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# Community based disaster management: Indonesian experience

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**Abstract.** Natural disasters are events that friendly to Indonesia. Every year natural disasters come in turns ranging from earthquakes, volcanoes, tsunamis, floods, tornado, landslides, forest fires, social conflicts and so on and covering the entire territory of Indonesia. To deal with these disasters, the Government of Indonesia has developed community-based disaster management (CBDM). This paper intended to explain the implementation of community-based disaster management. The data used in this paper are secondary data onto several references. Between 1815 and 2014 (200 years ) there was 13.172 times disaster happened and killed 291.427 people. In the last ten years, significant disasters were volcanic eruptions, tsunamis, earthquakes, floods and social conflict. The CBDM in Indonesia is implemented by increasing the capacity of communities to prepare for and cope with a disaster by encouraging full participation of government, private and public. To institutionalize this effort, it has been developed disaster organization by local conditions; increase public knowledge and awareness and maintain the possibility of catastrophe caused by human activity. There was some limitation faced in implementation of CBDM such as lack of understanding of stakeholders due to lack of socialization, and lack of formal organization BNPB capacity in disaster management.

## 1. Introduction

Natural Natural disasters are events seemed friendly to Indonesia. Every year natural disasters come in turns ranging from earthquakes, volcanoes, tsunamis, floods, tornado anging, landslides, forest fires, social conflicts and so on and covering the entire territory of Indonesia. These disasters can be estimated their coming, however there are also coming without any preceding signs. When disaster comes, resulted in not only life and property, but also spawned a range of economic problems, social, political and psychology that is not easily to overcome.

The disaster can be categorized purely for the disaster caused by natural factors and disasters that occur as a result of human activity. Earthquakes, volcanic eruptions, tornado and tsunamis can be classified into a disaster in the first category, while landslides, floods, forest fires are a disaster can be classified into the second category is a result of human activities in fulfilling their needs such as forest logging, land clearance and burning [1]. Law no. 24 of 2007 classifies disasters into three categories: (a) The natural disaster is a disaster caused by the event or series of events caused by nature, among others, in terms of earthquakes, tsunamis, volcanoes, floods, droughts, hurricanes, and landslides; (b) a



non-natural disaster is a disaster caused by the event or non-natural sequence of events which include the technology failed, failed modernization, epidemics, and outbreaks of disease; (c) social disaster is a disaster caused by the event or series of events caused by humans which include social conflicts between groups or between communities, and terror.

According Meriem-Webster Dictionary, disaster means "something that happens suddenly and causes much suffering or loss to many people, something that has a very bad effect or result". Asian Disaster Preparedness Center (ADPC) defines a disaster as "the serious disruption of the functioning of society, Causing widespread human, material or environmental losses, the which exceed the ability of the affected communities to cope using their own resources". Meanwhile, according to Indonesian Law no. 24 tahun 2007, a disaster is defined as "an event or series of events that threaten and disrupt the lives and livelihoods caused by natural factors and/or non-natural factors and human factors that lead to the emergence of human casualties, environmental damage, loss of property, and psychological impact".

## 2. Disaster Phenomenon in Indonesia

National Disaster Management Agency (BNPB) has recorded disaster between 1815 and 2014. During that period the biggest disaster happened was 5.204 times of flood killed 18 860 people, followed by hurricanes of 2,879 times with 292 casualties, 2,254 landslides times with the 2,035 victims and drought of 1,692 times even only 2 victims people. Some of the disasters happened infrequently, but resulted in many victims like earthquake and tsunami. They occurred only 10 times but resulted in loss of life as much as 167.779 people; catastrophic volcanic eruption of 126 times by 78.627 victims. In addition there has been also a disaster in terms of conflict of 108 times and killing of 6,010 people (table 1).

**Table 1.** Distribution of Major Disaster Type and Death Victim in Indonesia (1815-2014)

No	Type of Disasters	Event	Victims
1.	Earthquake	297	15,518
2.	Earthquake and Tsunami	10	167,779
3.	Eruption	126	78,627
4.	Floods	5,204	18,860
5.	Floods and Landslide	411	2,294
6.	Landslides	2,254	2,035
7.	Strong Wind	2,879	292
8.	Conflict	108	6,010
9.	Forest Fire	191	10
10.	Drought	1,692	2
	Total	13,172	291,427

Source:[2]

## 3. Some Great Natural Disasters in the Last 10 Years

Major disasters occurred in Indonesia in the last 10 years in the form of volcanic eruptions, tsunamis, earthquakes, floods and social conflict will be explained below.

