

# Analysis of the Palembang's Government Mutual Cooperation Program Implementation for Flood Disaster Mitigation

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## ABSTRACT

Flood is an annual issue in Palembang and has an impact on the condition of society both socially, environmentally and economically. Related to this, in 2015 the Palembang's Government decided to launch the Mutual cooperation program as an effort to reduce flood risk. Mutual cooperation was carried out every Sunday morning by cleaning streams and drainage channels. The success of the program was largely determined by the extent to which the program planning was able to involve community participation. Therefore, this study aimed to analyze community participation in the mutual cooperation program launched by the Palembang's Government and evaluate the problems in implementing the mutual cooperation Program. The results showed that community participation in the mutual cooperation program was considered quite active, but in the program implementation there were still aspects that needed to be reviewed, such as socialization regarding the mechanism for implementing mutual cooperation activities, involvement of community organizations, and supporting facilities from the government during the activity.

*Key words:* Flood disaster, Palembang city, Mutual cooperation program, Community participation

## Introduction

Palembang is a lowland and swampy area where 70% of the city is located at an altitude of 4 to 20 meters above sea level (Imelda, 2013). With this geographic condition, Palembang is one of the areas prone to flooding in Indonesia. Floods in Palembang usually occur during the rainy season from October to March with total rainfall of more than 150 mm / hour (Iryani, 2016). Many other factors caused flooding and inundation in Palembang, either directly or indirectly. The main factors were land use changes, tides in the water level of the Musi River (Putra, 2011), and drainage pollution caused by garbage and sewage (Hamim, 2019). Glo-

bally, floods were responsible for the largest economic and social losses and were expected to continue to increase (Kundzewicz *et al.*, 2014).

Given the impact of flooding that could destabilize development, the Government of Palembang took a proactive approach to disaster management with a focus on mitigating the impact of floods. One of the approaches taken by the government was through a community empowerment program called the mutual cooperation program. Starting in 2015, the Government of Palembang implemented the mutual cooperation program as non-structural mitigation in order to reduce the risk of flooding by cleaning streams and drainage channels. The program was launched to build community behavior in

an effort to maintain cleanliness and environmental preservation in Palembang (Wati, 2017).

The concept of community-based flood risk management had been developed as a holistic approach to increase community responsibility and involvement in the development process. The community was increasingly seen as the most important part in decision making related to flood risk (Sadiq, 2019). Research showed that trends in flood risk management and environmental management strategies were changing globally from expert-based decision making to a top-down approach to involving local community participation in the implementation of flood management (Atanga, 2019). In research conducted by Osti (2017), community empowerment was an alternative approach on how government and communities could work together effectively to reduce flood risk. Community members participated to complement the efforts of government agencies and government officials in the policy implementation process. Worowirasmi (2015) also explained that community empowerment-based flood disaster risk reduction required large community involvement and collaboration between stakeholders to increase community knowledge and ability to have an efficient and appropriate response to the risks of sustainable disaster management. The Palembang's Government through the Decree of the Mayor of Palembang Number 211 / KPTS / I / 2016 regarding technical guidelines for the implementation of mutual cooperation provided a policy to increase community participation in the implementation of government programs, especially in an effort to raise public awareness in terms of preserving the environment in Palembang, as well as increasing the role of apparatus, especially officials in the Palembang's Government, by providing examples and motivation in activating mutual cooperation activities (Decree of Mutual Cooperation, 2016).

The implementation of the Palembang Mayor's policy Number 211 / KPTS / I / 2016 required community participation in the flood management cycle. Participation was a central concept and basic principle of community development that had an impact on the effectiveness and efficiency of implementing a program (Dewisulistiyani, 2016). This raised questions about: (1) What was the level of community participation in Palembang in implementing the mutual cooperation program? (2) How is the implementation of policies related to environmental mutual cooperation launched by the Gov-

ernment? In connection with this, the main objective of this study was to evaluate the level of community participation in the implementation of mutual cooperation activities to reduce the risk of flooding in Palembang and identify problems in the implementation of the Mutual cooperation program.

