

The Efforts of Yogyakarta Regional Disaster Management Agency (BPBD) in Empowering Flood Disaster Mitigation on Banks of the Gajah Wong River

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Abstract: The purpose of this study is to determine the efforts of BPBD in flood disaster management on the banks of the Gajah Wong River. The method used in this research is a qualitative descriptive method that emphasises the process rather than the results achieved. Data collection techniques were carried out by means of observation, interviews and documentation. The targets in this research are BPBD and people who live on the banks of the Gajah Wong River which are often affected by flooding. The data analysis technique uses the Miles and Huberman approach which consists of several stages, namely data collection, data reduction, data presentation to verification. In this study, researchers used data validity techniques using a data triangulation approach. The results of the research conducted are that in handling flood disasters, BPBD has taken preventive measures through the KTB (Disaster Response Village) training programme, it is hoped that the programme will be able to solve flood problems because the community becomes responsive to disasters such as floods that often occur when rainfall is high. The flood disaster that occurred in Gajah Wong River did not cause a big impact.

Keywords: BPBD; Disaster; Empowering; Flood; Mitigation

Introduction

Indonesia is a country with a tropical geographical climate and high humidity (Mutaqi & Suparwoko, 2020; Putra et al., 2022). This is due to high rainfall during the rainy season in almost all regions. The annual average rainfall rate in the tropics occurs due to convection processes and hot cloud formation which basically results from the upward movement of moist air masses. Rainfall is the height of rainwater that falls on a flat area assuming it does not evaporate, does not seep and does not flow. Rainfall data is important for engineering planning, especially for drainage systems such as irrigation, dams, urban drainage, harbours, docks and other water structures (Fatimah et al., 2023; Herlambang et al., 2010).

The negative impact of extreme rainfall in the rainy season is flooding (Marengo et al., 2020; Schumacher, 2017; Tabari, 2020). According to Findayani (2015) flooding is a condition where overflowing river water inundates the land caused by heavy rain or flooding due to submissions from other areas that are higher. Plus according to Yohana et al. (2017) flooding is an event that occurs due to the accumulation of water that cannot be accommodated by the soil. Floods can occur when a body of water, such as a river, lake or canal, overflows so that water escapes from the body of water (Pearce, 2018). In addition, flooding can also occur due to the overflow of surface water drainage and the volume exceeds the capacity of a channel, such as a ditch or water body.

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One of the places where flooding often occurs during high rainfall is the Gajah Wong River located in the Special Region of Yogyakarta. Gajah Wong River is a river that divides the city of Yogyakarta. The upstream part is on the slopes of Merapi in the southeastern Sleman Regency, while the downstream part is in Bantul Regency which leads to the southern area and meets the flow of the Opak River.

Reported from <https://jogja.tribunnews.com/> that the flood disaster occurred again in Gajah Wong River which caused dozens of houses submerged in water and the river embankment broke (Ramadhan, 2022). In addition to high rainfall, flooding in the Gajah Wong River is caused by silting and narrowing of the river channel due to piles of garbage and residential development on the riverbanks. There is a lot of rubbish stuck to the roots of trees which disrupts the flow of river water, the rubbish is usually carried during floods and some comes from local people who throw rubbish into the river (Abduh, 2018; Arif Mustofa, 2023; Asmal et al., 2023).



Figure 1. Watershed area of Gajah Wong River
(Source: Google.com)

Along the riverbanks there are also many people who build residences and carry out their daily activities in that place, not a few of their living environments are slum because they are too close to the river so they are vulnerable to disease when exposed to floods. This is supported by the statement Sulaiman et al. (2020) that the factors supporting the onset of flooding are caused by two factors, the first is natural factors such as high rainfall and regional topography. And the other is the human factor, especially activities sourced from the element of population growth followed by an increase in infrastructure, settlements, human activities, and other community services.

Law Number 24 Year (2007) on Disaster Management Article 18 instructs each region in the

context of disaster management to have a grand plan for disaster management and on that basis the efforts made by local governments in disaster management are to form Regional Disaster Management Agencies (BPBD). BPBD is a non-departmental government agency that has the task of disaster management in the region from both the Provincial level and the Regency / City level with special guidance on policies set by the National Disaster Management Agency. The Regional Disaster Management Agency (BPBD) of Yogyakarta City has the task of assisting the Mayor in implementing regional autonomy in the field of disaster management. The function of BPBD is to make and formulate policies related to disaster management and handling refugees that are appropriate, effective and efficient. Coupled with coordinating the implementation of disaster management activities in a planned, integrated and comprehensive manner.

