floods in Kebomlati Village are not easy to predict. For this reason, it is necessary to handle floods well so that the impact of flood can be reduced. Participation and cooperation between stakeholders is necessary to reduce the impact of disaster risk through social capital [20]. The elements of social capital for flood disaster management in this village consist of bonding, bridging, linking, and hybrid social capital.

Flood management includes three stages. The first is an effort to prevent the risk of flooding. Social-capital bonds can be described as a) the village head's appeal to villagers to raise their houses 1–2 m above the village road; b) appeal to villagers to physically and mentally prepare villagers, for example preparing food supplies, building good interactions among community members through the activities of religious groups of every member of the family; c) preparing facilities to deal with the flood, of rubber boats for the transportation of residents, buoys; d) appeal to prepare food; e) strengthening social capital through participation in religious activities at the RT and RW level. Bridging social-capital involves: a) the participation of volunteers, and village officials as members of the WhatsApp Group at the village district level; and b) river surveys during the dry season as an effort to reduce the risk of flooding. The linking social capital involves a) participation of villagers for training and socialization in facing flood disasters from BPBD of Tuban Regency; and b) disaster volunteer village residents at the district level. At the stage of efforts to prevent the effects of flooding, the collaboration between stakeholders in the village, outside the village, the government and the private sector are needed. An example of when handling a disaster is making *gabions* or flood retaining embankment, etc.

At the time of the flood disaster, a disaster management committee was formed, chaired by the Regent of the district of BPBD Tuban. For this reason, a number of stakeholders from the village, outside the village, the government, and the private sector are involved in disaster management, because hybrid social capital in disaster management is an intersection of bonding, bridging, linking social capital. Forms of social capital in disaster management include, among other: a) calling for emergency response through WhatsApp groups or direct communication to villagers to be prepared for flood disasters: b) The committee establishes an aid Post which operates 24 h; c) villagers join hands in cooperation, especially men, to reduce the impact of floods such as making water retaining embankments made from sacks filled with sand in vulnerable areas; d) villagers who work as fishermen provide boats to help with transportation. However, those who use the service pay rent 5000–7000 rupiahs per person; e) identify the effects of physical and non-physical losses; f) help villagers find job information outside the village.

For post-flood recovery, bonding social capital also occurs including villagers working together to clean houses, clean public facilities (village offices, roads, mosques, school buildings). Furthermore, villagers also receive post-flood assistance such as getting basic food assistance from alumni from outside the village; social-religious organization Nadhatul Ulama and Muhammadiyah Social Service and others. Therefore the hybrid social capital element which is a combination of bonding, bridging, and social capital linking is very necessary for flood disaster recovery. But there has been no material assistance to villagers who suffered losses to plants when their crops were flooded.

Overall, the results of this study are expected to be useful for stakeholders at all levels from the village to the central government. The cooperation, collaboration between stakeholders in the village, outside the village, individual, institution, the government, the private sector continues to be strengthened and improved so that the handling of floods in disaster-prone areas get good and appropriate treatment. The activities involved cooperation from villagers, outside the village, government and the private sector.

It is necessary to conduct further research on stakeholder involvement in managing disasters and evaluation of flood disaster management so that it can be known to what extent flood management can provide comfort for residents affected by flooding.

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References

[1] W.N. Adger, Social Vulnerability to climate change and extremes in coastal Vietnam, World Dev. 27 (2) (1999) 249–269.

[2] S. Rufat, Eric Tate, C.G. Burton, Social vulnerability to flooding: review of case studies and implication for measurement, Int. J. Disaster Risk Reduc. 14 (4) (2015) 470–486, https://doi.org/10-1016/J.ijdrr.2015.09.013.

[3] Z.W. Kundzewicz, K. Takeuchi, Flood protection and management: quo radius? Hydrol. Sci. J. 44 (3) (1999) 417–432.

[4] Z.W. Kundzewicz, dan Lucas Menzel, "Natural flood reduction strategies–a challenge", Int. J. River Basin Manag. 3 (2) (2005) 125–131, https://doi.org/10.1080/15715124.2005.9635252. http://www.tandfonline-con/loi/trbm20.

[5] B.F. Montz, dan E. Grunfest, Flash flood mitigation recommendations for research and application, Global Environ. Change B Environ. Hazards 4 (1) (2002), https://doi.org/10.3763/ehaz-2002.0402.

[6] S. Sanyal, J. Routray, Social Capital for risk reduction and management with empirical evidence from Sundarbans of India, Int. J. Disaster Risk Reduc. 19 (2016) (2016) 101–111.

[7] P. Bourdieu, Form of capital, in: J. C Richard (Ed.), Handbook of Theory and Research for the Sociology of Education, Greenwoods and Press, New York, 1983.

[8] Xinjia, Mesbahudin Chowdhury, Girish Prayag, The role of social capital on proactive and reactive resilience of organization post-disaster, Int. J. Disaster Risk Reduc. (2019) https://doi.org/10-1016/j.ijdrr.2020.101614.

[9] F. Foxton, Richard Jones, Social Capital Indicators Review, Office for National Statistic, 2011.

[10] Woolcock, D. Narayan, Social Capital: Implications for Development Theory, Research, and Policy, 2000.

[11] Robert D. Putnam, Bowling Alone: the Collapse and Revival of American *Community*, Simon and Schuster, New York, 2000, 9780684832838.

[12] Rustinsyah, Social capital and implementation of subsidized fertilizer programs for small farmers: a case study in rural Java Indonesia, Int. J. Rural Manag. 11 (2015) 1 (Sage Publication).

[13] F. Fukuyama, Trust. The Social Virtues and Creation of Prosperity, Simon and Schuster, New York, 1995.

[14] Christian Grootaert, Thierry Van Bestseller, Understanding and Measuring Social Capital: A Multidisciplinary. Tool for Practitioner. Directions in Development, World Bank, Washington, DC, 2002. http://ddl.handle.net/10986/14098.

[15] A. Joshi, M. Aoki, The role of social capital and public policy in disaster recovery. A case study of Tamil Nadu state, India, Int. J. Disaster Risk Reduc. 7 (2014) 100–108, https://doi.org/10.1016/j.ijdrr.2013.09.004.

[16] P.D. Dao, Y.A. Liou, Object-based flood mapping and affected rice field estimation with Lands at 8 Oli and Modis data, Rem. Sens. 7 (2015) 5077–5097, https://doi.org/10.3390/rs70505077.

[17] A. Kotera, T. Nagano, P. Hanittinan, S. Koontanakulvong, Assessing the degree of flood damage to rice crops in the Chao Phraya delta, Thailand, using MODIS satellite imaging, Paddy Water Environ. 14 (2016) 271–280, https://doi.org/10.1007/s10333-015-0496-9.

[18] O. Karnieli-Miller, R. Strier, L. Pessach, Power relations in qualitative research, Qual. Health Res. 19 (2) (2009) 279–289.

[19] J. Attride-Stirling, Thematic networks: an analytic tool for qualitative research, Qual. Res. 1 (3) (2001) 385–405.

[20] Kiyomi Kawamoto, Kim Kurl, Efficiencies of bonding, bridging and linking social capital: cleaning-up after disasters in Japan, Int. J. Disaster Risk Reduc. 33 (2019) (2019) 64–73.

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