The Readiness of villages in Surakarta City Toward The Disaster Resilient Village

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Abstract. This study aims to assess the readiness of villages in the Surakarta city to be developed into disaster resilient villages. The research location was 14 villages which are prone to floods in Surakarta city. The research subjects were the government and the community, the research sample was taken purposively, each village was taken 2 government officials and 3 community leaders. Data collection using disaster resilient village preparedness questionnaire made by BNPB consists of 6 indicators which are described in 60 questions. The results showed that in Surakarta there were 2 intermediate disaster resilient villages, 4 primary disaster resilient villages and the remaining 8 villages were included in the non-resilient category. In general it can be said that the disaster resilient of villages of Surakarta city was still low.

1. Introduction
Disasters, both caused by nature and as a result of human behavior, occur indiscriminately throughout the world. Wherever disasters occur they leave the destruction and suffering of the affected population [1], [2], [3]. According to the National Disaster Management Agency (BNPB), there has been a trend of increasing disaster events from year to year. During 2017 in Indonesia there were 2,892 disasters that caused 378 fatalities, 1,042 injured and 3,674,369 people were displaced [4]. Disasters are not mere natural events, because when they occur, disaster risks will arise when interacting with the physical, social, economic and environmental vulnerabilities of exposed communities [5].

According to Twigg [6], community resilience to disasters can be understood as the capacity to: (a) anticipate, minimize, and absorb potential stresses or destructive forces through adaptation or resistance, (b) manage or maintain certain basic functions and structures during occurrence disaster and (c) recover or 'rise again' after an event. Paton [7] states that disaster resilience can be achieved by building capacity to coexist with natural hazards and their consequences. Community resilience has become an important concept to characterize and measure the ability of residents to anticipate, absorb, accommodate or recover from the effects of dangerous events in a timely and efficient manner [8], [9].

Surakarta City is a disaster-prone area, especially by flooding. Floods are generally caused by high rainfall, low slope or river embankments that are unable to withstand rainwater discharge [10]. Low human awareness in protecting the environment can be used as a trigger for flooding, including in Indonesia [11]. According to Rizky [12] the flood characteristics of the Bengawan Solo Bendung Colo Section - Surakarta City were affected by lateral inflow of tributaries in the watershed, with dominant tributaries being the Dengkeng River and the Samin River.

In the Republic Indonesia Law [13] concerning Disaster Management implies that disaster management efforts are the joint responsibility of all elements, both the government, non-governmental organizations, the business world, and community participation. Since 2012, the Deputy for Prevention and Preparedness of the National Disaster Management Agency has organized
Institutional to strengthening capacity to increasing the capability and knowledge of local governments and community in Disaster-Resilient Village program

Once of the BNPB program priorities for 2015 - 2019 is to increase the community capacity through establishing Disaster Resilient Villages in 136 districts / cities. Based on preliminary research, in the Surakarta city, it is only at the initial stage of initiating the formation of the Tangguh Disaster Village, whereas in the Surakarta city every year there is definitely a disaster, especially flooding. For this reason, it is necessary to first examine the level of readiness of villages in the Surakarta city to be developed into disaster resilient village.

2. Methods
This research was conducted in 14 villages in Surakarta city, which are villages that are categorized as flood prone. Data collection uses a disaster resilient village preparedness questionnaire Perka BNPB [14] which consists of six indicators, namely legislation, planning, institutional, funding, capacity building, implementation of disaster resilience which are outlined in 60 questions.

The research subjects were the government and the community of each Informan village chosen purposively, each with 5 villages consisting of 2 village officials and 3 people representing community groups. Questions are arranged with the answer 'Yes' or 'No' and each answer 'Yes' will be given a score of 1, while the answer 'No' will be given a score of 0. Based on this assessment the village or kelurahan can be grouped into:

- Main Disaster Resilient Village, score 51-60
- Intermediate Disaster Resilient Village score, 36-50
- Primary Disaster Resilient Village, score 20-35

3. Results and Discussion
The Surakarta city was located in the depression zone between the plateau in the south (Wonogiri), Mount Merapi in the west, the Kendeng hills in the north, and Mount Lawu in the east. This location is like a bowl base which causes runoff water to enter Surakarta City from three directions, there are the southeast slope of Mount Merapi, the southwest slope of Mount Lawu, and the Wonogiri plateau. This condition results in unequal discharge-recharge areas or Surakarta City's water balance so that the Surakarta city was prone to flooding.

Based on the literature study, field observations, interviews with village officials, and the community can be described that the 14 villages in Surakarta city there must be flooding every rainy season, even in a year there can be four to five times. Floods in this area can be categorized into three causes, there are: (1) local inundation caused by building density, concreting roads and house yards, and overflowing of drainage due to littering (2) river overflow that passes through the Surakarta city. The Surakarta city was crossed by 5 rivers, there are Anyar River, Pepe River, Jenes River, Premulung River and Brojo River. All rivers that pass through the Surakarta city flowed into Bengawan Solo, and when the Bengawan Solo water level is high, sometimes the river water cannot enter to Bengawan Solo, overflowing and inundating the area around the river mouth. Disaster-prone areas in Surakarta are areas around the mouth of the rivers flow to Bengawan Solo. (3) Bengawan Solo Overflow. Many rivers in Wonogiri, Sukoharjo and Karanganyar Regencies flow toward Bengawan Solo so that if heavy rains occur in the upstream area, the Bengawan Solo flow will be very high and sometimes overflow in some parts which causes flooding.