### 3.1. The Earthquake and Tsunami

Earthquake and Tsunami in Aceh, which occurred on December 26, 2004 was one of the worst natural disasters in human history. Earthquake of 9.1 on the Richter scale centered in the Indian Ocean caused a tsunami that swept across the Indian Ocean and resulted in the death and destruction across South Asia including Thailand, Bangladesh, Sri Lanka, and India to East Africa. The most suffering in this disaster is Indonesian. 10-meter-high waves hit the coast of Aceh along with the level of physical destruction and human suffering is enormous. In Aceh alone, it was found that 221,000 people dead or missing, and

about half a million homeless. As 750,000 people lost their livelihoods. At all levels of the infrastructure crippled or destroyed.

In addition to the Aceh, earthquake and tsunami occurred also in Tasikmalaya on 2 September 2009 by 7.7 Mw causing a tsunami of 3 feet, and it was the second worst tsunami in Aceh after the tsunami of 2004. The Tsunami killed by 668 people and 65 people missing. The tsunami was caused by the earthquake up to 400 meters from the beach.

### 3.2. *Volcanic Eruption of "Merapi"*

The volcanic eruption of Merapi in Central Java is one of the largest eruptions and it carries a lot of casualties. The last eruption was in October and November 2010 were considered as the largest eruption since the eruption in 1872 and killed of 273 people. This kind of small erupts happen every 2-3 years, and a larger eruption happen within 10-15 years. Merapi eruptions had big impact especially in 1006, 1786, 1822, 1872, 1930, 1994, and 2010. Eruption in 1006 made the whole central part of Java Island shrouded volcanic ash eruption in 1930 destroyed of 13 villages and killed of 1400 people. In November 1994 eruption caused hot clouds glide to reach several villages and killed of 60 people.

The volcanic eruption of Kelud in Kediri, East Java is also a fierce eruption and claimed many victims. The last Kelud eruption occurred on Thursday, February 13th, 2014 and is believed by the Center for Volcanology and Geological Hazard Mitigation (PVMBG) as the largest eruptions in history Kelud eruptions. Kelud eruption was remarkable that cast material into the air to a radius of 17 kilometers and dust eruptions up to the region of West Java. In fact, due to the high intensity of dust, a number of airports on the island of Java were forced to stop operations. A total of seven people died from the eruption of Kelud. The death toll from the disease because of falling buildings and caused ash recorded vulkanik. Kelud has erupted several times, namely in 1586, 1901, 1919, 1951, 1966, and 1990, 2007 and the last erupted on February 13, 2014. Eruption of this mountain in 1586 killed more than 10,000 lives. In 1919, eruption claimed thousands of lives due to cold lava flood swept settlements.

### 3.3. *Flood*

Floods are natural disasters that are familiar to the Indonesian people and the most common is when the rainy season arrives. Floods are generally caused by the overflow of river water into the surrounding environment as a result of heavy rainfall. In addition, in urban areas is also caused by the lack of catchment areas as a result of widespread development. Almost all parts of Indonesia experienced this disaster and that is often a concern is the flooding that occurred in Jakarta (capital of Indonesia) that in ten years always happen. According to the Regional Disaster Management Agency (BPBD) Jakarta in 2014, floods killed of 23 people in Jakarta. The victim died from washed away, drowning, falls, electric shock, and pain. Meanwhile, the number of refugee reached 38, 079 people spread over in 150 refugee camps.

### 3.4. *Social Conflict*

Historically, Indonesia is not social-conflict free nation [3]. Social conflicts continue to occur repeatedly and replicate continuously from one place to another with-in such diverse forms throughout Indonesia. Social conflict seems to have been a part of "routine and everyday" people of Indonesia.

Large-scale of social conflicts with high levels of violence was happen in Poso, Aceh, Maluku, North Maluku, Papua, West Papua and West Kalimantan in the period 1998-2008. Social conflict is based on racism and separatism. During 2006-2008, the conflict has killed more than 600 people, 6,000 injuries, and more than 1,900 buildings were destroyed [4].

