Knowledge, Attitude & Practice (KAP) Survey on Earthquake Preparedness in Selected Earthquake-prone Areas of Myanmar

April 2018

Contents

ACRONYMS 3
EXECUTIVE SUMMARY 4
INTRODUCTION 6
Methodology 6
FINDINGS 9
Indicator 1: Government personnel's awareness and confidence of earthquake response measures 9
Logframe indicator findings 9
Analysis: Awareness of functional roles and responsibilities 10
Analysis: Confidence to undertake roles 12
Indicator 2: Community members' awareness of what to do before, during and after an earthquake 16
Logframe indicator findings 16
Analysis: Sense of preparedness 16
Analysis: What to do **before** an earthquake 18
Analysis: What to do **during** an earthquake 23
Analysis: What to do **after** an earthquake 28
Indicator 3: Knowledge of, and access to, the Myanmar Earthquake Resilience Strategy 30
Logframe indicator findings 30
Indicator 4: Expectation of earthquake impact 32
Logframe indicator findings 32
Analysis: Expectations of the likelihood of an earthquake 32
Analysis: Expectations of how people would be affected by an earthquake 34
Recommendations for DDM & UNDP Programme Implementation 40
1. Which channel to use to build knowledge? 40
2. What to communicate to change attitudes? 47
3. How to influence practices? 48
CONCLUSION 49
Annex 1: Demographic profile of respondents 50
Annex 2: Detailed Methodology 54

Cover photo: Focus group participants in Chin running for cover in a mock earthquake

ACRONYMS

DSWRR	Department of Social Welfare, Relief and Resettlement
ECHO	European Civil Protection and Humanitarian Aid Operations
FGD	Focus Group Discussion
GDP	Gross Domestic Product
IDI	In-Depth Interview
KAP	Knowledge, Attitudes & Practices
NDMC	National Disaster Management Committee
MERS	Myanmar Earthquake Resilience Strategy
MMK	Myanmar kyats
DDM	Department of Disaster Management
SEC	Socio Economic Classification
UNDP	United Nations Development Programme
USD	United States Dollar

EXECUTIVE SUMMARY

This report documents the findings from a Knowledge Attitudes and Practice (KAP) assessment to inform the implementation of an18-month project: "Building resilience in earthquake prone areas in Myanmar through better preparedness and response". This is being initiated by the Department of Disaster Management (DDM) of the Ministry of Social welfare, Relief and Resettlement, in collaboration with UNDP Myanmar in the 6 most earthquake-prone states/ regions namely: Yangon, Bago, Mandalay, Sagaing, Chin, and Kachin and Union Territory of Nay Pyi Taw. The aim of the project is to reduce the loss of lives and damages arising from an earthquake. The study serves as a baseline on KAP that pertains in the country and for monitoring of progress of interventions. It involves: (i) a representative community survey of 2,457 people living in those 6 states and regions; (ii) 11 focus group discussions with the most vulnerable people living in particularly at-risk urban and mountainous areas; and (iii) in-depth interviews with 45 government personnel who present relevant disaster management work committees / departments.

Indicator 1: Government personnel's awareness and confidence of earthquake response measures: Around two-thirds of the government personnel interviewed clearly described the responsibilities of their committees / departments. They clearly identified their institution's strengths (such as the capacity for immediate response and the strength of inter-ministry relationships) as well as being aware of the challenges (such as the lack of adequate tools and infrastructure, insufficient funding, and a lack of interest from the public.). Overall, therefore, almost all personnel were confident that their committee / department is fulfilling its responsibilities well, and almost all believe their institution is well prepared for an earthquake. Fewer respondents (just over one third) identified their individual responsibilities within their committee / department. They cited personal challenges of being overloaded with work, inefficient communication channels between departments, and insufficient technical support. The most commonly suggested solutions were: faster information-sharing systems, and more technical skills-building.

Indicator 2: Community members' awareness of what to do before, during and after an earthquake: *Advance* preparations for earthquakes have only been made by less than one quarter of respondents: less than 10% have discussed emergency plans or meeting points, and disaster supplies are usually conceived upon presentation of personal identity certificates or financial documents by affected persons. The practice of household mitigation procedures (such as securing furniture or structural weaknesses) was very low, but rose with respondents' increasing education levels. Regarding actions to take *during* an earthquake, the most educated were again the most well-informed. Nonetheless, almost two-thirds of all respondents had heard of the message 'Drop, Cover, Hold On!' and correctly identified other immediate actions to take. Respondents with disabilities nonetheless expressed concern that some of these actions were very difficult. For example, deaf respondents wouldn't be able to follow emergency instructions call-out by family members. More respondents knew what to do *after* an earthquake, with the majority correctly identifying these actions. In mountainous areas, such as Chin, respondents described their reliance on their Village Administrator as a key coordinator of emergency assistance The Chin respondents were indeed more knowledgeable about natural disasters overall, given their frequent exposure to fatal landslides.

Indicator 3: Knowledge of, and access to the Myanmar Earthquake Resilience Strategy: Although Myanmar Earthquake Resilience Strategy is being developed, almost all government personnel interviewed nonetheless anticipated that it would be useful for their work (one third of whom said 'very' useful) on their disaster management committee.

Indicator 4: Expectation of earthquake impact: On average, respondents expect that: just short of half of their community members will have their houses destroyed; one third will be injured; and just short of one quarter will be killed. Collapsing of buildings were recognized as the largest threat, followed by falling trees. This damage was anticipated to be highest by respondents in Chin, Nay Pi Taw and Yangon; yet in all locations, an earthquake's expected impact decreased steeply with age. Most respondents were indeed uncertain or thought it unlikely that a large earthquake would ever occur in their communities. Reasons given for why Myanmar was safe from earthquakes often rested on religious justifications, or personal experience (those living now have only experienced smaller, non-fatal earthquakes).

Recommendations for DDM & UNDP programme implementation:

Community programming

1. Popularly-held public misconceptions to be tackled through this project include:
    a. 'Earthquakes are unlikely in Myanmar.'
    b. 'It is not a necessary for parents to discuss what to do in an earthquake with their children.'
    c. 'Getting hold of personal ID and financial documents is an important first action in an earthquake.'
    d. 'Communities have no disaster plans.'
2. The public should be informed through messages which (i) *motivate* a change in attitudes towards a culture of safety and precautionary action; (ii) give practical solutions that they have *opportunity* to take; and (iii) suggest memorable actions that they have the *capability* to remember.
3. TV should be used for informing the public what to do before, during and after an earthquake, as it is respondents' primary source for earthquake information. This could have maximum impact at the peak viewing time of 6pm-10pm on MRTV 4, Channel 7, or MRTV.
4. The internet or Facebook are used as an information source by one quarter of respondents, who were primarily under age 25. Material shared on this platform should thus appeal to a young audience – who particularly appreciate visualizations – and should complement information received at school.
5. Teachers need further training on the causes of earthquakes, and in teaching their students to share information with their families. Information-sharing networks from schools are not currently working to their best potential.

Government programming

6. Government personnel request better communication mechanisms to make the work of their committees / departments more efficient and effective. This includes support for the widespread use of digital communications (such as e-mail, internet and phone messaging applications), rather than reliance on paperwork.
7. Capacity-building training for disaster management committee / department members should consistently help them to understand their individual role and responsibilities for *each task*, so that they can best make a meaningful contribution.

INTRODUCTION

Myanmar is at high risk of cyclonic storms, floods, earthquakes, tsunamis, forest fires, landslides and epidemics which have, in the past, caused loss of lives and destroyed the infrastructure and livelihoods of people across the country. The annual average expected economic losses arising from these disasters in Myanmar is nearly $200 million USD – or 1% of National GDP (UNDP Myanmar).

With ECHO funds, the Department of Disaster Management (DDM), formerly, the Relief and Resettlement Department (RRD) in collaboration with UNDP Myanmar, is initiating an 18-month project entitled, "Building resilience in earthquake prone areas in Myanmar through better preparedness and response" in the 6 most earthquake-prone states/regions one Union State of Myanmar, namely: Yangon, Mandalay, Sagaing, Bago, Kachin, Chin and Nay Pyi Taw. The objective of this project is to reduce the loss of lives from the impact of earthquakes in Myanmar, by: a) raising community awareness of actions for preparedness and response and b) enhancing the Government's ability to coordinate and lead earthquake preparedness and response.

This report documents the findings from a Knowledge Attitudes and Practice study in March 2018, to inform the implementation of this project, and to establish baseline indicators for it. (see Figure 1):

Figure 1: FGD with deaf respondents in Yangon

Methodology

The KAP study employed both qualitative method and quantitative data collection methods, encompassing 11 Focus Group Discussions (FGD) with community members; 45 in-depth interviews (IDI) with government personnel who engage in Disaster Management functions (at the national and sub-national level); and a household survey of 2,457 randomly-selected individuals.

Fieldwork was conducted from March to April 2018, in the earthquake-prone areas in Myanmar, namely: Yangon, Mandalay, Sagaing, Bago, Kachin, Chin and Nay Pyi Taw. The number of respondents surveyed from each state and region is shown below (see Table 1):

Table 1: Respondents to the household survey

State/Region	Number of respondents
Kachin	201
Chin	202
Sagaing	435
Bago	404
Mandalay	508
Yangon	605
Nay Pyi Taw	102
TOTAL	**2,457**

FGDs with vulnerable groups were conducted as follows (see Table 2):

Table 2: Focus group composition locations

FGD	Location
1. Middle-school children	**Yangon** (urban)
2. High-school children	
3. Teachers	
4. Elderly women	
5. People with visual disability	
6. People with hearing disability	
7. Middle-school children	**Chin** (rural & mountainous)
8. High-school children	
9. Teachers	
10. Elderly women	
11. People with mobility disability	

Representatives from the following government departments in each state/region were interviewed (see Table 3):

Table 3: Location and departments of government respondents

Departments in States/Regions	No of respondents
Kachin	**Total: 5**
Health Care Work Committee	1
Search and rescue working committee	1
Security work committee	1
State/Regional Disaster Management Committee (DMC)	2
Chin	**Total: 5**
Health Care Work Committee	1
Search and rescue working committee	1
Security work committee	1
State/Regional Disaster Management Committee (DMC)	2
Sagaing	**Total: 5**
Health Care Work Committee	1

National Disaster Management Work Committee	1
Search and rescue working committee	1
Security work committee	1
State/Regional Disaster Management Committee (DMC)	1
Bago	**Total: 5**
Health Care Work Committee	1
Relief and Resettlement Department (RRD)	1
State/Regional Disaster Management Committee (DMC)	3
Mandalay	**Total: 5**
National Disaster Management Work Committee	1
Search and rescue working committee	1
State/Regional Disaster Management Committee (DMC)	3
Yangon	**Total: 5**
Health Care Work Committee	1
Recovery and rehabilitation work committee	1
Search and rescue working committee	1
Security work committee	1
State/Regional Disaster Management Committee (DMC)	1
Nay Pyi Taw	**Total: 15**
Environment Conservation Work Committee	1
Financing and Financial Management Work Committee	1
Health Care Work Committee	2
News and Information Work Committee	4
Initial Need Assessment, Damage and Loss Verification Work Committee	1
International Relation Work Committees	1
Recovery and Rehabilitation Work Committee	1
Department of Disaster Management	1
Search and Rescue Work Committee	1
Security Work Committee	2
Grand Total	**45**

For more information, kindly refer to the 'Detailed Methodology' in Annex 2.

FINDINGS

Indicator 1: Government personnel's awareness and confidence of earthquake response measures

Logframe indicator findings

INDICATOR 1		
Indicator	Value	Source and method of data collection
% increase in the number of government personnel who are fully aware of their functional roles and responsibilities regarding earthquake response and are confident to undertake their roles in the respective disaster management committees.	*TARGET:* 50% *BASELINE*: **62%** can clearly describe at least 2 responsibilities of their Committee/Dept. **89%** believe their Committee/Dept. is fulfilling these responsibilities 'quite well' or 'very well'. **38%** can name at least 2 of their personal responsibilities on their Committee/Dept. **38%** felt 'very confident' in fulfilling their personal role for their Committee/Dept.	*BASELINE:* *All government personnel were asked: "What are the three main responsibilities of the [Name of Committee / Department]?"* *All government personnel were asked: "What are your personal responsibilities of the [Name of Committee / Department]?"* *Also: "Overall, how well do you think the Committee / Department is fulfilling these responsibilities?'* *Also: "How confident are you in fulfilling these responsibilities for the Committee / Department?"*

Of the 45 government personnel who were interviewed for this study (11 women [24%], and 34 men [76%]), there was a great range of experience on their respective disaster committees/departments – ranging from 1 month to 25 years. The median was 10 months of experience, though the average was just short of 3 years (19 months).

They represented the following committees / departments; only in Bago and Chin did some personnel sit on multiple committees (see Table 4):

Table 4: "Which Department or Disaster Management Working Committee are you a member of?"

Committee / Department	Number of personnel interviewed
State/Regional Disaster Management Committee (DMC)	12
Health Care Work Committee	7
Search and rescue working committee	7
Security Work Committee	6
News and Information Work Committee	4
National Disaster Management Work Committee	2
Recovery and Rehabilitation Work Committee	2
Relief and Resettlement Department (RRD)	2
Financing and Financial Management Work Committee	1
Initial Need Assessment, Damage and Loss Verification and Need Identification Work Committee	1

International Relation Work Committees	1
Environment Conservation Work Committee	1

Analysis: Awareness of functional roles and responsibilities

A. Awareness of role of Committee / Department

Some government personnel could describe the roles of their committee or department in great detail, particularly in Nay Pyi Taw and Yangon. For example:

> *"YCDC grants permissions for high rise buildings …There are a set of codes from UN-Habitat and MOC and Myanmar National Building Code, published in 2012-2015, and we have to ensure that these codes are considered as criteria." [Respondent 16, Yangon]*

> *"To distribute medicines and medical supplies for emergency cases within the region, taking precautions to maintain them without any damage" [Respondent 33, Yangon]*

> *"We have people on duty for a 24-hour standby service. There are online media and pamphlets for distributing and broadcasting the information." [Respondent 10, Nay Pyi Taw]*

Others, however, could only suggest very vague responsibilities – such as "healthcare" [Respondent 5, Nay Pyi Taw], or "rule of law and peaceful community" [Respondent 30, Bago]. One respondent even expressed the misconception that his department should "prevent the natural disaster from happening" [Respondent 37, Chin].

Perceptions as to whether these responsibilities were being fulfilled were positive. No respondents said, 'not well' or 'not at all well', and only 11% were unsure or preferred not to say. The vast majority of respondents believe their committee / department is fulfilling its responsibilities 'quite well': (see Figure 2):

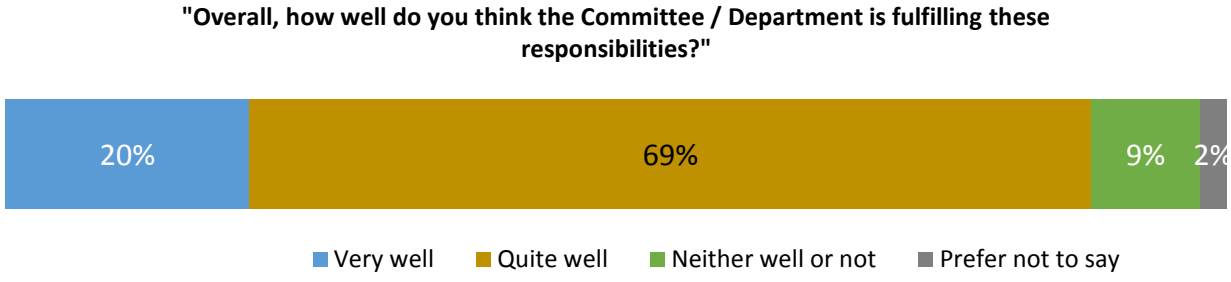


Figure 2: Respondent's confidence in the performance of their committee / dept.

Despite some lack of clarity in immediately recalling their roles, most government personnel could more easily describe the first actions they would take in case of a natural disaster. 11 respondents (around one-fifth) specified acting "quickly", "fast" or "immediately". 6 mentioned that "coordination" or "collaboration" between departments or task forces would be a key element of their response.

B. *Awareness of personal responsibilities*

38% of the respondents (17 out of 45 government personnel) could name at least 2 of their personal responsibilities on the committee / department on which they sat. Some gave precise detail on these:

> *"I designed the Yangon natural disaster protocol as well as making a hazard map of the region along with technical experts." (Respondent 16, Yangon)*
>
> *"I advocate disaster-related education programmes [to 'higher level government']" (Respondent 34, Chin)*
>
> *"I communicate between different levels of the department to disseminate the same information at all levels" (Respondent 42, Sagaing)*
>
> *"I observe whether or not, people from the lower level management actually know about the objectives of the organization. Then, I need to coordinate with media to be able to disseminate information and raise awareness to public." (Respondent 45, Mandalay)*

Almost two-thirds of respondents (62%), however, could *not* identify their personal role. They echoed the responsibilities of their whole committee / department instead, or gave general areas of work such as, 'security' or 'rehabilitation'.

This lack of awareness is, in spite of the fact that two-thirds of respondents said they had received training for their role on their committee / department (see Figure 3).

Such a gap suggests that trainings may not yet adequately help committee / department members to fully understand their own, personal roles, and the responsibilities which they must each individually take.

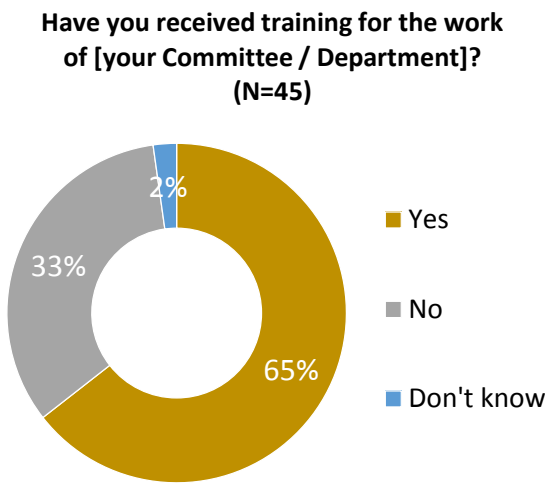


Figure 3: Government personnel who have received training

Analysis: Confidence to undertake roles

A. Confidence in Committee / Department

If a major earthquake hit Myanmar next week, most government personnel respondents (67%) thought their committee/department would be 'somewhat prepared'. While this doesn't suggest great confidence, it is not a negative answer (only 1 respondent said 'unprepared'). One-third of respondents were firmly confident that their committee/department is very well prepared. (see Figure 4):

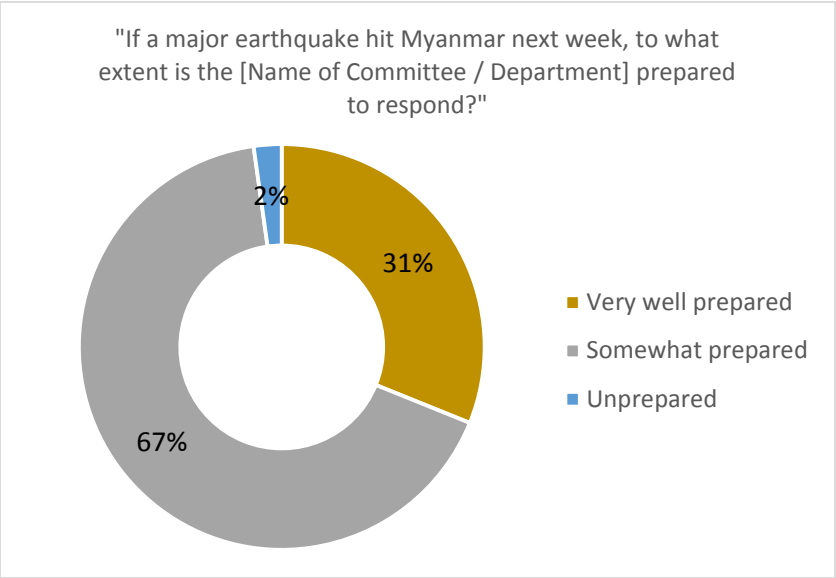


Figure 4: Government personnel's perception of their department / committee's earthquake preparedness

Institutional challenges & overcoming them

To illuminate these perspectives on government preparedness, the table below shows the strengths and challenges for each committee/department which were mentioned by at least two respondents. They are listed from most- to least-mentioned (see Table 5):

Table 5: In your opinion, what are the 3 key strengths which make your Committee / Department successful? Which 3 main challenges does your Committee / Department face?

