



Linking climate and early warning information with resilience: insights from Myanmar



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Summary

The Rapid Response Research (RRR) project seeks to gather information on households' perceptions of climate change and its links to resilience. Under the wider Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) programme, a series of mobile phone surveys were conducted in Hpa-An township, eastern Myanmar. This report lays down early findings from the RRR, focusing on access and response to climate information and early warning of extreme events. For more information of the RRR see the interactive website: [The Resilience Dashboard](#).

The RRR has provided four key insights related to access and use of climate information:

- Evidence from the RRR survey in Hpa-An **confirms the vital role access to climate information plays in enhancing resilience**. Access to climate information is associated with higher levels of resilience (when measured using people's own perceptions of risk).
- To enhance resilience, **climate information needs to be communicated in a targeted manner, with specific communication products designed to reach the most vulnerable**. Less educated and poorer households tend to have lower access to climate information. They are also more concerned about the future impacts of climate change.
- **Awareness of change in climate is not enough to trigger adaptation actions**. Very few households in Hpa-An report adaptation actions, despite widespread acceptance of changes in the climate.
- Further **training and support for positive adaptation measures** should follow awareness-raising on climate change to **ensure populations at risk are taking action to adapt**.

1. Background information and context

Climate information, perception and resilience

The dissemination of knowledge and information on climate change can play a crucial part in informing adaptation activities and reducing disaster risk for vulnerable groups. For this reason, accurate and timely climate information is an essential tool to enhance resilience to climate change and related extreme weather events at local and national levels. Medium- and short-term weather forecasts combined with the development of Early Warning Systems (EWS) are key to reducing physical and economic damage from extreme weather events (UNDP, 2016). Similarly, long-term climate information can allow various sectors of a country's economy to adapt accordingly, and support long-term development objectives (Jones et al., 2015a).

However, a wide range of barriers to effective sharing of climate information still limits its use in resilience-building and disaster risk reduction (Jones et al., 2015b; UNDP, 2016). From data collection to suggesting appropriate actions, each step has gaps and obstacles. From the perspective of practitioners, major gaps include limited capacity to collect and use climate data, difficulties in communicating information and a limited understanding among at-risk populations of the messages. People receiving information also often do not know what adaptation actions to take as a response (UNDP, 2016).

Many disaster risk reduction and resilience-building programmes are focusing on improving the availability of climate data and forecasts. However, the utility of climate information depends heavily on the way it is communicated and received by populations at risk (Barihaihi and Mwanzia, 2017). Climate information should be disseminated in a targeted and considered manner, as a range of socioeconomic, cultural and psychological factors will guide how recipients interpret it (Marshall et al., 2011). Research in psychology has shown that climate change perceptions strongly influence the way farmers take action as a result of seasonal climate information (Alam et al., 2017). For instance, drawing on an example in the US, Weber (1997) demonstrates that farmers' expectations and perceptions – 'mental models' – substantially change the way they adapt their production and pricing in response to climate change. Evidence also shows that levels of understanding of climate change are a strong determinant of farmers' willingness to adapt (Bord et al., 1998).

To find out more about how people on the ground receive and understand climate information, this report explores survey data of households in a region of Myanmar that is particularly vulnerable to climate change-related hazards, carried out by the Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) programme through its Rapid Response Research (RRR) initiative.

Investigating climate perceptions in Hpa-An, Myanmar

BRACED's RRR project collects data from 1,203 households in Hpa-An township in Kayin state, mid-eastern Myanmar (for full details of the survey initiative see Jones, 2018). It covers eight villages, each of which received disaster risk reduction support from the BRACED Myanmar Alliance¹ between 2015 and 2017. The site is located next to the Thanlyin River and is frequently affected by flooding. The RRR initiative uses mobile phone to collect data on various topics related to households' resilience to climate change, at different point in time. It provides an opportunity to explore factors of resilience at the local level based on rural populations' perceptions. The following analysis uses the RRR data to investigate the way people access, understand and perceive climate information.

The households surveyed are mostly composed of farmers and casual workers, who make up almost two thirds of respondents. The population is also characterised by high levels of poverty, with 20% of households below the national poverty line (Jones, 2018). More than a third of household heads never

¹ www.braced.org/about/about-the-projects/project/?id=eb1fb3dd-2d5f-4301-9302-acc332360f8f

received any formal education, and only a fifth attended secondary school. Diverse ethnicities are also represented. Half of all households are Burmese-speaking, and the other half are mainly Kayin-speaking (30%) and Hindi-speaking (9%). Women head almost a quarter of the 1,203 households.

Sources of local climate information and dissemination mechanisms exist in Hpa-An but have limited production capacity and reach. There is one working hydrological forecasting station on the Thanlyin River near Hpa-An town, which allows for flood risk monitoring. As in most other regions of the country, weather information is largely spread by radio (Shwe FM) and TV. Much of this is based on the national Department of Meteorology and Hydrology's (DMH's) daily weather forecasts and hazard-specific severe weather bulletins. Flood warnings are communicated on the DMH website and by radio (DMH, 2016). A flood risk map of Hpa-An township has also been developed with international support, and a flood and earthquake risk assessment was conducted a few years ago (Rego, 2013).

Yet, as in most other parts of the country, limited communication capacity and unequal access to information hamper the efficacy of long-term climate information and extreme events warnings. For instance, the limited effectiveness of flood warnings in the country has often been attributed to their restricted reach. This limitation is emphasised by an insufficient response from the government and often results in confusion over evacuations (Wilkinson et al., 2015).