BPBD is present to reduce disaster risk, there used to be a blue triangle, namely: government; entrepreneur; community; and now the name is a triangle which includes government, entrepreneur, community, institution, and mass media where this mass media plays a very important role because news that occurs in the immediate area can be known quickly and easily in handling. Disaster management activities aim to reduce the threat of disaster (Oktari et al., 2020; Sun et al., 2020; Titko & Ristvej, 2020). BPBD's efforts in the disaster management process include three stages, namely: 1) Pre-disaster; 2) Disaster Emergency Response; 3) Post-disaster (Sari et al., 2020).

The flood disaster in Gajah Wong River is not a one-time disaster, if the flood problem is not addressed immediately, there will be problems faced by the community, namely experiencing large losses considering that every high rainfall is prone to flooding. To deal with flood disasters, it is necessary to study the location and level of flood disasters, study the social, environmental, and economic impacts of flood disasters, prepare criteria for flood disaster management, set priorities for flood disaster management. Therefore, there is a need for studies or research on flood disaster mitigation that occurs in the Gajah Wong River so that it can find solutions that can be done to prevent the recurrence of flood disasters in the future. One of the ways is by empowering disaster mitigation in order to reduce the damage caused by flooding and also train community members to be alert in dealing with disasters that can occur at any time.

Method

The research conducted in Gajah Wong River uses descriptive and qualitative research methods that emphasize the process rather than the results achieved, so

that researchers can explore and describe the social situation to be observed more specifically, transparently, and deeply. Researchers make observations in ways, steps, and procedures that involve more data and information obtained through respondents as subjects who can provide information to get a holistic overview of the matter under study.

This research was conducted twice, on 6 October 2022 and 23 November 2022. The first research site was at Gajah Wong River located in Muja Muju Village, Umbulharjo Subdistrict, Yogyakarta City, Yogyakarta Special Region while the second research site was at the Yogyakarta City Regional Disaster Management Agency (BPBD) located at Jl. Gambiran No.26, Pandeyan, Umbulharjo Subdistrict, Yogyakarta City, Yogyakarta Special Region. The subjects of this research on the Gajah Wong River are several residents who live along the river and also Mr Bayu Wijayanto, S.T., M.Eng. Head of the Prevention and Preparedness Section of the Yogyakarta Disaster Management Agency. The target of this research is people who live along the Gajah Wong River who are often affected by flooding.

The type of research used in this study is descriptive research with a qualitative approach (Lechowska, 2022; Nugraheni & Suyatna, 2020). The data taken, identified in the following order: data collection; data sorting; data analysis; conclusion making. As for data analysis, there is a predetermined sequence in accordance with the empirical steps taken, namely as follows: examination of data; suspected data findings; data confirmation; diagnosis; and Action.

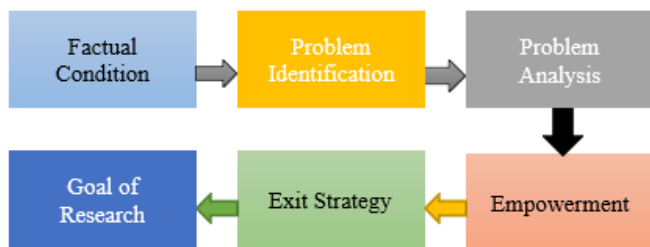


Figure 2. Flow method of study

Flooding that often occurs on the Gajah Wong River is caused by high rainfall so that river water overflows into residential areas. Apart from high rainfall, the cause of flooding is also caused by siltation and narrowing of the river channel due to piles of garbage and residential development on the riverbanks. Flooding that occurs is not always recorded because flooding in Gajah Wong River is not classified as a major threat and flooding on the banks of Gajah Wong River is a seasonal disaster, only exists during the rainy season and does not experience large material losses.

The impact of the Gajah Wong River flooding disaster did not cause casualties. It's just that the losses

experienced by the community are in the form of damage to public facilities such as the erosion of the riverbank embankment and this is considered commonplace by the local community. However, the need for disaster management empowerment is directed at increasing the strength and empowerment of the community by participating in various disaster management program. This is important to do because the community as affected victims should be given a facilitation and learning process so that they are able to prevent and handle disasters. Handling flood hazards can be done in structural and non-structural ways (Udori & Miranti, 2019).

