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COMMUNITY RESILIENCE IN HANDLING FLOOD DISASTER IN BOGOR CITY, WEST JAVA PROVINCE

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ABSTRACT

Bogor City often faces the risk of natural disasters, such as floods, landslides, and strong winds. Community resilience in disaster management is a crucial factor in facing these challenges. This research aims to determine, describe, and analyze the Bogor City Regional Government in building community resilience in flood disaster management, specifically the steps taken by the local government in building community resilience in flood disaster management, and the challenges in building community resilience in disaster management in Bogor City. The research method used is the qualitative design with a descriptive method with data collected using interviews, observations, and taking sample criteria based on risk levels, geographic location, and participation in mitigation. The data were examined using Fuller's resilience theory, namely anticipation, preparation, response, and adaptation. The research results showed that in the anticipation dimension through an early warning system (EWS) installed at various points, the community was able receive early warnings and take preventive actions. In addition, training programs such as SPAB and Disaster Resilient Villages. While in the preparation dimension, the community identified potential disasters in the residential environment by mapping local risks such as geographic conditions and infrastructure. The use of EWS and utilizing disaster history were also important to measure risk. After that, the preparation of a family evacuation plan must include identifying safe routes, gathering points, and routine evacuation simulations, so that each family member was ready to face an emergency situation and prepare communication using alternative communication tools such as radio or applications that do not depend on the telephone network. Furthermore, from the response dimension, the Bogor City community responded to the disaster with concrete actions such as independent evacuation and reporting to authorities via social media or emergency telephone numbers. Finally, in terms of adaptation, the community took concrete steps, such as building embankments as well as planning and evacuation.

Keywords: Community Resilience, Disaster Management.

ABSTRAK

Kota Bogor merupakan kawasan yang sering kali menghadapi risiko bencana alam, seperti banjir, tanah longsor, dan angin kencang. Ketahanan masyarakat dalam penanganan bencana menjadi faktor krusial dalam menghadapi tantangan tersebut. Tujuan dari penelitian ini adalah untuk mengetahui, mendeskripsikan, dan menganalisa Pemerintah daerah Kota Bogor dalam membangun ketahanan masyarakat dalam penanggulangan bencana banjir. langkah-langkah yang dilakukan oleh Pemerintah daerah dalam membangun ketahanan masyarakat dalam penanggulangan bencana banjir dan tantangan yang dihadapi dalam membangun ketahanan masyarakat dalam penanggulangan di Kota Bogor. Adapun metode yang digunakan dalam penelitian ini adalah menggunakan desain penelitian kualitatif dengan metode deskriptif dengan teknik analisis datanya menggunakan teknik wawancara dan observasi dan pengambilan kriteria sampelnya berdasarkan tingkat resiko, lokasi geografis dan partisipasi dalam mitigasi, kemudian peneliti mengkajinya dengan teori ketahanan dari Fuller yaitu antisipasi, periapan, tanggapan dan adaptasi. Hasil penelitian menunjukan bahwa Pada dimensi antisipasi melalui sistem peringatan dini (EWS) yang dipasang di berbagai titik, masyarakat dapat menerima peringatan dini dan mengambil tindakan preventif. Selain itu, program pelatihan seperti SPAB dan Kelurahan Tangguh Bencana. Sedangkan dalam dimensi persiapan masyarakat mengidentifikasi potensi bencana di lingkungan tempat tinggal dengan memetakan risiko lokal seperti kondisi geografis dan infrastruktur. Penggunaan sistem peringatan dini dan memanfaatkan sejarah bencana juga penting untuk mengukur risiko. Setelah itu, penyusunan rencana evakuasi keluarga harus mencakup identifikasi rute aman, titik kumpul, dan simulasi evakuasi yang rutin, agar setiap anggota keluarga siap menghadapi situasi darurat dan mempersiapkan komunikasi dengan menggunakan alat komunikasi alternatif seperti radio atau aplikasi yang tidak bergantung pada jaringan telepon. Selanjutnya dari dimensi tanggapan masyarakat Kota Bogor menanggapi bencana dengan tindakan konkret seperti evakuasi mandiri dan pelaporan kepada pihak berwenang melalui media sosial atau nomor telepon darurat dan terakhir dari segi adaptasi masyarakat melakukan langkah-langkah yang kongkrit yaitu seperti pembuatan tanggul dan perencanaan dan evakuasi.

