

# Community-Based Disaster Risk Management Model for Covid-19 in Tembi Hamlet

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## Abstract

*Covid-19 Pandemic arrived in the fifth month of Timbulharjo Village, Sewon District, Bantul Regency, Special Region of Yogyakarta. Until now there are still less alternative activities of villagers in responding. Some villages have carried out prevention activities. This research was conducted to see the practice of community-based disaster risk management (CBDRM) by the independency of locals in their initiatives to deal with Covid-19. This research uses a qualitative - participatory approach with Participatory Action Research (PAR). Collaborative community action and effectively managing the local resources helps citizens' solves their problems and become a model for developing Mitra Desa. The ongoing process stimulates the independence of the people and becomes a place for local initiatives that are in line with local resources in dealing with Covid-19.*

Keywords: cbdrm, covid-19, disaster management, disaster risk reduction, community

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## INTRODUCTION

Covid-19 pandemic has been a huge struggle for every state in the world including Indonesia. World Health Organization on 11 March 2020 confirms Covid-19 as a global pandemic. Based on EM-DAT, there are approximately 464 major disasters that had occurred in Indonesia between 1900 and 2016 killing more than 240,000 people, putting the country at the top rank (World Bank, 2016). Indonesia as a country with a variety of disasters dealing with this pandemic as a double challenge. Guidelines for the Prevention and Control of Coronavirus Disease (Covid-19) 5th Revision of Ministry of Health regulate that the positive Covid-19 person with asymptomatic, mild, and moderate for ten days self-quarantine (Indonesian Ministry of Health, 2020). Hospitals effectively can only manage the patient with a severe condition. Yogyakarta already implements this policy since 15 August 2020 (*Tribunnews*, 2020). Thus, the community was forced to take the initiative to provide independent quarantine facilities and other supporting responses to meet community needs.

The act of establishing independent quarantine and community-based surveillance is also a strategy recommended by the Ministry of Health in dealing with Covid-19. The Minister of Villages, Development of Disadvantaged Areas, and Transmigration also stipulated the Village New Normal Protocol to accelerate the handling and break the chain of Covid-19 transmission at the Village (Kepmendes PDTT No. 63/2020). Interestingly, Tembi Hamlet - as the object of research - has taken actions long before the health ministry and the village ministry recommendation. For example, since March community has been creating an independent quarantine place by utilizing network with the external actors. This kind of response initiated and independently done by the community called as community based disaster risk management (CBDRM).

Tembi Hamlet CBDRM practice is imbalance with conditions in other communities that are unprepared to respond to Covid-19 at their level of authority. Media coverage has demonstrated this condition in Magelang (*Kompas*, 2020b), Pati (*Mitrapost*, 2020), and Jombang (*Jawa Post*, 2020). This condition makes it important to create a community-level model that can be replicated in other areas. The researcher argues that this modeling is useful in application to hamlet and village level initiative. This replication expected to make other village or hamlet achieve risk reduction initiatives and resilience in

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facing the threat of Covid-19. This model does not only cover external activities in response to Covid-19, but also builds citizen movement to be aware, confident, capable, and committed to disaster risk reduction activities.

## **LITERATURE REVIEW**

### **I. Brief Background of Tembi Hamlet**

The research was conducted in Tembi Hamlet, Timbulharjo Village, Sewon District, Bantul Regency. Tembi Hamlet in the Bantul Regency was affected by the Yogyakarta earthquake in 2006. There are 1100 people in Tembi Hamlet. Tembi Hamlet majority being farmers. The traditionality of Tembi Hamlet has become a tourist attraction so there are several hotels and homestays both owned by the company and residents themselves. Recorded on August 13, 2020, cases of positive residents of Covid-19 in this sub-district reached 16 people (Bantul Covid-19 Taskforce Website, 2020). So it is the highest district in the case of positive residents of Covid-19. In terms of health facilities, Timbulharjo Village does not have a hospital but has a health centre and Polyclinic (BPS Kabupaten Bantul, 2019). Based on the records of the activities of the Tembi Hamlet Covid-19 Team, the first response that was carried out for Covid-19 was spraying disinfectants in public facilities on March 23, 2020 (Satgas Covid-19 Dusun Tembi, 2020). This first response is the key to increasing cooperation between communities, by involving all members of the society of all ages. Tembi Hamlet continued activities in the form of planning public health protocols, activities to reduce the impact of the economy and food, to building infrastructure.

