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Group 22

REQUIREMENTS GATHERING

Task 2

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1. INTRODUCTION

In the wake of the growing frequency and intensity of natural disasters around the world, effective disaster management has become a critical priority for governments, emergency services, and communities. To develop a comprehensive disaster management strategy, it is essential to thoroughly understand the requirements and needs of all stakeholders involved.

This report presents the findings from a requirements gathering exercise focused on improving disaster preparedness, response, and recovery capabilities. The goal was to identify the key needs, challenges, and opportunities across various aspects of disaster management, including early warning systems, evacuation planning, emergency supplies and logistics, search and rescue operations, sheltering and housing, and long-term recovery efforts.

Requirement gathering is the process of collecting information about what the stakeholders want to achieve. It is a vital step in the software development life cycle. This task ensures there is clarity in the project and ease in its development as all other processes such as the requirement analysis or system design is dependent on what requirements are gathered.

To carry out this comprehensive requirements gathering initiative, the project team followed a structured approach consisting of the following key steps:

2. REQUIREMENTS GATHERING FROM EXISTING DOCUMENTATION

A disaster management system is a comprehensive framework or set of processes, policies, and procedures that are designed to help organizations and communities prepare for, respond to, and recover from disasters. It provides a structured approach to managing all aspects of disaster management, from prevention and mitigation to response and recovery.

2.1 Literature Review:

Traditional methods of disaster management are based on indigenous knowledge and practices that have been passed down from generation to generation. Traditional disaster management primarily relies on manual processes and often involves the following steps:

2.1 Preparedness:

- Develop disaster plans and procedures
- Conduct training and drills
- Stockpile supplies and resources
- Identify vulnerable areas and populations

2.2 Response:

- Activate emergency response teams
- Assess the situation and needs
- Provide immediate assistance to affected communities
- Coordinate with relevant authorities and organizations

2.3 Recovery:

- Restore essential services and infrastructure
- Support affected individuals and communities
- Conduct damage assessments

- Develop long-term recovery plans

2.4 Mitigation:

- Identify and reduce risks before disasters occur
- Implement policies and measures to lessen the impact of disasters
- Raise awareness about disaster prevention
- Invest in infrastructure resilience

The traditional method of disaster management is however due to lack of real time data to create awareness of possible occurring event and as a result, early warning or alert systems are not being utilized which would have improve the disaster management process. Another key limitation to the traditional methods for disaster management is the drawback in communication and collaboration among stakeholders involved as well as the users.

A mobile based application for disaster management utilizes technology to enhance and streamline the traditional disaster management process. Key features of such an application may include:

- 1) **Real-time data collection and analysis:** Collects and analyzes data from various sources (e.g., sensors, social media, satellite imagery) to provide real-time situational awareness during disasters
- 2) **Early warning systems:** Monitors data to issue early warnings and alerts, enabling timely evacuation and response.
- 3) **Resource management:** Tracks and manages available resources (e.g., personnel, equipment, supplies) to optimize their allocation during response and recovery efforts.
- 4) **Communication and coordination:** Facilitates communication between emergency responders, government agencies, and affected communities, ensuring timely information sharing and coordination.
- 5) **Damage assessment:** Uses technology (e.g., drones, satellite imagery) to conduct rapid and accurate damage assessments, aiding in recovery planning and resource allocation.
- 6) **Public education and preparedness:** Provides educational resources and tools to raise awareness about disaster preparedness and risk reduction measures.

Therefore, with a mobile based application for disaster management, we can improve the disaster recovery management system through;

- Improved situational awareness through real-time data
- Faster and more accurate response due to early warning systems
- Optimized resource management and coordination
- Enhanced communication and collaboration
- More efficient damage assessment and recovery planning
- Increased public awareness and preparedness

While disaster management applications offer significant benefits, they are not intended to replace traditional disaster management methods but rather to complement and enhance them. By leveraging technology, these applications can improve the efficiency, effectiveness, and coordination of disaster management efforts.