### Related Works

Community participation in the flood disaster risk management process had great potential to improve communication between the government and the community, knowledge of flood management and impacts, and can strengthen solidarity between communities (Van der Molen, 2018). As recognized by world institutions (World Bank and UNISDR (United Nations International Strategy for Disaster Reduction)), participation in disaster risk management was complex in its application and had dynamic effects according to the objectives, location, region and frequency that need to be analyzed (Ardaya, 2019). The existing literature presented many case studies on how to increase participation, such as analyzing social potential (Wehn and Evers, 2015), exploring people's perceptions of their environment (Verbrugge *et al.*, 2016), designing participatory operations models to increase stakeholder commitment and communities (Malve *et al.*, 2016) and collaborative decision making in flood risk management (Evers *et al.*, 2016).

Mutual cooperation-based flood disaster mitigation had been implemented in various locations in Indonesia. Several studies examined how the participation of the Indonesian people in helping the government implement flood disaster risk management. Julimawati (2015) evaluated the form of community participation in the form of thoughts, energy, assets, skills and expertise in Baleendah District, Bandung. Worowirasmi *et al.* (2015) shared their experiences in implementing community-based disaster risk reduction in Semarang. The results of his research through a participatory mapping process stated that the community in the city of Semarang needed facilitators to provide ideas for reducing the risk of floods, so that they had mutual agreement in the form of community contingency plans. Dewi Sulistyani (2016) examined community participation in flood disaster management in DKI Jakarta. The results showed that community participation could affect the effectiveness of flood disaster management in DKI Jakarta by 61.76%. Dewi Sulistyani (2016) suggested that people should be

empowered and given space to participate by paying attention to economic, political, social, cultural and educational factors. They must also be given regular and continuous knowledge and training in dealing with flood disasters. Zakariah and Kismartini (2018) analyzed community participation in flood management in Sumbawa through the Village Disaster Alert Team. This study analyzed the factors that support and hinder the community in flood management, and formulate a flood disaster prevention strategy carried out by the Village Disaster Alert Team. The results showed that the community participation in Songkar Village in activities was quite high, but the flood prevention and control activities carried out were still ineffective. Fitriani and Oktorie (2019) also analyzed community participation in flood disaster mitigation in South Solok, West Sumatra. The people of South Solok worked together to clean houses and villages, build emergency tents and improve public facilities. The government of South Solok had also done the same by participating, conducting socialization and designing a mapping of flood-prone areas in South Solok.

## Materials and Methods

This study applied an explanatory case study with a qualitative approach (Yin, 2014). In this context, research based on explanatory case-study was used to obtain information and data regarding unknown matters, while the qualitative approach aimed to analyze the implementation of the mutual cooperation program and community participation. The research was conducted over a period of two years (2017-2019) in the city of Palembang. The techniques for data collection used were through observation, interviews, questionnaires, and literature studies. From this data, a descriptive situation could be observed in detail.

The sample in this study was determined by the purposive method. In this case, the researcher determined the sample based on the special characteristics of the population, according to the objectives of this study. The samples were determined based on the consideration that those who could represent the population were the people in the locations where the mutual cooperation was held. The target audience was obtained as many as 109 Neighborhood Associations (RT) spread throughout the city of Palembang.

The Cochran method (1977) was used to identify the required sample size. The formula of this sample size method could be seen in the following equation:

$$S = \frac{z^2 \times p(1-p)}{d^2} \quad .. (1)$$

Where is an acceptable possibility of error. Generally, the Z-Score is set at 1.96. Whereas p is the expected conversion ratio and d is the expected absolute precision level. The researcher observed that the level of community participation in mutual cooperation activities carried out by the Palembang's Government was 30%. This figure was obtained from the assumptions and observations of researchers who had participated in this mutual cooperation program since 2015 until now. The level of precision (d) absolute expected is 0.1% and p is 0.3%, and then the minimum sample size in this study is:

$$S = \frac{1,96^2 \times 0,3(1 - 0,3)}{0,1^2} = 80,04 \approx 81$$

Based on the minimum number of samples obtained, the results would be divided by 3 (three) people in each neighborhood associations (RT), so that the number of NAs was 27 points.