Kata Kunci: Ketahanan Masyarakat, Penanggulangan, Bencana.

INTRODUCTION

Bogor City, West Java, often faces the risk of natural disasters such as floods, landslides, and strong winds. As reported in Tempo.co that heavy rain in Bogor City caused landslides and floods in several areas, including Tanah Baru. *Badan Penanggulangan Bencana Daerah* (BPBD/Regional Disaster Management Agency) of Bogor City reported that high rainfall and the confluence of river currents were the main causes of water overflowing into the surrounding areas. The Head of BPBD, Theofilo Patrocinio Freitas, explained that the combination of heavy rain and blocked water flow worsened the disaster conditions (Murtadho, 2021). Community resilience, which includes the ability to survive,

adapt, and recover from the impact of disasters, is a key factor in overcoming these challenges. With high population density and diverse topography, disaster risks in Bogor are complex, thus the government and community are making efforts to build sustainable resilience. Softani (as cited in Ruslandari et al., 2020) decribed community resilience as the ability to manage disasters, through the adaptation process, maintaining basic functions in society that determine the sustainability of life, the ability to recover to its original state. However, building community resilience in Bogor City ha significant challenges, including limited infrastructure, coordination between stakeholders, and public awareness. Therefore, it is necessary to further examine how the government and the community of Bogor City can improve community resilience as part of a sustainable disaster management strategy. Fuller, (as cited in SPMKB UII, 2021) in a webinar, defined resilience as “the ability to anticipate, prepare for, respond to, and adapt to everything from small everyday events to chronic shocks and changes or survive when a disaster occurs”.

Community resilience in dealing with disasters in Bogor City is very important not only when a disaster occurs, but also in the prevention, mitigation, and recovery phases. This involves risk awareness, knowledge of appropriate actions, preparedness, and cooperation between the government, institutions, and the community. The government, through the BPBD, takes mitigation measures such as socialization of preparedness and construction of disaster prevention infrastructure, such as embankments and concrete walls. These measures aim to minimize the impact of disasters such as floods and landslides, which often hit Bogor due to its hilly topography and high rainfall (Hasan et al., 2024). This is in line with a study stating that public awareness of changes that occur in the environment due to disasters is very important as an effort to reduce the risk of disasters that can arise and strengthen community resilience in dealing with disasters (Suherningtyas et al., 2021).

This research aims to analyze the Bogor City Regional Government in building community resilience in disaster management, the steps taken by the Regional Government in building community resilience in disaster management, and the challenges faced in building community resilience in disaster management in Bogor City.

THEORETICAL REVIEW

Resilience is "the ability to anticipate, prepare and respond and adapt to everything from small everyday events to chronic shocks and changes or survive when a disaster occurs" (Fuller, as cited in SPMKB UII, 2021). From the definition, there are four indicators, namely the ability to anticipate, prepare, respond, and adapt.

Community resilience refers to the ability to survive, adapt, and recover from the impact of a disaster. This includes preparation, education, strong infrastructure, early warning systems, and effective coordination to reduce losses. This resilience is a shared responsibility between the government and the community. This is in line with Sunan (as cited in Suherningtyas et al., 2021) that resilience is the ability to develop strength in facing and overcoming all challenges, threats, and obstacles directly or indirectly to ensure survival. Meanwhile, according to Softani (as cited in Ruslandari et al., 2020), community resilience is the ability to manage disasters, through the adaptation process, maintaining basic functions in society that determine the sustainability of life, and the ability to recover to its original state. Disaster-resilient communities include: (a) the community capacity to reduce risk/damage through mitigation or adaptation; (b) the capacity to maintain basic functions and structures in disaster situations; (c) the capacity to recover after a disaster. This includes resilience that is created due to community capacity and character that supports community resilience (Ruslandari et al., 2020).

A disaster is an event or incident that threatens and disrupts life caused by natural or non-natural factors that cause loss of life, environmental damage, property loss, and psychological impacts (Kartika, 2021).