Based on existing mobile applications for disaster recovery management, some loopholes have been identified as many of the applications focus on managing a single natural or manmade disaster such as fire, or earthquake or landslide. Some of these applications are meant only for sending out warning alerts and others do not have any communication channels for collaboration between stakeholders, users and emergency responders as well as volunteers. Also, none of the existing applications target all four phases in disaster management. Therefore, in this project, we aim to overcome these shortcomings by designing a system that will involve all four phases in the

disaster management life cycle, give out timely alerts and provide a communication channel for easy collaboration and so on.

3. STAKEHOLDER IDENTIFICATION

Stakeholders are individuals, groups, or organizations that have an interest, involvement, or concern in the project's success or failure. Stakeholders can have a direct or indirect influence on the project's objectives, outcomes, and deliverables. An effective disaster management system requires a collaborative effort from various stakeholders. Here's a breakdown of key stakeholder groups for our disaster management system, outlining their roles throughout the disaster management cycle:

3.1 Citizens:

a. Preparedness:

- i. Stay informed about disaster risks (e.g., landslides, floods)
- ii. Participate in drills and preparedness training
- iii. Take mitigation measures around homes (e.g., clear drainage ditches, secure loose objects)

b. Mitigation:

- i. Participate in community-based mitigation projects (e.g., planting trees to prevent erosion)
- ii. Advocate for stricter building codes in high-risk areas

c. Response:

- i. Follow evacuation orders promptly
- ii. Seek shelter in designated locations
- iii. Report incidents to authorities.

d. Recovery:

- i. Assist with cleanup efforts
- ii. Access recovery resources (shelters, food, water)

3.2 Emergency Responders (Firefighters, Police, Medical Personnel, Search and Rescue Teams):

a. Preparedness:

- i. Train for various disaster scenarios
- ii. Maintain equipment and supplies
- iii. Participate in public education on hazard mitigation

b. Mitigation:

- i. Conduct hazard assessments and identify high-risk areas
- ii. Participate in mock disaster drills

c. Response:

- i. Conduct search and rescue operations
- ii. Provide medical aid to injured population
- iii. Assess damage to infrastructure and property

d. Recovery:

- i. Support ongoing search and rescue efforts
- ii. Assist with infrastructure repair

3.3 Government Agencies (National Disaster Management Agency (NDMA), Ministry of Public Health, Local authorities):

a. Preparedness:

- i. Develop comprehensive disaster management plans
 - ii. Conduct risk assessments to identify vulnerable areas
 - iii. Organize public education campaigns on preparedness measures
 - iv. Implement mitigation projects (e.g., building seawalls, reinforcing infrastructure)
- b. **Mitigation:**
 - i. Enforce building codes and land-use regulations in hazard-prone areas
 - ii. Invest in early warning systems and public awareness campaigns
 - iii. Develop evacuation plans for vulnerable communities
- c. **Response:**
 - i. Coordinate response efforts among different stakeholders
 - ii. Allocate resources (personnel, supplies) to affected areas
 - iii. Manage shelters and evacuation centers
- d. **Recovery:**
 - i. Lead recovery efforts and reconstruction projects
 - ii. Provide financial assistance to individuals and businesses
 - iii. Develop long-term plans for risk reduction

3.4 Non-Governmental Organizations (NGOs) (Red Cross/Crescent Society, International aid organizations):

- a. **Preparedness:**
 - i. Partner with local communities for preparedness training
 - ii. Stockpile relief supplies (food, water, medicine)
 - iii. Support mitigation efforts (e.g., community tree planting)
- b. **Mitigation:**
 - i. Advocate for community-based disaster risk reduction programs
 - ii. Provide resources for mitigation measures in vulnerable communities
- c. **Response:**
 - i. Provide humanitarian assistance (search and rescue, medical care)
 - ii. Distribute relief supplies to affected population
- d. **Recovery:**
 - i. Support long-term recovery efforts (housing reconstruction, livelihood support)
 - ii. Provide social services (psychological support, childcare)