## Results

### Existing Geographical Condition of Flood Prone in Palembang City

Palembang is one of the metropolitan cities that are often hit by floods due to high rainfall and the tides of the Musi River as well as several settlements that are located almost near the surface of the river (Supani, 2020). Flood incidence in South Sumatra in 2019 showed that flood disasters had increased from the previous year and Palembang still held the highest incidence rate every year (Walhi, 2019). Palembang was about 85 km upstream from the river mouth. The river bed is almost entirely low because the main causes were sedimentation, erosion at the top, and geological conditions (anticline). Several locations that were almost always inundated during the rainy season such as Ilir Timur I with 6 (six) locations, Ilir Timur II with 12 locations, Kalidoni with three locations, Sako in one location, Seberang Ulu II in two locations and Kemuning 3 locations (PSDA PU, 2017). In addition, there were several locations that often experience flooding as a

result of the sloping topography, such as the Pakjo area and Demang Lebar Daun with a volume of 143,000 m<sup>2</sup>. Whereas around the middle area of the Sekanak River, it had a volume of 105,780 m<sup>2</sup>, around the Polda intersection of 105,780 m<sup>2</sup>, around the Bendung river 16,800 m<sup>2</sup>, and around the Patal intersection of 18,500 m<sup>2</sup>. Figure 1 below showed that Palembang was in a location with a very high potential for flooding.

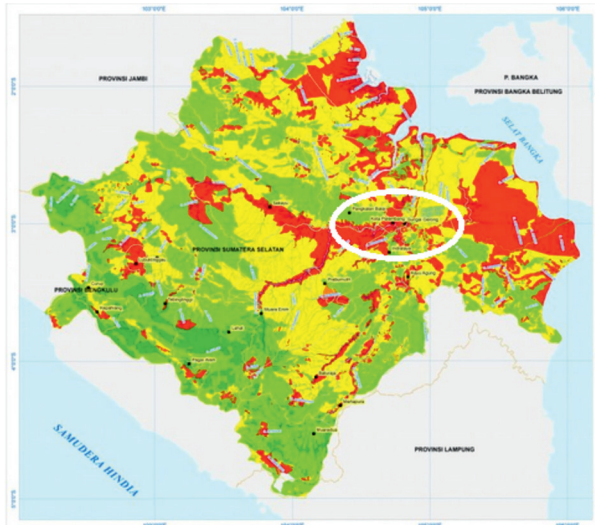


Fig. 1. Map of Potential Floods Area in South Sumatra (Source: Regional Regulation of South Sumatra Province, 2018)

Flood events did not only occur due to natural factors, but could occur due to a lack of public concern for their environment. Based on a limited observational study, around the roads and riverbank areas of Palembang, there were several points of accumulation of garbage which were not temporary dumpsites. This suggested that there was still a lack of public understanding of the importance of maintaining a clean environment. Through this mutual cooperation program, it was hoped that it could increase public awareness of their environment.

### Community Participation in the Mutual Cooperation Program

The mutual cooperation program launched by the Government of Palembang in an effort to reduce the risk of flooding was included in the Regulation of the Mayor of Palembang Number 14 of 2019 concerning the Implementation of City-Level mutual cooperation, Sub-District-Level Mutual Cooperation, autonomous mutual cooperation at the neigh-

borhood association (RT) / administrative unit (RW) Level), with the aim that the mutual cooperation activities carried out every Sunday morning would be more focused and evenly distributed throughout the city of Palembang. Based on the results of questionnaire data processing in Figure 2, there were 54% respondents who knew about the Palembang Mayor regulation number 14 of 2019, 26% respondents expressed doubtful, and 20% respondents said they did not know.

Figure 2 showed that 54% of respondents did not know the existence of Palembang Mayor regulation No. 14 of 2019. The Government of Palembang in this case needed to carry out more intense socialization because the level of public knowledge of policies on a program was also a driving factor for achieving the desired goals and objectives. When viewed from the assessment carried out by the community at the mutual cooperation location on the level of presence of residents during the mutual cooperation activity, based on the questionnaire data processing in Figure 3, there were 18% respondents who stated that the level of resident attendance was very high, as many as 73% respondents stated that the level of the presence of residents was sufficient, and 9% respondents stated that the presence of the community was very lacking.