Based on the results of interviews with village officials and community leaders consisting of Chairman of RW, representatives of institutions and community representatives indicate the readiness of the village as Tangguh disaster village is as follows:
Table 1. Disaster Resilient Village Readiness in Surakarta City

| Village         | Score | Category     |
|-----------------|-------|--------------|
| Serengan        | 12    | non resilient|
| Sangkrah        | 29    | primary      |
| Sewu            | 17    | non resilient|
| Pucang Sawit    | 47    | intermediate |
| Gandekan        | 25    | primary      |
| Joyontakan      | 13    | non resilient|
| Kedung Lumbu    | 29    | primary      |
| Pajang          | 20    | non resilient|
| Banyu Anyar     | 10    | non resilient|
| Sumber          | 14    | non resilient|
| Jebres          | 16    | non resilient|
| Joyosuran       | 12    | non resilient|
| Mojo            | 29    | primary      |
| Semanggi        | 36    | intermediate |

Source: primary data analysis

The table above shows that in the disaster prone villages in the Surakarta city no one belongs to the main disaster resilience class, and there are only 2 intermediate disaster resilient villages, only 4 primary class and the remaining 8 are included as non-resilient classes. Thus it can be said that the level of disaster resilience is still very low.

Based on the answers to each question item can be analyzed as follows:

a. Legislation
Most of the disaster-prone villages in the Surakarta city (64%) have had initial efforts to develop DRR policies, and these efforts have involved the community, but only one village has legalized these policies in the form of village regulations or equivalent.

b. Planning
Most of the disaster prone villages in the Surakarta city (64%) have made initial efforts to prepare disaster management planning documents such as the Disaster Management Plan, DRR Action Plan. However, only 4 villages have integrated these activities in the Village Development Plan activities.

c. Institutional
Institutionally there have been initial efforts to increase the resilience of villages as a result of the formation of volunteer teams and cooperation between villages, this is evidenced by the data:
(a) There are 11 (78.6%) Disaster-prone villages in the Surakarta city that have made initial efforts to form a volunteer team but only 4 villages have complete equipment and routinely conduct exercises. (b) There are 7 (50%) Disaster-prone villages in the Surakarta city that have made efforts to collaborate with other villages, sub-districts, districts and PMI but only 4 villages have the results of the collaboration.

d. Capacity building
There have been several activities carried out the community capacity building in disaster management, such as training, provision of facilities and infrastructure for disaster response, training of volunteer teams, simulation practices by residents, community involvement in disaster response groups, and involving women in disaster response volunteer teams. Of the 14 disaster-prone villages in the Surakarta city, there are around 60% who have initiated...
disaster capacity building, but only about 30% have concrete actions. This is in accordance with the research of Yu S.L. et al [15] which concluded that the basis for building a resilient society requires joint efforts of various parties ranging from human resources including industry, government, academia and society. Whereas Story, W.T. [16] found a positive relationship between women's empowerment, social capital, and disaster risk reduction.

e. Implementation of disaster management
Safety and livelihoods are core requirements that must be met in creating resilient communities [17]. The research results showed that the establishment of the Disaster Resilient Village in Kendal District could make the community better understand the roles and responsibilities of the disaster [18]. Research on the management of the Disaster Resilient Village in Poncosari, Bantul Regency concluded that the Disaster Resilient Village had been formed and implemented but there are still obstacles especially from community participation [19].

In general, the practice of disaster management in villages of Surakarta city was still weak. From the indicators of disaster management prepared by BNPB such as mapping and analyzing threats, making evacuation path maps and simulating them, building early warning systems and simulating them, physical development for disaster mitigation and their maintenance systems, conducting community economic development to reduce vulnerability the public, providing health protection to vulnerable groups, and protecting productive assets, most of the disaster-prone villages in the Surakarta city have not done it, and if only a small portion does. Only Semanggi Village and Pucangswit Village have carried out several indicators of disaster management, but the implementation has not been perfect, especially in reaching out to the whole community.

4. Conclusion
From the data analysis it can be concluded that the readiness of villages in Surakarta city to be developed into disaster resilient villages are:

a. Legislation, planning and institutional indicators have been implemented in the initial efforts and there are already several villages that have strong implementation
b. The funding indicator is still weak because there are only 2 villages that have included disaster management funds in the village development fund
c. As for capacity building indicators, there have been several activities carried out such as training, provision of facilities and infrastructure for disaster response, training of volunteer teams, simulation practices by residents, community involvement in disaster response groups, and involvement of women in disaster response volunteer teams.
d. In general, the practice of disaster management in urban villages in the city of Surakarta is still weak because most of the parameters have not been implemented, especially community economic development, provision of protection for vulnerable groups and productive assets.