Among the six provinces above, Papua is a province with the highest rate of violent incidents and the number of Maluku province recorded the sharpest rise in the number of violent incidents in recent years. In Aceh province, separatist violence ended in 2005, but instead the number of incidents related moral issues/offense has increased and violent peaceful post-Memorandum of Understanding (MoU) was concentrated in the central region of violence. In six provinces, the level, form and impact of violent

conflict varies widely between districts. This also shows the significance of local factors in encouraging violent incidents [4].

### 3.5. Disaster Management Paradigm

Disaster is a part of human life. Paradigm in disaster management can be distinguished into the live paradigm that is free of disasters and paradigm coexists with disaster (living with disaster). Until a decade ago, the ideals of disaster experts still echoing the slogan 'free of disaster' that is based on the absence of natural hazards (natural hazard). Recent publications on disaster management, there have been a paradigm shift. For example, in Bangladesh and Vietnam, especially those who live in the Mekong River Basin, the original dream to be free from flood, finally decided to live with flood. Furthermore, the commitment to live together with the disaster, still guided by a spirit that should a disaster occur but do not lead to disaster victims. In the East region, especially the Besikama, has a very long life together with flood events. Traditional societies Besikama actually already know about flood mitigation practices based on their traditional home construction for a long time, the stage house, which has been very popular because of 'development' teach you all 'modern' things.

In terms of disaster management policies, identified a paradigm shift as shown in the following table.

**Table 2.** Paradigm Shift in Disaster Management Policies

<b>From</b>	<b>To</b>
<b>Framing the fundamental issue:</b> Hazards as 'other' – acts of God Event driven	Hazards are generated by humans Situational and less visible creeping hazards included
<b>Policy context:</b> Lack of visibility and profile	Legal liability Rising expectations and critical scrutiny Impacts of counter-terrorism and security
<b>Problem ownership and framing:</b> Acceptance/individual decision-making Local Choice	Community vulnerability and sustainability Local–global Institutional constraints
<b>Style:</b> Secret Paramilitary Uncertainty ignored or quantified	Open Dominantly civilian Uncertainty is acknowledged
<b>Policy emphasis:</b> Accept or reduce loss Focus on the hazard and event Solutions as separate	Manage vulnerability or increase resilience Focus on community safety and consequences Solutions found in organization of society and the development process

Source: [5]

## 4. Community Based Disaster Management (CBDM) in Indonesia

The basic concept of community-based disaster management in Indonesia and as well in some countries is an effort to increase the capacity of communities to prepare for and cope with the result of a disaster. This is because the government has limited resources including human resources, funding, equipment and logistics. Because of that disaster management should be universality, involving all stakeholders, including government, private and public. All three of these components must be able to be equal actors, all must play a major role, not only play a role as well. The recovery from disaster can only be achieved through full participation of the affected communities.

The goal of community-based disaster management is to increase awareness and community preparedness, especially in prone areas to natural disasters; strengthen the ability of communities to cope

with disasters by cooperating with relevant parties; developing disaster organization in accordance with local conditions; increase public knowledge about the education of the disaster; increase public awareness of the importance of maintaining the possibility of disaster caused by human activity.

The importance of involving the community in disaster management because: Local communities know their village and the local situation best and no outsider can understand the local opportunities and constraints as they do; thus, they need to be involved in identifying and resolving disaster vulnerability issues. Communities have a personal interest in avoiding disasters and are the main source of local resources; thus, they have the motivation and ability to carry out local activities. Communities are naturally very concerned with the local affairs on which their survival and well-being depend, so information should be generated in a manner and language that is understood by the community. Central level management and response programs often fail to assess the needs of vulnerable communities, undermine the potential of local resources and capacities, and may, in some cases, even increase people's vulnerability.

### 5. Disaster Management Institutional

Responsibility for disaster management in Indonesia has been stipulated in Law no. 24 of 2007 which stipulates that the (central) government has a responsibility in disaster management operations. This responsibility includes:

- a. Disaster risk reduction (DRR) and the integration of disaster risk reduction into development programs;
- b. Protection of society from the impact of disasters;
- c. Guarantee the fulfillment of rights and refugee communities affected fairly and in accordance with the minimum service standards;
- d. Recovery from the impact of disasters;
- e. Budget allocation of disaster management in the State Budget adequate;
- f. Budget allocation of disaster relief funds
- g. Maintenance of records / documents are authentic and credible threat and impact of disasters.
- h. While the responsibility of the Local Government formulated as follows:
- i. Guarantee the fulfillment of rights and refugee communities affected in accordance with the minimum service standards;
- j. Protection of society from the impact of disasters;
- k. Disaster risk reduction (DRR) and the integration of disaster risk reduction into development programs; and
- l. Allocation of disaster relief funds in the Revenue and Expenditure adequate.