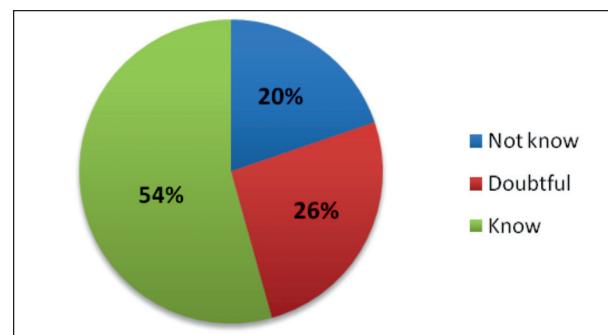


Fig. 2. Community Knowledge about the Existence of Mayor Regulation No. 14 th. 2019

Referring to Figure 3, it was illustrated that as many as 73% of the community thought that the level of participation during mutual cooperation activities was adequate. The existence of awareness to participate was the main key to the sustainability of the program. The high enthusiasm of the community in implementing the mutual cooperation program showed that there was a trust and opportunity given to the community to be actively involved in implementing the program. This must be main-

tained by the government so that the objectives of the mutual cooperation program could be achieved properly. Therefore, the government should be more supportive of program implementation by providing supporting equipment and facilities for the smooth running of mutual cooperation activities because based on the survey results in Figure 4, almost 60% of the community stated that the government did not provide supporting equipment during the activity.

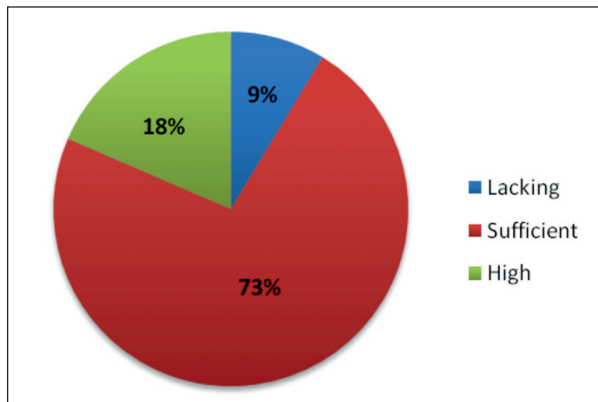


Fig. 3. Assessment of Community Participation Level in Mutual Cooperation Activities

Lack of availability of facilities that support physical activity could reduce the level of participation in subsequent activities (Parker, 2009). When the community had been involved in a program, the role and initiatives of the government were urgently needed to encourage effectiveness and sustainable programs (PytlikZillig, 2012). Community participation was related to the activeness of the government in running the program, meaning that government activities were an indicator of the assessment

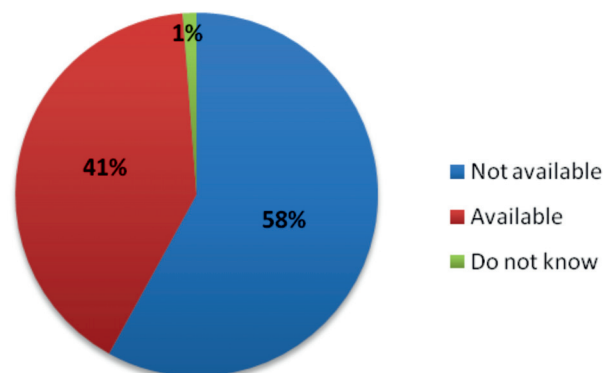


Fig. 4. Availability of Supporting Equipment by the Government of Palembang

of the community itself (Jatmikowati, 2019).

Nikkhah and Redzuan (2010) in their study of community awareness about environmental management stated that the role of community organizations was important in striving for community empowerment for sustainable programs. In addition, community organizations could also mediate various interests that occurred between community groups so as to minimize the potential for social conflicts. However, based on the survey results regarding the involvement of community organizations in the mutual cooperation program in Palembang, it was still considered very minimal, as could be seen in Figure 5.

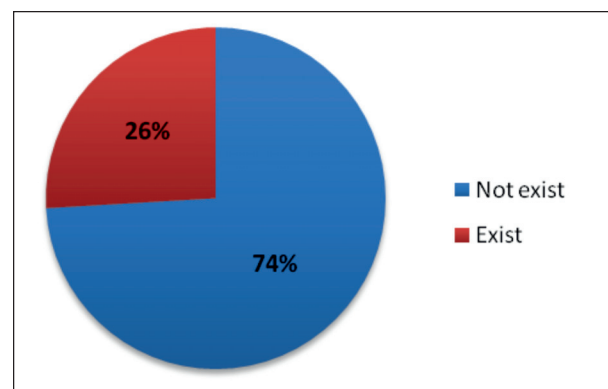


Fig. 5. Community Organization Involvement

Figure 5 showed that as many as 74% of respondents answered that there was no involvement of community organizations in mutual cooperation activities. Yet according to Law no. 17 of 2013 article 6, one of the functions of community organizations is as a means of community empowerment. In addition, the involvement of community organizations was needed because it could increase enthusiasm for other communities.