STRENGTHS [# of personnel who suggested]	CHALLENGES [# of personnel who suggested]
Capacity for immediate mobilization [6]	Inadequate equipment / tools / vehicles (particularly when compared to Germany, US or Japan) [11]
Well-established relationships enable fast decision-making between institutions (e.g. with ministries, *army*, police force) [6]	Lack of interest / trust from public [6]
Efficient administration / funding transfers [4]	Lack of funding, and difficulties in funding acquisition [6]
Sufficient equipment / infrastructure [4]	Inaccessible terrain and poor transport systems – particularly in rainy season [5]
Support from international assistance bodies [4]	Insufficient man-power in every township [5]
Public trust [3]	Unpredictability of natural disasters [5]
Thorough preparations have been made [2]	Limited collaboration among ministerial bodies / departments [3]

Support from government [2]	Lack of adequate / back-up connectivity and communications networks [3]
Broad presence across the country [2]	Fake news [2]
Strong leadership [2]	
Well-trained by drills [2]	

The coloured pairs of cells show how different committees and departments experience very differently in strengths and challenges: one institutions strength, is another institutions weakness. The main areas for variation were:

- Stock of equipment: which was twice mentioned as a strength of the police, but a challenge for others
- Public engagement: which three Nap Pyi Taw respondents mentioned as a strength, while in other states/regions it was felt to be a difficulty
- Funding and administration: which was described positively and negatively across the country and across committees.

To overcome these challenges at the institutional level, the most commonly suggested actions were as follows [the number of respondents who mentioned each is given in brackets]:

1. Improve information flows and communication systems – e.g. timely delivery of documents, or use of email/fax, or internet connection [9 respondents mentioned]
2. Collaboration between/within committees through more regular meetings [5]
3. Faster public information sharing [5]
4. Investment in better equipment e.g. wells and rain water tanks in villages [5]
5. Improve transportation / road conditions [4]
6. Repetition of drills / trainings / capacity building among committee members [4]
7. Increase funding / protect funding for both disaster preparedness and response [4]
8. Employ more personnel [3]

Other interesting suggestions included to establish Memorandums of Understanding (MOUs) with research centers (Respondent 10, Nay Pyi Taw); and to remove levels of permissions for faster mobilization of resources – including personnel, supplies and equipment (Respondent 34, Chin).

B. *Confidence in fulfilling personal responsibilities*

Respondents reported higher confidence in their *own* capacity to fulfill their role, than their *institution's* capacity. 38% were 'very confident' and 56% were 'somewhat confident', leaving only 6% who were unsure or preferred not to say. This suggests that respondents believe their committee / department responsibilities are easily manageable – which is perhaps unsurprising, given that only 38% of respondents could name their own responsibilities (see Figure 5):

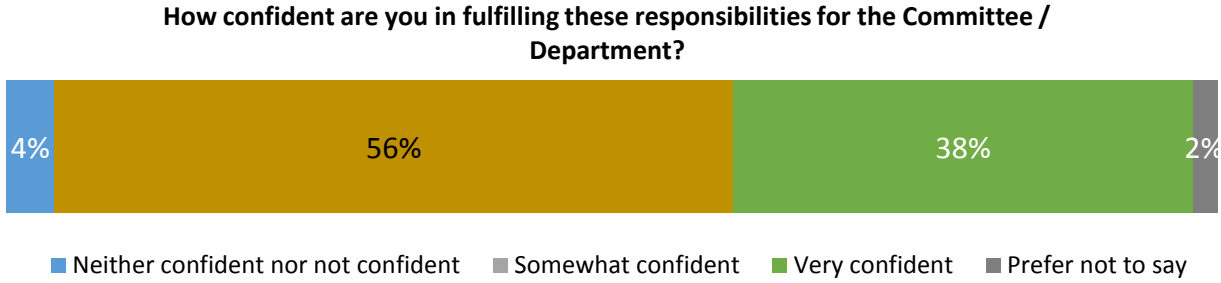


Figure 5: Respondents' confidence in fulfilling their responsibilities

Government respondents' confidence in their own capacities closely mirrored the extent to which they felt supported (see Figure 6):

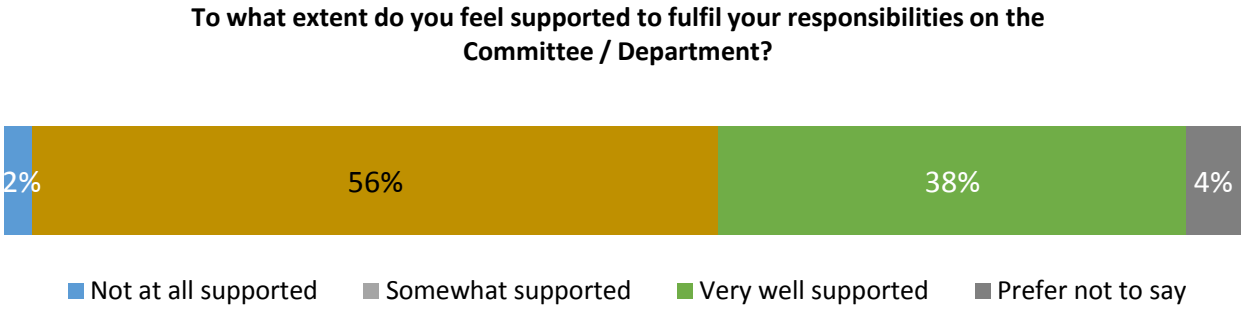


Figure 6: Respondents' sense of being supported

Personal challenges & overcoming them

29% of respondents reported facing no challenges in their work for their committee / department. Most respondents, however, did. Most commonly, government personnel cited being over-worked and facing difficulties in communication. A lack of support was also mentioned: some respondents felt their seniors did not support them with expertise or take accountability, while others felt that their whole department was generally under-trained.

Many solutions were suggested to the problem of communication difficulties. They revolved around investment in and adoption of ICTs, to reduce reliance on paperwork (see Table 6):

> *"[We need] the integration of electronic technology, viber, email… We have to stop relying on the paperwork." (Respondent 19, Nay Pi Taw)*

*Table 6: What challenges do you **individually** face in fulfilling your responsibilities for your Committee / Department?; What would most help you to fulfil your responsibilities for your Committee / Department? [The number of respondents who mentioned each is given in brackets]:*

	PERSONAL CHALLENGE	SOLUTION
1.	**Overloaded with work / insufficient manpower [9 respondents mentioned]**	Employ more qualified personnel [1] Employ more staff [1] Employ more local staff [1]
2.	**Difficulty in receiving information / communicating [6]** Limited internet access [1] Distances between Nay Pi Taw Ministries hinders communication [1] Language barriers [1]	**Faster, more accurate information- and data-sharing systems [6]** "[We need] the integration of electronic technology, viber, email… We have to stop relying on the paperwork." [1] Investment in ICTs [1] Investment in internet access [3]
3.	**Insufficient support / expertise [5]** Lack of interest from regional offices [1] Poorly defined duties / work structures [1]	**Technical training / skills-building [7]** Investment in research facilities [1] Ensure committee members' awareness of their responsibilities [1] **More support from senior personnel / other departments / Ministries [5]** Better accountability of leaders [1] Better collaboration with hospitals, so they can prepare beds for emergencies [1] **Better coordination between international organizations and government [1]**
4.	**Insufficient equipment / infrastructure [5]**	**Investment in equipment / technology [6]** E.g. Walkie talkie [1] Sufficient medical supplies [1]
5.	**Insufficient budget [4]**	**More/adequate funding [9]**
6.	**Transportation [4]**	**Investment in better roads [2]** **Investment in means of transportation** (cars, boats, helicopter, etc) [2]
7.	**Insufficient exposure to the public [3]**	**Provide the public with locally-relevant information [1]**
8.	**Infrequency/inadequacy of committee meetings [2]**	**Stronger coordination and collaboration [5]** Organise of sub-committees to support [1] Employ translators and interpreters [1] Allocate budget to organising more regular meetings [1]
9.	**Risk of disease transmission [1]**	

There were a number of calls for staff trainings and greater collaborations between Ministries to respond to the lack of support felt by some respondents.

> *"There are many members of regional committee. They need to be aware of their terms of responsibilities. The disaster committee should be aware of them and the technicians should collaborate to the fullest potential." (Respondent 16)*

Better collaboration and cooperation was called for by a number of respondents, also in the context of stimulating real action towards preparedness:

"There are a lot of organizations in the quest for public involvement but they are not connected with each other. [Collaboration] would speed up the process and materialize a finalized, overall view. The method of setting up TORs [Terms of Reference] for each situation demonstrates a lack of rapid response and hinders public volunteer involvement at the regional level." (Respondent 15, Yangon)

"Coordination between international organizations and their support to government organizations would be much appreciated, and would help the projects to better more effectively reach the grassroots level." (Respondent 26, Mandalay)

Indicator 2: Community members' awareness of what to do before, during and after an earthquake

Logframe indicator findings

INDICATOR 2		
Indicator	Value	Source and method of data collection
% increase in number of people who are aware of what to do before, during and after an earthquake.	*TARGET:* 50% *BASELINE*: **Before: 22%** have made preparations for a major disaster **During: 62%** are aware of the action 'Drop, Cover and Hold on' **After: 70%** can correctly identify actions to take after an earthquake	*BASELINE:* All respondents were asked: *"Thinking about how prepared you are for a major disaster. Which is most true?"* All respondents were asked *"Have you heard of the earthquake message 'Drop, Cover and Hold on'?'* All respondents were asked five 'True / False' questions about actions to take after an earthquake. This number is the average % of respondents who were correct.

Analysis: Sense of preparedness

Respondents were evenly split between those who feel prepared for earthquakes, and those who do not. Of the 94% of respondents who had experienced an earthquake first-hand (see Fig. 34, p.50), 49.7% felt that they were well prepared and 49.2% felt that they were not. Although there was little variation of these responses by age and gender, education status showed a clearer trend (see Fig. 6, below). 50% *more* university graduates (61%) felt prepared than those with no formal education (41%). There were also notably few people who felt prepared in Chin state: with only 21% reporting they felt prepared, this was almost three times lower than 59% in Mandalay.

These variations with education level can be clearly linked to access to information on earthquake preparedness. Twice as many university graduates (78%) than those without formal education (39%) had read, seen or heard such materials. On average, 54% of respondents had come across information on earthquake preparedness in the past year. Particularly low rates were also among those over age 60 (at 46%), and those in Chin state (at only 24%; see Figure 7).

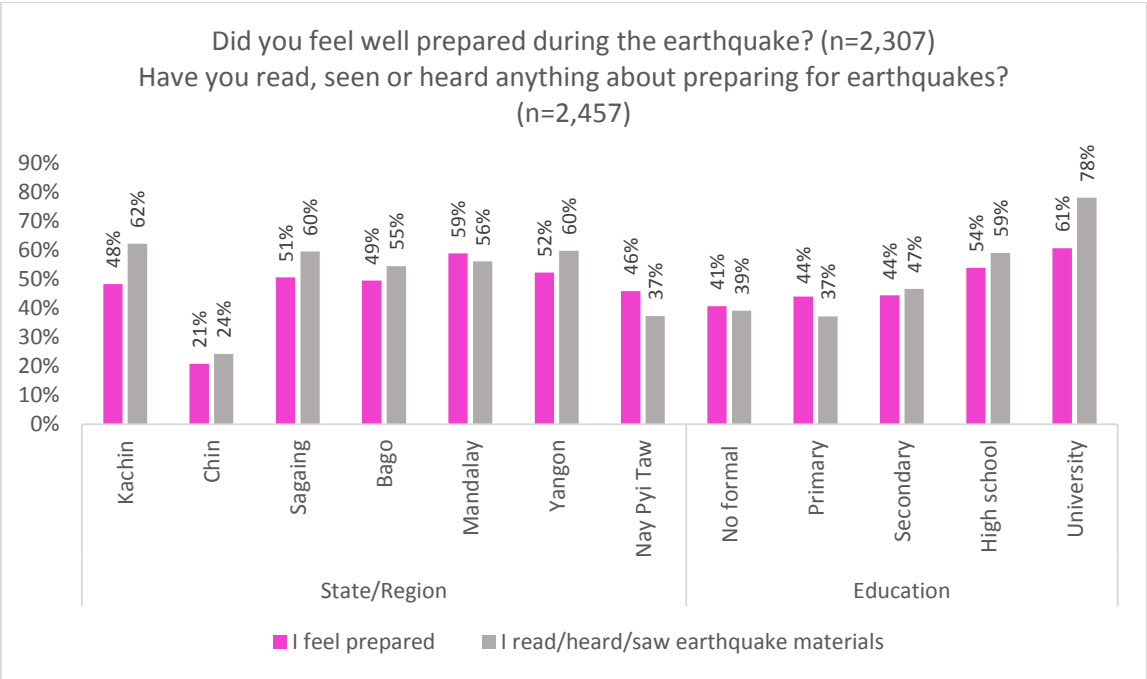


Figure 7 Earthquake preparedness and access to information

In most cases (85%), earthquake information which respondents came across was about earthquakes happening here in Myanmar. This may be because – as focus group participants described – there are often stories about Myanmar's earthquakes on national news channels on TV, radio and shared through social media. At 67%, the primary source of this information was indeed TV (see Figure 8). Nonetheless, 79% believed that the information they had received could be used in an emergency, suggesting that the material had a broader preparedness role than merely informing of earthquake occurrence. *More detailed analysis on sources of information can be found in the section on 'Recommendations for RRD & UNDP Planning'.*

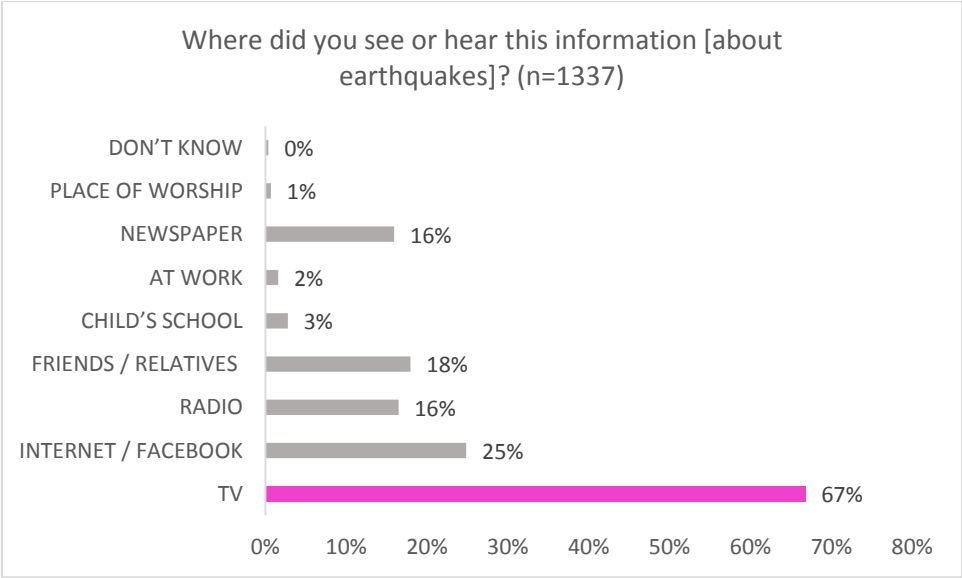


Figure 8 Earthquake information source

Analysis: What to do **before** an earthquake

Family preparedness

There was very little evidence that families are taking earthquake preparedness measures at the household level. Very few respondents had a household emergency plan (7%) and even fewer had a family meeting point in case of emergency (4% - see Figure 8). Moreover, fewer than half of the respondents with a household emergency plan had actually discussed this with other family members (48%; see Figure 9).

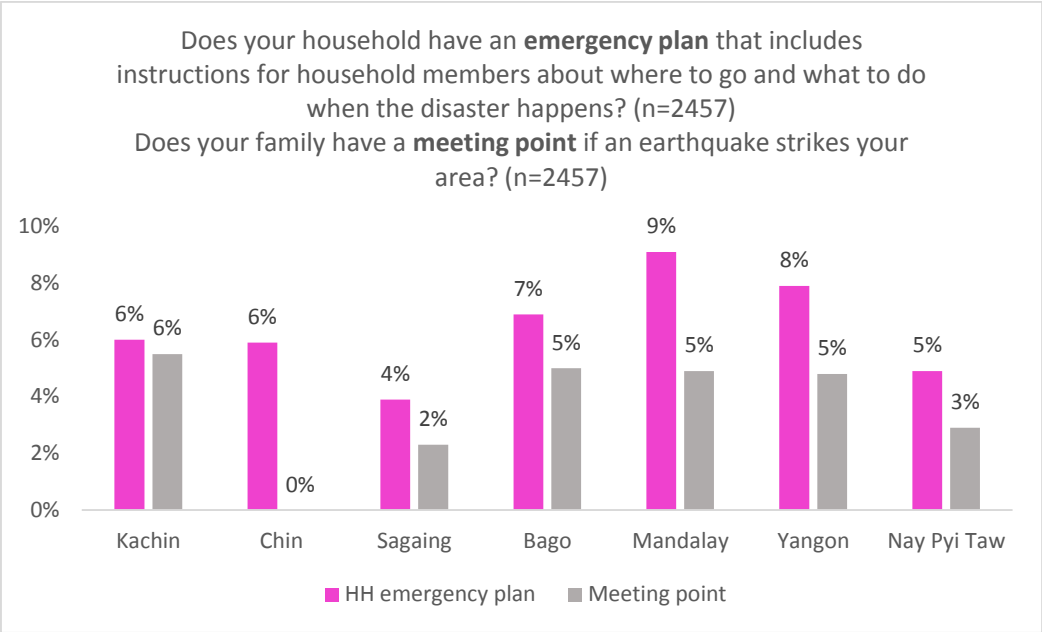
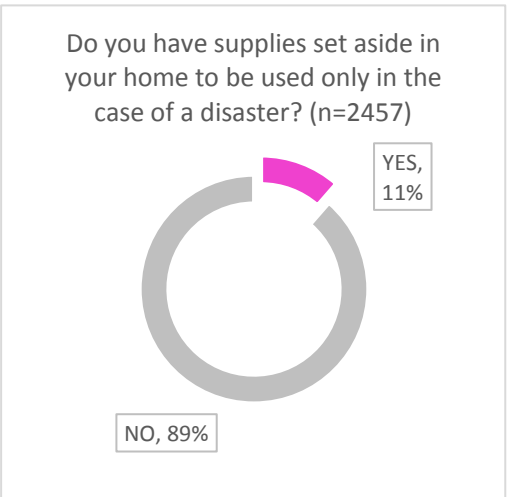


Figure 9 Household emergency plan and meeting point

11% of respondents had set aside disaster supplies in their homes. When asked what these 'supplies' were, respondents nonetheless mentioned materials for their livelihoods, rather than their immediate health and safety (see Figure. 10):



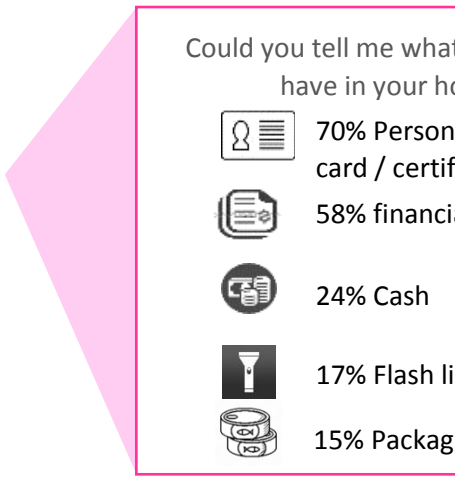


Figure 10 Disaster supplies at home

Copies of personal and financial documents were only considered vital in select states and regions. In Kachin, almost all respondents (around 90%) had these documents ready for an emergency. A similar proportion had prepared their personal identification in Sagaing, and at least 60% had taken

these measures in Yangon and Mandalay. Contrastingly, in Chin and Nay Pyi Taw, far fewer respondents had prepared such documents.