According to Nurjanahet (as cited in Fitrianto, 2020), disaster management is a unity in disaster management efforts, which are interconnected. Disaster management activities can be divided into three main activities or phases, namely the pre-disaster, during a disaster, and post-disaster, and all three are included in a single disaster management effort. Meanwhile, Ulum (as cited in Fitrianto, 2020), revealed several factors in disaster management efforts through the concept of disaster management, including the following:

a) The political commitment of the government to institutionalize of building a sustainable mechanism;

b) The management information system, community/community participation, mobilization; and
c) The distribution of resources. Ulum further stated that the key elements for designing an effective institution for effective disaster management are access to information, autonomy, affordability, accountability of adaptability, efficiency, equity, and sustainability (Fitrianto, 2020).

Disaster management is essential to protect communities from sudden and unexpected threats, such as earthquakes, floods, and storms. This process includes planning, preparation, rapid response, recovery, and ongoing prevention efforts to reduce the impact of damage, loss of life, and material loss. In disaster management, integration and cooperation are needed between disaster-prone villages and villages that are safe from disasters. Wismadi (in SPMKB UII, 2021) conveyed the basic concept of a sister village which is a form of cooperation between villages prone to volcanic disasters and safe villages outside disaster-prone areas or those not affected by volcanic disasters, so that they can be used as evacuation sites. He described that "the concept of a sister village must include shelters that are always available, buildings that are always there and can be used in any situation, therefore the purpose of the 'one home one pavilion' concept provides benefits in efforts to provide evacuation assistance for disaster victims after a disaster occurs".

METHOD

This research descriptive qualitative, with data analysis based from interview and observation, and the sampling criteria was based on risk levels, geographic location, and participation in mitigation. The researchers then examined the data using Fuller's resilience theory, namely anticipation, preparation, response and adaptation. This research was conducted in Bogor City. The informants were chosen using the purposive sampling technique. The informants were (a) the Head of the BPBD of Bogor City, (2) the Head of the Bogor City Public Works and Spatial Planning Agency, (c) the Head of the Bogor City Social Service, (d) Head of the Bogor City Health Service, (e) the Employees of the BPBD of Bogor City; and (f) the people. The data collection was carried out by interview, observation, and documentation. The interview model used was a semi-structured interview. According to Miles and Huberman (as cited in Kafomai & Ramlah, 2023), activities in qualitative data analysis are carried out interactively and continuously

until they are completed so that the data is saturated. These activities are in the form of data reduction, data presentation, and data verification. Therefore, in this research, the data analysis used the Miles & Huberman model with the stages of data collection, data reduction, data presentation, and drawing conclusions (Kafomai & Ramlah, 2023).

RESULTS AND DISCUSSION

Bogor City Regional Government in Building Community Resilience in Flood Disaster Management

Disaster resilience is an important aspect in efforts to maintain the safety and welfare of communities in various parts of the world. In facing the threat of natural disasters such as earthquakes, floods, storms, and non-natural disasters such as pandemics, communities with high capabilities in this regard have a very crucial role. Community capacity in disaster resilience includes the knowledge, skills, resources, and cooperation needed to survive, overcome, and recover from the impact of disasters.

The community resilience was analyzed using Fuller's four indicators, namely anticipation, preparation, response, and adaptation capabilities.

1. Anticipation

The community plays a very important role in anticipating and dealing with disasters. They are the most familiar with the environment in which they live, and have unique knowledge about the specific challenges and needs they face. Thus, community awareness, preparedness, and participation in disaster resilience efforts are very important. The community has made various prevention efforts to reduce the negative impacts of disasters. According to the Head of the Bogor City Rehabilitation Plan Preparation Sub-Section, the disasters that often occur include landslides, fallen trees, and flash floods. In dealing with bad weather, the community is expected to be more vigilant. Some concrete actions that have been taken include the construction of embankments, the preparation of evacuation plans, and the provision of emergency equipment, which are carried out together with districts and villages. In addition, the community also receives information through the Early Warning System (EWS) which is installed at several points in Bogor City. In addition, training programs such as *Satuan Pendidikan Aman Bencana* (SPAB/Disaster Safe Education Unit) and Disaster Resilient Villages have been held to improve the ability to detect and

respond to early signs of disaster. The function of the EWS installed at various points in Bogor City is to provide early warning to the public regarding the potential for natural disasters, such as landslides, floods, or other disasters. This system is designed to detect early signs of a disaster and immediately send information to the public, so that they can take preventive measures, such as evacuation or mitigation measures, to minimize the impact of the disaster. The EWS plays an important role in improving the preparedness and rapid response of the community to the threat of disaster. Meanwhile, the purpose of training programs such as SPAB and Disaster Resilient Villages is to improve the ability of the community, especially in schools and villages, to detect and respond to early signs of disaster. Through this training, it is hoped that the community can be better prepared and responsive in dealing with potential disasters, so that it can reduce the risk and impact of disasters on life safety and material losses. This program also aims to build awareness and a culture of preparedness among the community, so that they are more proactive in taking preventive measures before a disaster occurs.