In evaluating the level of respondent satisfaction regarding the effect of the results of the mutual cooperation program on improving environmental hygiene and health, the survey results in Figure 6 showed that 46% of respondents stated that mutual cooperation activities affected the improvement of their environmental quality, 48% answered that it was quite influential, while 6% answered that it had no effect.

The community, as one of the actors in implementing the program, had a very clear role in the mechanism for changes in environmental quality. The mutual cooperation program in an effort to re-

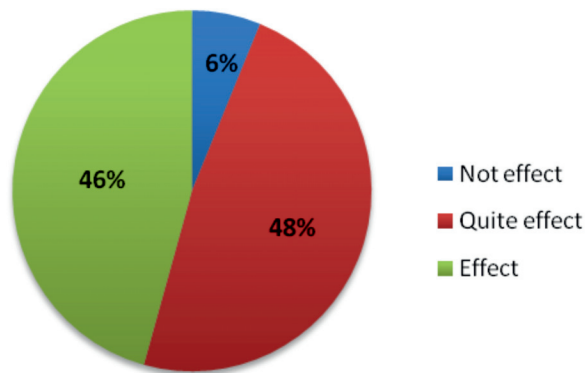


Fig. 6. The Effect of the Mutual Cooperation Program on Improving Environmental Quality

duce the risk of flood disasters formed an environmental care attitude which was certainly an effective way out in shaping people's mindsets and perceptions of the importance of having a good environmental quality.

## Discussion

The main findings of this study indicated that community participation in the mutual cooperation program for flood disaster mitigation in Palembang was considered quite active by the community. As discussed in Kamaruddin *et al.* (2015), the level of participation in environmental programs could be an indicator to measure the level of public awareness of the environment. Public awareness could form the basis of the capacity to participate in pro-environmental behavior and was considered the first step to change in environmental management and sustainable development. Public participation must also be supported by the government and institutions so that this program could continue. The survey results in this study indicated that there were problems in the implementation of mutual cooperation activities such as a lack of public knowledge of Mayor Regulation No.14 of 2019 which contained the implementation of mutual cooperation, the availability of supporting facilities for mutual cooperation activities, and the lack of involvement of community organizations.

Mutual cooperation activities in reducing flood risk were also carried out in several other cities in Indonesia. Subhan *et al.* (2012) discussed the Mutual Cooperation Program for flood management in Banjarmasin, South Kalimantan. The mutual cooperation activities in Banjarmasin were carried out

twice a month to clean drainage. According to Subhan *et al.* (2012), community participation was high during the rainy season or when they directly experienced the impact of flooding, while when it was dry season, their participation decreased. Apart from that, there was no specific policy from the government regarding mutual cooperation activities for flood disaster management in Banjarmasin. Santoso (2014) evaluated mutual cooperation activities in Pekanbaru. The activity was carried out twice a month. The form of participation that was carried out was not only in the form of energy, but also in the form of thoughts and assets. The drawback of mutual cooperation activities in Pekanbaru according to Santoso (2014) was that there was no evaluation after the mutual cooperation activities were carried out. Umeidini (2019) conducted research on mutual cooperation activities in Mekargalih Village, Jatinangor District, West Java. There were local leaders who were involved and actively participated in disaster management in Jatinangor District, namely the heads of NA(RT) and AU (RW). The form of community participation in disaster management in Mekargalih Village, Jatinangor District was in the form of thought participation, labor participation, skills participation, goods participation and money participation. The five forms of participation had been implemented and were running well in society. In addition, the people of Jatinangor worked together to provide information to all residents day and night when the water overflow.

## Conclusion

This study aimed to determine the level of community participation and the implementation of the mutual cooperation program for flood disaster mitigation in Palembang. Based on the results of the research that had been done, the following conclusions were obtained:

1. Community participation in the activities of the mutual cooperation program which was launched by the Palembang's Government was considered quite active by the community. But on the other hand, the participation of community organizations was considered minimal. The results of the questionnaire data processing showed that as many as 74% of respondents answered that there was no involvement of community organizations in mutual cooperation activities.