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References
[1] Chitiyo G & Chitiyo M 2009 The impact of the HIV/AIDS and economic crises on orphans and other vulnerable children in Zimbabwe (Childhood Education, International Focus Issue 85(6)), 347–351. http://dx.doi.org/10.1080/00094056.2009.10521399
[2] Gangi, J M & Barowsky E 2009 Listening To Children's Voices: Literature And The Arts As Means Of Responding To The Effects Of War, Terrorism, And Disaster (Childhood Education, International Focus Issue 85(6)) 347–351. http://dx.doi.org/10.1080/00094056.2009.10521401
[3] Shibley H 2010 Psychological First Aid: Helping Children Overcome Disasters (The Brown University Child and Adolescent Behaviour Letter 4(26), 1-6.)

[4] Badan Nasional Penanggulangan Bencana., 2018, Data dan Informasi Bencana Indonesia tahun 2018, http://www.dibi.bnpb.go.id

[5] UNISDR (United Nations International Strategy for Disaster Reduction) 2013 Proposed elements for consideration in the post- 2015 framework for disaster risk reduction: By the UN special representative of the secretary-general for disaster risk reduction. (http://www.preventionweb.net/files/35888_srsgelements.pdf. Accesed on August 2018.)

[6] Twigg J 2009 Characteristics of a Disaster Resilient Community (A Guidance Note. DFID Disaster Risk Reduction Interagency Coordination Group, www.abuhrc.org/research/dsm/Pages/project_view.aspx?project=13) accessed on Agustus 2018.

[7] Paton D F 2005 Community Resilience: Integrating Hazard Management and Community Engagement (Proceedings of the International Conference on Engaging Communities, edited by: United Nations & Queensland State Government, Internationa Conference on Engaging Communities, Brisbane, Queensland, Australia), 14–17 August 2005.

[8] Almedom A M 2013 Resilience: Outcome, Process, Emergence, Narrative (OPEN) theory, (On the Horizon, 21, 15–23) https://doi.org/10.1108/1074812131297030

[9] Deeming H Fordham M and Swartling Å G 2014 Resilience and Adaptation to Hydrometeorological Hazards, (in: Hydrometeorological hazards: Interfacing science and policy, edited by: Quevauviller,P., Wiley Blackwell, Chichester, West Sussex, United Kingdom), 291–316.

[10] Janet LB 2017 Analisis Penentuan Lokasi Evakuasi Bencana Banjir dengan Pemanfaatan Sistem Informasi Geografis dan Metode Simmple Additive Weighting (Jurnal Teknologi Informasi dan Ilmu Komputer (JTIIK)) p-ISSN: 2355-7699 Vol. 4, No. 2, Juni 2017,hlm. 127-135.

[11] Rosyidie, Arief 2013 Banjir: Fakta dan Dampaknya, Serta Pengaruh dari Perubahan Guna Lahan (Jurnal Perencanaan Wilayah dan Kota, vol. 24, no. 3), pp.241–249.

[12] Rizky BA 2014 Analisis Karakteristik Banjir Sungai Bengawan Solo Ruas Bendung Colo – Kota Surakarta (Yogyakarta: Electronic Tesis and Dissertation Gadjah Mada University)

[13] Undang-Undang No. 24 Tahun 2007 Tentang Penanggulangan Bencana

[14] Peraturan Kepala BNPB No 1 tahun 2012 tentang Desa Tangguh Bencana.

[15] Yu SL et al 2016 Environmental changes and building resilient community in Penghu Islands (Journal of Marine and Island Cultures (2016) 5, 126-132). Avaible online at www.sciencedirect.com

[16] Story W T et al 2018 Social capital and disaster preparedness in Oromia, Ethiopia: An evaluation of the “Women Empowered” approach, Social Science & Medicine doi: 10.1016/ j.socscimed.2018.08.027.

[17] Kaluarachchi Y 2018 Building Community Re-settlement of Displaced Communities. Proceedings Engineering 7th International Conference on Building Resilience: Using Scientific Knowledge to inform Policy and Practice in Disaster Risk Reduction (ICBR 2017, 27-29 November 2017. Bangkok, Thailand). www.sciencedirect.com

[18] Munir M 2016 Evaluasi Pelaksanaan Program Desa Tangguh Bencana di Kabupaten Kendal Tahun 2016 (Journal of Politic and Government Studies Vol 06, No 03 (2017)) https://ejournal3.undip.ac.id/index.php/jpgs/article/view/16746

[19] Kusumaratih 2015 Manajemen Desa Tangguh Bencana Di Desa Poncosari Kecamatan Srandakan Kabupaten Bantul Daerah Istimewa Yogyakarta (Jurnal Adinegara Vol 5 No 1 (2016)), http://journal.student.undip.ac.id/ojs/index.php/adinegara/article/view/3848/3507