From the explanation, it can be concluded that various steps have been taken to improve community preparedness in facing disasters in Bogor City. Through the EWS, the community can receive early warnings and take preventive measures. In addition, training programs such as SPAB and Disaster Resilient Villages aim to increase community capacity in detecting and responding to early signs of disaster. These efforts are expected to strengthen community preparedness and responsiveness so that the impact of disasters can be minimized. Thus, these steps emphasize the importance of the active role of the community in disaster prevention. The EWS provides technology to detect risks, while training programs provide the knowledge and skills needed to manage emergency situations. The combination of these two efforts helps create a community that is more responsive and prepared to face various potential disasters, so that it can reduce losses and accelerate post-disaster recovery.

2. Preparation

Community preparation for disaster resilience includes various things, from risk awareness, emergency planning, physical and mental readiness, to active participation in disaster mitigation and recovery. According to the Rehabilitation and Construction Section, communities need to take real action by identifying

potential disasters in their residential environment, preparing family evacuation plans, and preparing ways to communicate during emergencies. All of these efforts will be coordinated by the government, the Indonesian National Army, and the Police when an emergency occurs. The government also plays an important role in helping community preparation, such as providing shelter and providing evacuation training.

To identify potential disasters in the residential environment, several steps that can be taken include mapping local risks based on environmental characteristics. This process involves observing physical factors such as land contours (to anticipate landslides), distance from water sources (to measure potential flooding), and the existence of infrastructure that may be affected by earthquakes or other disasters. Communities can also use EWS and conduct studies on the history of disasters in the area. This is in line with what Rikin (2021) expressed in an online news story that described the flood disaster in the Jakarta area: "to find out and reduce risks and dangers, people can utilize information technology through InaRISK and weather forecasts down to the sub-district level with BMKG Info. It can also be from official government sources and various information channels, including social media." To find out and reduce risks and dangers in Bogor City, people use EWS. Evacuation plans need to be discussed and understood by all family members, including children. In addition, routine evacuation simulations can help ensure that everyone is prepared for disasters.

The study of the family preparedness level is often used using a framework developed by the *Lembaga Ilmu Pengetahuan Indonesia* (LIPI/Indonesian Institute of Sciences) in collaboration with UNESCO. One of the parameters is a plan for disaster emergencies which is an important part of preparedness, namely related to evacuation, first aid, and rescue. This effort is very important, especially when a disaster occurs, the first day after a disaster, and before outside assistance arrives (Sarfika et al., 2023).

Meanwhile, communication during emergency conditions can be prepared by using alternative communication tools such as radio communication or special applications that do not depend on cellular telephone networks. The community can also work together with authorities such as *Badan Nasional Penanggulangan Bencana* (BNPD/the National Disaster Management Agency) or local institutions

to obtain the latest information and official instructions. In summary, disaster preparation means that the community needs to take a series of proactive steps to increase disaster resilience.

3. Response

The community takes disasters seriously and they take concrete steps during a disaster. As expressed by the Head of the Disaster Rehabilitation Sub-Section, the people of Bogor City respond to the disaster by evacuating independently, then reporting the situation to the authorities via social media or the provided emergency telephone number. In the evacuation process, they are assisted by volunteers and social organizations. In addition, they follow directions from the government to ensure proper handling.

The community's response to disasters usually involves various forms of reaction, such as preparedness, participation in mitigation, and adaptation to emergency situations. Based on references, this response is greatly influenced by public awareness of disaster risks, knowledge of preventive measures, and the availability of accurate information. Factors driving positive community responses include education, access to information, and infrastructure readiness. On the other hand, obstacles that are often faced include lack of knowledge or coordination between the community and the government and related institutions.

