



ENGINEERING DISASTER PREPAREDNESS IN MALAWI: LESSONS FROM CYCLONE ANA & FREDDY

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INTRODUCTION

- Nations, households and businesses need to always be prepared for any kind of disaster it is however unfortunate that they remain usually unprepared (Sutton & Tierney, 2006).
- The recent floods in Malawi namely Cyclone Ana in 2022 and Cyclone Freddy in 2023 have clearly proven that Malawi as a nation is not prepared for any disaster of such magnitude.
- Disaster preparedness is organized around four phases: **mitigation, preparedness, response, and recovery.**
- A full disaster preparedness action plan will include ability to safe guard life during the disaster, ability to undertake emergency action, engage in post disaster restoration and recovery activities.

CYCLONE ANA 2022



- During Cyclone Ana in 2022 Malawi **37 people** lost their lives while more than 170 people suffered various body injuries (DoDMA, 2022)
- Most of the flood damaged occurred in the southern part of Malawi compared to the center and north.
- The impact of the cyclone includes;
 - ✓ Damaged roads network
 - ✓ Damage of public and private infrastructure (schools, health facilities, churches)
 - ✓ Damage of electric power infrastructure leading to disruption of power supply across the country.
 - ✓ Contamination of water sources.
 - ✓ Loss of livestock, collapsing of houses and toilets, collapsing of brick fences.

CYCLONE FREDDY 2023

- In 2023 Cyclone Freddy tragically claimed about **499 people** 2022 (DoDMA, 2023). Over 700,000 people displaced and lack decent accommodation.
- The worst affected districts were Nsanje, Chikwawa, Phalombe, Mulanje and Blantyre.
- The impacts of the cyclone Freddy are similar to those cyclone Ana in 2022.





- To learn lessons from past disasters.
- Find out how Malawi is prepared for disasters.
- To recommend ways for Malawi to be more prepared for disasters.



Data was collected from literature and observation.

LITERATURE REVIEW:

CHALLENGES, CONSTRAINTS AND GAPS (1)

- The challenges, constraints and gaps that were experienced in 2022 are similar to those experienced in 2023.
- This shows that no lessons were learnt and no effort was made to get prepared for similar disasters in the coming future.
- The challenges included;
 - ✓ Damaged road sections.
 - ✓ Disruption of electricity power supply leading to among other things failure to operate water treatment and distribution systems, adversely affecting hospital operations, telecommunications no readily available shelter materials, for instance, big and family tents, housing units, tarpaulins or plastic sheets.
 - ✓ Shortage of sanitary facilities e.g., toilets and sanitary supplies, shortage of medical supplies and personnel in camps, inadequate sleeping materials and NFIs and inadequate first aid kits.

LITERATURE REVIEW: DISASTER RESPONSE INITIATIVES (2)

Malawi Government

- Malawi declared a **state of disaster** on 13th March 2023 in the 14 districts that were severely affected by the cyclone.
- NGO sector responded such as WFP, red Cross, Water Aid, CARE, Plan etc
- Government through **DoDMA** coordinated and led all humanitarian actors in the assessment of disaster impact and needs as well as provision relief assistance to the affected people.



LITERATURE REVIEW: DISASTER RESPONSE INITIATIVES (3)

Malawi Engineering Institute

- MEI on 19 March 2023 called for engineer volunteers to come out and assist in the response initiative.
- Initiative to assess and restore public infrastructure such as potable water, electricity supply, schools, hospitals, repair damaged road sections and bridges.



General Public

- The general public through various individuals also made an effort to assist the victims of the cyclones. They contribute cash and in kind items to DoDMA or went directly to the victims to support them.

DISCUSSION

LESSONS FROM CYCLONE ANA & FREDDY (1)

- **Lack of action on lesson learnt from previous disasters.** It is very evident that the challenges faced in 2022 are very similar to the challenges faced in 2023. This is a clear sign that as a country we are not learning any lessons. We are leaving everything to chance hoping that a disaster will not happen. This error must be corrected. We need those in authority to take action and prepare the nation for future disasters.
- **Lack of emergency fund.** As a nation we do not have funds deliberately set aside for use during a disaster. According to the Ministry of Finance, Economic Planning and Development (2018) the national budget has a contingency budget line – the Vote of Unforeseen Expenditure for use during disasters. Unfortunately, the allocation is not known before hand and from experience it has proven to be much less than what is required to respond to a disaster of cyclone magnitude.



DISCUSSION

LESSONS FROM CYCLONE ANA & FREDDY (2)



- **Inadequate workmanship.** Some infrastructure in Malawi was constructed with poor workmanship. This is a disaster in waiting. Standards are not properly followed in the use of construction materials which makes the projects vulnerable to weather elements. This means that the very structures that are meant to protect, save lives and function in extreme weather conditions fail miserably.
- **Inadequate supervision.** The engineers on site fail to guide the contractors to comply with design specifications. This leads to construction works that are far below standards and consequently became a hazard to human life.