### **II. Community Based Disaster Risk Management**

Community Based Disaster Risk Management (CBDRM) is an approach of promoting the involvement of grassroots-community disaster risk management at the local level. For this, a series of efforts are required that include community self-interpretation of hazards and disaster risk, reduction and monitoring and evaluation of their own performance in disaster risk reduction. However, the key to both are optimal mobilisation of resources that community has and has control over and become the integral part of community daily lives (Eko Teguh Paripurno, 2014).

Community-based approaches to reduce disaster risk have been known by various different names. Some called it community-based disaster risk management (CBDRM), community-based disaster management (CBDM), community-driven disaster risk reduction (CBDRR), communitybased disaster preparedness (CBDP), community-driven disaster risk management (CDDRR), community-managed disaster risk reduction (CMDRR) and community-managed disaster risk management (CMDRM) (Lassa, J.A., Boli, Y., Nakmofa, Y, 2018).

There is not yet any social research on the history of Community Based Disaster Risk Management (CBDRM). The first adoption of CDBRM was in the context of Merapi volcano of Yogyakarta back as early as 1994. It started with the assessment of the behaviour of community living around Merapi who survived the volcano eruption in 1994. Activists of KAPPALA Indonesia – a local Nature Lovers and Environment Activists NGO – of Indonesia developed a self-learning and conceptualisation of their works with Merapi community (Eko Teguh Paripurno, 2014).

## **RESEARCH METHODOLOGY**

This research is qualitative research using Participatory Rural Appraisal (PRA) tools. PRA is a set of participatory approaches and methods to learn about rural life and conditions by, together, and from rural communities (Robert Chambers, 1994). The research was conducted in the form of documentary and exploratory studies of community and stakeholder practices. The documentary study was carried out by re-reading the document of program activities carried out by the communities in dealing with Covid-19. Explorative assessments were carried out directly with interviews representing communities in Tembi Hamlet. The use of PRA tools is certainly consistent with qualitative research which has the core of understanding society through their frame of reference. The PRA technique was formed by drawing directly from qualitative social research. Launched from Campbell, that PRA is part of qualitative research (Campbell, 2001).

In disaster risk reduction, PRA is a key assessment tool to help choose strategies that are maningful and useful for vulnerable communities (Kotze & Holloway, 1996). PRA as an approach to assess risks as well

as vulnerabilities and capacities, is a valuable method in disaster reduction planning at community level. From a disaster reduction perspective, PRA is one tool which can be used to assess key vulnerabilities and capacities, as these relate to the risks faced by disaster prone communities. Compared to other assessment methods, PRA is particularly powerful, as it: a) actively involves community; b) empowers the community to identify the risks and priorities, as well as capacities to reduce these risks; c) provides a picture of the community's perceptions of the risks it faces; d) allows both community insiders and outsiders to jointly identify risk reduction measures – is both time and cost effective (Kotze & Holloway, 1996).

## FINDING AND DISCUSSION

### I. History of Covid-19 Response in Tembi Hamlet

The response starts from the administrative division below of Tembi Hamlet, namely *Kemasyarakatan*. Tembi Hamlet divided into two *Kemasyarakatan*, namely *Kemasyarakatan I* and *Kemasyarakatan II*. Below *Kemasyarakatan* there are lowest administrative division namely *Rukun Tetangga*. Each *Rukun Tetangga* have their own head to coordinate the function.