2. Although the community stated that the results of the implementation of the mutual cooperation program affected the quality of their environment, there were several aspects that needed to be reviewed in the implementation of the mutual cooperation program so that activities could run more effectively and efficiently, such as technical socialization or mechanisms related to the implementation of the mutual cooperation program, equipment and supporting facilities for mutual cooperation activities, and policies regarding the follow-up of mutual cooperation activities so that the program was not just an incidental activity but became a routine activity for the government and the people of Palembang.

### Suggestion

Suggestions for further research could discuss more deeply about the factors that influence community participation or community perceptions of the mutual cooperation program. In addition, further research could propose a community empowerment model that was relevant to the environmental mutual cooperation program as an effort to reduce the risk of flooding in the future.

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### References

Ardayaa, B., Eversa, M. and Ribbe, L. 2009. Participatory approaches for disaster risk governance? Exploring participatory mechanisms and mapping to close the communication gap between population living in flood risk areas and authorities in Nova Friburgo Municipality, RJ, Brazil. *Land Use Policy*. 88 : 1-13.

Atanga, R. A. 2019. The role of local community leaders in flood disaster risk management strategy making in Accra. *International Journal of Disaster Risk Reduction*. 43 : 1-22.

Cochran, W.G. 1977. *Sampling Techniques*, 3<sup>rd</sup> Edition, John Wiley & Sons: New York.

Dewi Sulistyani. 2016. Community Participation Helps Government in Flood Disaster Management. *Scientific Research Journal (SCIRJ)*. IV, Issue VIII, pp. 45-48.

Dinas, PU-PR 2018. *PU-net Kementerian Pekerjaan Umum dan Perumahan Rakyat* Retrieved 5 Juli 2019 from <https://www.pu.go.id/>

Hamim, S. A., Usman, F. and Shalihah, A. K. 2019. Determination of Land Subsidence Caused by Land- Use Changing in Palembang City using Remote Sensing Data. *Advances in Engineering Research*. 187 : 101-106.

Evers, M., Jonoski, A., Almoradie, A. and Lange, L. 2016. Collaborative decision making in sustainable flood risk management: a socio-technical approach and tools for participatory governance. *Environ. Sci. Policy*. 55 : 335-344.

Fitriani, D. and Oktorie, O. 2019. Community Participation In Flood Disaster Mitigation in Solok Selatan Regency-Indonesia. *Science and Environmental Journals for Postgraduate*. 1(2) : 1-9.

Imelda, 2013. Identifikasi pusat pertumbuhan dan daerah hinterland kota Palembang. *Journal of Economic & Development*. 11(1) : 54- 66.

Iryani, S. Y. and Amalia, F. 2016. Analisis karakteristik temporal dan spasial hujan untuk mendukung pengembangan peringatan dini banjir di Palembang. *Fakultas Teknik Sipil , Universitas Sriwijaya*, pp. 1-5.

Jatmikowati, S. H., Abdullah, and Pangalila, T. 2019. Community Participation (Analysis on Implementation of Policies on Village Development Guidelines Based on Permendagri No. 114 of 2014 in Simejayan Village, Ampelgading District, Malang Regency). *International Journal of Recent Technology and Engineering (IJRTE)*. pp. 520-526.

Julimawati, 2015. Partisipasi Masyarakat Dalam Menjaga Kualitas Lingkungan Permukiman Di Kecamatan Baleendah. *Jurnal Pendidikan Ilmu Sosial*. 24(2) : 155-165.

Kamaruddin, S. M., Ahmad, P. and Alwee, N. 2016. Community Awareness on Environmental Management through Local Agenda 21 (LA21). *Procedia - Social and Behavioral Sciences*. 222 : 729-737.

Kundzewicz, Z.W. 2014. Flood risk and climate change: global and regional perspectives. *Hydrol Sci Journal*. 59(1) : 1-28.

Malve, O., Hjerpe, T., Tattari, S., Vaisanen, S., Huttunen, I., Kotamaki, N., Kallio, K., Taskinen, A. and Kauppila, P. 2016. Participatory operations model for cost-efficient monitoring and modeling of river basins—A systematic approach. *Sci. Total Environ*. 540: 79-89.