Result and Discussion

Flooding that often occurs on the Gajah Wong River is caused by high rainfall so that river water overflows into residential areas. Apart from high rainfall, the cause of flooding is also caused by siltation and narrowing of the river channel due to piles of garbage and residential development on the riverbanks. Flooding that occurs is not always recorded because flooding in Gajah Wong River is not classified as a major threat and flooding on the banks of Gajah Wong River is a seasonal disaster, only exists during the rainy season and does not experience large material losses.

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BPBD Yogyakarta City has made efforts to prevent disaster mitigation by establishing the KTB (Disaster Response Village) training programs which began in 2013. BPBD has conducted the programs in 145 out of 169 villages in Yogyakarta City, with the target that by 2024 all villages in Yogyakarta City will become Disaster Response Villages. There will also be a mapping of potential disasters in an area and BPBD plays a role in providing education and socialization to the community.

The program aims to make the community alert, understand what to do from the threats that will occur. In addition, the purpose of this training is to strengthen

the capacity of the community in terms of existing resources and provide the facilities and infrastructure needed. In the formation of this programs, the village will undergo a series of disaster response simulations. Knowledge related to theory, to disaster response simulations will be delivered to the community. The expected result of the training is that the community can use disaster equipment and be ready when a natural disaster occurs.

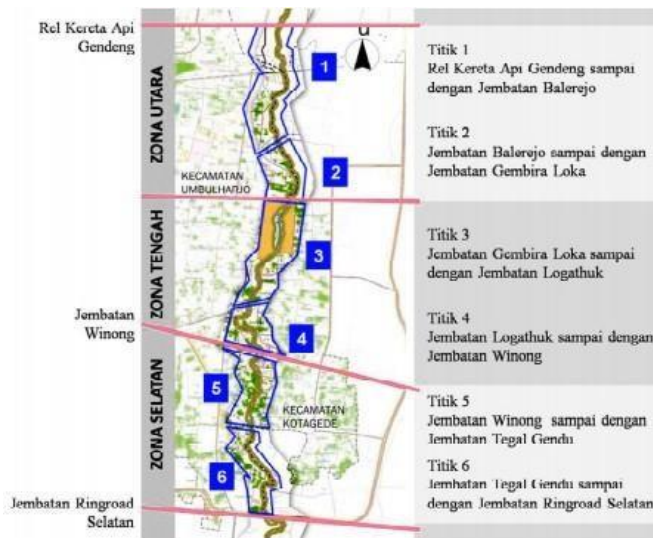


Figure 3. Division of zone scope of Gajah Wong River Basin Area (Source: Forsidas Gajah Wong Activity Report, 2012)

Apart from the Disaster Response Village training program, BPBD also carries out joint training with partners such as PMI and Islamic boarding schools. Every year, BPBD always carries out community empowerment related to disaster mitigation. Apart from that, BPBD also provides facilities to community groups who wish to hold disaster mitigation training with certain partners. This is an effort to attract community interest in taking disaster mitigation empowerment training seriously.



Figure 4. Watershed Area of Gajah Wong River (Source: Google.com)

The obstacle experienced in the training process was the lack of public awareness of the importance of disaster mitigation (Ayuningtyas et al., 2021). That by showing a proactive attitude of awareness in dealing with disasters can increase the effectiveness of the response and reduce losses of life and property (Azizah et al., 2022). If the program is implemented without community consent, it is likely that the community will not attend the training. In fact, one of the causes of flooding problems also comes from the community itself. The solution to this obstacle is to carry out a community empowerment strategy in the form of implementation times that are carried out outside BPBD working hours, such as Saturdays or Sundays or evenings because it adapts to the community.

The training program can solve the problem of flooding because the community becomes responsive to disasters, one of which is flooding, which often occurs when there is high rainfall. The community also has the ability to recognize threats in their area and is able to organize community resources to reduce vulnerability while increasing capacity to reduce disaster risk.

This disaster resilience is realized in development planning that contains prevention, preparedness, disaster risk reduction (DRR) (Aka et al., 2017; Arifin et al., 2021; Pancasilawan et al., 2020), and capacity building for post-emergency recovery. This training program can provide efforts to reduce community-based disaster risk by increasing preparedness capacity, which is planned and implemented by the community as the main actor. Related to the government's plan to tackle flooding is handled by the Public Works Office, which endeavors to repair public facilities damaged by flooding.