From the statement above, it can be concluded that the people of Bogor City responded to the disasters with concrete actions such as independent evacuation and reporting to authorities via social media or emergency telephone numbers. They were supported by volunteers and social organizations, and followed government directions to ensure proper handling. This response was influenced by risk awareness, knowledge of prevention, and adequate access to information. However, the challenges that are often faced are the lack of knowledge and coordination between the community and the government.

4. Adaptation

It is important to understand that disaster adaptation in Bogor City is not an easy task. The city has unique characteristics that affect the types of disasters that may occur, including hilly topography, high rainfall, and a history of disasters that have occurred. Therefore, adaptation strategies must be tailored to the context of this city. All adaptation steps taken in Bogor City have a common goal, namely protecting the lives and property of residents, maintaining economic sustainability, and preserving

existing natural resources. With coordinated and sustained efforts, Bogor City can be an example of how a city that is vulnerable to disasters can prepare itself well to face incoming threats, minimize risks, and ensure better survival for all its citizens. In terms of protecting the lives and property of residents, maintaining economic sustainability, and preserving existing natural resources by taking concrete steps, such as building embankments and evacuation planning, as explained by the Head of the Disaster Rehabilitation Sub-Section.

In the adaptation to disasters, the assessment of adaptive capacity depends on economic (financial) resources, availability of technology, individual/adaptor's ability to adapt, management, and performance. This adaptive capacity can be carried out at the individual or social group level to respond, overcome, recover, and adapt to environmental changes that occur (Sanger et al., 2021).

From the explanation above, it can be concluded that adaptation to disasters in Bogor City faces unique challenges due to its hilly topography, high rainfall, and history of disasters that have occurred. Adaptation strategies must be tailored to the specific conditions of the city. The steps taken, such as the construction of embankments and evacuation planning, aim to protect residents, property, and economic and environmental sustainability. With coordinated and sustainable efforts, Bogor City can be an example in preparing for disaster risks and ensuring the safety and well-being of its citizens.

Based on the four dimensions in building community resilience manage flood disasters, first, in terms of anticipation, Bogor City has anticipated the possibility of disasters in the community environment, namely by making embankments, evacuation planning, or providing emergency equipment through the involvement of sub-districts and villages. Then in terms of preparation, the city has used an early warning system and utilized disaster history to measure risk. Next, in terms of response, disasters are responded when they occur, by carrying out independent evacuations, and reporting to the relevant parties through social media or emergency telephone numbers. Moreover, the evacuation is assisted by volunteers and social organizations. Finally, in terms of adaptation, the city of Bogor in building disaster resilience is by preparing the community well to face threats that come, minimizing risks, and ensuring better survival for all its citizens. In protecting

the lives and property of residents, maintaining economic sustainability, and preserving existing natural resources, the city take concrete steps, namely making embankments and evacuation planning.

Analysis of Disaster Resilience Measures through Mitigation in Bogor City in Accordance with Government Regulation No. 21 of 2008

Article 15 states that the implementation of disaster management in situations where there is potential for disasters as referred to in Article 4 letter b includes preparedness, early warning, and disaster mitigation (Peraturan Pemerintah Tentang Penyelenggaraan Penanggulangan Bencana, 2008).

a) Preparedness: This is in line with the Bogor City Disaster Rehabilitation Sub-Section that "increasing preparedness is done by forming a Kajian Risiko Bencana (KRB/Disaster Risk Assessment), Rencana Penanggulangan Bencana (RPB/Disaster Management Plan) and Contingency Plan."
b) Early warning: Early warning can be seen from one of the efforts made by the BPBD, namely using a flood EWS tool in the Ciheuleut River, Tanah Baru Village, North Bogor District. The installation of this tool is related to the flood conditions due to the discharge or overflow of the Ciheuleut River when the rainfall is quite high. This tool is proof of the existing challenges and one form of collaboration and community participation. This tool is only a warning, the main effort is that all parties must be able to mitigate (prevent) (BPBD Kota Bogor Sosialisasi Dan Simulasi Alat Peringatan Dini Banjir, 2022). In addition, to optimize disaster mitigation, it is carried out through education, training, and counseling programs. This is as stated by the sub-section of the Rehabilitation compiler that "optimizing disaster mitigation is done through education, training, and counseling programs."
c) Disaster mitigation: Disaster mitigation in Bogor City also includes efforts to educate and raise public awareness about actions that must be taken in disaster situations, as well as the development of efficient evacuation plans. These efforts are very important to minimize risks and protect the community.