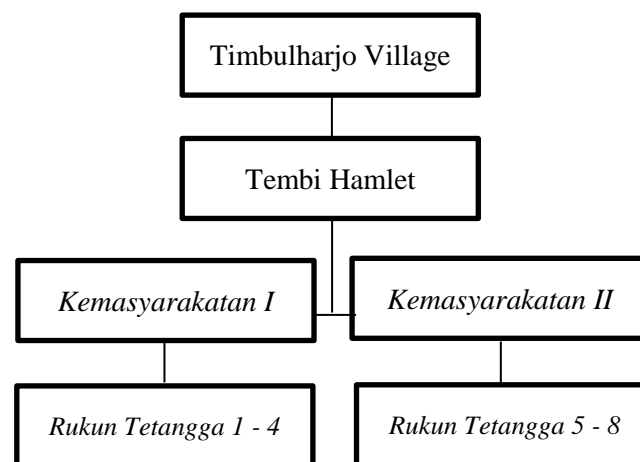


Figure 1. Timbulharjo Village Administrative Structure

On 22 March 2020, the administrator of *Kemasyarakatan II* discuss by Whatsapp about the needs of rapid response regarding the Covid-19 Virus threat. This activity involves 36 people in the Whatsapp Group. They agreed to disinfectant spraying on the public facilities in Tembi Hamlet on the next day. 22 March 2020, the administrator of *Kemasyarakatan I* discuss by Whatsapp about the needs of rapid response regarding the Covid-19 Virus threat. This activity involves 36 people in the Whatsapp Group. They agreed to disinfectant spraying on the public facilities in Tembi Hamlet on the next day. On 30 March, the process of response ongoing into another aspect, such as handwasher and liquid soap making. In the process of making handwasher, administrator of *Kemasyarakatan II* seeing that area of *Kemasyarakatan I* still have no response regarding risk of Covid-19. The condition caused by the vacuum of administrator in *Kemasyarakatan I*. Thus, administrator of *Kemasyarakatan II*, resident of *Kemasyarakatan I*, and head of Tembi Hamlet hold a meeting to discuss Covid-19 joint response. The meeting decided to form a Covid-19 Team to response in Hamlet level, and head of *Kemasyarakatan II* act as the head of Covid-19 Team. After the establishment, all the actor in the Covid-19 response strategy involved every household in Tembi Hamlet. Also, Covid-19 Team start to gather donation from business entity that exist in Tembi Hamlet.

### II. Damage of Covid-19 on Tembi Hamlet Community

Covid-19 making severe impact on informal workers by being unemployed. Although, other office resident also feel such salary cuts and workers that work on factory get unpaid leave until unspecified time. Tembi Hamlet as tourism destination also lose many tourist, thus hotels and tourism workers decreases of profit. This financial impact affect the psychology of community, especially the most vulnerable one, the lower income family. Being stress and anxiety for the future after Covid-19 being problem for every household. Some other, fear of the Covid-19 spread into their family and the loved

ones. While rural community frequently gather as part of their daily life, but Covid-19 forced them to cancel and postponed the gathering and social events. Meanwhile, rural community really enjoy social gathering. In the long run, if the condition not being better, the impact will be severe, because Covid-19 not only reducing the income of household, but also dissociate community from its social excitement.

### III. Qualitative Formula of Covid-19 Risk Level

The need to determine the level of risk encourages the creation of a qualitative formula of Covid-19 Risk Level which is then used to determine high-risk individuals who need specific treatment. This formula used to determine level of risk affected by factor of each individual. The risk of Covid-19 is directly proportional to mobility and physical interaction and inversely proportional to immunity levels and levels of health services. The level of mobility includes, among others, the mode of transportation, distance traveled, space and time. The level of physical interaction includes crowd density, distance, type of crowd, length of crowd time. Immunity levels include age and health. The level of positive habit means how each individual has positive habits for himself, to be resilient from exposure to Covid-19 by clean clothing, routine disinfectant, use of masks, exercise, and nutrition.