3.5 Media (News outlets, radio stations):

- a. **Preparedness:**
 - i. Share public information about disaster risks and mitigation strategies
 - ii. Disseminate preparedness tips and drills schedule
- b. **Mitigation:**
 - i. Partner with government agencies to raise public awareness about mitigation measures
 - ii. Promote a culture of preparedness through educational programs
- c. **Response:**
 - i. Broadcast critical information (evacuation orders, shelter locations)
 - ii. Provide real-time updates on the disaster situation
- d. **Recovery:**
 - i. Report on recovery efforts and ongoing needs
 - ii. Offer platforms for public communication and resource sharing

4. DATA COLLECTION (REQUIREMENTS ELICITATION)

This section outlines the data collection methods and tools used to understand the community's level of preparedness for unexpected events. The goal was to gather information from a diverse range of residents to identify areas of strength and potential gaps in preparedness efforts.

4.1 Methods:

We employed a multi-pronged approach to data collection, utilizing three methods:

4.1.1 Web-Based Survey

The primary method of data collection was a web-based survey created using Google Forms. This platform offered several advantages:

- **Accessibility:** Google Forms is user-friendly and accessible on various devices with internet access, making it convenient for a wider audience to participate. (<https://forms.gle/7ctGESQNciEiSxNv8>)
- **Data Security:** Google Forms offers built-in security features to protect respondent privacy and ensure the confidentiality of all collected data.
- **Data Analysis Capabilities:** Google Forms automatically compiles responses into spreadsheets facilitating efficient data analysis and reporting

i. Survey Design:

The survey consisted of a mix of question types:

- **Multiple Choice:** Selecting from pre-defined options (e.g., disaster awareness, mitigation measures taken)
- **Likert Scale:** Gauging agreement levels on preparedness statements (e.g., importance of disaster preparedness)
- **Open Ended:** Allowing for detailed responses and capturing specific concerns or suggestions (e.g., preferred information sources, ideas for community preparedness efforts)


The survey was designed to be completed in approximately 10 minutes. A pre-testing phase was conducted with a small group of residents (approximately 20) to ensure clarity, flow, and appropriate question phrasing.

Here are the example survey questions in the online survey form:

DISASTER MANAGEMENT SYSTEM

We're conducting a brief survey to understand how prepared people in our community are for unexpected events. Your participation is completely voluntary and all your answers will be kept confidential. This information will be used to develop better resources and support to help our community stay safe.

takemjim43@gmail.com [Switch accounts](#)

 Not shared

 Resubmit to save

* Indicates required question

Age Range *

- ☐ 18-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 65+
- ☐ Other: _____

Gender*

- ☐ MALE
- ☐ FEMALE

Neighborhood you live in

Your answer _____

In your opinion, what are the most likely natural disasters to affect your location?
(Select all that apply)

- ☐ Floods
- ☐ Landslides
- ☐ Earthquakes
- ☐ Volcanic eruptions
- ☐ Other: _____

Have you ever experienced a natural disaster ?

- ☐ YES
- ☐ NO

Have you participated in any disaster preparedness training or drills in the past year?

- ☐ Yes
- ☐ No
- ☐ Maybe

Does your household have a disaster preparedness plan

- ☐ Yes
- ☐ No

If you answered yes to having a plan, does your plan include the following? (Select all that apply)

- ☐ Designated evacuation route
- ☐ Emergency contact information
- ☐ Location of a safe shelter
- ☐ Stockpile of emergency supplies (food, water, first-aid kit)
- ☐ Other: _____

Have you taken any steps to mitigate potential disaster risks around your home?
(Select all that apply)

- ☐ Cleared drainage ditches
- ☐ Secured loose objects outside your home
- ☐ Trimmed overhanging trees
- ☐ Reinforced windows and doors (if applicable)
- ☐ Other: _____