Conclusion

Flooding that occurs is not always recorded because flooding in the Gajah Wong River is not classified as a major threat and flooding on the banks of the Gajah Wong River is a seasonal disaster, only exists during the rainy season and does not experience large material losses. In addition, BPBD also provides facilities to community groups who want to hold disaster mitigation training with certain partners, this is one of the efforts to attract the community to take disaster mitigation empowerment training seriously. The solution to these obstacles is to carry out a community empowerment strategy in the form of implementation time carried out outside BPBD working hours, such as Saturday or Sunday or at night due to adjusting to the community. The training program can solve the flooding problem because the community becomes responsive to disasters, one of which is flooding, which often occurs when there is high rainfall. The training program should continue to

be carried out in order to provide efforts to reduce community-based disaster risk by increasing preparedness capacity, which is planned and implemented by the community as the main actor.

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Author Contributions

The authors listed in this article contributed to the development of the article, and have read, approved the published manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

References

- Abduh, I. M. N. (2018). *Ilmu dan Rekayasa Lingkungan*. Makassar: Sah Media.
- Aka, F. T., Buh, G. W., Fantong, W. Y., Issa, Zouh, I. T., Djomou, S. L. B., Ghogomu, R. T., Gibson, T., Marmol del, M.-A., & Sigha, L. N. (2017). Disaster prevention, disaster preparedness and local community resilience within the context of disaster risk management in Cameroon. *Natural Hazards*, 86, 57–88. <https://doi.org/10.1007/s11069-016-2674-5>
- Arif Mustofa, S. T. (2023). *Buku Ajar Mata Kuliah Ekologi Perairan*. UNISNU Press.
- Arifin, S., Wicaksono, S. S., Sumarto, S., Martitah, M., & Sulistianingsih, D. (2021). Disaster resilient village-based approach to disaster risk reduction policy in Indonesia: A regulatory analysis. *Jambá: Journal of Disaster Risk Studies*, 13(1), 1–9. <https://doi.org/10.1088/1755-1315/409/1/012024>
- Asmal, I., Walenna, M. A., & Nas, W. (2023). Application of local wisdom in handling waste in coastal settlements as an effort to minimize waste production. *Environmental and Sustainability Indicators*, 19, 100283. <https://doi.org/10.1016/j.indic.2023.100283>
- Ayuningtyas, D., Windiarti, S., Hadi, M. S., Fasrini, U. U., & Barinda, S. (2021). Disaster preparedness and mitigation in Indonesia: A narrative review. *Iranian Journal of Public Health*, 50(8), 1536. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8643537/>
- Azizah, M., Subiyanto, A., Triutomo, S., & Wahyuni, D. (2022). Pengaruh perubahan iklim terhadap bencana hidrometeorologi di kecamatan cisarua-kabupaten bogor. *PENDIPA Journal of Science Education*, 6(2), 541–546. <https://doi.org/10.33369/PENDIPA.6.2.541-546>
- Fatimah, M. F., & Bakar, R. A. (2023). Analisis Risiko Bencana pada kasus Curah Hujan Ekstrem Provinsi Sulawesi Barat dengan Metode Moran's I & Local Indicator Of Spatial Association. *Journal of Mathematics: Theory and Applications*, 5(2), 87–94. <https://doi.org/10.31605/jomta.v5i2.2997>
- Findayani, A. (2015). Kesiap siagaan masyarakat dalam penanggulangan banjir di Kota Semarang. *Jurnal Geografi: Media Informasi Pengembangan Dan Profesi Kegeografian*, 12(1), 102–114. <https://doi.org/10.15294/jg.v12i>
- Herlambang, A., Indriatmoko, R. H., Yudo, S., & Samsuhadi, S. (2010). Uji Coba Aplikasi Pemanenan Air Hujan Dan Sumur Resapan Di Wilayah Bogor, Depok Dan Jakarta. *Jurnal Air Indonesia*, 6(2). Retrieved from <https://shorturl.asia/4fEVn>
- Lechowska, E. (2022). Approaches in research on flood risk perception and their importance in flood risk management: a review. *Natural Hazards*, 111(3), 2343–2378. <https://doi.org/10.1007/s11069-021-05140-7>
- Marengo, J. A., Alves, L. M., Ambrizzi, T., Young, A., Barreto, N. J. C., & Ramos, A. M. (2020). Trends in extreme rainfall and hydrogeometeorological disasters in the Metropolitan Area of São Paulo: a review. *Annals of the New York Academy of Sciences*, 1472(1), 5–20. <https://doi.org/10.1111/nyas.14307>
- Mutaqi, A. S., & Suparwoko, S. (2020). Arsitektur Tropis Nusantara Era Adaptasi Kelaziman Baru Implementasi Prinsip-prinsip Arsitektur Tropis Nusantara Dalam Merespon Adaptasi Kelaziman Baru. *SAKAPARI (Seminar Karya & Pameran Arsitektur Indonesia)*. Retrieved from <https://dspace.uin.ac.id/handle/123456789/43461>
- Nugraheni, I. L., & Suyatna, A. (2020). Community Participation in Flood Disaster Mitigation Oriented on The Preparedness: A Literature Review. *Journal of Physics: Conference Series*, 1, 12028. <https://doi.org/10.1088/1742-6596/1467/1/012028>
- Oktari, R. S., Munadi, K., Idroes, R., & Sofyan, H. (2020). Knowledge management practices in disaster management: Systematic review. *International Journal of Disaster Risk Reduction*, 51, 101881. <https://doi.org/10.1016/j.ijdr.2020.101881>
- Pancasilawan, R., Utami, S. B., Sumaryana, A., Ismanto, S. U., & Rosmalasari, D. (2020). Mitigation of disaster risk reduction in Pangandaran Regency. *Sosiohumaniora*, 22(2), 214–222. Retrieved from