To run this Responsibility, Indonesian Government established National Disaster Management Agency (BNPB) which has the following tasks:

- a. Provide guidance and direction to the disaster relief efforts that include disaster prevention, emergency response, rehabilitation, and reconstruction in a fair and equitable;
- b. Establish standardization and implementation of disaster management needs based on laws and regulations;
- c. Convey information to the community about disaster management activities;
- d. Reporting disaster management to the President once a month under normal conditions and at all times in a state of emergency;
- e. Use and take responsibility to national/international donations /aid;
- f. Responsible for the use of funds received from the State Budget;
- g. Running obligations in accordance with laws and regulations; and

#### h. Developing guidelines for the establishment of the Regional Disaster Management Agency.

In addition to the three parties mentioned above [2], Law no. 24 of 2007 also recognizes the role of the other parties, namely the business institutions and international organizations. Article 28 of Law no. 24 in 2007 formulates the role of business institutions in disaster management operations, either individually or jointly with other parties." Furthermore, the business organizations involved in disaster management operations need to "adjust activities with policy management operations disaster "," submit a report to the government and / or agencies that are tasked with"," heed the principle of humanity ". The role of the international organizations and foreign non-governmental organizations in disaster management is guaranteed by Article 30 paragraph (1) of Law no. 24 in 2007. The role procedures in disaster management has been arranged through.

### 6. Community Participation

Public participation is a key factor in response to the disaster. In Law number 24 of 2007 on Disaster Management and Regulation of the National Disaster Management Agency No.13 of 2010 on the National Disaster Management Plan (Renast-PB) 2010-2014, and the Decree of the Head of the National Agency for Disaster Management No. 5 of 2010 on the National Action Plan for Disaster Risk Reduction (RAN-PRB) of 2010 to 2012 clearly stated the importance of community participation, NGOs including international community.

Implementation of disaster management based community participation will lead :

- a. Disaster risk reduction with communities in disaster-prone areas independently;
- b. Avoid the emergence of new vulnerabilities and dependency society in disaster-prone areas;
- c. Disaster risk management is an integral part of the development process and management of natural resources for the survival of life in disaster-prone areas; and
- d. Multisectoral approach, multidisciplinary and multicultural.

Further stated that the people in the disaster have the right, among others, are:

- a. Education, training and skills in disaster management operations;
- b. Get information in writing and / or orally on disaster management policy;
- c. Participate in the planning, operation and maintenance program to provide health services including psychosocial support;
- d. Participate in decision-making on disaster management, particularly with respect to themselves and the community;
- e. Supervise in accordance with the mechanism set for the implementation of disaster management.

While the obligation of the community in disaster management include the following:

- a. Maintain a harmonious social life, maintain balance, harmony, and preservation of the environment;
- b. Doing activities of disaster management.

To develop this participation, the Indonesian government has always tried to build awareness in the community that (1) natural disaster not as a curse but rather be part of the exam given by the God. Through this awareness will awaken harmonious attitude and harmonious relationship between man and God. Therefore, the disaster must be addressed wisely through introspection and self-repair in order to be closer to his Lord; (2) natural disasters were caused by volcanic eruptions, tsunamis, earthquakes must be viewed as a natural process that is universal. Antropocentris paradigm has to be terminated, because humans also must allow nature to run its natural processes. Humans should not destroy nature, and vice versa obliged to maintain, and conserve them sustainable; (3) Disaster can befall any human being is a disaster that is when and where. This attitude to grow and develop the feeling of helping others, cooperativeness, kinship, social solidarity that reflects the harmonious relationship between human beings; (4) the power of society / community is the main base in the response to the disaster victims. Evacuation of victims in emergency, reconstruction and recovery of victims of natural disasters

can not be achieved optimally without revitalizing society/community; (5) shift the focus of emergency treatment to be a vital community development priority attention in disaster management. If at the time of emergency creativity in the hands of an outsider, then reverse into the reconstruction and recovery into its owner is the public/community concerned; (6) disaster management should be sustainable. It means that disaster management is not stop at reconstruction and recovery stages, but more importantly realizing preparedness of individuals, groups and society / community to prevent, manage and rehabilitate due to catastrophic events [6].