$$RC19 = \frac{Mo \times Pi}{Im \times Ph}$$

RC19	: Risk of Covid 19
Mo	: Level of Mobility
Pi	: Level of Physical Interaction
Im	: Level of Immunity
Ph	: Level of Positive Habit

#### Qualitative Formula of Covid-19 Risk Level

Thus, the individual risk of Covid-19 is determined by these factors. The higher the individual's mobility (Mo) and physical interaction (Pi), the greater the individual's risk. However, if it is balanced with high levels of immunity (Im) and Positive Habit (Ph), then the individual risk can also be reduced. Of course, to achieve low risk, each individual needs to reduce the level of mobility and physical interaction, and strengthen the level of immunity (Im) and positive habit (Ph).

	Mo	Pi		
Im	5	4	9	
	1	1	2	
Ph	5	4	9	
	3	3	6	
			18	
			8	<b>2.25</b>

Higher mobility (Mo) and physical interaction (Pi) with a lower of immunity (Im) and positive habit (Ph) making individual have a high risk on Covid-19.  
> 1 = High Risk

	Mo	Pi		
Im	2	3	5	
	4	4	8	
Ph	2	3	5	
	5	5	10	
			10	
			18	<b>0.55</b>

Higher immunity (Im) and positive habit (Ph) with a lower mobility (Mo) and physical interaction (Pi) making individual have a low risk on Covid-19.  
<1 = Low Risk

	Mo	Pi		
Im	4	1	5	
	3	3	6	

Same condition of mobility (Mo), physical interaction (Pi), immunity (Im), and positive habit (Ph) making

Ph	4	1	5	
	2	2	4	
			10	1
			10	

individual have a medium risk on Covid-19.  
1 = Medium Risk

Figure 2. Example of Qualitative Formula Application

#### IV. Implementation and Impact of Tembi Hamlet CBDRM

##### A. Prevention of Covid-19 Transmission

On 23 March 2020, because of the rarity of disinfectant liquid, administrator of *Kemasyarakatan II* send eight-person from the youth organization to hunt disinfectants from every store in Parangtritis Road. Then, community starts to spraying the public facilities. It prioritizes public facilities such as roads, mosques, and other places where the community commonly gathers. Sterilizing places that have a high risk carried out to prevent the spread of Covid-19. A week after that, On 30 March 2020 Tembi Hamlet receive disinfectant support from Timbulharjo Village. This second time sterilization focused on communities' houses in *Rukun Tetangga*. *Kemasyarakatan* distribute small sprays and disinfectants for *Rukun Tetangga* to clean the doors of houses and household items that frequently used by family members.

To support further public health, *Kemasyarakatan* together with the *Rukun Tetangga* install handwashing places in public area such as food stalls, alleys, workshops, and children playground. Along with the installation, the community individually took the initiative to install handwashing in front of their own houses. Also, liquid soap is made by dissolving bar soap. This liquid soap is placed in public handwashing places. On the same day, community start crafting hand sanitizer. Learning from Youtube, hand sanitizers are made using alcohol mixed with aloe vera and then packed in small bottles. Every person with high mobility rate based on *Rukun Tetangga* data receive one hand sanitizer. Nine women that work as a tailor in Tembi Hamlet start to crafting mask for every person in the Hamlet. A total of 1250 masks were crafted. Education banners used by community to campaign and educating visitor and resident about maintain a clean life and risk of Covid-19.

On 5 April 2020, community carried out the construction of checkpoint gates for all road accesses that enter Tembi Hamlet. This action have mission to controlling the mobilization residents and visitors, thus anticipate the spread of Covid 19. To maintain the security, community do safety patrol at each gates. This patrol aiming to find out the mobilization of Tembi residents and people outside Tembi in every access. Its done by night shift from 22.00 to 04.00. The unexpected impact of the night shift is on the psychological effect. When resident gather, they sharing their problem and reducing their stress level. Covid-19 give resident with low economy anxiety and stress.