Possible reasons for these geographic variations emerged in focus group discussions. As one elderly woman in Yangon said:

> *"Before Nargis, I wasn't prepared. Now, I know what to do." (Elderly woman, Yangon)*

The experience of cyclone Nargis in 2008 appears to have been a pivotal experience for the disaster perceptions of many who lived through it. One Nargis survivor, for example, described how she has now gathered her family's important documents together, ready for the next natural disaster, because getting replacement documents was very time-consuming and difficult. If she is left homeless and forced to migrate within Myanmar, she feels reassured that her National Registration Card (NRC) will ensure that she can be accepted in a new place to live, saving an expensive immigration process. As well as identification and financial documents, one blind respondent in Yangon added that he would take his certificate for massage training, his prescription, his housing contract and his Masters certificate. He anticipates that these physical records would be vital for re-establishing himself after a major earthquake. Asking someone to find and bring these documents would therefore be one of the first actions he would take during an earthquake. Deaf respondents also raised the issue of documentation, with a younger respondent explained how his parents keep such documents safe and readily accessible for him (see Figure 11):

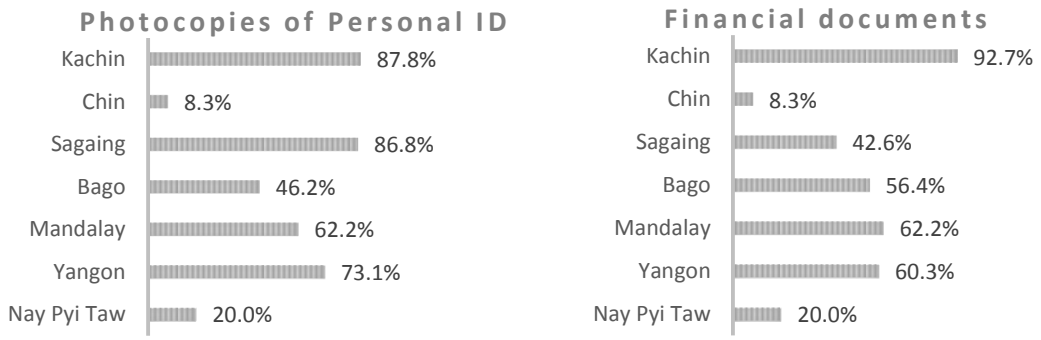


Figure 11: Respondents' most commonly mentioned 'emergency supplies': by state/region

***Flashbacks to Nargis:* Learning from Myanmar's 2008 cyclone**

The first 'Post-Nargis Periodic Review' found that *"people who lost their documentation are more vulnerable than those who possess this information, as claims to various rights and services are predicated on national registration."*[1] So it is unsurprising that these 'claims to rights and services' are so important to those who lived through the cyclone.

***On the move:* Internally Displaced People (IDP) in Kachin**

[1] 'Post-Nargis Periodic Review I', Tripartite Core Group, December 2008, https://reliefweb.int/sites/reliefweb.int/files/resources/2A957C4524F7C335C125752400493C8D-Full_Report.pdf

Although Kachin state was not directly affected by Nargis, it has some of the highest numbers of people who have been displaced by conflict: across Kachin and northern Shan, almost 100,000 people live in IDP camps[2]. For these people, documentation is similarly crucial for re-establishing one's identity after moving.

While some respondents had given thought to items needed in an emergency, household *mitigation procedures* – that is, actions which are taken in advance of an earthquake, to reduce its impact – were not found to be widely practiced in respondents' homes. The prevalence of these rose with education levels: most notably in the securing of furniture (11% among those with vocational training, which more than doubles to 23% among those at university – see Table 7). Although more respondents in Mandalay had acted to protect their homes than in other states / regions, this remained the minority of respondents (see Table 7). Of the 11% who had repaired structural weaknesses in their homes, these were primarily for roofs or walls (Table 7a). Only 1% of respondents have insurance for their house and belongings; in fact, in Kachin and Sagaing no respondents were insured.

Table 7: Have you taken any of the following actions to prepare for an earthquake? (n=2,457)

	TOTAL	Vocational training	Primary	Secondary	Matriculation	University
Strapped down furniture or large belongings to keep them in place	**17%**	11%	13%	17%	18%	23%
Purchased insurance for your house and belongings	**1%**	1%	0.5%	1%	2%	2%
Repaired or upgraded structural weaknesses in home materials	**11%**	9%	11%	11%	10%	15%

Table 7a Which structures did you repair? (n=269)

	TOTAL
Repaired roof	63%
Repaired wall	63%
Repaired doors	26%
Repaired windows	17%
Repaired toilet	6%
Repaired water tanks	2%

Table 8: Have you taken any of the following actions to prepare for an earthquake? (n=2,457), by state/region

	TOTAL	Kachin	Chin	Sagaing	Bago	Mandalay	Yangon	Nay Pyi Taw
Strapped down furniture or large belongings to keep them in place	**17%**	20%	3%	19%	13%	**26%**	15%	18%
Repaired or upgraded structural weaknesses in the material of home	**11%**	7%	1%	14%	10%	**15%**	10%	12%
Purchased insurance for your house and belongings	**1%**	0%	1%	0%	1%	**2%**	2%	3%

[2] 'Myanmar IDP Camps in Kachin and Shan states (September 2017)', UNOCHA, October 2017

Community preparedness

At the community level, there was slightly more evidence of pre-earthquake preparedness, though this remained low: one quarter of respondents had heard of an earthquake plan in their community, although only 9% believed they knew what these plans involved (see Figures 12 and 13:

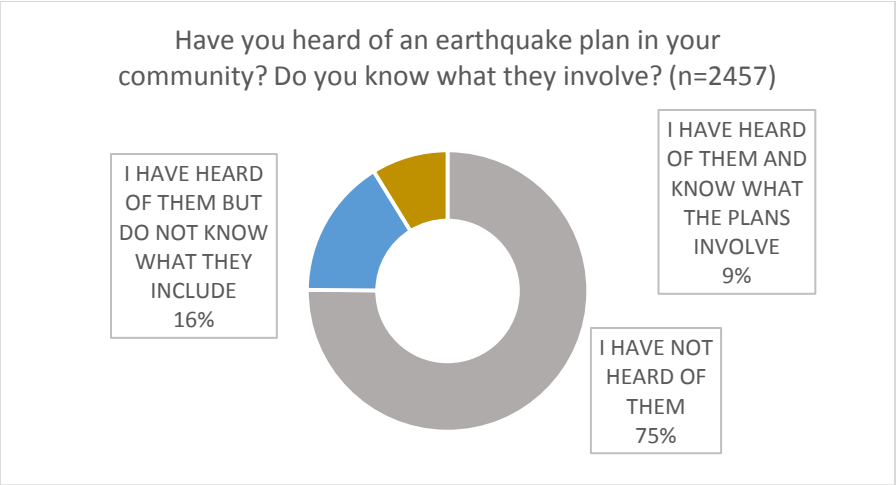


Figure 12: Awareness of community earthquake plans

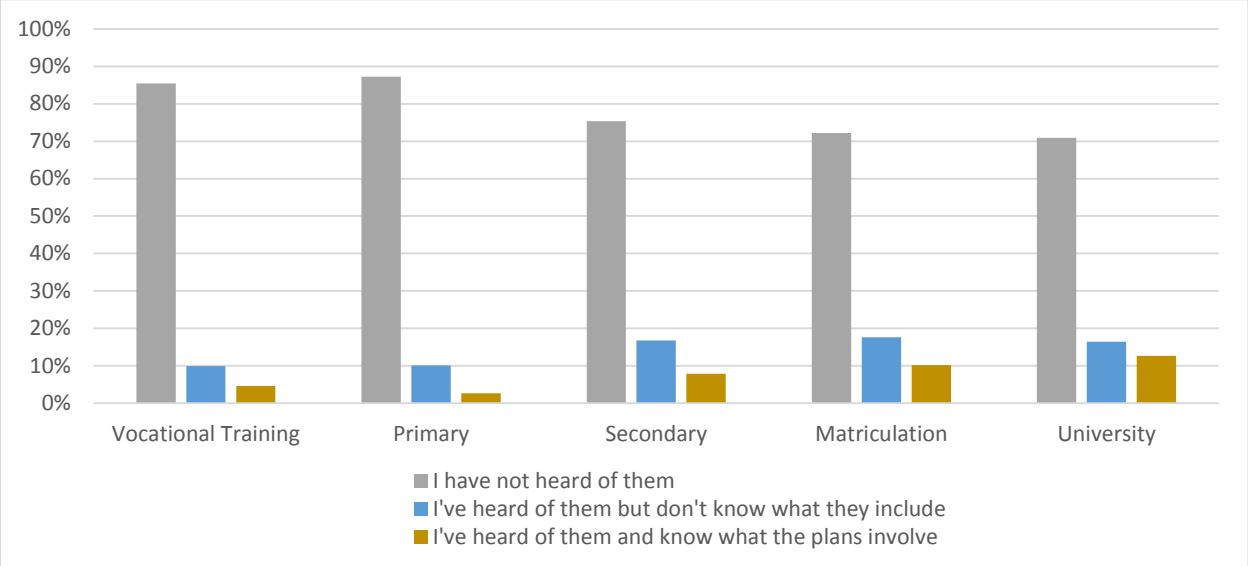


Figure 13 Heard of community plan for an earthquake

More broadly, familiarity with any disaster plans or warning systems still did not exceed 17% familiarity (see Figures 14):

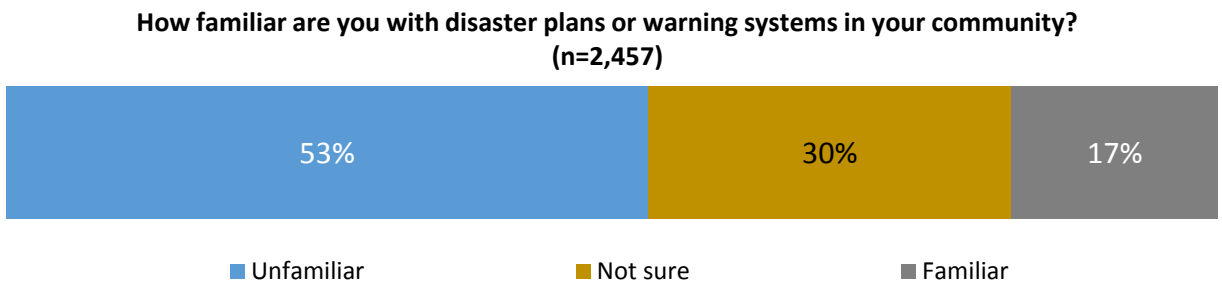


Figure 14: Familiarity with disaster plans

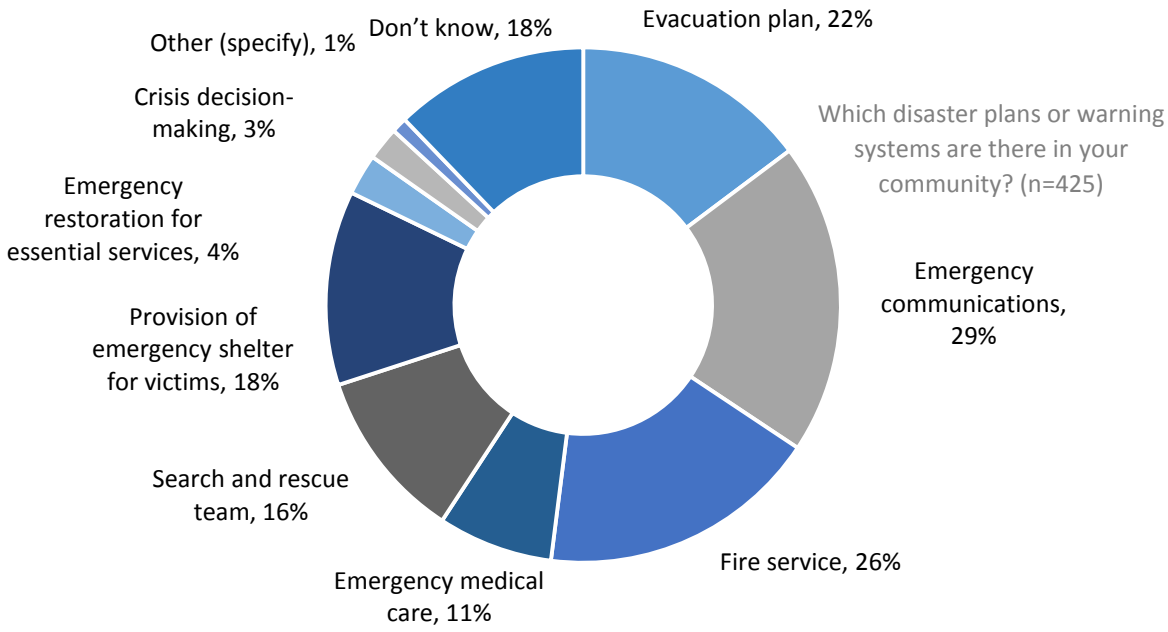


Figure 15 Familiarity with different types of disaster plan/warning system

The minority of respondents who were familiar with community preparedness systems most frequently referenced the following community preparedness systems: emergency communications, firefighting service, and evacuation plan (Figure 15). Yet, these were highly dependent on geography, as shown below (see Table 9):

Table 9: Which disaster plans or warning systems are there in your community? (n=425)

	TOTAL	Kachin	Chin	Sagaing	Bago	Mandalay	Yangon	Nay Pyi Taw
Evacuation plan	21.6%	7.8%	26.5%	10.2%	26.7%	36.4%	17.8%	16.7%
Emergency communications (e.g. loudspeaker, sirens)	28.7%	2.0%	52.9%	50.0%	11.7%	24.3%	31.5%	25.0%
Fire-fighting service	25.9%	13.7%	76.5%	21.6%	8.3%	31.8%	21.9%	25.0%

There was the highest awareness of almost all warning systems in Chin – likely due to the frequency of landslides which communities must respond too. Evacuation plans, however, were most mentioned in Mandalay. It thus appears that respondents in Chin had the highest awareness of warning systems, and the highest awareness about the likelihood of earthquakes - but it remains one of the least prepared states. This is likely tied to the broader lack of infrastructure services and personal resources in this state. As the Myanmar Information Management Unit writes:

> "*Chin is one of the poorest of Myanmar's States/Regions and chronic poverty and food insecurity have been important concerns, along with their other consequences such as health and migration issues. Interventions have often been hampered by logistical difficulties in physical access to and from different townships due to geographical characteristics of Chin State."*[3]

Analysis: What to do during an earthquake.

Several traditional or superstitious earthquake responses emerged in focus groups with elderly women, including:

> *"A person can go mad if they fall to the ground during an earthquake."*
>
> *"Stay safe by sitting down and putting coconut oil on the top of your head."*
>
> *"A pregnant woman should carry a stone in her bag."*
>
> *(3 elderly women in Yangon)*

Respondents' confidence in what to do in the first five minutes of an earthquake closely mirrored their confidence in earthquake preparedness more broadly: just over half were 'very confident' or 'quite confident' (55%), while the other half were unsure (16%) or unconfident (29%; Fig.9). It is difficult to ascertain how well-founded this confidence is, without recent data of earthquake impact. Actual levels of preparedness are better suggested by awareness and demonstration of key earthquake response actions, which is around 60% for most of these actions – as will now be discussed (see Figure 16):

[3] MIMU (Myanmar Information Management Unit), 'Chin', https://themimu.info/states_regions/chin

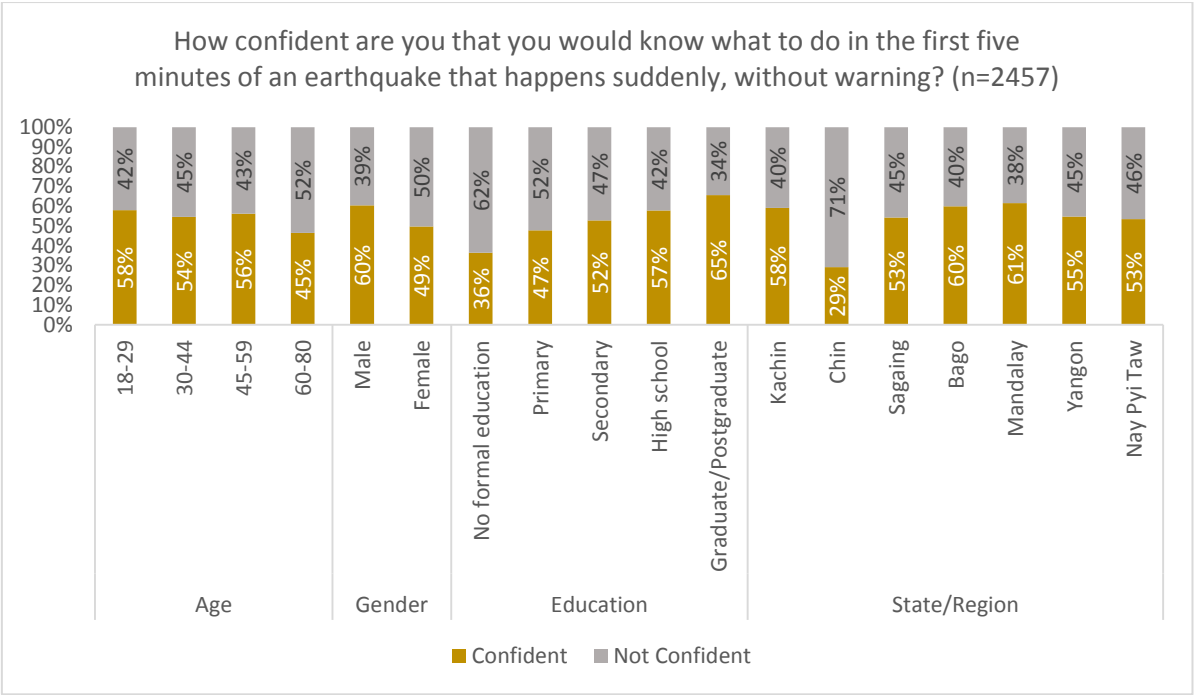


Figure 16 Confidence of immediate action in an earthquake

62% of respondents have heard of the message: **"DROP, COVER & HOLD ON!"**

Globally-acknowledged best practice advises individuals to 'Drop, Cover & Hold On!' during an earthquake. Almost two-thirds of respondents were aware of this message: though this falls to 52% among those with no formal education, and reaches 72% among university graduates (see Fig. 18). Awareness of this practice also varied interestingly by state (Fig. 17):