Nikkhah, H. A. and Redzuan, M. 2010. The Role of NGOs in Promoting Empowerment for Sustainable Community Development. *J Human Ecology*. 30(2) : 85-92.

- Osti, R.P. 2017. Embedding community-based flood risk management in investment *East Asia Working Paper Series*. pp. 1-31.
- Parker, L. Burns, A. C. and Sanchez, E. 2009. *Local Governments Actions*. National Academies Press (US): Washington (DC).
- Putra, E. S., Suryadi, F. X., Tarigan, K., Bastari, A. and Sylvia, M. 2011. Strategy of Drainage and Flood Control in Palembang City. *Technical Employee of Drainage and Flood Control Section in Water Resource Management and Bina Marga of Public Work Office, Palembang*.
- PytlíkZillig, L., Tomkins, A., Herian, M., Hamm, J. and Abdel-Monem, T. 2012. Public Input Methods Impacting Confidence in Government, *Transforming Government: People, Process and Policy*. 6 : 92-111.
- PSDA PU. 2017. *Pola Wilayah Sungai*. Retrieved 5 Juli 2019 from <https://www.sda.pu.go.id/>
- Sadiq, A. A., Tyler, J. and Noonan, D. S. 2019. A review of community flood risk management studies in the United States. *International Journal of Disaster Risk Reduction*. 41 : 1-59.
- Santoso, W. R. 2014. Partisipasi Masyarakat Dalam Penanggulangan Banjir Di Kota Pekanbaru. *Jom FISIP*. 1(2) : 1-11.
- SK Gotong Royong, P.N.S. 2016. *Petunjuk Teknis Pelaksanaan Gotong Royong dan Pembentukan Koordinator Wilayah*. Retrieved 5 Juli 2019 from <https://www.sipsn.menlhk.go.id/>
- Subhan, M., Wahyu, Erhaka, E. and Septiana, M. 2012. Partisipasi Masyarakat Terhadap Penanggulangan Banjir Di Kota Banjarmasin. *Enviro Scientiae*. 8 : 135-145.
- Supani, A. and Andriani, Y. 2020. Designing and Applying Flood Early Warning System Based on Waterfall and Water Level for Special of Palembang City. *Journal of Physics: Conference Series*. pp. 1-8.
- Umeidini, F., Nuriah, E. and Fedryansyah, M. 2019. Partisipasi Masyarakat Dalam Penanggulangan Bencana Di Desa Mekargalih Kecamatan Jatinangor. *Jurnal Pekerjaan Sosial*. 2 (1) : 13-22.
- UNISDR. 2013. From Shared Risk to Shared Value –The BusinessCase for Disaster Risk Reduction. Global Assessment Report on Disaster Risk Reduction. United Nations Office for Disaster Risk Reduction, Geneva.
- Wati, E. P. and Hidayah, A. 2017. Kearifan lokal menjaga lingkungan hidup dalam perspektif ekoregion di Palembang. *Bina Hukum Lingkungan*. 2 (1) : hal 56-69.
- Wehn, U. and Evers, J. 2015. The social innovation potential of ICT-enabled citizen observatories to increase eParticipation in local flood risk management. *Technol. Soc.* 42 : 187-198.
- World Bank. 2013d. Climate and Disaster Resilience: The Rolefor Community-Driven Development. Social Development Department. Washington, DC.
- Worowirasmi, T. S., Waluyo, M. E., Rachmawati, Y. and Hidayati, I. Y. 2015. The Community – Based Flood Disaster Risk Reduction (CBDRR) in Beringin Watershed in Semarang City. *Jurnal Wilayah Dan Lingkungan*. 3(2) : 131-150.
- Van der Molen, F. 2018. How knowledge enables governance: the coproduction of environmental governance capacity. *Environ. Sci. Policy*. 87.
- Verbrugge, L.N.H., Ganzevoort, W., Fliervoet, J.M., Panten, K. and van den Born, R.J.G. 2016. Implementing participatory monitoring in river management: the role of stakeholders' perspectives and incentives. *Journal of Environmental Management*. 195(1): 62-69.
- Yin, R. K. 2014. Case study research. *Design and Methods*, Sage: London
- Zakariah, H. W. and Kismartini, 2018. Community Participation in Flood Disaster Management in Sumbawa Regency (case study in Songkar Village). *ICENIS Conferences*. pp. 1-5.