



# **Safer House Construction Guidelines: A Tool for Mitigating Housing Related Disasters in Malawi**

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6-10 August, 2018, Malawi University of Science and Technology,  
Thyolo, Malawi



# Presentation Outline

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## Introduction and Background

- Housing sector is among most vulnerable sectors to disasters in Malawi;
- In 2009/10 the earthquake affected over 24,396 households in Karonga and in 2015, floods damaged 356,643 housing units; 82 percent damaged units were constructed with limited standards;
- Natural Intensity and frequency of disasters increased over past 3 decades;
- Government in collaboration with UN-Habitat, Malawi Red Cross, TEVETA, CCODE and MIE with technical and financial support from World Bank and DFID produced the first construction guidelines.

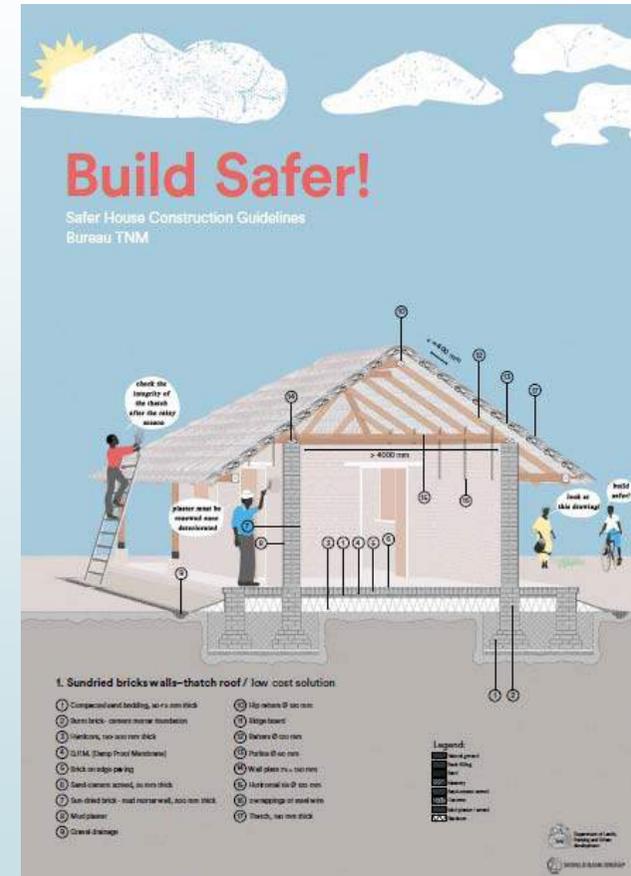
# Problem Statement and Justification

- Poor house construction practices are closely associated with poor access to knowledge and information;
- Flow of information on safer house construction is limited;
- Wider dissemination of information and techniques is critical for attainment of resilient societies;
- Safer house construction guidelines provide the required techniques for resilient house construction.



# Objectives of the Guidelines

- To promote local practices, low-cost technologies and provide strategies for multi-hazard risk reduction through affordable and appropriate solutions.
- The Guidelines:
  - contain guiding principles to develop context-specific solutions in order to ensure the construction of safer houses.
  - provide multi-hazard, adaptive and sustainable, and incremental solutions applicable to different target audiences.



## Methodology

- Guidelines developed by Task Team comprising technical personnel in disaster risk management and built environment in government and non-governmental institutions;
- Consultant contracted to facilitate the process;
- Consultations with various players in the sectors (academia, private sector);
- First developed in 2010 following the earthquake;
- Revised version developed in 2015 to address gaps in previous guidelines;
- Literature review and field assessments to identify gaps and best practices.