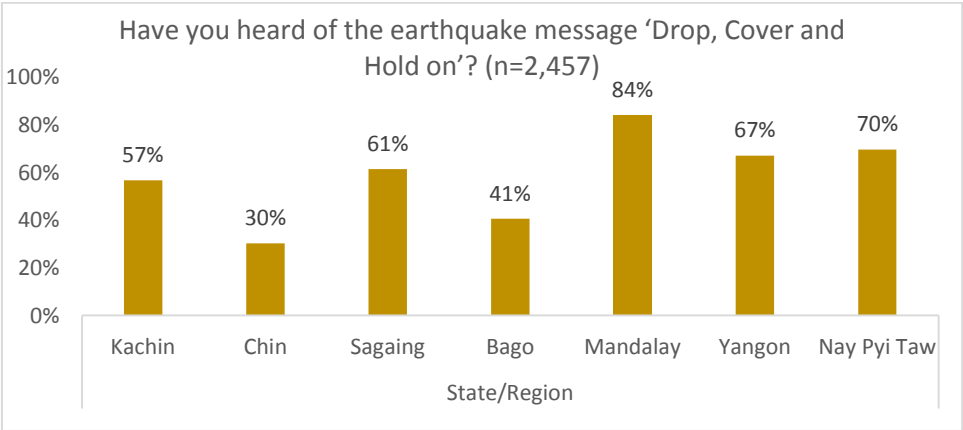


Figure 17: Awareness of the 'Drop, Cover, Hold On' message: by state/region

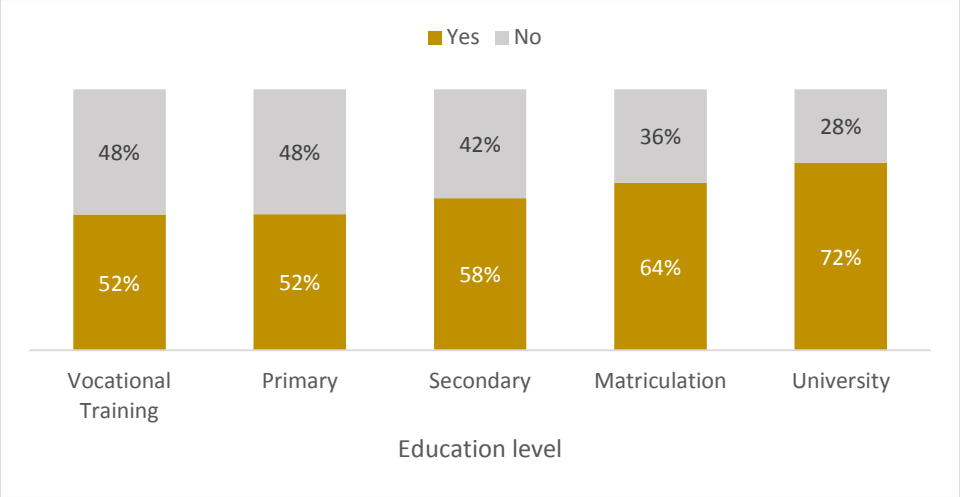


Figure 18 : Awareness of the 'Drop, Cover, Hold On' message: by education level

Only 30% of respondents in Chin knew of 'Drop, Cover, Hold On!', and 41% in Bago. Mandalay, on the other hand, was as high as 84%. Given that Bago and Mandalay are not otherwise outliers in terms of earthquake preparedness, this suggests that dissemination of this message has been through more localized sources – perhaps through community radio, social networks, or township-level communications. Despite low awareness of the message, dropping to the ground, covering one's head, and holding onto something proved to be instinctive reactions among participants during earthquake simulations. In focus groups in Chin, children and adults alike immediately dropped to the floor and either moved under a table or held onto a pillar, wall, or bench. This is shown in the photos (see below Figure 19):

Figure 19: Earthquake drill with focus group participants in Chin state: elderly women (left) and teachers (right)

On being asked why they had taken this action, respondents usually explained that they had followed the actions of others, or done what 'felt' safest. This suggests that even if only one or two people in a space know the safest action during an earthquake, others in the space will most often mimic this.

Regarding specific actions to take during an earthquake, respondents' awareness was as follows (Table 6). Respondents knew very well to hold on to something during an earthquake (80%), not to run out of a building (77%), and to get down close to the ground (76%). Yet there was greater misunderstanding around being 'covered': around half of the respondents (57%) knew to get under a big piece of furniture, while the other half did not (43%). Most respondents (79%) believed they should get in a doorway during an earthquake: although this is popularly shared safety advice, it is in fact *not* the safest action to take (See Table 10):

*Table 10: Knowledge of actions to take **during** an earthquake*

Action	Correct	Incorrect	Don't know
In an earthquake, you should get down close to the ground. [TRUE]	76%	22%	2%
In an earthquake, you should get under a big piece of furniture or other cover. [TRUE]	57%	43%	0%
In an earthquake, you should hold on to something. [TRUE]	80%	19%	1%

If you are indoors during an earthquake, you should run out of the building. [FALSE]	77%	23%	0%
In an earthquake, you should get in a doorway. [FALSE]	20%	**79%**	1%
AVERAGE	62%	37%	1%

People with disabilities and elderly people did not suggest that they would have life-risking difficulty in immediately responding to an earthquake, as they are all able to find means to be mobile in day-to-day life. Nonetheless, several concerns emerged:

Blind respondents were concerned for the deprivation of their other senses: with lots of people shouting, they wouldn't be able to hear; with the ground shaking, they might lose their sense of balance and direction.

Deaf respondents acknowledged that they might be alerted that there was an earthquake after others, without being able to hear alarms (either verbal warnings from other people, or the sound of a mechanical bell). They would therefore need to be given clear instructions of what action to take as soon as possible.

Respondents with mobility disabilities described how they asked their families to stay close in case of an emergency. They may rely on their strongest relative for help, even if this is a wife or one's child.

Elderly respondents – beyond the acknowledgement that they can run slightly less fast that their younger relatives – were otherwise confident that they would not be significantly disadvantaged in responding to an earthquake.

Analysis: What to do **after** an earthquake

Respondents' awareness of what to do *after* an earthquake reflected a similar trend as what to do *before*, although there was slightly more accurate knowledge. 70% of actions were correctly identified, while 29% were incorrect. The greatest uncertainty was around the immediacy of going back inside to check one's belongings, and around rescuing family members oneself: both issues split respondents equally between those who would and those who wouldn't (Table 11). The latter action – rescuing family members – is particularly dangerous.

*Table 11: Knowledge of actions to take **after** an earthquake*

Action	Correct	Incorrect	Don't know
After an earthquake which damages your home, you should immediately go back inside to see whether everything is okay. [FALSE]	54%	**46%**	0%
After an earthquake, you should check for gas leaks. [TRUE]	70%	29%	1%
After an earthquake, you should be ready for another earthquake to happen very soon. [TRUE]	93%	6%	1%
After the ground has stopped shaking, you should evacuate your house. [TRUE]	84%	15%	1%
If a family member is trapped inside, you should wait for Search and Rescue teams to help before entering a building. [TRUE]	**50%**	**49%**	1%
AVERAGE	70%	29%	1%

In terms of getting information in the aftermath of an earthquake, television was assumed by most respondents to be the major source of information (60%). Second to this were friends, family and neighbours (37%), followed by radio (33% - although Bago, Sagaing and Nay Pyi Taw rely on radio more, Fig. 20). In Chin State, the main source of information is friends, family and neighbors. Respondents suggested that government agencies, the army and the police play a minimal role, as they were seen as a source of disaster information by less than 2% of respondents (see Figure 20):

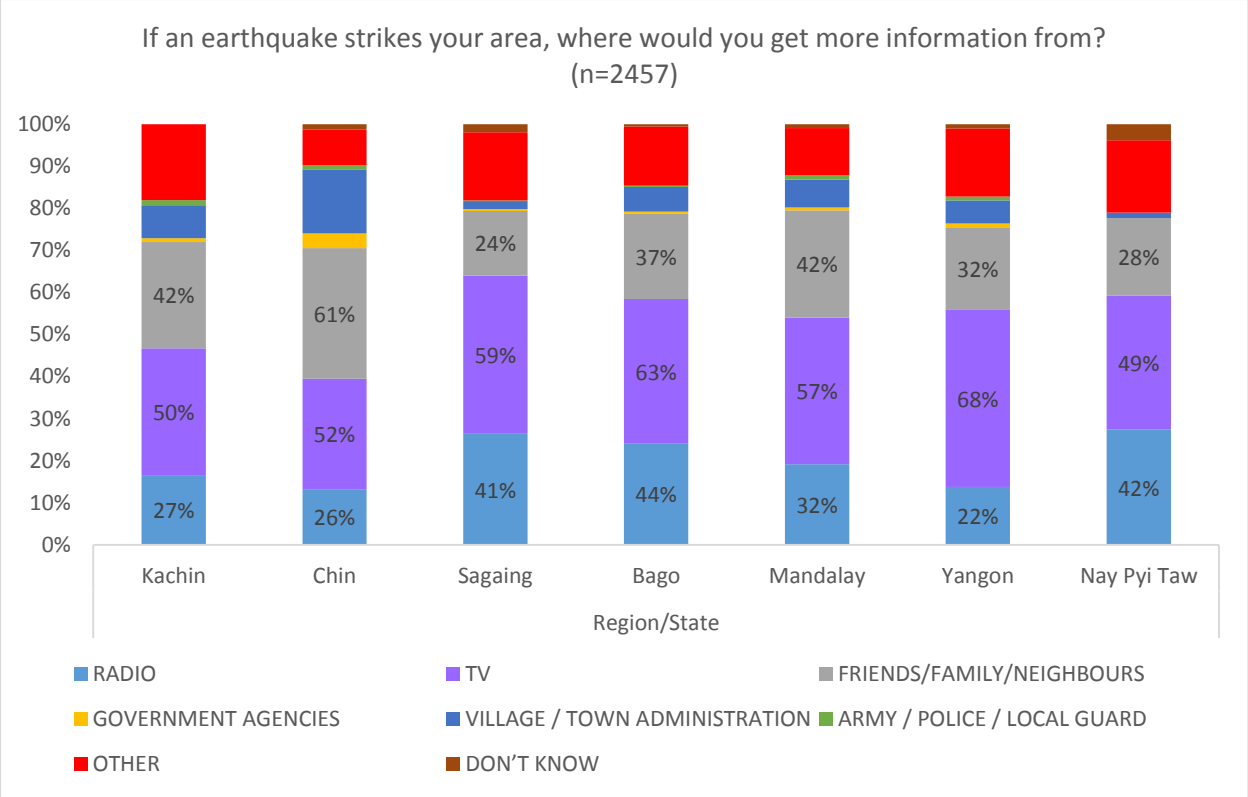


Figure 20: Information source by State/Region

In Chin state, 30% of respondents would seek information from their village or town administration. This is three times higher than the average across all respondents (at 10%). Focus group respondents in Chin described how they would call their Village Administrator if a major earthquake hit, and would then wait for him to coordinate assistance with the Falam township. They would then follow the Village Administrator's instructions. In interview, the Village Administrator himself in fact described a process which was more robust – but which his neighbors (those whom we interviewed) were unaware of:

"We have a disaster group in our village. It is made up of 4 men who were chosen by all the villagers. I was told by the Administrator of Falam Township that I must create that group. They aren't trained yet.

If there was an earthquake in our village, I would call together the disaster group so that they can work together to help the other villagers.

I also need to call the Falam Administrator – but that will only go through the upper levels [of state government] step by step. After I have told those authorities about the disaster, the respective government department will then help the village to recover".

(Village Administrator for Lum Bang village, Chin state)

Indicator 3: Knowledge of, and access to, the Myanmar Earthquake Resilience Strategy

Logframe indicator findings

INDICATOR 3		
Indicator	Value	Source and method of data collection
% increase in the level of stakeholders' knowledge and satisfaction with access to and availability of information on earthquake resilience through their involvement in Myanmar Earthquake Resilience Strategy.	*TARGET:* 50%	
	BASELINE: **0%** of respondents have read or referred to the Myanmar Earthquake Resilience Strategy – it is not yet in existence.	

When asked about the most convenient way to access the MERS, respondents showed a preference for digital channels: overwhelmingly, as a mobile phone app (66%); but with PowerPoint at 27%, and digital document at 9%. A printed copy was only favoured by 38% of respondents (see Figure 21):

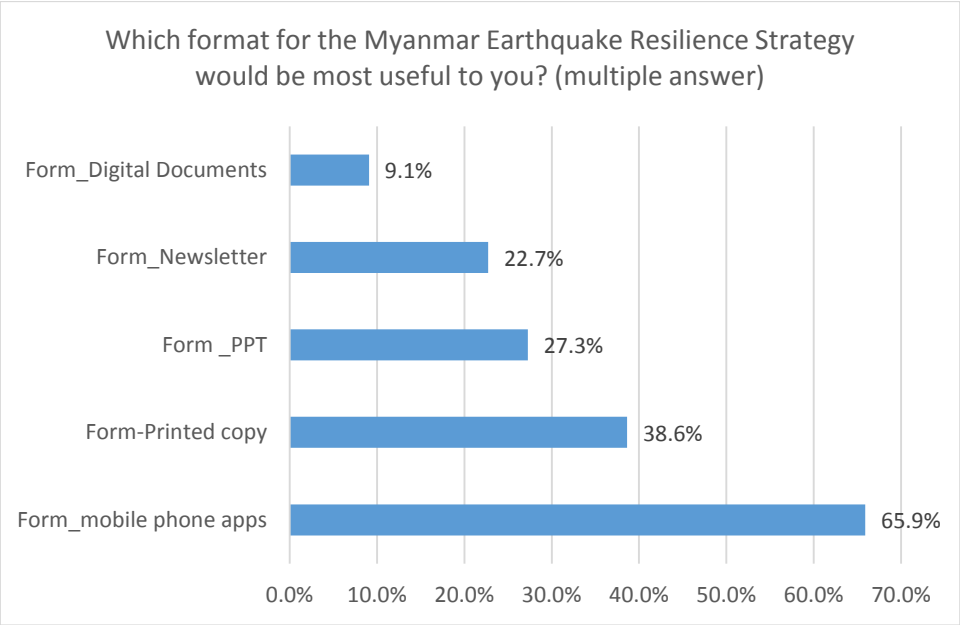


Figure 21: Favoured channels for accessing the Myanmar Earthquake Resilience Strategy

95% of respondents believe the strategy will be either 'somewhat' or 'very' useful to their work (see Figure 22). Most reasons given for this centered on the fact that it will keep the respondent informed about valuable safety protocols in the event of a disaster. Some respondents believe that the Strategy will be used to educate the public; while others described it as an advocacy document, to be shared with personnel in other departments and roles:

- It is a guideline to be updated
- It can be shared with other personnel in different positions
- It gives precautions / applicable scenarios / 4 factors for earthquake prevention
- It is to educate the public

- It instructs / keeps us prepared well in advance
- It doesn't contain effective plans
- Because scholars predict another major earthquake will happen soon
- It will protect lives
- It is relevant to my role
- It tells us 'do's and 'don't's

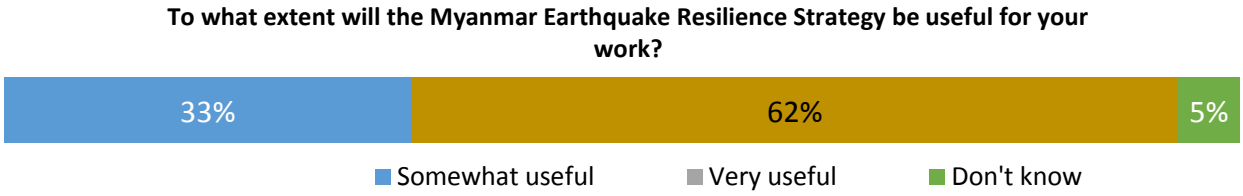


Figure 22: Perceptions of the usefulness of MERS

> *"There's a disaster preparation aspect [to the strategy]. In the event of actual disaster, the public needs to be knowledgeable about the protocol; i.e. what to do, where to escape, and safety places.' {Respondent 3)*
>
> *"Taking early actions and preparing is very useful as our work, by its nature, involves protecting citizens' lives." (Respondent 25)*

As the fire service department, we have to know these [strategies], regardless of their usefulness or application. (Respondent 7)

Indicator 4: Expectation of earthquake impact

Logframe indicator findings

INDICATOR 4		
Indicator	Value	Source and method of data collection
1) define "affected people" (injured, evacuated, relocated, with houses damaged/destroyed, deprived of livelihood, crops, etc.); 2) provide absolute numbers; 3) state if the reduction is experienced, expected or modelled.	*TARGET:* 50%	*TARGET*: Survey of people at risk in the project areas at the beginning and at the end of the project. Since there is no baseline data on the effect of an earthquake in the project areas, and an earthquake would not happen during the project period, it is not possible to set the target and indicator as "experienced". In this regard, the target and indicator are set as "expected". A community survey will be conducted at the beginning and at the end of the project. The survey will gather the community perception and identify their estimation on number of death, affected people, estimate % reduction of the affected people, if an earthquake strikes.
	BASELINE: **45.5%** are *expected* to have their **houses destroyed**; **34.6%** are *expected* to be **injured**; **22.5%** are *expected* to be **killed**.	*BASELINE:* All respondents were asked: *"If a major earthquake occurred in your community, what proportion of people do you think would [Q21. have their houses destroyed / Q22. Be injured / Q23. be killed]?"* The average proportion was then calculated from all responses (minus those who answer 'Don't Know'), to give these figures

Analysis: Expectations of the likelihood of an earthquake

There is much uncertainty as to the likelihood of earthquakes among respondents living in earthquake-prone areas: only around one third (34.0%) believe that a major earthquake is 'Quite likely' or 'Very likely' to *ever* happen in their community. Equally, one third (34.2%) believe it is 'unlikely' or 'not likely at all', while the final third do not know. These perceptions of the likelihood of an earthquake were seen to increase with higher levels of education (see Table 12):

Table 12: Perceptions on the likelihood of an earthquake: by education level

	Level of schooling completed				
	Vocational Training	Primary School	Middle School	High School	University
It is 'Quite likely' or 'Very likely' that a major earthquake will happen in my community	29.8%	29.8%	32.2%	36.0%	37.8%

Geographically, respondents in Chin state felt most threatened by earthquakes, with almost half (41.1%) believing a major earthquake to be likely. This is most likely owing to their experiences with fatal landslides in their mountainous region – an event closely related to earthquakes. In Kachin, on the other hand, less than one quarter (24.9%) felt threatened (see Figure 23) – which, we can speculate, may be owing to communities there having experienced fewer severe earthquakes, or having access to different media sources which show earthquakes less.