<p>Where do you get information about disaster risks and preparedness? (Select all that apply)</p> <p><input type="checkbox"/> Local radio stations</p> <p><input type="checkbox"/> Community meetings</p> <p><input type="checkbox"/> Government websites</p> <p><input type="checkbox"/> Social media</p> <p><input type="checkbox"/> Family and friends</p> <p><input type="checkbox"/> Other: _____</p>	<p>Do you have alternative methods of communication in case regular communication channels are disrupted? (e.g., backup phone, radio)</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
<p>Are you aware of the emergency response procedures in your neighborhood in the event of a disaster?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>Do you have an emergency supply kit prepared in your home?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
<p>Do you know the location of the nearest emergency shelter in your neighborhood?</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> Maybe</p>	<p>If yes, please select the items you have in your emergency supply kit: (Select all that apply)</p> <p><input type="checkbox"/> Flashlights and batteries</p> <p><input type="checkbox"/> Non-perishable food items</p> <p><input type="checkbox"/> Bottled water</p> <p><input type="checkbox"/> First aid supplies</p> <p><input type="checkbox"/> Medications</p> <p><input type="checkbox"/> Personal hygiene items</p> <p><input type="checkbox"/> Blankets or sleeping bags</p> <p><input type="checkbox"/> Cash or important documents</p> <p><input type="checkbox"/> Other: _____</p>
<p>Are you familiar with the warning signs or signals that indicate a potential disaster?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>Imagine there was a mobile application designed to help residents prepare for and respond to disasters. Would you be interested in using such an application?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
<p>Do you have a plan in place for evacuating your home in the event of a disaster</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>If yes, what features would you like this application to have? (Select all that apply) and if you choose other, add the functionalities you wish the app should possess</p> <p><input type="checkbox"/> Real-time emergency alerts and updates</p> <p><input type="checkbox"/> Information on disaster preparedness and mitigation strategies</p> <p><input type="checkbox"/> Evacuation route maps and shelter locations</p> <p><input type="checkbox"/> Family communication tools</p> <p><input type="checkbox"/> Resource directory for disaster relief services</p> <p><input type="checkbox"/> Offline functionality (access to information without internet)</p> <p><input type="checkbox"/> Other: _____</p>
<p>Do you have a designated family communication plan in case of separation during a disaster?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>Are you involved in any community groups or organizations that focus on disaster preparedness?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p>Do you have any suggestions or feedback on how the local government can improve effective disaster management</p> <p>Your answer _____</p>

Submit

ii. **Data Collection Process:**

The survey was disseminated through various online channels to reach a broad audience:

- Social media platforms (e.g., Facebook, Twitter, WhatsApp etc.) relevant to the community
- Community websites and online bulletin boards.

iii. **Sample Size and Demographics:**

The survey aimed for a diverse sample to represent the entire community. While we cannot pinpoint exact demographics until data analysis, the distribution methods were chosen to encourage participation from all age groups and backgrounds. (Raw data was collected for approximately 20 people through the pre-testing phase).

iv. **Data Security and Confidentiality:**

The survey was designed anonymously, and no personal identifying information was collected. All responses will be kept confidential and used solely for the purpose of improving community disaster preparedness resources.

4.1.2 Document Review and Research

One crucial methodology is document review and research. This approach fosters a knowledge base informed by the very entities at the forefront of disaster preparedness, response, and recovery: government agencies, NGOs, and emergency responders.

These organizations produce a wealth of valuable documents, including reports, action plans, and guidelines. While some documents might focus on specific disaster types (e.g., earthquakes, floods), the insights they offer transcend the particulars and contribute to a broader understanding of disaster management principles. By meticulously reading through these resources, we gain access to the collective wisdom and best practices accumulated through years of experience on the ground.