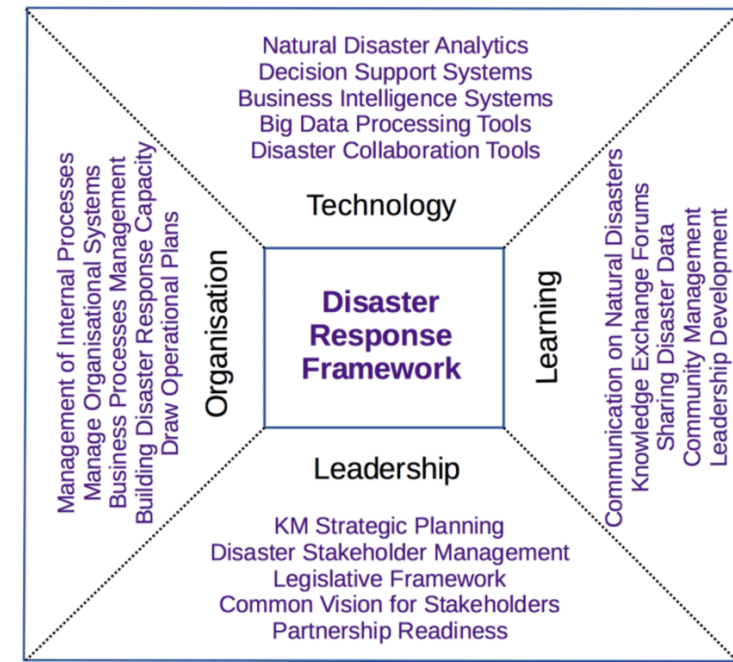
DISCUSSION

LESSONS FROM CYCLONE ANA & FREDDY (3)



- **Inadequate design of works.** Any project design must meet the criteria for its intended purpose. The design must take into account the environment in which it will function. We should avoid having typical designs for multiple projects sites. One design cannot fit all. For example, depending on the expected flow of a river a designer might include expended wing walls with gabion and even allow for overtopping on a culvert. The idea is to discharge the water safely during a flood event.

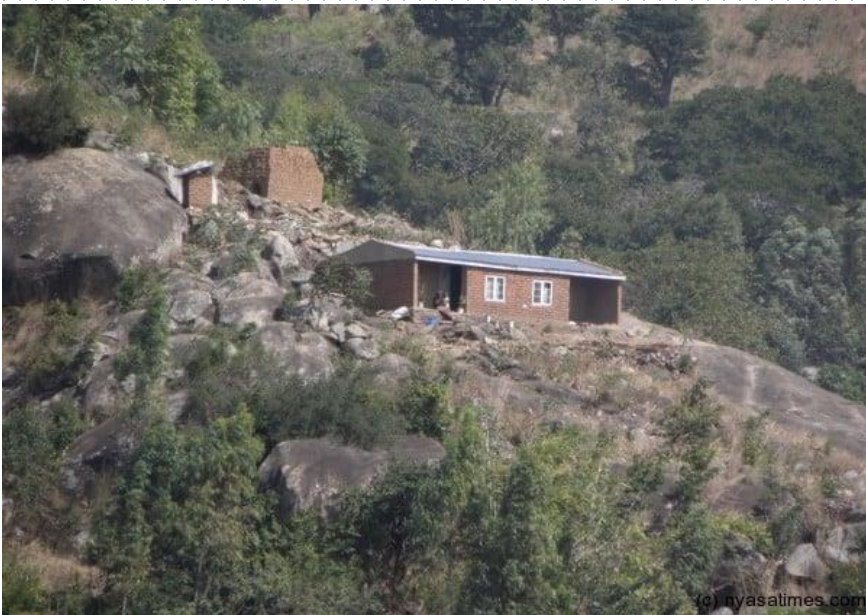
- **Lack of disaster response coordination framework (The GO TEAM).** DoDMA is the sole entity mandated to coordinate disasters in Malawi. Unfortunately, we do not see much of it unless they are reacting to a disaster event. This leads to the public losing confidence in DoDMA hence channeling the response items and cash through other means.



DISCUSSION

LESSONS FROM CYCLONE ANA & FREDDY (4)

- **Lack of clarity on land use demarcation.** Land has specific uses depending on its topographic nature. We have country wide land use demarcations that we are not abiding by. People have encroached and settled in risky areas that are not fit for settlement. As engineers we must push this agenda and ensure that land is used according to its intended purpose.



Lack of maintenance programs on engineering structures. Engineering structures have a design life. Structure will function better and for longer periods as designed for it they are maintained properly. Unfortunately, in Malawi we do not have a maintenance culture. We somehow think that once construction is completed that is the end of works on the structure.

- Learn from past disasters and implement the recommendations.
- Start a national/institutional emergency fund.
- Institute measure that will enforce good workmanship on construction projects.
- Enforce good works supervision procedures.
- Design projects fit for purpose and avoid typical designs.
- Establish the Engineering Response Team (The GO TEAM)
- Publicize the disaster coordination framework.
- Enforce maintenance of engineering infrastructure regularly by responsible offices/departments.
- Carry out an inspection of the preparedness to disaster four months before the rain season.
- Lobby government to enforce land use demarcation to be adhered to nationwide.



Disasters are prone to happen and will happen. The only way to be safe, preserve life and property is to be prepared in advance. We need to develop and implement action plans that will ensure that we as a nation are ready for any disaster.

CONCLUSION



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THANK YOU