Eid Al-Fitr approaching, on 14 April 2020 community preparing quarantine facility to accommodate Tembi Hamlet resident that homecoming from out of Yogyakarta, if the family uncapable to support self-quarantine in their own house. In realising this quarantine facility, Covid-19 Team collaborate with KAPPALA Indonesia, a NGO that have empty office in Tembi Hamlet to be used as quarantine place. For the interior, Covid-19 Team collaborate with University of Pembangunan Nasional "Veteran" Yogyakarta to equip the facility. The Team also collaborate with Alliance of Independence Journalist to campaigning Tembi Hamlet local initiative on Covid-19. From March to August, more or less nine resident do self-quarantine in their own house.

Eid Al-Fitr and Eid Al-Adha come in very close moment. Thus, Covid-19 Team making protocol for Eid prayers. The location of the prayers is divided into five places, and Covid-19 Team campaigning and suggesting for every household to done the prayer by themselves in their houses if they capable. The prayer mechanism also pays attention to health protocols, including existence of public handwash facilities, filling in the attendance book, using masks and keeping the distance.

##### B. Prevention of Covid-19 Impact on Food Insecurity

To support the quarantine facility and anticipating food crisis, Covid-19 Team cultivate the land of village. Community that mostly farmer makes it easy for Covid-19 Team to get support of skill and seeds in growing carbohydrate crops and greens. To fulfill the protein, Covid-19 Team collaborate with Freshwater fish farmer to raising catfish. Every household that need food stock could freely take this foodstuff.

*C. Rehabilitation on Covid-19 Impact*

On 20 April 2020, Covid-19 Team which executed by Division of Art and Culture held kids coloring competition to maintain the psychology of children. Covid-19 Team assume that the pandemic making children bored at home, because the school done by video conference. Theme of competition related to the health and sanitation, so children could get educated at once. The competition done by children in their own house, thus avoid gathering lot of people in one place. This activity was attended by 80 children of Tembi Hamlet. Even so this event called as competition, but every children get present of vegetable seedling to maintain their family food security.

Checkpoint gates that carried out by Covid-19 Team done by residents who have skills in the field of welding and building construction. Work by residents with special skills will receive payment from community funds as a reward and also aims to help the economy of residents that working informally, which more severely affected by the pandemic. Covid-19 Team also pay some residents to take care the communal food stocks in order to keep it growing well. The payments of both services are Rp. 100.000 per days. The Covid-19 Team also giving support to Nine women tailor group by find orders of cloth mask. Every cloth mask crafted, the tailor obtain Rp. 2.500. Lately, Team Covid-19 could find 4.750 cloth mask order for the women tailor group, from varied consuments. This engagement important to keep resident that work informally in order to stay have incomes. However, the Covid-19 Team also aware that this intervention is not enough.