# Results and Discussion

## 1. Understanding Risk

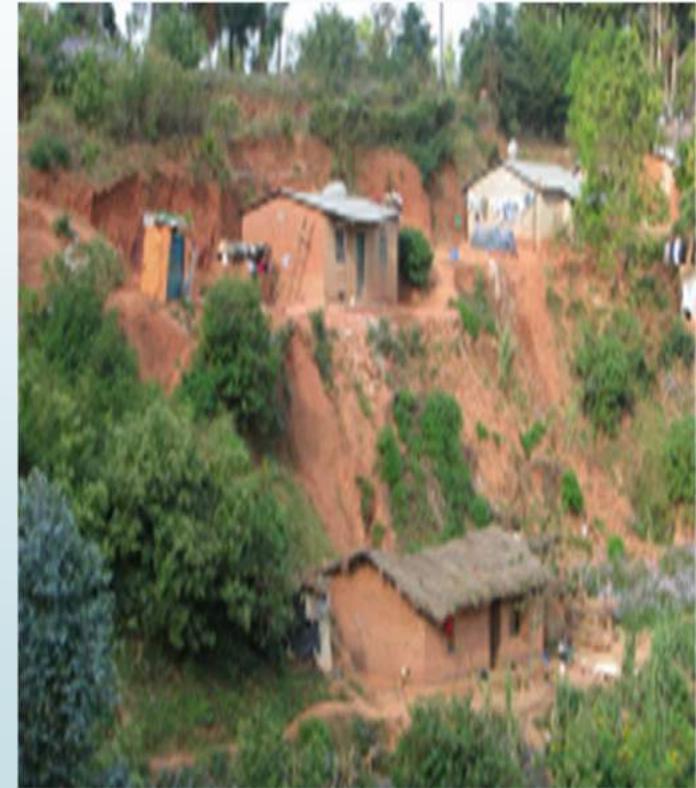
- Safer construction solutions require understanding of different hazards
- Safer house should be adaptive to different risks and resist different hazards in an area.
- Main hazards include: floods, landslides, windstorm; earthquakes, soil erosion (due to deforestation and brick making), termites, and fires.



# Results and Discussion

## 2. Site Selection

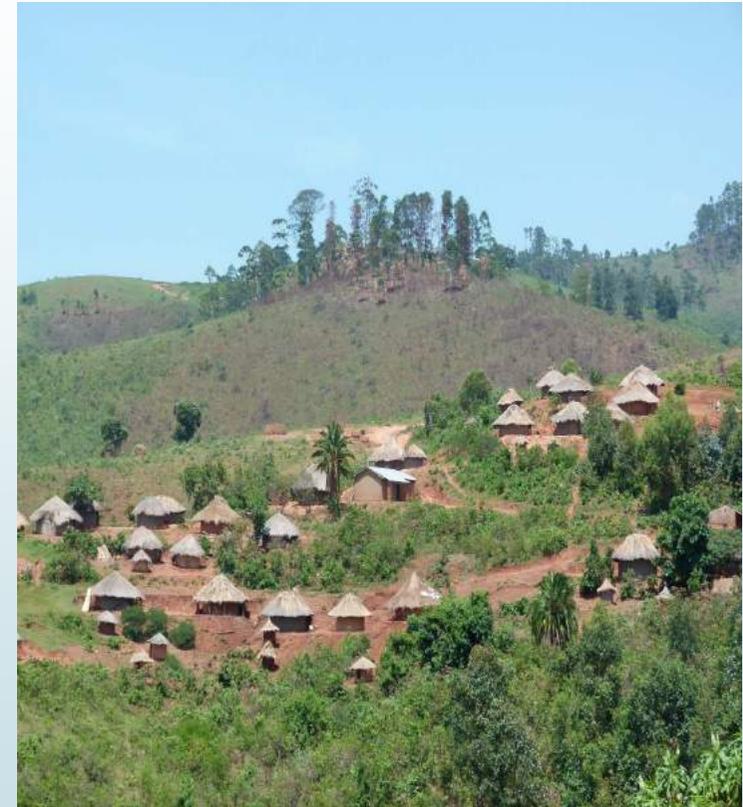
- Most important factor that affects buildings' safety;
- Respond to different risks, consider:
  - distance from rivers that flood;
  - Local knowledge, historical data, advises on vulnerability;
  - Distance from the power line;
  - Presence of trees enhance soil stabilization, reduce wind speed;
  - distance between buildings



# Results and Discussion

## ...2. Site Selection

- Consider soil type;
- Plant trees to improve soil's stability, protect houses from windstorms;
- Avoid brick-making, soil extraction in immediate vicinity;
- Avoid settling in areas with recurrent flooding;
- Avoid settling on top or at the bottom of steep hills ( $>30^\circ$ );
- Avoid settling in wetlands.



# Results and Discussion

## 3. Lay-out and orientation of buildings

- Building plans kept symmetrical along both axis;
- Asymmetrical plans vulnerable to earthquakes, lead to torsional effects;
- Regular shaped buildings: square, rectangular, or circular are ideal;
- Symmetry in door and window openings;
- Length not exceed 3 times its width;
- Shorter elevation of a building should face towards the dominant direction of strong winds to reduce wind pressure.