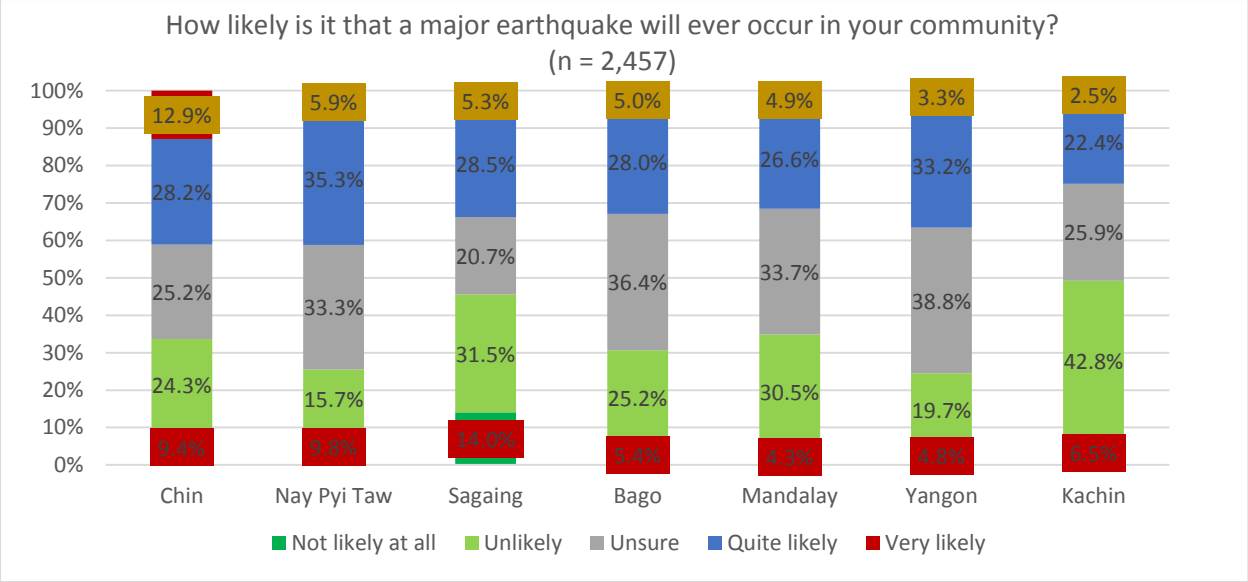


Figure 23: Perceptions on the likelihood of an earthquake: by state

Participants in focus group discussions had widely varying justifications for their sense of the likelihood of an earthquake. Those who thought a major earthquake would be *unlikely* to occur suggested reasons including:

> *"[Myanmar] is a religious country, so big disasters probably won't happen." (Teacher in Yangon)*
>
> *"There's less deforestation here, so we're unlikely to have an earthquake. And our village is surrounded by mountains, like a wall – so we'll be protected." (High-school student in Chin)*

Others believe a major earthquake is likely – one blind respondent in Yangon even suggested that "*an earthquake could happen any time now, while we're sitting here!*" They gave reasons such as:

> *"We're in an earthquake risk zone." (Teacher in Yangon)*
>
> *"We are afraid another earthquake will come – stronger than last year – because of climate change." (Mobility disabled respondent in Chin)*
>
> *"People's behavior is bad – there is less forest and the climate is not normal, so I think an earthquake can happen." (High school student in Yangon)*
>
> *"It's written in the Bible – in the Book of Revelations – that these things [earthquakes] can happen." (Elderly woman in Chin)*

One deaf respondent concluded: "We cannot know if an earthquake is coming. Only scientists can tell." While the overwhelming sentiment is therefore of uncertainty and unpredictability, many people also associate the risk of earthquakes with environmental factors (such as deforestation and climate change) and religion, and set their expectations accordingly.

Analysis: Expectations of how people would be affected by an earthquake

Houses destroyed

If there were to be a major earthquake, most respondents (64%) believe that less than half of the people in their community would have their houses destroyed. 23% of respondents believed that most or all people would lose their property – yet there were clear geographic differences in these perceptions. In predominantly urban Yangon, for example, 32% of respondents thought that most or all people would lose their property; and in mountainous Chin, this rose to 47% (see Figure 13). Respondents in Sagaing were the most confident in the stability of houses in their community: 47% expected that few or no homes would be destroyed; whereas 15% expected that most or all would be destroyed.

This suggests that living in densely populated areas such as Yangon (70% urban[1]), or mountainous terrain such as Chin (which reaches 3,200m above sea level), increase's respondents' expectation of property destruction. In these vertiginous landscapes (both urban and rural), the threats of earthquake damage are more visually apparent. Sagaing, by contrast, is the most rural region in this study (83% of its population are rural[4]), with most of its landmass lying at less than 500m above sea level (see Figure 24):

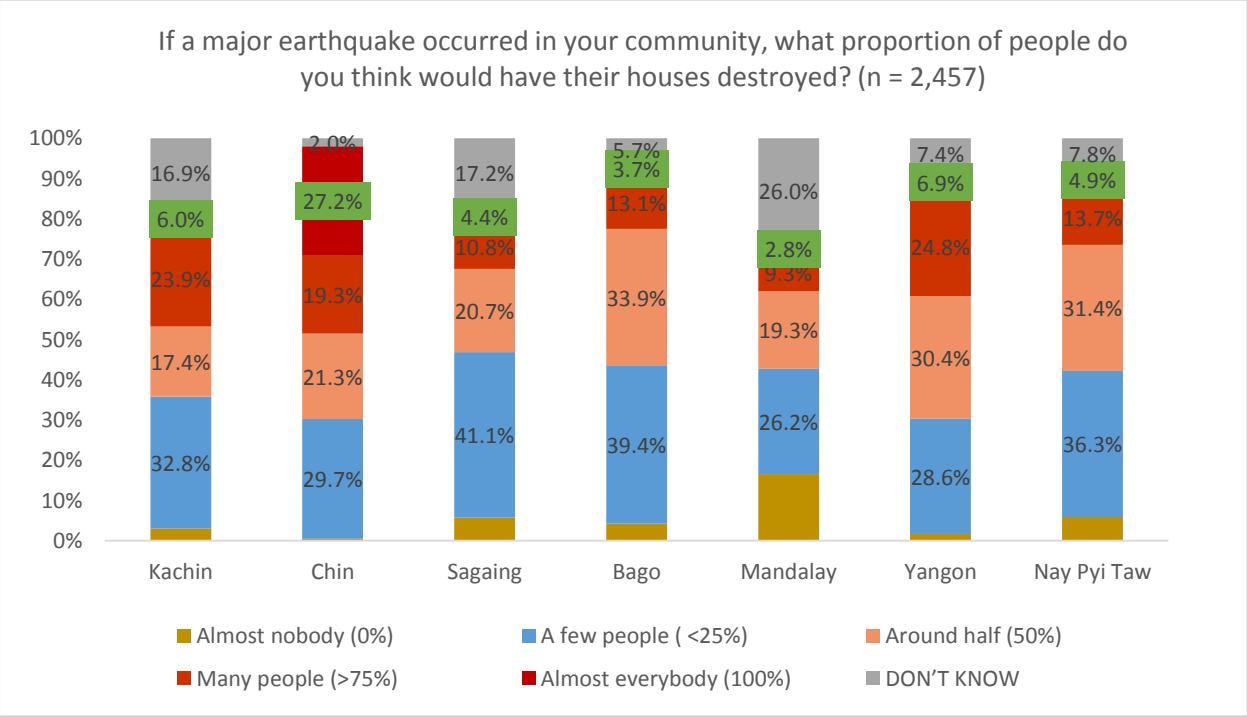


Figure 24: Expected loss of property in a major earthquake; by state/region

High expectations of destruction in mountainous areas – informed by experiences of destructive landslides – and in densely populated urban areas, were confirmed by the focus group discussions. The drawings below (see Figure 25) show how middle- and high-school children in Chin State visualized an earthquake to affect their village:

[4] 2014 National Census

Figure 25: 'What would an earthquake look like in your community?' Drawings from school students in Chin

These illustrations show houses and – central to most depictions – the village church being destroyed by rocks tumbling down the mountainside, by land-slides, by falling trees, and by other collapsing structures (such as the MRTV signal tower, and a hydro-electric transmission tower). Beyond houses, focus group participants thus described how the earthquake would destroy village infrastructure: bridges would collapse, power lines be damaged, and landslides would block or destroy access roads.

Almost all focus group participants in Chin – school children, teachers, elderly and mobility disabled people – lived in houses made of timber. While they believed that these houses would be *less sturdy* than brick houses in an earthquake, they explained that they would feel *safer* in a wooden house, where no heavy bricks could fall and hurt them. This sentiment was echoed by almost all participants in Yangon. An elderly woman added that brick apartments would shake less than wooden buildings in an earthquake, and thus give less advanced warning to escape.

There were mixed opinions as to the safety of buildings in Yangon. An elderly woman suggested that, high-rise apartments would be safer than low buildings, which could be crushed by the taller buildings. Several teachers and middle-school students, however, believed tall buildings ("two stories and above") have more risk as they must run further to escape, and there are chances of falling. One deaf respondent in Yangon who lived in a house constructed of bamboo thought that

her house will certainly be damaged. One blind participant in Yangon indeed speculated that "1 billion apartments would be damaged because most are so badly built". The teachers presented the following perspectives:

> *"I'm afraid that I wouldn't be able run away to a safe place [during an earthquake], because most of the buildings in Yangon are high. It would be safer to stay at home."*
>
> *"Nowadays, building quality is low. My school will fall down if there is a big earthquake."*
>
> *"My school was built well and it is safe." (Three teachers in Yangon)*

Disaggregating these findings by education level shows how less educated respondents were less certain about the impact of an earthquake in their community (23% 'don't know), and anticipated less damage (11% of those with no formal education thought no houses would be destroyed, compared to 4% of university graduates; see Figure 26):

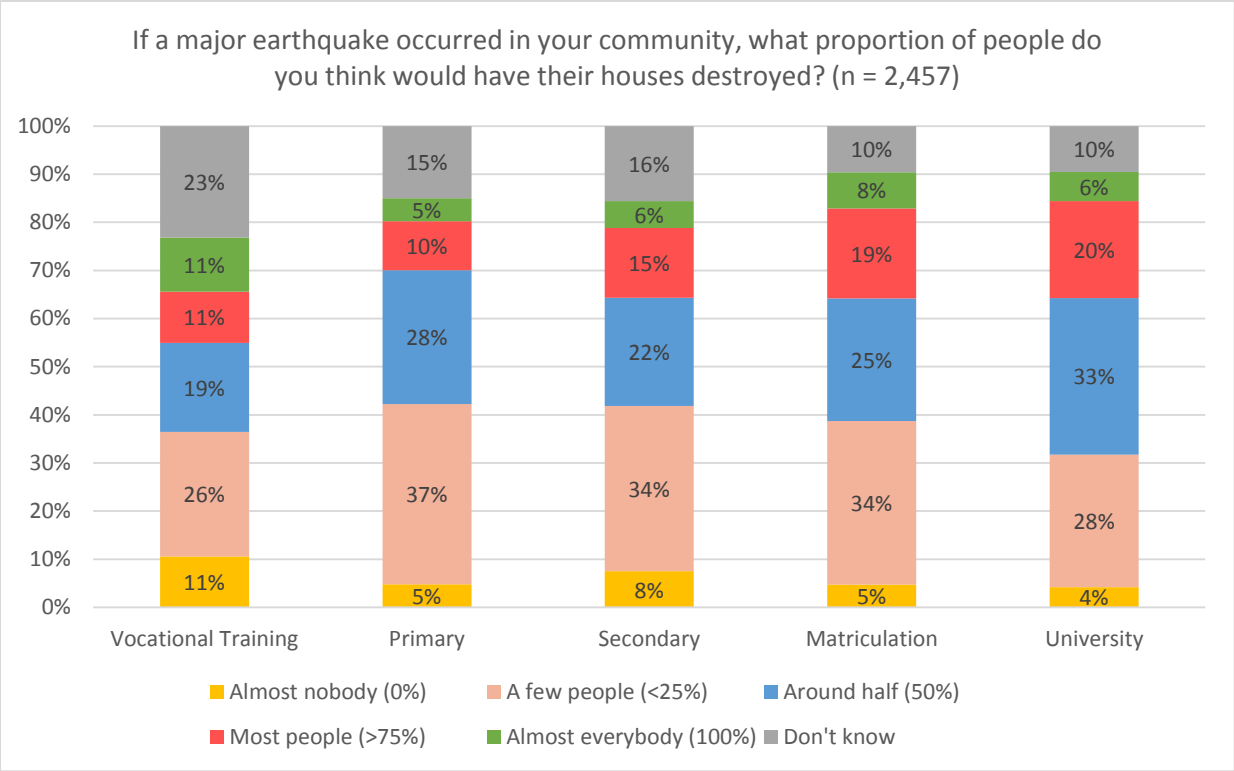


Figure 26: Expected loss of property in a major earthquake; by education level

Injuries to community members

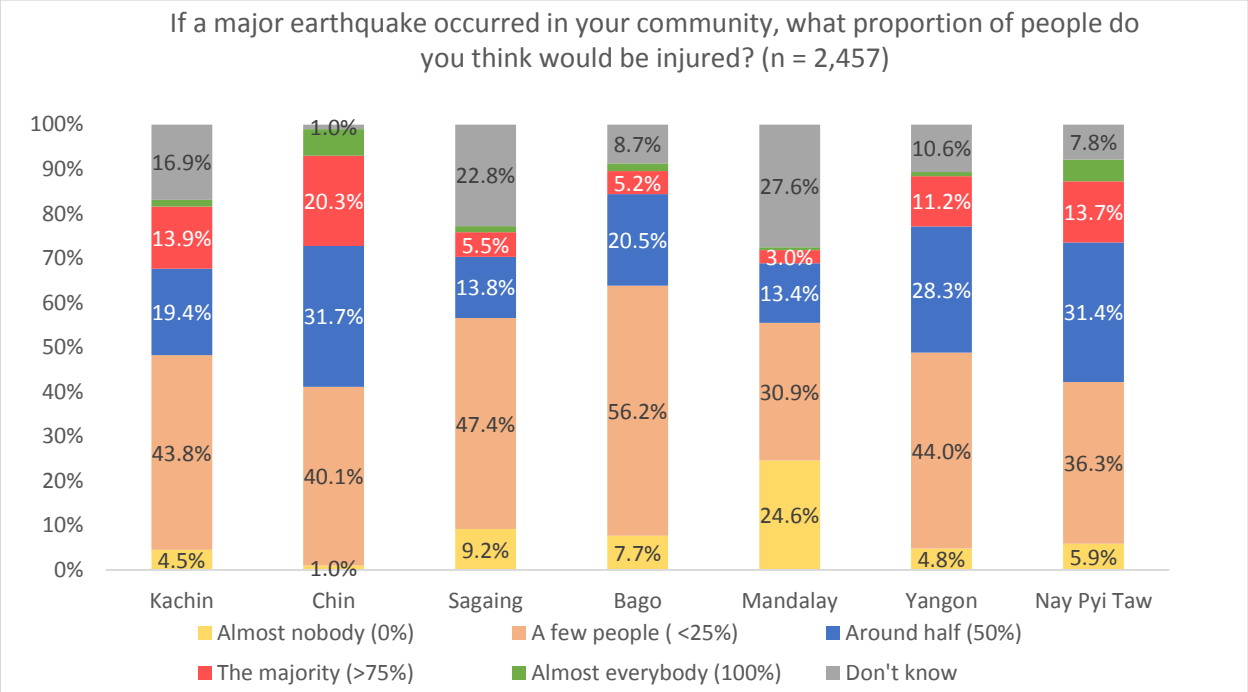


Figure 27: Expected injury in a major earthquake

Over two-thirds of respondents (68.9%) expected that 'almost nobody' or only 'a few people' would be injured by a major earthquake. In Bago, almost 64% of respondents expected this (see Figure 27). Across all respondents, 21.1% expected an earthquake to injure around half of their community. Fewer than 10% expected 'the majority' would be injured, while only a handful (1.6%) thought almost everybody would be injured. Mirroring higher expectations of property damage, more than twice as many respondents in Chin anticipated widespread injury than respondents anywhere else: 20.3% in Chin expected 'the majority', and 5.9% expected 'almost everybody' to be injured.

In order to understand how realistic these expectations are, we can draw comparisons with another major earthquake in the region (see below):

***Putting a major earthquake in regional context:* Impact of the Nepal 2015 Earthquake[5]**

Magnitude:	7.8 on the Richter scale
Houses destroyed:	Over 800,000 buildings, across 31 out of 75 districts
People injured:	22,000 injured by earthquake; 2.8 million (10% national population; almost 100% of Kathamndu valley i.e. the most earthquake-prone area) then needed humanitarian assistance
People killed:	8,900

Expectations of injury were seen to be strongly influenced by a respondent's age: older respondents expected fewer people to be injured in an earthquake. Similarly, they expected fewer houses to be destroyed and fewer people to be killed (see Figure 28).

[5] 'Quick Facts: What you need to know about the Nepal Earthquake', Mercy Corps, 14th March 2016, https://www.mercycorps.org/articles/nepal/quick-facts-what-you-need-know-about-nepal-earthquake

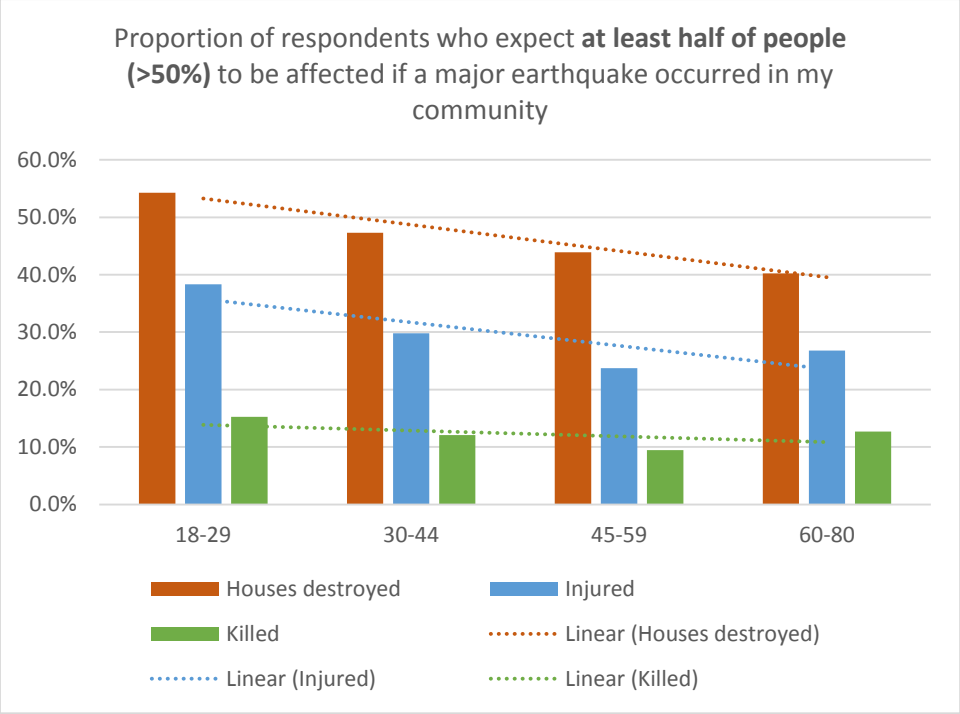


Figure 28: Expected effect of a major earthquake: by age

In focus groups, the contrasting perspectives of school children, elderly women suggested reasons for this trend. Elderly respondents living in Yangon and Chin had experienced numerous small earthquakes throughout their lives, and therefore feel they have empirical evidence of their safety in the next earthquake. Moreover, the larger earthquakes that they have followed in news stories have primarily been in sparsely populated areas of Myanmar – such as Bagan, where damage to sacred pagodas was news-worthy, but the impact on people has been minimal.