Here are some of our document sources:

- **Local emergency response plans:**
https://floodready.vermont.gov/update_plans/local_emergency_operations
https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/local-government/em_planning_guide_for_la_fn.pdf
<https://www.alertmedia.com/blog/emergency-response-plan/>
- **Incident reports from previous disasters:** <https://ourworldindata.org/grapher/natural-disasters-by-type>
- **Community risk assessments:**
<https://rb.gy/8gge9t>
<https://riskassessment.strategicfire.org/wp-content/uploads/2016/03/Community-Risk-Assessment-Guide-v1.5.pdf>
<https://dipecholac.net/docs/files/Community%20Risk%20Assessment%20Training%20Module%20Mala%20wi.pdf>
- **Public awareness campaigns on disaster preparedness:** <https://rb.gy/r28tce>, <https://rb.gy/lt0s9y>

Below is a distillation of key requirements for a disaster management system, extracted from a thorough review of documents above;

1. Data-Driven Decision Making:

- Documents consistently emphasize the need for comprehensive data collection and monitoring of disaster occurrences. This includes gathering information on the frequency, duration, and intensity of disasters, encompassing various types relevant to the target region.
- Rationale: Historical data serves as the bedrock for understanding past trends, predicting future risks, and optimally allocating resources.

2. Identifying Community Vulnerability:

- Documents highlight the importance of identifying factors that make communities more susceptible to disasters. Examples include:
 - The frequency of specific disaster types in an area.
 - Waste management efficiency and sanitation facilities (impacting disease risks after disasters).
 - Proximity to potential hazards like rivers, fault lines, or other danger zones.
- Justification: Understanding vulnerabilities enables targeted interventions and empowers communities to build resilience in the face of potential hazards.

3. Early Warning Systems: Saving Lives and Property:

- Documents underscore the critical role of early warning systems in alerting communities about potential disasters. These systems should leverage real-time data and forecasts to issue timely warnings through various communication channels (sirens, text messages, public announcements) for maximum effectiveness.
- Importance: Early warnings empower communities to take necessary precautions (evacuation, securing property) or prepare for immediate response, potentially saving lives and minimizing damage.

4. Risk Assessment and Hazard Mapping: A Visual Guide for Mitigating Risks:

- Documents suggest conducting risk assessments to identify areas prone to disasters based on historical data and geological factors. Additionally, they recommend assessing the vulnerability of communities within those areas. This information should be translated into disaster hazard maps, providing a clear visual representation of high-risk zones.
- Benefits: Hazard maps are invaluable tools for:
 - Land-use planning to avoid development in highly hazardous areas.
 - Infrastructure development that can withstand disaster impacts.

5. Collaborative Response: Building Resilience Through Coordination:

- Documents advocate for facilitating information dissemination and education about health risks associated with disasters. Additionally, they emphasize the necessity of establishing robust coordination among stakeholders, such as government agencies, healthcare providers, and NGOs. This collaboration should also enable resource sharing and the exchange of best practices to enhance disaster response capabilities.

- Value: Improved coordination ensures a timely, well-organized response, minimizing casualties and facilitating a swifter recovery process.

6. Long-Term Planning and Policy Development: Building a Safer Future:

- Documents highlight the need for data and analysis to support long-term planning for improved disaster management and public health preparedness.

- This data should inform policy development aimed at reducing disaster risks and building community resilience.

- Benefits: Data-driven insights enable informed decision-making to create safer communities and minimize the impact of future disasters.

By harnessing the collective knowledge embedded in documents produced by government agencies, NGOs, and emergency responders, we have identified key requirements for an effective disaster management system. This system, equipped with these functionalities, can serve as a vital tool for mitigating disaster risks, protecting communities, and fostering resilience in the face of unforeseen challenges.

4.1.3 Citizen Interview

Citizen interviews provided an opportunity to gain detailed insights and personal perspectives from residents.