## 7. Limitation of Disaster Management in Indonesia

Indonesia's disaster management weaknesses occur because of several factors. First, the lack of understanding of disaster management of stakeholders both at the level of decision maker and formal actors in disaster management become serious issue. It is due to lack of socialization. Society in general lay of the concept. Even if there are some traditional practices on disaster management, increasingly the understanding and practice is increasingly faded and was considered not important to be a priority. Although an understanding of the existing disaster management on a limited level, but this understanding seems to be dominated by the understanding of conventional disaster management. In conventional disaster management, public position of the object as well as its involvement in the understanding of disaster management is not a necessity. Disaster management models put even this much government as the main actor who plays a role in disaster management. With such understanding it is natural that the public will not understand the hazards, disasters, causal factors, and impact on a broad prevention and properly control. So far their understanding is based on self-perception. These conditions certainly had an impact on the lack of carrying capacity for disaster management activities are carried out.

Second, it was found that the lack of formal organization BNPB capacity in disaster management becomes a causal factor. National Disaster Management Agency is an organization that has a huge task, but with the capacity and flexibility is very limited. Limitations of capacity (human and financial) and this flexibility can occur due to the nature of bureaucratic organizations. The third factor relates to the membership of the organization. This organization consists of officials from the central government structural position as head of departments and ministries and local officials also serves as head of the region. This condition would have been an obstacle for the totality of disaster management arrangements, considering their main duties and responsibilities in a structural position as the official government of course is very complex. Besides the membership, also allows the difficulty of coordinating the body of National Coordinating Agency. As an organization that is filled by government officials the task of disaster management was adopting a more tend to be bureaucratic and compliance inherent hierarchical structure and formal bureaucratic procedures so that the working flexibility is of very hard to do. Budget considerations and legal guides are often the backrest base bureaucratic work, appears to be a distinct problem for these organizations to be able to perform the function as formal actors in disaster management.

## 8. Case

As a country that has always affected by a disaster, the government's has efforts to develop disaster management. At first, disaster management in Indonesia is government-based in which the government is taking overall responsibility for the disaster management. Recognizing that disaster issue is not a small thing to solve, and the limitations of resources owned by the government, the disaster management is shifted towards community-based prevention as much as possible by encouraging the participation of communities, NGOs and the international community.

Below is the cases of community-based disaster management that is implemented by the Java Reconstruction Fund, an institution established by the Government of Indonesia in tackling the earthquake struck Yogyakarta and Central Java. This section is taken from the JRF report in 2008 entitled "Two Years after the Earthquake and Tsunami Java: Implementing Community-Based Reconstruction, Increasing Transparency."

In mid-2006, the two regions are densely populated Java stricken within two months. On the morning of May 27, an earthquake measuring 5.9 on the Richter scale struck the province of Yogyakarta and Central Java, killing more than 5,700 people. Preliminary estimates of houses destroyed and damaged more than 350,000. Total damage and loss of housing, infrastructure and productive sector is estimated at U.S. \$ 3.1 billion. Subsequent verification by central and provincial governments ensures that 280,000 people lost their homes, making this disaster as the worst disaster in over the last years.

Two months later, on July 17, an undersea earthquake with a 7.7 on the Richter scale struck the southern coast of Java, causing a tsunami that destroying 29,000 homeless people and killed 650 people. Along the coast of Ciamis, nearly 6,000 families were left homeless. Overall more than 1,900 homes were destroyed and 51 severely damaged homes.

Under the leadership of the Coordinating Ministry for Economic Affairs, Government of Indonesia established the National Coordination Team by Presidential Decree 9/2006 to effectively respond to the needs of a recovery in the region. In addition, two teams also were headed by the provincial Governor. In performing its duties, the National Coordination Team was assisted National Technical Team (TTN). The National Development Planning Board (Bappenas) prepared an Action Plan for the Rehabilitation and Reconstruction of Areas affected Earthquake in Yogyakarta and Central Java province in June 2006.