Many young respondents, however, have earthquake teaching fresh in their minds, and their active imaginations are further stimulated by TV shows depicting dramatic consequences from earthquakes. This is evidenced in the drawing (Figure 29), in which middle school students depict people injured by fallen rocks and trees, and others rushing them to an ambulance. A rescue helicopter flies in to take other victims to safety. When asked whether such medical assistance has come to their village before, the high-school participants confirmed that ambulances sometimes come, but that a helicopter "has only come in our dreams".

Figure 29: Children's illustration of the impact of an earthquake in a community in Chin

Death of community members

A major earthquake is *not* expected to be fatal by most respondents: a quarter expect that almost nobody would die (23%) and almost half expect that a few people would die (46%). In every state / region except Chin, less than 1% of respondents believe that 'almost everybody' would die (see Figure 30). It is again worth noting respondent's uncertainty. One fifth of housewives (21%) and one quarter of retired elderly peoples (25%) said that they 'Don't Know' an answer to this question; in Mandalay, this was as high as 31% of respondents.

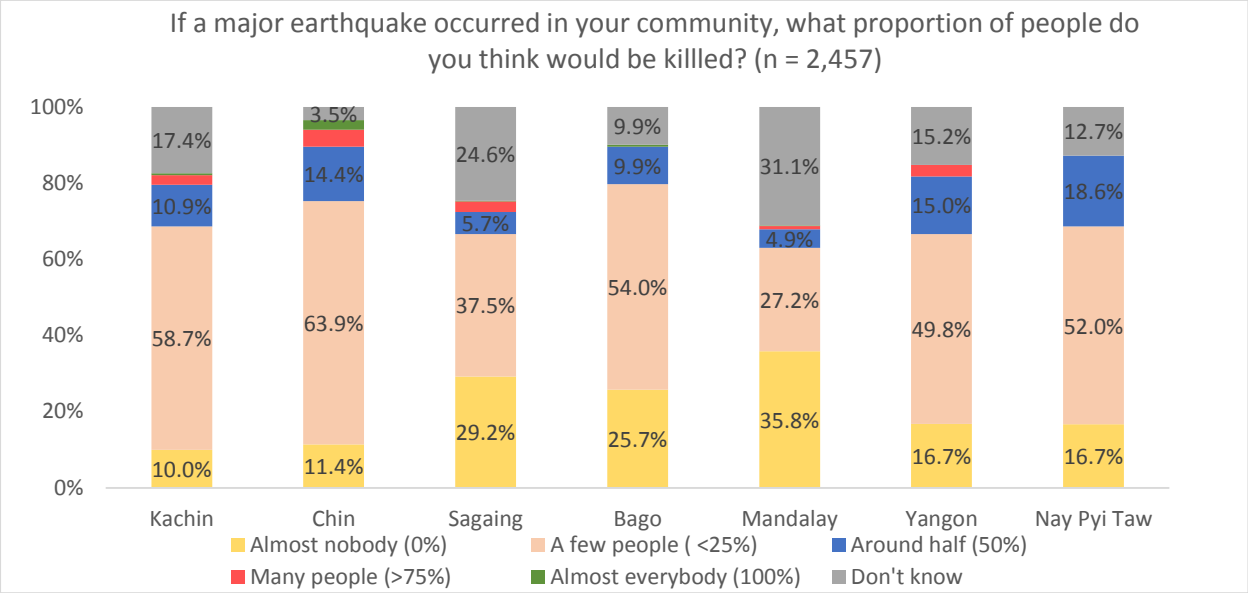


Figure 30: Expected death in a major earthquake

When asked, unprompted, what would be the greatest threat to lives in an earthquake, the responses given were as noted in the pie chart below (Figure 31):

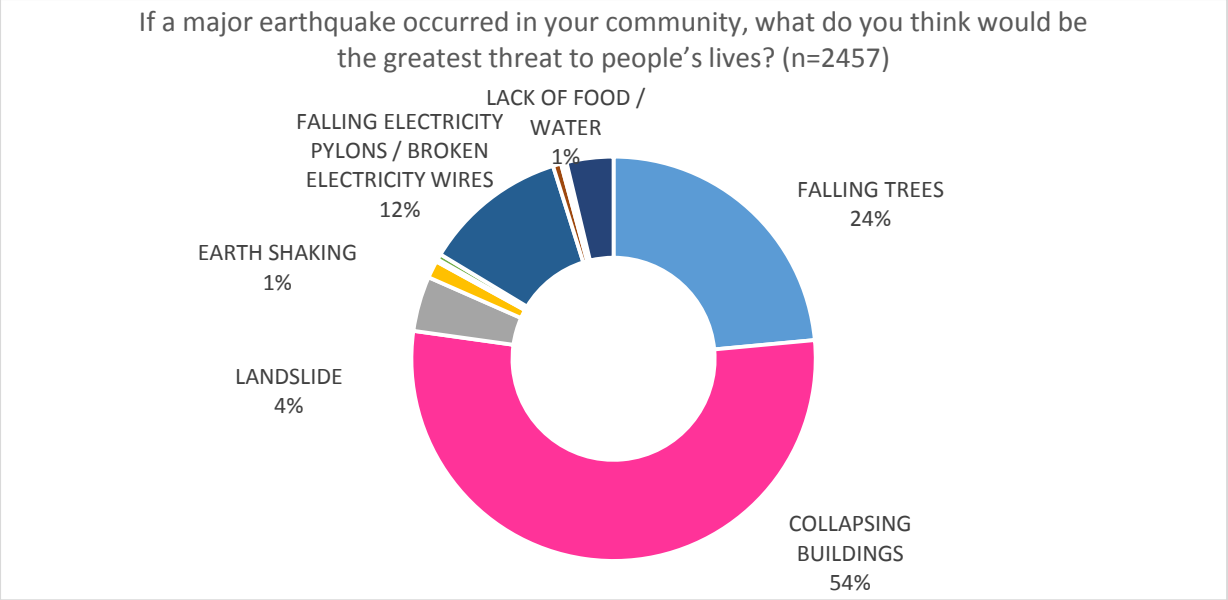


Figure 31: Greatest threat of a major earthquake

With its predominantly urban population, Yangon respondents had the highest concerns over collapsing buildings (61% - see Figure 32). Falling trees most concerned Bago respondents, being the primary concern of 35.4%. Chin was a clear outlier in anticipation of landslides, with 30.2% of respondents naming in their main concern (compared to at least 10 times fewer everywhere else).

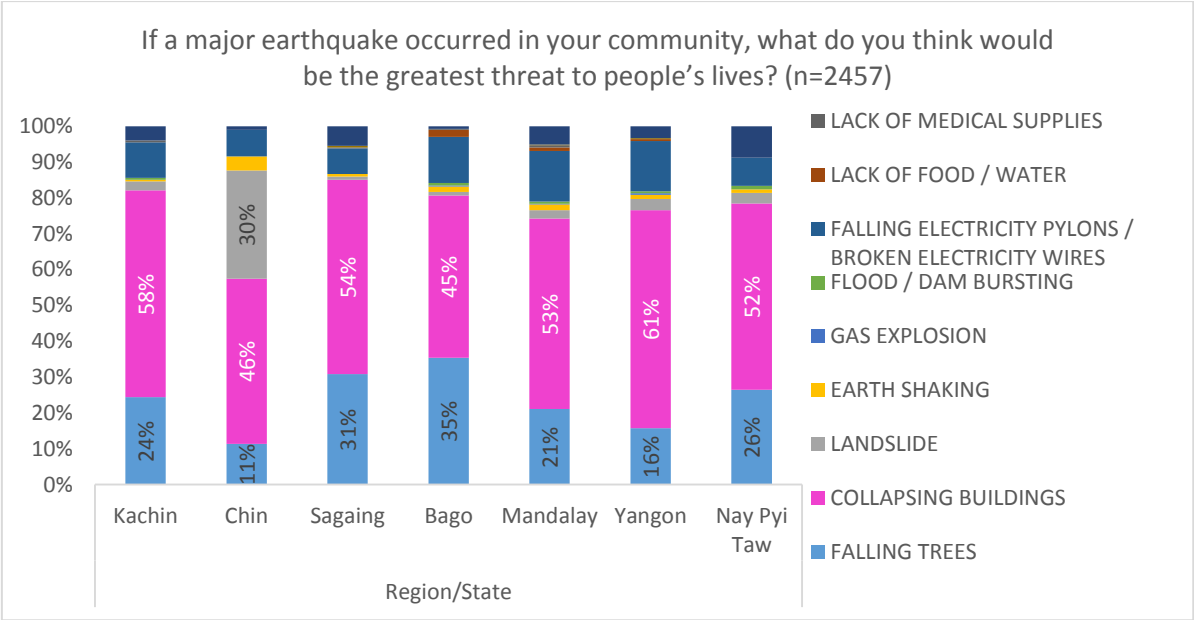


Figure 32 Greatest threat of a major earthquake by State/Region

Recommendations for DDM & UNDP Programme Implementation

1. Which channel to use to build knowledge?

TV was respondents' primary source for earthquake information, serving 67% of the respondents who had received information about earthquakes. The internet or Facebook was the second most

popular source (at 25%), followed by friends or relatives (18%), newspaper (16%) and radio (16%). See Figure 33:

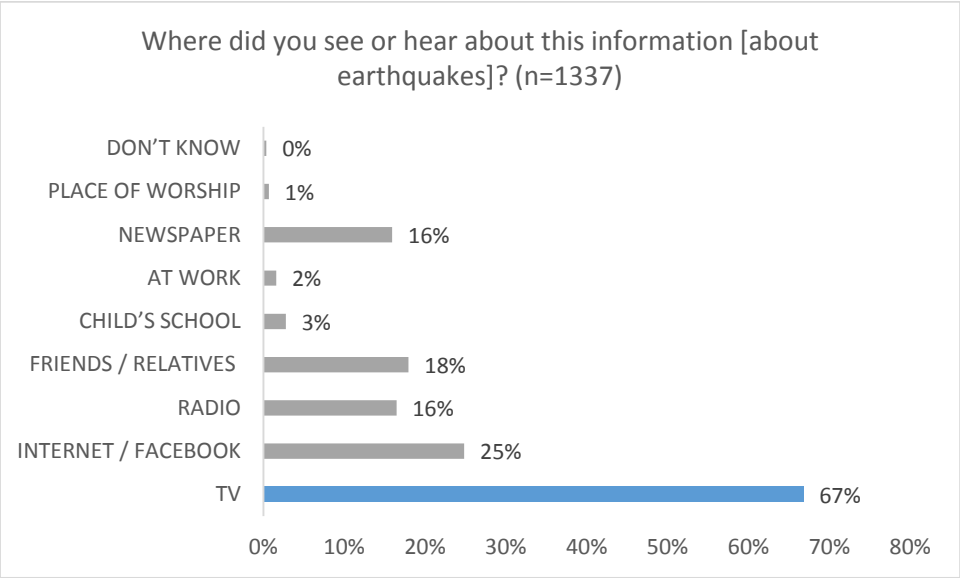


Figure 33: Earthquake information source

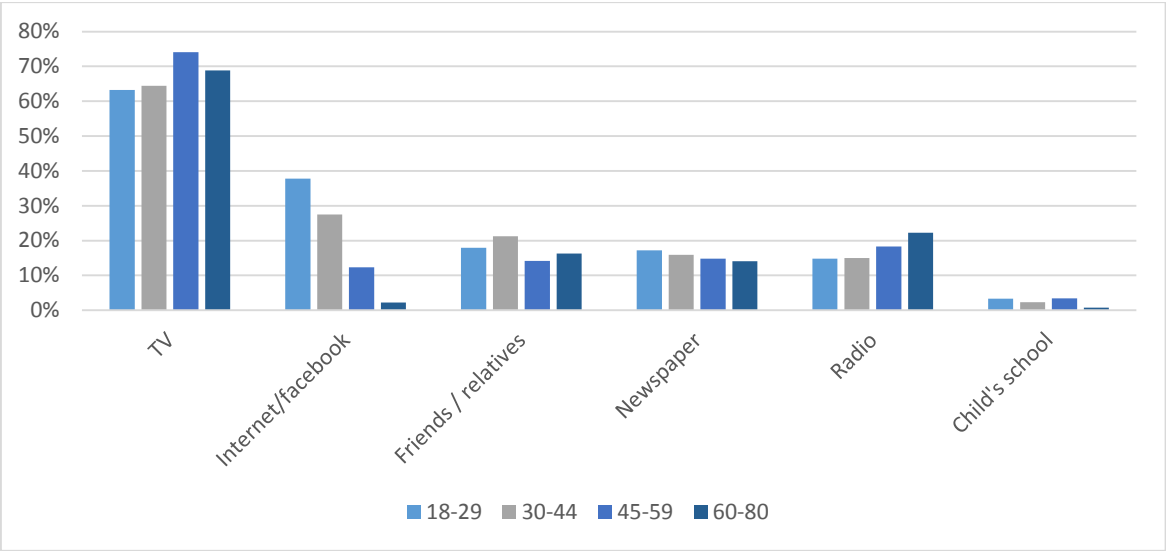


Figure 34: Earthquake information source, by age

The use of internet and Facebook as a source of earthquake information shows the greatest variation by age: it was used as a source by almost 20 times more of the youngest respondents (38%, age 18-29) than the oldest (2% over age 60; see Figure 34). Nonetheless, TV remains the most popular source of information for all age groups – and particularly those over age 45. While the secondary source of earthquake information was internet or Facebook for those under age 44, the secondary source for those age 45+ was radio.

Although TV was the most popular source in all states/regions, the internet was an almost equally important source in Chin (at 43%, compared to TV at 47%).

TV

One quarter of all respondents were found to have seen earthquake information on TV (that is, 45% of the 54% who had come across earthquake information). The fact that 77% of respondents own a TV, suggests that there is potential for this viewership to be increased. See Figure 35:

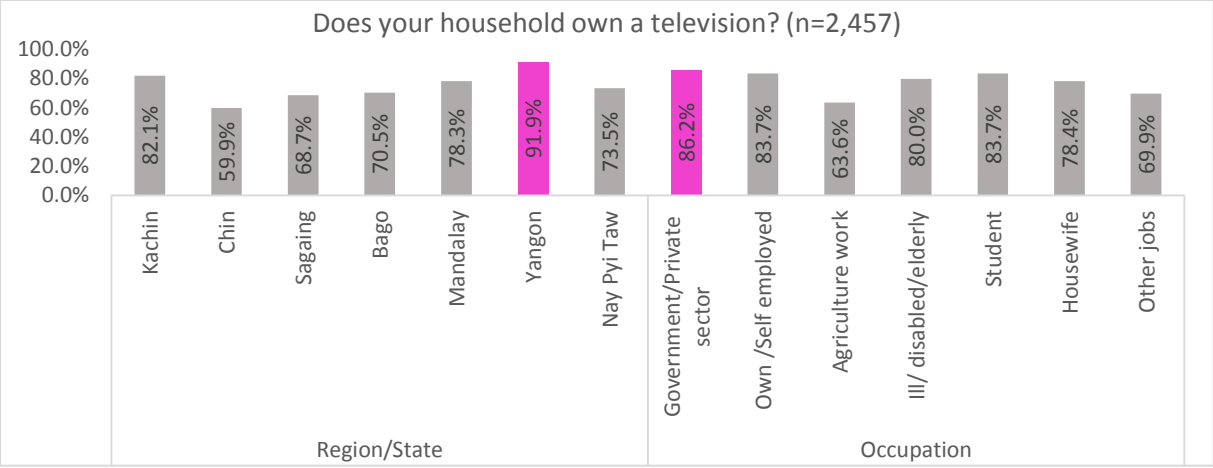


Figure 35 TV ownership

MRTV 4 is respondents' most frequently watched TV channel (mentioned by 46% of respondents). Channel 7 and MRTV are the second and third most-watched channels, at 39% and 33% respectively (see Figure 36).

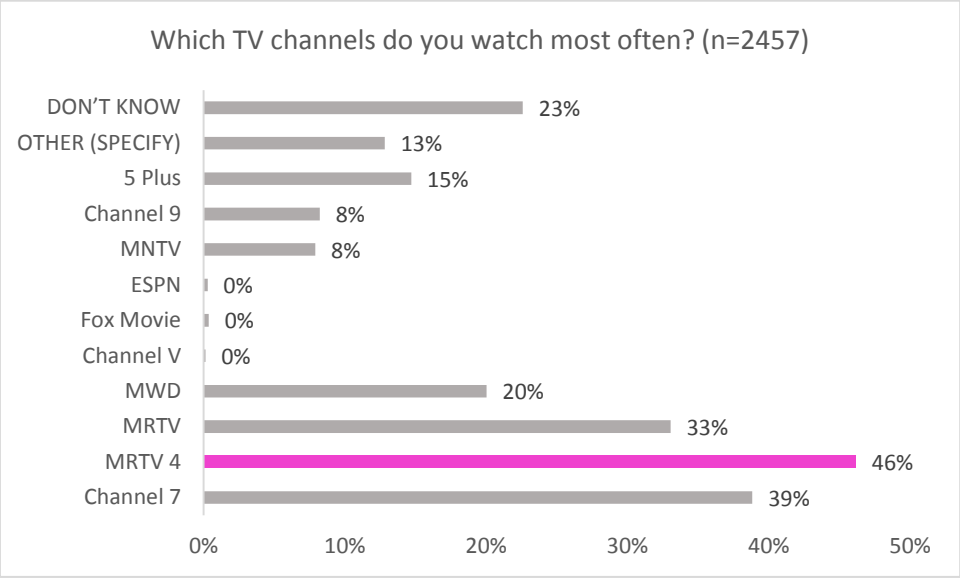


Figure 36: TV channel preferences

Peak TV viewing times among respondents were between 6pm to 10pm. There was a slightly higher proportion of respondents watching MRTV, Channel 7 and MRTV 4 at 6-8 pm, compared with 8-10 pm. There was also a slight preference to watch Channel 9 and 5 plus, later in the evening. (See Figure 37):

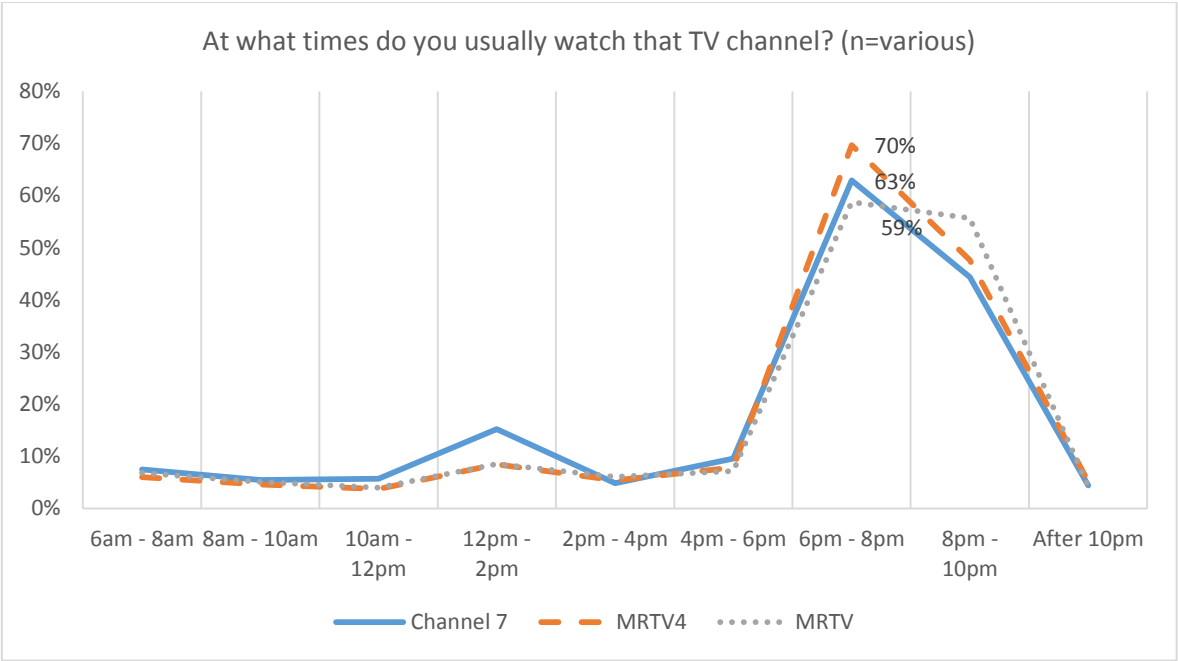


Figure 37: TV viewership times

Mobile internet

89% of respondent households own a smart phone. The highest percentages of ownership were seen in Yangon region and Kachin State, at 94% and 93% respectively. Bago region had the lowest percentage of smartphone ownership.