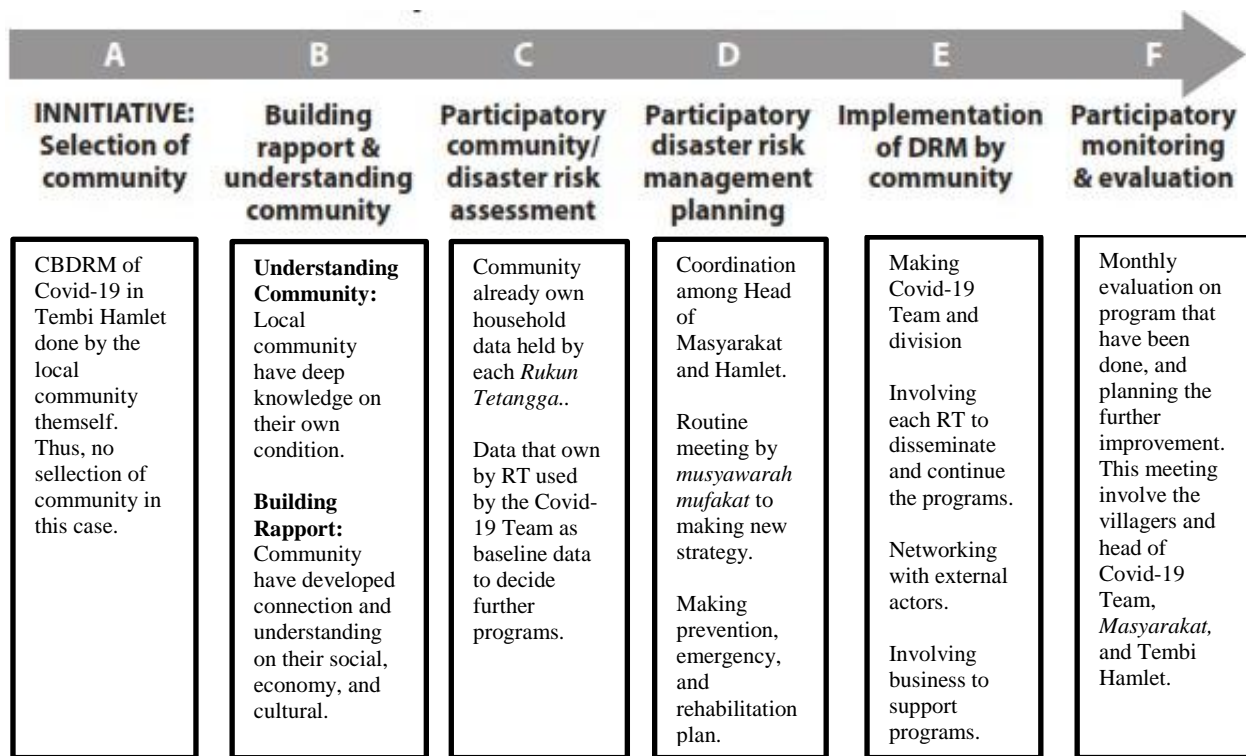


Figure 3. Model of Community-based disaster risk management process for Covid-19 in Tembi Hamlet

On 10 June 2020, Covid-19 Team with head of Tembi Hamlet and business entity discuss on the tourism planning on Covid-19 condition. Some of the agreed terms are the obligation to fulfill the health protocol, transparency on guest information, quarantining the guest, and limitation of guests activity inside the Tembi Hamlet. This decision is valid for one month until July 10, 2020. July 10, 2020, the further discussion agreed on opening the tourism wider, but following the health protocol tightly. This decision could be a great help for resident that work on tourism, however the protocol must be followed to ensure transmission of Covid-19 are not happen.

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## CONCLUSION AND FURTHER RESEARCH

The Covid-19 response that initiated by *Kemasyarakatan II* and developed into Covid-19 Team in Hamlet level show the importance of mobilization community resource to achieve disaster resiliency. Covid-19 clearly making impact on household and community. However, the good strategy, willingness, and local resource management important to initiate the disaster risk reduction. Since the initiation was purely carried out by the local with few involvements of the village government, community can show their own willingness to survive in this global pandemic by its own way and approach.

The need to determine the level of risk encourages the creation of a qualitative formula of Covid-19 Risk Level which is then used to determine high-risk individuals who need special measures, including self-quarantine and isolation. The community took the initiative to optimize the small things, the neglected space, such as land and unused building, and transform it into supporting facility and social support. Taking effective measures being important. Its proven, that community could manage the risk of Covid-19. By using their own local resources, community could prevent and rehabilitate the transmission and impact of Covid-19, thus reducing the bigger risk of Covid-19 that could be occur. This minimalist practice done by Tembi Hamlet shown that every community in each level, even without huge support of funding could survive the crisis if manage and optimize their own local resources.

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