In response to this disaster, the European Commission and the Government of the Netherlands, the UK, Canada, Finland, and Denmark contribute U.S. \$ 84 million to the Java Reconstruction Fund (JRF) managed by the World Bank. JRF was formed at the request of the Indonesian government to support the reconstruction and rehabilitation of the central and provincial governments in areas affected by the earthquake and tsunami.

Java Reconstruction Fund has aimed to create a sense of ownership of the reconstruction activity, synergy with the activities and agenda of the government's reconstruction plan and manage the results. Java Reconstruction Fund has established a close working relationship with the Indonesian Government at all levels. More than 71% of JRF funds managed by government agencies and channeled through the government budget to promote government ownership. Steering Committee, which is chaired by the representative of the National Coordination Team, the European Commission and the World Bank as Trustee, is a decision-making body for JRF responsible for: (i) approve the overall priorities and proposals, (ii) assess the progress of JRF, (iii) ensure the coherence and collaboration with the Indonesian government works' plan. In this way, the JRF portfolio strategy and in line with the National Action Plan for the Rehabilitation and Reconstruction relating to: (i) Recovery of Housing and Settlements, (ii) Recovery of Public Infrastructure and (iii) Economic Recovery and Regional Communities.

Java Reconstruction Fund seeks to ensure the quality of its portfolio, therefore strived to deliver the results as effectively and efficiently as possible to beneficiaries. The main focus during the preparation, monitoring and evaluation of the project is the end result of the project. Project progress and targets are measured periodically to ensure that critical needs are met and funds are used effectively. During project implementation, the government and donor agencies participated in a six-monthly surveillance missions for each project to see the progress, challenges, and lessons learned, and discussion of corrective actions for the future. By ensuring that input is reflected in the portfolio, the Java Reconstruction Fund further ensures the quality of the results. Two Steering Committee meetings and technical assessment of ten meetings have been held since the JRF develop permanent housing projects, as well as assess the critical needs of livelihood rehabilitation in this region and review the intervention strategies are most effective.

Two years later, the recovery effort, led by the Government of Indonesia, have been relatively smooth. As of December 2007, approximately 279,000 houses were reconstructed and 97.3% of the population has been re-occupying the house. Both provinces have taken different approaches to permanent housing recovery: Central Java evenly distribute housing grants to families affected by the disaster, while the Yogyakarta government gives grants to community groups to prioritize the distribution of funding among community members. In March 2008, beneficiaries in Yogyakarta and Central Java have received funds of Rp. 25 million for each province. Recovery of public infrastructure and facilities that support the recovery of social life and economic activity is another pillar of the policy of the post-earthquake recovery.

Based on the mid-term evaluation (mid-term) conducted by the National Development Planning Agency (Bappenas), most of the restoration of public infrastructure financed through funds from the sectoral ministries / institutions (Rp 780 billion) and by donors, NGOs, and governmental organizations (Rp 3.4 trillion). Recovery of regional economies and communities that have been proposed runs slower than expectations. A survey conducted by UNDP in April 2007 indicated that 95% of business activities affected entrepreneurs have been resumed; however, 53 percent of businesses affected by the disaster are still struggling to reach capacity before the earthquake. The mid-term evaluation was conducted by Bappenas conclude that the lack of funding in the recovery of the productive sector reached Rp 1 trillion (U.S. \$ 106 million) and that the estimate of the total funding required in this sector is worth Rp. 1.3 trillion (U.S. \$ 138 million). Two projects that support livelihood recovery have been prepared and will be running soon. Both of these projects will focus on the rehabilitation of micro, small and medium enterprises of those people who affected by the earthquake.

## 9. Closing remarks

Disaster is that our lives are always lurking. It is true that there are disasters can be avoided such as fire, social conflict, but it is also true that there are disaster cannot be avoided. Disaster will affect the large property damage and even lead to people die. It is impossible to stop disaster. Therefore living with disaster paradigm is more relevant to the paradigm of living without disaster. However, the arrival of every disaster should not be faced with resignation, but there should be an effort to minimize the disaster effects. Cope with disasters by relying on the ability of the government alone is no longer effective and popular because of the limitations of the resources government. Therefore, involvement of the entire community in disaster management is a must. In the context of Community-Based Disaster Management (CBDM) is essential.

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