Measures Taken by the Regional Government in Building Community Resilience in Disaster Management in Bogor City

The measures taken by Bogor City in building disaster resilience are as

follows: formation of a disaster management team, socialization and training, infrastructure development, development of information systems and cooperation with related agencies: The Bogor City regional government collaborates with various related agencies such as the West Java Provincial BPBD, the National Army, the Police, and others to improve coordination in disaster management (*Turun Langsung Ke Lokasi Bencana, Bima Arya Pimpin Koordinasi Penanganan Tanggap Darurat*, 2022). The challenges faced by Bogor City in building disaster resilience are the impact of climate change and many residents still live in disaster-prone zones. This is in line with the Bogor City Disaster Rehabilitation that "the main challenge is that many residents still live in disaster-prone zones, budget limitations and lack of existing human resources". Then the Head of the Bogor City Disaster Rehabilitation Sub-section said that "to overcome these challenges, we continue to strive for innovation and also synergize with other agencies."

CONCLUSION

Based on the research data, results, and discussion, it can be concluded that the community resilience in disaster management in Bogor City is as follows:

a) Anticipation: The community has a very important role in anticipating and dealing with disasters. The concrete actions that have been taken by the Bogor City community in anticipating the possibility of disasters in their environment are building embankments, evacuation planning, or providing emergency equipment through the involvement of districts and villages. One part of anticipating disasters is that the community gets information related to weather forecasts, potential earthquakes, or other early signs through EWS installed at a number of points in Bogor City and training programs such as SPAB and Disaster Resilient Villages aim to increase community capacity in detecting and responding to early signs of disasters
b) Preparation: In dealing with disasters, the community needs maximum preparation in the form of concrete actions that have been taken by the community in preparation for facing various types of disasters such as floods, earthquakes, or landslides, namely reporting to the authorities and also independent anticipation as long as there are no related parties at the location with the first step being to identify potential disasters in the

residential environment by mapping local risks such as geographical conditions and infrastructure. The use of EWS and utilizing disaster history are also important for measuring risk. After that, the preparation of a family evacuation plan must include identifying safe routes, gathering points, and routine evacuation simulations, so that every family member is ready to face an emergency situation. In addition, communication preparation during a disaster can be done by using alternative communication tools such as radio or applications that do not depend on telephone networks

c) Response: The response of the Bogor City community to disasters, especially when a disaster occurs, is carried out seriously, namely by responding to disasters when they occur, carrying out independent evacuations, and reporting to relevant parties via social media or provided telephone numbers.
d) Adaptation: All adaptation steps taken in Bogor City have a common goal, namely protecting the lives and property of residents, maintaining economic sustainability, and preserving existing natural resources. With coordinated and sustainable efforts, Bogor City can be an example of how a city that is vulnerable to disasters can prepare itself well to face incoming threats, minimize risks, and ensure better survival for all its citizens. In terms of protecting the lives and property of residents, maintaining economic sustainability, and preserving existing natural resources, this is done by taking concrete steps, such as building embankments and evacuation planning.

Measures taken by Bogor City in building disaster resilience are the formation of a disaster management team, socialization and training, infrastructure development, development of information systems, and cooperation with related agencies. The Bogor City regional government collaborates with various related agencies such as the West Java Provincial BPBD, the National Army, the Police, and others to improve coordination in disaster management.

Building community resilience in disaster management is crucial to protect residents and reduce the impact of disasters. In this regard, this research gives the following recommendations to the Bogor City Government:

a) Educate the community about the types of disasters that may occur in

the Bogor area, as well as how to deal with them;

b) Improve spatial planning that takes disaster risks into account;
c) Build or renovate earthquake and flood-resistant infrastructure, such as sturdy buildings and river security systems;
d) Strengthen an efficient and accurate early warning system for various types of disasters;
e) Create a clear evacuation plan, including safe shelter locations'
f) Build a Disaster Management Team that is trained and ready to act immediately when a disaster occurs;
g) Include the residents in the planning and decision-making process;
h) Develop a long-term recovery plan that allows communities to recover and rebuild their lives after a disaster;
i) Provide psychological and social assistance to disaster victims, and;
j) Evaluate disaster responses, both successful and less successful.

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