Overall, 6% of those who owned smartphones had installed the Government's Disaster Alert Notification application, with the highest concentration in Yangon (7%).

83% of those with smartphones who do not own this app, said that they would be willing to install it. Although people in Chin state had relatively lower percentage of smartphone ownership (85%), they showed highest percentage (93%) of willingness to install the Disaster Alert application. Nonetheless, several barriers to this were expressed in focus group discussions (See Figure 38):

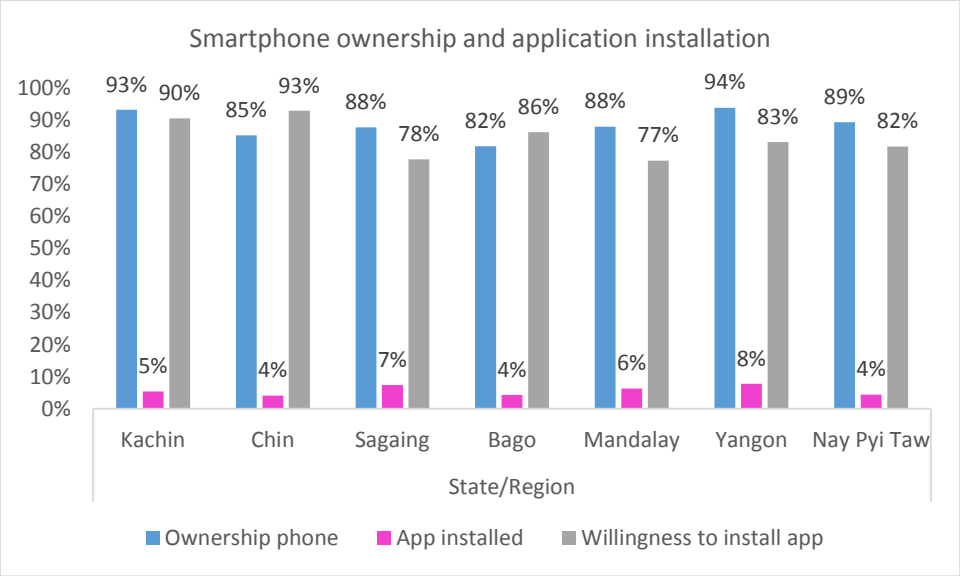


Figure 38 Mobile ownership and internet/app access

There is extensive evidence from digital behaviour studies in Myanmar to suggest that this 'internet' usage is almost exclusively usage of Facebook. In a 2017 study, it was found that 97% of internet users use Facebook every week, often using no other apps or web-pages: Facebook is often thought *to be* the internet[6]. One should therefore be cautious in equating enthusiasm and willingness to install the app, with digital literacy and the *capability* to do so.

Indeed, almost no respondents in focus groups used apps on their phones (though note that these participants were largely selected from 'digitally disadvantaged' groups: people with disabilities, children, and elderly). Deaf respondents reported that they would only be interested in an app if it had plenty of visual content, such as photos or videos. One respondent with a mobility disability in Chin said that he has a smartphone with a weather app installed, but that he can't afford to use apps like facebook. He only pays for data for important things, so he would consider using an app like the Government's Disaster Alert Notification in an emergency.

It therefore seems that people are stopped from installing the app by being unwilling to sacrifice the expensive airtime believed necessary to download; as well as generally low digital literacy, meaning that the majority of respondents don't know what exactly an app is or how to install one.

Radio

One-third of respondents owned a radio set (30%), with the highest rates of ownership in Kachin: at 53%, ownership was almost 3 times higher than Yangon region and Chin state (at 18% for each; see Figure 39). Among those who owned a radio set, respondents generally listen to radio in the morning (between 6 am to 8 am) and in the evening (between 6pm to 10 pm) for all radio channels. Peak listening times were between 8pm to 10 pm – except for City FM (most popular at lunchtime) and Shwe FM (popular in the early morning, from 6am to 8am; see Figure 40).

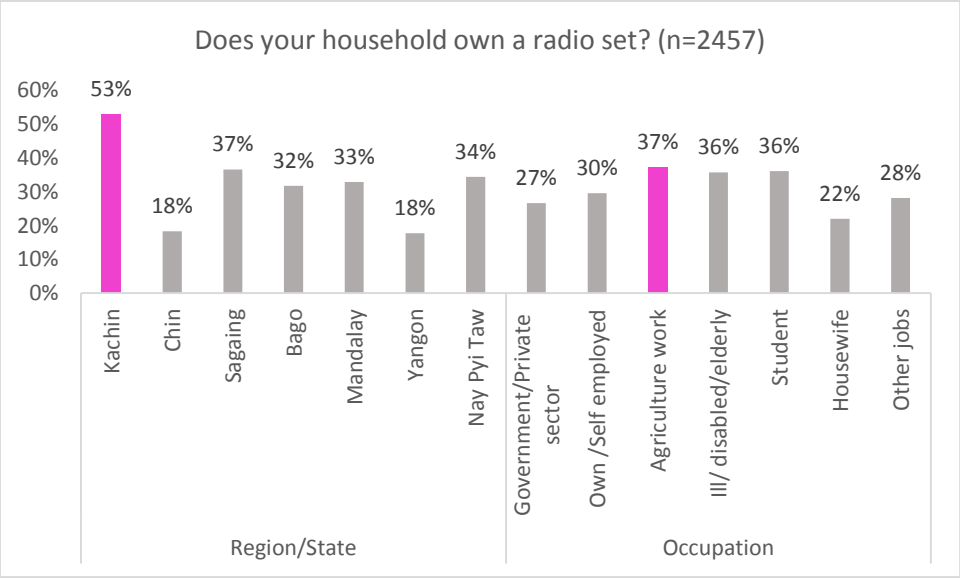


Figure 39: Radio ownership

[6] 'Connected Life Myanmar', Kantar TNS, 2017, http://connectedlife.tnsglobal.com/

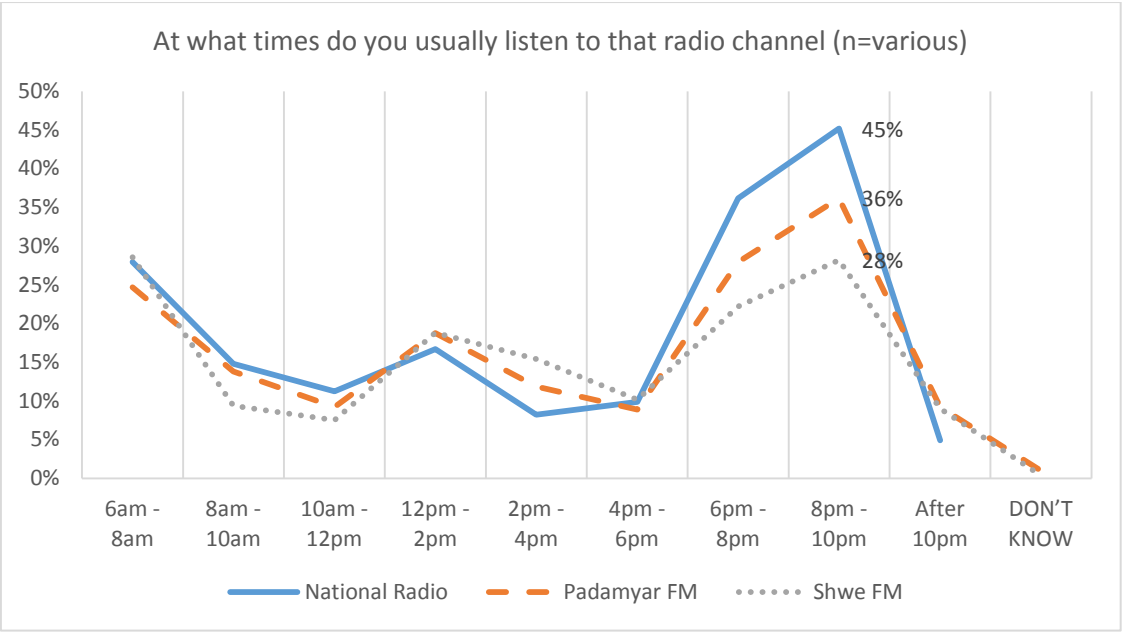


Figure 40: Radio listenership times

Schools

69% of respondents had children currently attending school. Of these respondents, only 12% had received earthquake preparedness materials which their child had brought home from school or spoken with their family on the topic. This suggests that inter-generational – school-child to parent – learning is currently very rare. Efforts made in schools to improve earthquake preparedness thus have a low impact on the broader community. Middle- and high-school students in focus groups in Chin indeed affirmed that they had learnt about earthquakes at school, and that they believe their teachers to be experts. But none had spoken with their parents about this: many children explained this was because their parents weren't interested, and one child suggested that this was because: "They [my parents] wouldn't understand."

Teachers, on the other hand, described how earthquake teaching in schools is either based on the geography curriculum, or is specific to action to be taken in schools. One primary school teacher described:

"I tell children what to do if there's an earthquake while we're at school. I hit on the table to show them it's loud and scary. I tell them where the safety place is, and that they must cover their heads with a textbook. They're not allowed to talk, they must just go to the safety place. They mustn't look back – only forwards, to the safety place. Don't look back." (Primary-school teacher, Chin)

"I am a geography teacher. To teach about earthquakes I look at the world map, and I use pictures. I teach according to the national curriculum, telling students about where volcanic eruptions can start, and where earthquakes can happen. In an earthquake, the earth starts shaking 5 miles away from a volcano eruption. […] Sometimes I also teach them [students] what to do when an earthquake happens, where to go, where to stay." (High-school teacher, Chin)

It is interesting to note, above, confusion as to the cause of earthquakes – even for in a high-school teacher. Several focus group respondents similarly linked earthquakes with volcanic eruptions, and therefore believed that Myanmar was safe from them.

Community meetings

81% of respondents would participate in a community drill on how to respond to an earthquake. When asked for the *best* way to teach earthquake preparedness, many focus group respondents indeed suggested that person-to-person teaching in a community meeting would be the most effective. When two middle-school students were asked what they thought was the best way to build earthquake preparedness, they suggested that peer learning within a community meeting would be best:

> *"We should get people together and tell them to build their houses strongly. But people won't believe young people – so it will better if they are given advice by older people, in a community meeting." (Two boys in middle school, Chin)*

2. What to communicate to change attitudes?

The most risky attitudes among respondents have been identified as follows, alongside suggestions for communication which could influence these attitudes (see Table 10):

Table 10: Common attitudes around earthquakes and sample communications to address them

Attitudes	**Communication to improve preparedness**
'Earthquakes are unlikely in Myanmar.'	*To all community members*: To stress the urgency and importance of this issue without scare-mongering, it is important to emphasize *both* that Myanmar is very vulnerable to earthquakes *and* that simple steps can be taken to stay safe.
'It is not a necessary for parents to discuss what to do in an earthquake with their children.'	*To parents*: Motivate parents to consider that their children are receiving the most up-to-date earthquake guidance from school. "Ask your child what they've learnt about earthquakes. We can help our children to remember how to stay safe by *kids teaching parents*." *To children*: Encourage children to share their knowledge with their parents. For example: "Shake things up – teach your parents!"
'Getting hold of personal ID and financial documents is an important first action in an earthquake.'	*To all community members*: Keep copies of your personal ID and financial documents in a safe but easily accessible place, in case of disaster. This is particularly important for people with disabilities, who will have more difficulty immediately locating such documents.
'Communities have no disaster plans.'	*To Ward / Village Tract Authorities*: Hold a community meeting to discuss and clarify: (i) The safest place in the community for the people to be during an earthquake (if outside when it happens); (ii) The disaster response process in your community; (iii) How to share the above information with every household and individual in the community.

3. How to influence practices?

Behavior is determined by individuals' **capabilities, opportunities and motivations**[7]. Central to people's motivations are their cultural interpretations of particular behaviors or events, often informed by myths, traditions or religion. Earthquake preparedness programming by DDM and UNDP must therefore address each of these, in order to influence community members' practices. Addressing one or two elements will only improve people's knowledge, or shift their attitudes, without stimulating a change in life-saving practices (see Figure 40):

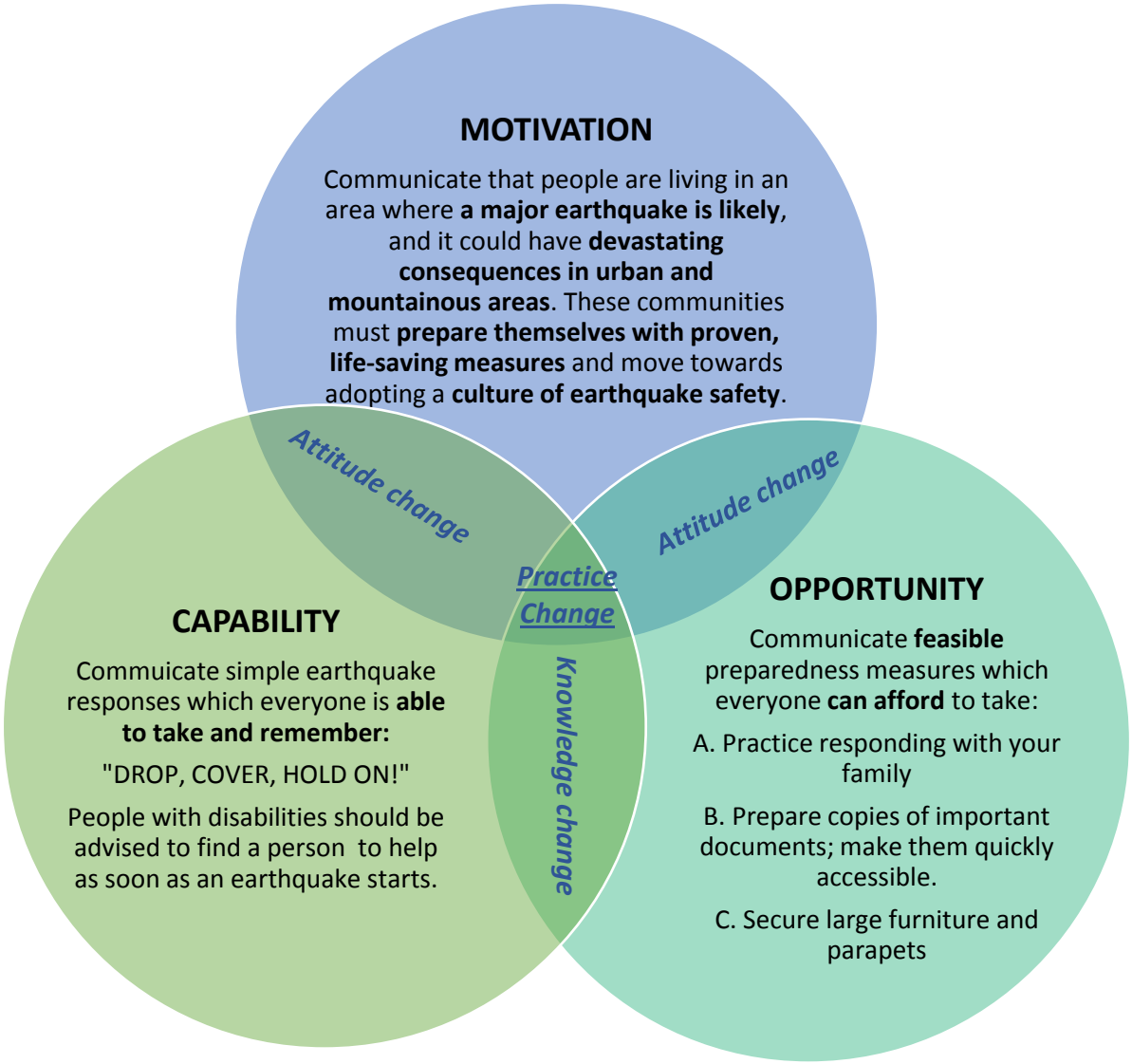


Figure 41: The three elements necessary to stimulate a change in practices

[7] More can be read on the 'COM-B' behaviour-change model here: http://www.behaviourchangewheel.com/about-wheel

CONCLUSION

Earthquake preparedness presents a double-sided challenge in Myanmar: the risk which earthquakes pose is very high and their occurrence is highly unpredictable; yet popular perception is that the risk is low, and so awareness of safety responses and precautionary actions is also low. In this study, older respondents had lived through the impact of most earthquakes – and so, personal experience was likely to persuade them that earthquakes are not deadly. Cyclone Nargis in 2008, nonetheless, did nudge the affected population (mainly around Myanmar's delta region) into broader disaster preparedness measures. These focus on the preparation of personal identity documents (owing to challenges in citizen registration after Nargis), rather than on immediate life-saving measures. Younger respondents were more fearful of earthquakes, and school children are receiving information at school from teachers. Yet the information is not always clear or accurate, and the percolation of learning from school to the home has not been strong. Across all respondents there is thus not a common, up-to-date understanding of around what to do and where to go when an earthquake strikes. In the face of mixed messages, inaction is the most often the response.

At this baseline stage, the representatives of NDMC interviewed were confident in their institutions' preparedness for earthquakes, though they can identify significant challenges faced. Around two-thirds of government personnel interviewed have a strong understanding of the role of their committee / department in earthquake response, and could clearly identify its strengths and challenges. There was less clarity around respondents' individual responsibilities, however, with most (two-thirds) unable to clearly identify their role. This finding should be seen in light of the two solutions which were most frequently suggested to government challenges: improved information-sharing systems, and more technical training.

The need for UNDP and RRD's 18-month "Building resilience strategy" is thus clear. The focus on strengthening communications is crucial, both within and between committees / departments, as well as with communities and schools. This information-sharing must be accompanied by adequate trainings at government and school level, particularly around the use of ICTs in ministries for fast response and action. At community level, communications channels must be carefully selected as those which are most trusted by different socio-economic and age groups of the population. The messages which are shared through these channels must focus on informing individuals as to the risk of earthquakes; motivating families to take preventative action; and sharing first-response action messages with clarity and memorability.

Annex 1: Demographic profile of respondents

Among the 2,457 individuals interviewed for this study, there was almost an equal number of male and female respondents (see Figure 42). 66% of respondents were between 18 to 44 years old (see Figure 43). Bamar was the most common ethnic group (82%; see Figure 46).

Most of the respondents (71%) had achieved secondary- (age 10-13) and high-school (age 14-16) level of education (see Figure 44). In nearly half of the households (49%), monthly income was between 100,000 Myanmar kyats and 300,000 Myanmar kyats; and in about one thirds of the households (29%), monthly income was 300,000 Myanmar kyats to 500,000 Myanmar kyats (see Figure 45). 19% of the respondents worked in agriculture and related jobs (Figure 47).