- **Interview Format:** Semi-structured interviews allowed for flexibility to explore topics in more depth based on the resident's responses.
- **Sample Selection:** A purposive sampling approach was used to ensure a diverse group of participants representing different age groups, neighborhoods, and backgrounds potentially impacted by disasters (approximately 30 – 40 participants).
- **Interview Topics:** The interview guide covered topics such as:
 - Disaster awareness and concerns
 - Existing preparedness measures taken at home and within the community
 - Information sources and preferred communication channels during disasters
 - Perceptions of community preparedness efforts
 - Suggestions for improvement

i. Data Collection Process:

Interviews were conducted in-person at a mutually convenient location or remotely via our popular social media platforms e.g. WhatsApp, Facebook etc. Informed consent was obtained from all participants before the interview began.

ii. Data Security and Confidentiality:

All interviews were conducted confidentially. Participants were informed that their responses would be anonymized in the final report.

Requirements Gathered From the Citizens Interview

1. **User Feedback and Support:** Users wanted a feature that enables them to provide feedback regarding the disaster management system, and, they expressed the need for support channels to address any concerns or worries they may have during system's usage.
2. **Offline Functionality:** Users emphasized the necessity for the disaster management system to be accessible even in scenarios where internet connectivity is unavailable. Offline functionality could include offline access to maps, emergency contact information, and saved user data.
3. **Multi-language Support:** Recognizing the diverse linguistic preferences within the community, users requested support for multiple languages within the disaster management system. This requirement ensures that information and instructions provided by the system are comprehensible to all users, regardless of their language proficiency.
4. **Report Disaster:** Users expressed the need for a feature that allows them to report the occurrence of a disaster promptly. This requirement emphasizes the importance of enabling users to contribute to the collective awareness of disaster situations, facilitating timely response and coordination efforts by relevant authorities.
5. **Evacuation Routes:** Users emphasized the importance of having access to clear and up-to-date evacuation routes in the event of a disaster. This requirement underscores the critical role of the system in providing life-saving information to users, enabling them to navigate safely to designated evacuation points and minimize potential risks during evacuation procedures.
6. **Request Help:** Users desired a feature that enables them to request assistance or support from relevant authorities or community responders during emergencies. This requirement emphasizes the importance of communication and coordination between users in distress and the appropriate response teams, enhancing overall emergency response efficiency and effectiveness.
7. **Alerts and Notifications:** Users expressed the need for timely alerts and notifications regarding potential or ongoing disaster situations. This requirement emphasizes the importance of real-time communication and situational awareness, enabling users to stay informed and take appropriate actions to ensure their safety and well-being.
8. **Receive Alerts Offline (SMS):** Recognizing the limitations of internet connectivity during emergencies, users specifically requested the ability to receive alerts and notifications via SMS. This requirement ensures that critical information reaches them promptly regardless of their online status.
9. **Usability:** Users highlighted the importance of a user-friendly interface and intuitive design in the disaster management system. This requirement emphasizes the need for a system that is easy to navigate, understand, and operate, especially during high-stress situations. Ensuring usability enhances user adoption and effectiveness of the system in supporting disaster preparedness and response efforts.

4.1.4 Brainstorming

Brainstorming in a requirements gathering process is a technique used to generate ideas and solutions for the project requirements. It involves a group of stakeholders or team members coming together to share their thoughts, ideas, and suggestions related to the project requirements.

During this brainstorming session, our team pondered on how our system will support all stages of the disaster management lifecycle, including preparedness, response, recovery, and mitigation.