- <https://shorturl.asia/bxALH>
- Pearce, F. (2018). *When the rivers run dry, fully revised and updated edition: water-the defining crisis of the twenty-first century*. Beacon Press.
- Putra, I. D. G. A., Nimiya, H., Sopaheluwakan, A., Kubota, T., Lee, H. S., Pradana, R. P., Alfata, M. N. F., Perdana, R. B., Permana, D. S., & Riama, N. F. (2022). Development of climate zones for passive cooling techniques in the hot and humid climate of Indonesia. *Building and Environment*, 226, 109698. <https://doi.org/10.1016/j.buildenv.2022.109698>
- Ramadhan, A. (2022). *Sungai Gajahwong Meluap, Puluhan Rumah Warga di Umbulharjo Yogyakarta Terendam Banjir*. Tribun Jogja. Retrieved from <https://jogja.tribunnews.com/2022/10/03/sungai-gajahwong-meluap-puluhan-rumah-warga-di-umbulharjo-yogyakarta-terendam-banjir>
- Sari, A. A., Sabilla, A. A., & Hertati, D. (2020). Peran Badan Penanggulangan Bencana Daerah Dalam Manajemen Bencana Banjir Di Kabupaten Gresik. *Syntax*, 2(5), 21–35. Retrieved from <https://jurnal.syntaxidea.co.id/index.php/syntax-idea/article/view/252/282>
- Schumacher, R. S. (2017). Heavy rainfall and flash flooding. In *Oxford research encyclopedia of natural hazard science*. <https://doi.org/10.1093/acrefore/9780199389407.013.132>
- Sulaiman, M. E., Setiawan, H., Jalil, M., Purwadi, F., Brata, A. W., & Jufda, A. S. (2020). Analisis penyebab banjir di kota Samarinda. *Jurnal Geografi Gea*, 20(1), 39–43. Retrieved from <https://ejournal.upi.edu/index.php/gea/article/view/22021>
- Sun, W., Bocchini, P., & Davison, B. D. (2020). Applications of artificial intelligence for disaster management. *Natural Hazards*, 103(3), 2631–2689. <https://doi.org/10.1007/s11069-020-04124-3>
- Tabari, H. (2020). Climate change impact on flood and extreme precipitation increases with water availability. *Scientific Reports*, 10(1), 13768. Retrieved from <https://www.nature.com/articles/s41598-020-70816-2>
- Titko, M., & Ristvej, J. (2020). Assessing importance of disaster preparedness factors for sustainable disaster risk management: The case of the Slovak Republic. *Sustainability*, 12(21), 9121. <https://doi.org/10.3390/su12219121>
- Udori, A., & Miranti, M. (2019). Upaya Badan Penanggulangan Bencana Daerah (BPBD) dalam penanggulangan bencana banjir. *Jurnal Politik Dan Pemerintahan Daerah*, 1(2), 85–94. <https://doi.org/10.36355/jppd.v1i2.8>
- Yohana, C., Griandini, D., & Muzambeq, S. (2017). *Penerapan pembuatan teknik lubang biopori resapan sebagai upaya pengendalian banjir* (Vol. 1, Issue 2, pp. 296–308). <https://doi.org/10.21009/JPMM.001.2.10>