# Results and Discussion

## 4. Building materials

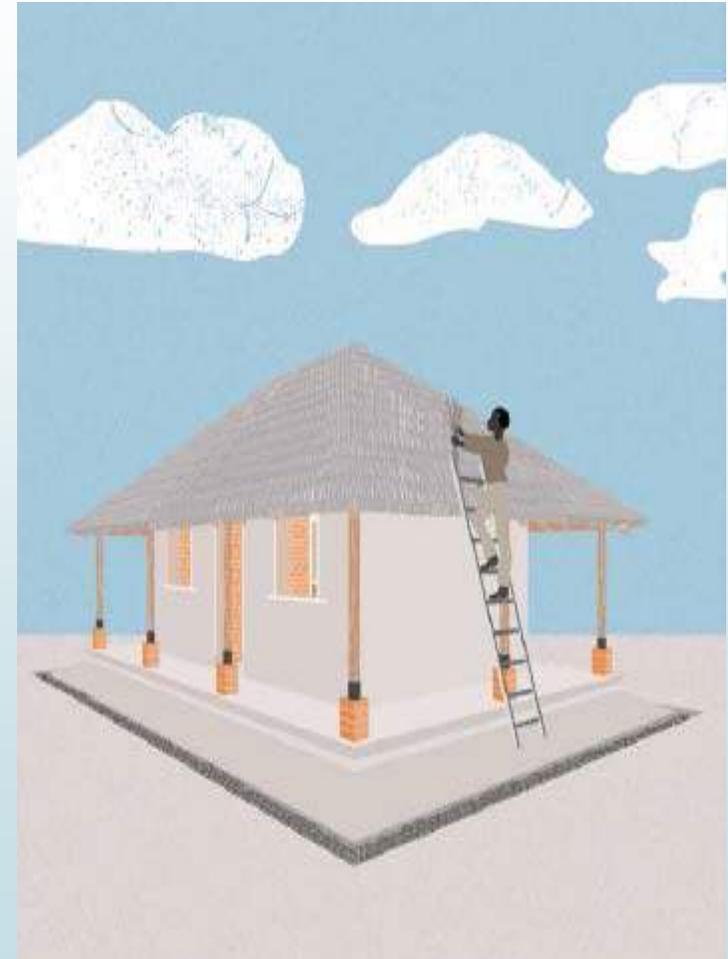
- Choice of different construction materials core element for safety
- Testing and choosing different components (soil, type of mortar) improves or weakens structures.
- Choice of materials and particular combinations (foundations, bricks, mortar, plaster), affect durability
- Materials include: rammed earth, burnt bricks, SSBs, cement, thatch, iron sheets, sand and timber.



# Results and Discussion

## 5. Construction Details

- Way elements combine together, characterize building and its safety.
- Choose best technological solution
- Depends on material availability and affordability, the budget.
- Includes foundations, walls, openings, ring beams, and roof.
- Avoid loose sands soils, soft silt and poorly compacted clays
- Prefer hipped roofs to gable roofs.
- Khonde be located externally.



# Results and Discussion

## 6. Maintenance and Strengthening

- Main reasons of deterioration:
  - Weathering, direct/indirect exposure to water and moisture; insect attack, and poor drainage
  - Routine maintenance will prevent deterioration
  - Construction errors (connections, location, foundation, materials)
- Regular maintenance: may be at structural level or minor works.



# Conclusion and recommendations

- Malawi is becoming more prone to disasters;
- Knowledge and skills in Safer House construction is limited among rural artisans and community members;
- Building resilience in house construction will require dissemination of easy to understand directions;
- The Safer House Construction Guidelines offer the opportunity to rethink construction practices and reach out to the rural person with improved knowledge and techniques;
- Wider dissemination of these Guidelines will help to reduce disasters and build resilient societies.

# Acknowledgements

- Development of Guidelines was facilitated by Government of Malawi, through Ministry of Lands, Housing and Urban Development in conjunction with Department of Disaster Management Affairs, in consultation with key stakeholders including:
  - Office of the President and Cabinet, others Govt Depts
  - UN- Habitat (Malawi)
  - Non Government Organizations
  - Academia (Public Universities and technical Colleges)
  - Professional institutions in built environment
- With technical and financial support from World Bank



End of Presentation  
THANK YOU