Below are the various requirements we gathered during our brainstorming session:

- 1. Real-time Alerts and Notifications (Preparation, Response):**
 - **Preparation:** By setting up real-time alert systems, individuals and authorities can prepare in advance for potential disasters, increasing overall readiness and resilience.
 - **Response:** Alerts and notifications provide timely information to individuals and emergency responders, enabling swift and coordinated responses to mitigate the impact of disasters.
- 2. Resource Management (Preparation, Recovery, Mitigation):**
 - **Preparation:** Effective resource management involves pre-positioning essential supplies and equipment, ensuring readiness to respond promptly to disaster events.
 - **Recovery:** Proper resource allocation facilitates the efficient distribution of aid and support to affected areas during the recovery phase, helping communities rebuild and restore normalcy.
 - **Mitigation:** Strategic resource management contributes to long-term resilience by allocating resources towards mitigation efforts, such as infrastructure improvements and risk reduction measures.
- 3. Communication (Response, Recovery, Mitigation):**
 - **Response:** Clear communication channels enable rapid dissemination of information and instructions during emergency response operations, enhancing coordination and situational awareness.
 - **Recovery:** Continuous communication facilitates ongoing updates and support services for affected communities during the recovery phase, fostering resilience and community engagement.
 - **Mitigation:** Effective communication campaigns raise awareness about disaster risks and preparedness measures, empowering individuals and communities to take proactive steps to reduce vulnerabilities.
- 4. Geospatial Data and Mapping (Response):**
 - **Response:** Geospatial data and mapping technologies provide critical situational awareness for emergency responders, helping them identify impacted areas, assess damage, and prioritize response efforts.
- 5. Incident Reporting (Response):**
 - **Response:** Incident reporting mechanisms enable individuals to report emergencies and provide essential information to responders, facilitating rapid assessment and deployment of resources during the response phase.
- 6. Damage Assessment (Response):**
 - **Response:** Damage assessment tools and techniques support the evaluation of infrastructure damage and inform decision-making processes for resource allocation and emergency response efforts.
- 7. Disaster Detection (Mitigation):**
 - **Mitigation:** Early detection of potential disasters allows for timely intervention and mitigation measures to reduce the impact and severity of the event, ultimately enhancing community resilience and safety.

4 REQUIREMENTS DOCUMENTATION

Requirements documentation refers to the written document that captures and defines the requirements for a software system or product. It serves as the foundation for the entire software development process and is a crucial artifact in any software project. Documenting the requirements in a clear and structured manner is essential for communication and traceability. The requirements documentation serves as a communication tool between the stakeholders (e.g., customers, users, product owners) and the development team. Not only will this

documentation be helpful at the end of the project when you reflect back on goals achieved, updates accomplished, features added and bugs fixed, but it will also act to help manage stakeholder expectations, and keep team members focused and on track. The requirements documentation typically includes the following key elements:

- Review Existing Documentation
- Identify Stakeholders
- Business Requirements
- Gather Functional Requirements
- Non-Functional Requirements...

This report acts as our requirements document as it defines the essential business and functional requirements for the development of the Mobile-Based Disaster Management System. The requirements document ensures the final product meets the goals, addresses the stakeholders' needs, and provides a solid foundation for the design and development of the system. It will serve as the foundation for the development team, allowing them to build a system that meets the specified criteria and can be updated later if stakeholder needs are changed.

5. MANAGING REQUIREMENT CHANGES

Given the dynamic nature of disaster management requirements and the potential for evolving stakeholder needs, a process needs to be put in place to manage the changes to the documented requirements. This change management process will ensure the disaster management system remains aligned with evolving stakeholder needs and stay responsive, relevant, and effective over time.

5.1 Change Request Submission: Once a change request is approved, the project team will update the requirements documentation accordingly, including the requirement descriptions, user stories, traceability matrix, and any other relevant artifacts.

The versioning system will be used to track the changes and maintain a clear history of the requirement evolution.

5.2 Communication and Dissemination: The project team will communicate the approved changes to all relevant stakeholders, including development teams, users, and external partners.

This will ensure that everyone involved in the disaster management system is aware of the updates and can adjust their plans and processes accordingly.

5.3 Ongoing Monitoring and Evaluation: The project team will continuously monitor the implementation and effectiveness of the changed requirements, gathering feedback from users and stakeholders.

This feedback will be used to further refine the requirements and inform future change requests, ensuring the disaster management system remains optimized and responsive to evolving needs.

6. REFERENCES

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