94% of respondents had personally experienced an earthquake (see Figure 41):

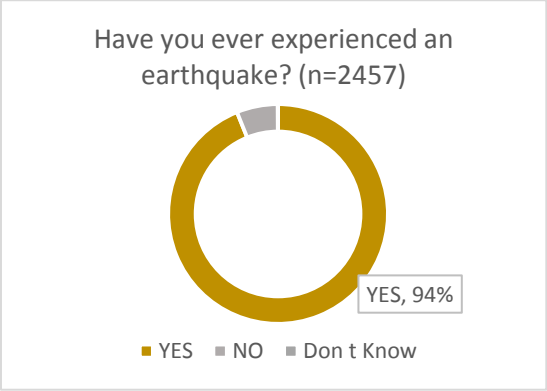


Figure 42: Experience of an earthquake

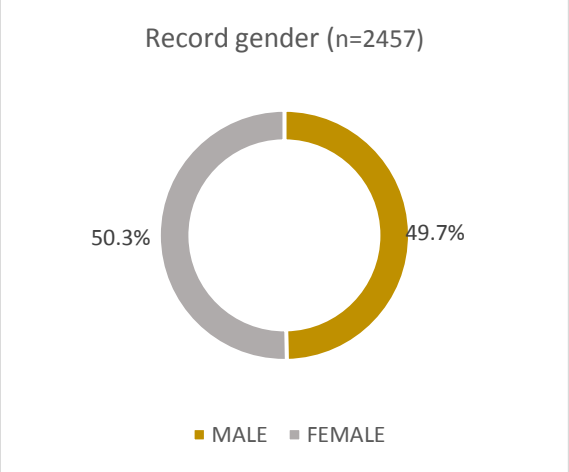


Figure 43: Respondent gender

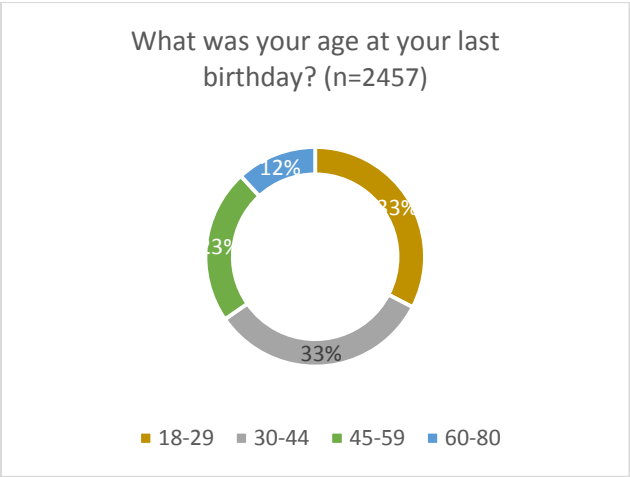


Figure 44: Respondent age group

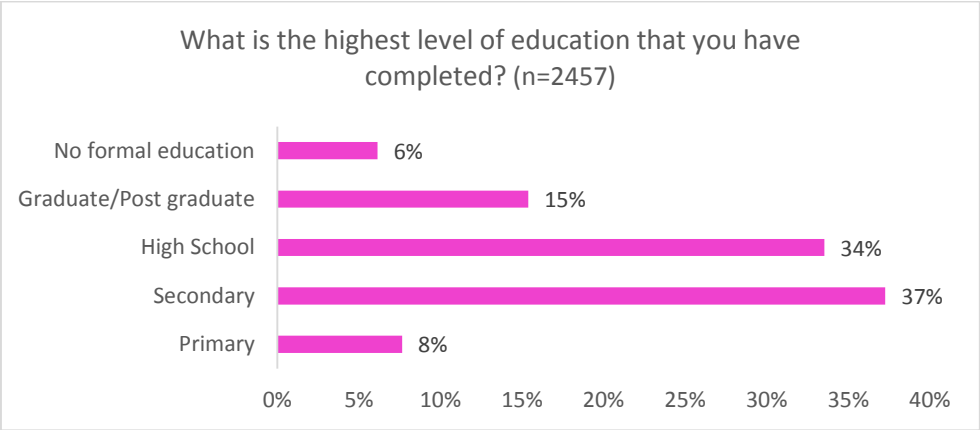


Figure 45: Respondent education

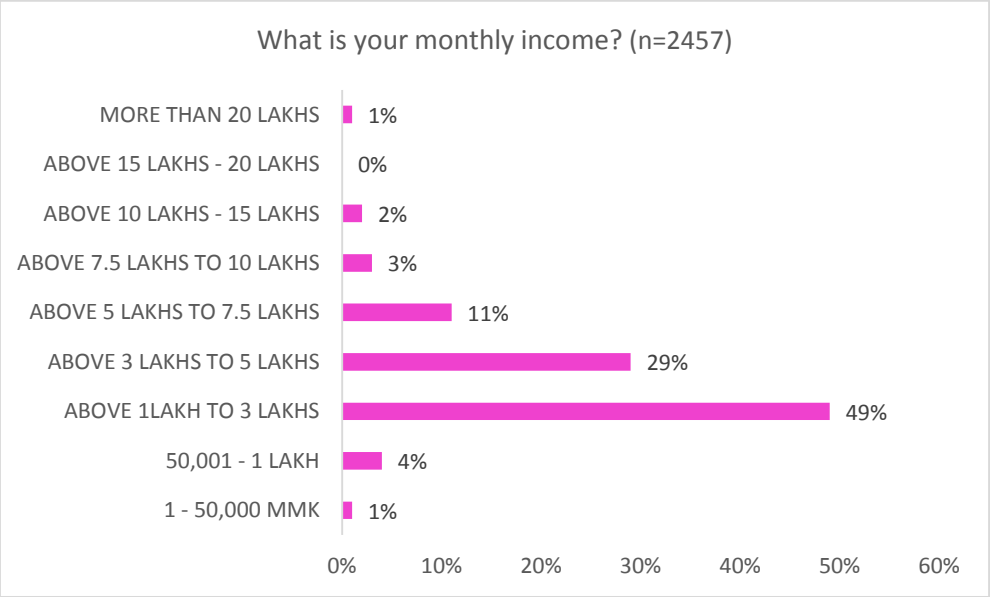


Figure 46: Household monthly income

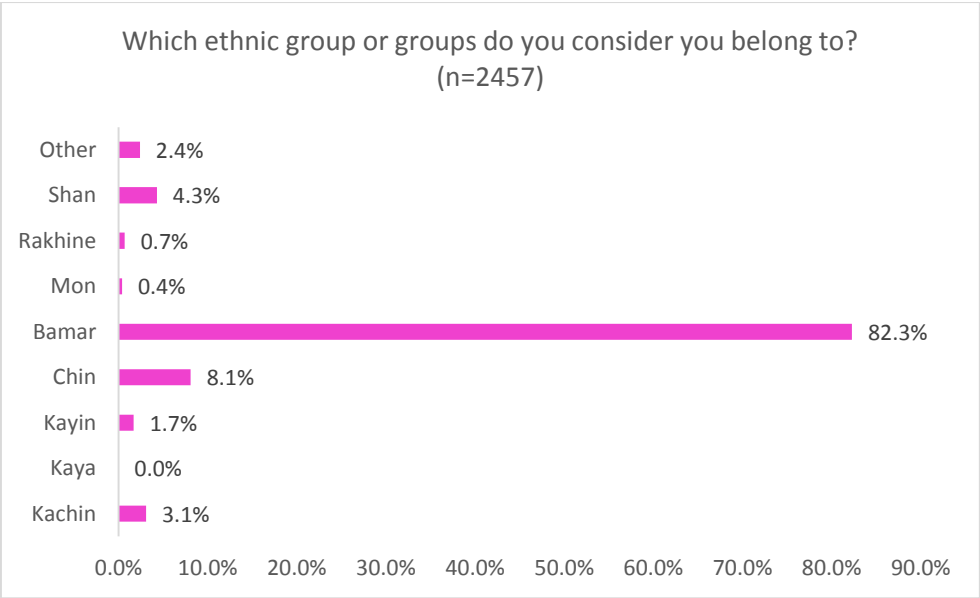


Figure 47: Respondents' ethnicity

Note that ethnicity was not controlled for, so this represents a random selection of respondents. Although ethnicity data has not been released for the 2014 National Census, these figures are roughly aligned with data from International Republican Institute's 2014 Opinion survey, which found 70% of respondents to be Bamar nationally[8]. The regional breakdown of ethnicity against location is as follows (see Table 11):

Table 11: Respondents' ethnicity against their location

Which ethnic group or groups do you consider you belong to? (multiple answer)	***Region/State where interviews were conducted***						
	Kachin	***Chin***	***Sagaing***	***Bago***	***Mandalay***	***Yangon***	***Nay Pyi Taw***
KACHIN	36%	1%	0%	0%	0%	0%	0%
KAYIN	0%	0%	1%	3%	0%	5%	1%
CHIN	1%	96%	0%	0%	0%	1%	0%
BAMAR	40%	4%	90%	97%	100%	90%	97%
MON	0%	0%	1%	1%	0%	1%	1%
RAKHINE	0%	1%	0%	0%	0%	2%	0%
SHAN	37%	0%	4%	1%	0%	1%	1%
OTHER	4%	1%	5%	1%	0%	5%	0%

[8] http://www.iri.org/sites/default/files/flip_docs/2014%20April%203%20Survey%20of%20Burma%20Public%20Opinion,%20December%2024,%202013-February%201,%202014.pdf

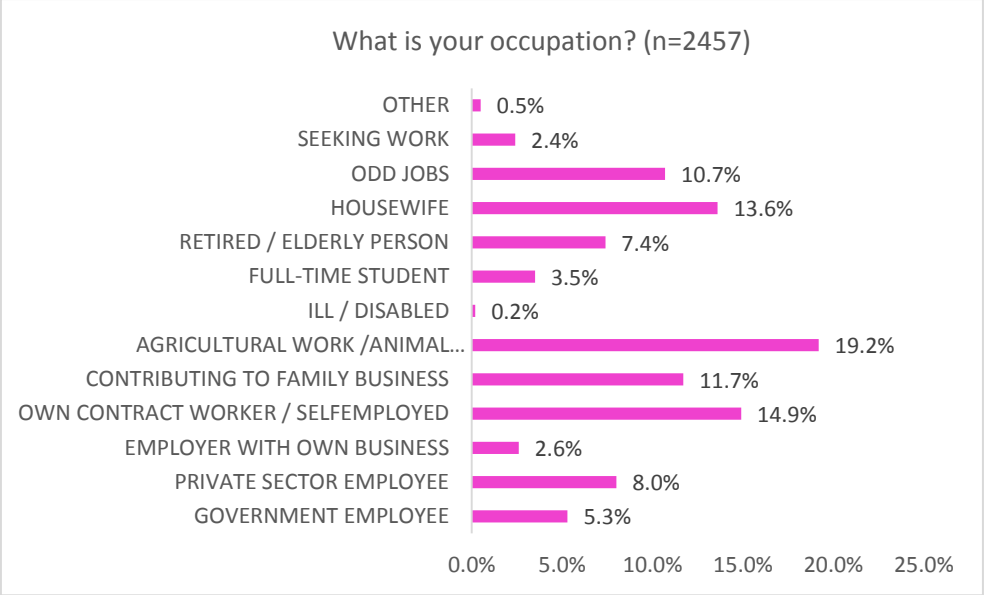


Figure 48: Occupation

Annex 2: Detailed Methodology

Study design

A cross-section descriptive study was conducted, applying both qualitative method and quantitative method.

Study period

The study was conducted during the project implementation period in 2018.

Study area

The study was conducted in the most earthquake prone States and Regions in Myanmar: Yangon, Mandalay, Sagaing, Bago, Kachin, Chin and Union Territory - Nay Pyi Taw.

Townships (and sub-townships – 'ST') which are currently in active conflict were excluded from the study. This was to ensure the security and wellbeing of all researchers involved – particularly field-based enumerators. The criteria for excluding were:

i. Union government nominated 'black areas'
ii. Areas of active fighting between government troops and Ethnic Armed Groups (EAG)
iii. EAG-controlled areas

Townships excluded from the study are shown below.

<u>Kachin State</u>

1	Ingyanyan	8	Shinbwayyan(ST)	15	Putao
2	Tanaing	9	Panwa(ST)	16	Sumprabum
3	Chiphwe	10	Kamine(ST)	17	Machanbaw
4	Hsotlaw	11	Mansi	18	Khaunglanphoo
5	Hsinbo(ST)	12	Myohla(ST)	19	Naungmoon
6	Hsadone(ST)	13	Lwe`ge`(ST)	20	Pannandin(ST)
7	Kanpaikti(ST)	14	Dotphoneyan(ST)	21	Hpakant

Study Population

The target population of the KAP survey was in two groups:

i. Communities in the most earthquake prone States/Regions both urban and rural population in the remote areas.
ii. Government officials from National and Sub-national level who engage in Disaster Management functions.

Study size calculation and sampling procedure

The following sampling procedures was used for the quantitative sample:

i. Multi-stage stratified random sampling procedure (proportionate to the size of the population) for selecting the township, as primary sampling units;
ii. Initially, the sample sizes for each state have been determined by the percentage distribution of population between the states.
iii. Subsequently, within the respective states and regions, the proportions of rural-urban population have been calculated according to the preliminary census data, and the sample size was split accordingly. The oversampling was built into the urban and rural sample sizes for each region and state.
iv. The number of wards and village tracts visited in each state and region has been calculated on a maximum of 10 to 12 respondents per village or ward (i.e. a maximum of 4 sampling points within the ward/village and three respondent interviews per sampling point). However, sample size per urban rural was not exactly multiple of 10. This means not all wards and villages had exactly 10 interviews.
v. Townships were selected (proportionate to the size of the population of township) within the states and regions. The number of townships surveyed were selected based on assumption that 6 wards and village tracts selected.
vi. Systematic random sampling procedure for selection of wards and village tract was applied
vii. Systematic random sampling procedure for the selection of households was applied;
viii. Kish grid method was used to select eligible respondents.

The total number of respondents from rural and urban population is shown below (see Table 12):

Table 12: Quantitative sample frame

QUANTITATIVE SAMPLES ***Multi-stage stratified random sampling, using probability proportionate to size***								
State / Region	**Total population**	**% of population**	**Sample size n = 2400**	**ADJUSTED TOTAL SAMPLE**	**Urban pop. %**	**Rural pop. %**	**Urban sample**	**Rural sample**
KACHIN	1,642,841	6%	144	201	36%	64%	73	128
CHIN	478,801	2%	48	202	21%	79%	42	160
SAGAING	5,325,347	20%	480	435	17%	83%	76	359
BAGO	4,867,373	18%	432	404	22%	78%	90	314
MANDALAY	6,165,723	23%	552	508	35%	65%	178	330
YANGON	7,360,703	27%	648	605	70%	30%	424	181
NAY PYI TAW	1,072,833	4%	96	102	32%	68%	33	69
TOTAL:				2,457			916	1,541

Sampling Approach

1. In each randomly selected village tract /ward, a maximum of three start points was selected and a maximum of four respondents were interviewed per start point. The start points were purposively selected by the team on the ground to ensure that there is good coverage across the village ward.
2. From the start point, households were contacted based on a predetermined interval. The interval depended on the density of the area and it was usually 5 in urban areas and 3 in rural areas. The interviewers moved from the starting point in a random walk based on the right-hand rule (RHR)9.
3. Kish Grid method was used to select which eligible household member to talk to. The Kish grid or Kish selection table is a method for selecting members within a household to be interviewed. It uses a pre-assigned table of random numbers to find the person to be interviewed. If

[9] Once the starting point is determined, the interviewer will have to place his or her back to the (main) entrance of the HH structure and move to the right (rule: always go to the right). Only those houses on the right side of the street are counted. When the interviewer comes to the end of the village or outer ring, he/she turns around and counts the houses on the right side which were on his/her left previously.

interviewers can't complete interview with selected respondents from Kish Grid, an appointment was made for call back.

Qualitative sample frame

A screener questionnaire was used to recruit individuals for Focus Group Discussions (FGDs) according to the quotas below. The locations have been chosen according to the communities most vulnerable in an earthquake – that is, those in densely populated urban areas and those in mountainous areas. Half of the focus groups took place in Yangon, which is Myanmar's most densely populated urban area. And the other half took place in Chin – the state which has the fewest security risks and the highest elevation (the most mountainous) in Myanmar. Although much of Kachin state is at a higher elevation, security threats in these areas mean we could not perform research there.

The number of FGDs and participant information are shown below (see Table 13):

Table 13: Qualitative sample frame

FGDs	Location	Gender	Socio-Economic Classification (see definition below)
1. Middle-school children	Yangon	3M / 3F	Unknown
2. High-school children	Yangon	3M / 3F	Unknown
3. Teachers	Yangon	3M / 3F	Unknown
4. Elderly women	Yangon	6F	C-D-E
5. Disabled people-blind	Yangon	4M	Unknown
6. Disabled people-hearing disability	Yangon	1M/3F	Unknown
7. Middle-school children	Chin	3M / 3F	Unknown
8. High-school children	Chin	2M / 4F	Unknown
9. Teachers	Chin	2M / 4F	Unknown
10. Elderly women	Chin	6F	C-D-E
11. Disabled people-physical disability	Chin	2M / 1F	Unknown

Note:

F=Female; M=Male; C-D-E; n/a; SEC

Socio-Economic Classifications are defined as follows (see Table 14):

Table 14: Definition of SEC levels

Monthly household income in MMK	SEC
100,000 or below	E
100,001 - 200,000	D
200,001 - 300,000	
300,001 - 400,000	C
400,001 - 500,000	
500,001 - 600,000	B
600,001 - 700,000	
700,001 - 800,000	
800,001 - 900,000	
900,001 – 1,000,000	
over 1,000,000	A

An 'elderly' person was defined as someone over age 60 (in accordance with the UN definition, and that used in Ministry of Immigration and Population's 2012 study in 'Ageing Transition in Myanmar'[10].

Elderly women were selected for this study as they are understood to be more marginalised than elderly men, who have higher access to resources in Myanmar society.

6.6 Data collection and instruments for data collection

All quantitative surveys were administered via Computer-Assisted Personal Interviewing (CAPI), whereby our surveys were administered face to face with interviewers carrying tablets with pre-scripted questionnaires. This enabled us to deliver research faster and more reliably, as we cut down data processing time and implemented additional quality control measures by applying interviewer monitoring, automatic data cleaning and validity checks and controls.

Interviewers were divided into teams. Each interviewer completed around 4 to 5 interviews per day. Our field team consisted of 6 interviewers plus one supervisor. Prior to beginning fieldwork, a field plan was drawn up which field teams will be followed and which will be communicated to them during the briefing and in the briefing notes.

For the qualitative component, the note-taker gathered full and detailed notes of FGDs by pen and paper during the interview process. With the informed consent of the respondents, FGD were audio-recorded, to enable word-for-word quotes and other details to be checked in the thorough notes that will be provided to UNDP. At the end of each day, each field team – comprising an interviewer and note-taker conducted a meeting to consolidate their findings from the day (2 – 3 interviews). This involved completing a thematic matrix of notes and key findings for each interview, to ensure that observations are captured when they are freshest.

[10] Ministry of Immigration and Population, (2012) 'Ageing Transition in Myanmar', p.14, http://themimu.info/sites/themimu.info/files/documents/Ref_Doc_Ageing_Transition_in_Myanmar_Sep2012.pdf