The present report gives an overview of how people in Hpa-An receive information on climate change, and of the extent to which their perceptions of climate change might affect their resilience-related behaviours. It also sheds some light on the relationship between subjective resilience and people's access to climate information.

Initial findings confirm the importance of access to information on climate change and its impacts on enhancing resilience. It reveals how households that are most vulnerable are also most concerned about future climate impacts on their livelihoods. It is particularly alarming to observe that, despite awareness having been raised about changes in climate, very few households are taking action to cope and adapt to it.

2. Findings from the Rapid Response Research data in Myanmar

Access to information strongly influences subjective resilience

Long-term information about climate change can make a substantial difference to people's ability to adapt and respond to new climatic contexts and risks. However, locally available information on future climate projections for eastern Myanmar is limited. Although some knowledge of precipitation trends and increasing flood risks exists, most estimations are derived from regional and national climate data and models. This not only results in imprecise forecasts but also hinders the accessibility of climate information at the local level. Moreover, difficulty in gathering precise local climate data is intertwined with the complexity of communicating relevant information to remote villages scattered around the river basin. This substantially limits households' access to accurate long-term climate information and timely short-term extreme events warnings.

When the data was collected in January 2018, a small majority of households reported never having received information about the causes and impacts of climate change. For those that had, radio was by far the main source (roughly 60%).

Figure 1: Have you received information about climate change and its impacts from others?

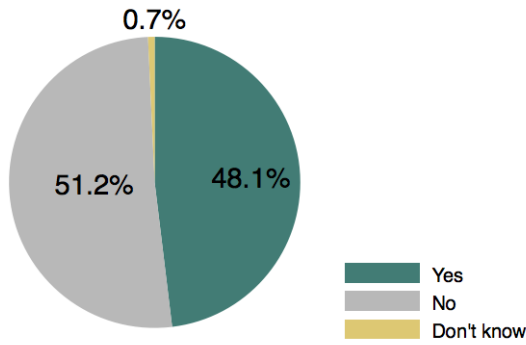
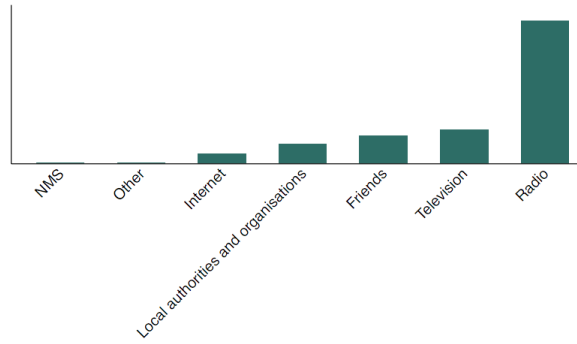


Figure 2: Main source of information on climate change



Concurrently, it is interesting to note that almost three quarters of households (71%) reported receiving warnings prior to extreme events such as cyclones, extreme winds or rainfall and floods. Access to shorter-term sources of information (such as daily, long-range weather forecasting and seasonal outlooks) is thus more developed than access to long-term climate information in Hpa-An.²

In addition, those who have not received information about climate change or extreme events warnings have a slightly lower level of subjective resilience on average. Looking at the average between the two groups, we see a statistically significant³ difference of 0.1 points. In the context of the RRR, subjective resilience refers to a measure of households' resilience as they themselves perceive it. It is an indicator, scaling from 0 to 5, based on people's own assessment of their capacity to deal with various risks. The indicator uses a set of questions reflecting households' absorptive, adaptive and transformative capacity (for more details see Jones and Tanner, 2017; Jones, 2018).

Figure 3 shows the difference in subjective resilience level between people who have received long-term information on climate change and people who have not. Figure 4 presents access to extreme events warnings.

Figure 3: Difference in mean resilience level between people accessing climate change information and others

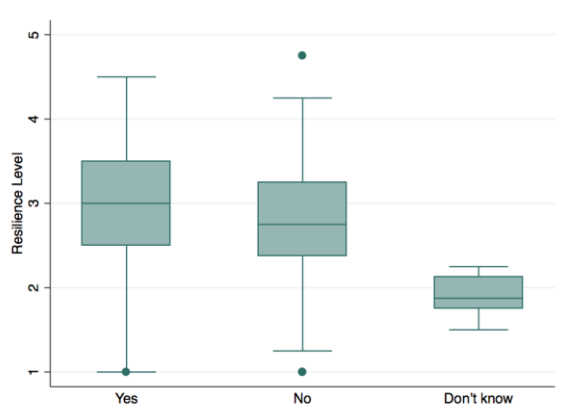
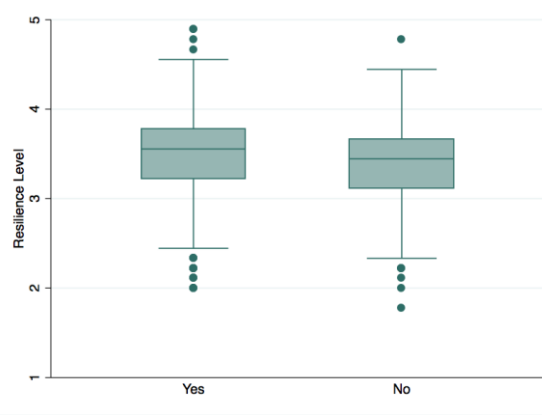


Figure 4: Difference in mean resilience between people accessing extreme event warnings and others



This association between higher levels of resilience and access to climate information suggests that information could be a factor in greater capacity to deal with climate risks. The effect of climate information

² It is important to note that these two aspects of climate information – long-term climate information and short-term extreme events warning – are closely related, as EWS are usually developed and improved as a result of better information on long-term climate change and its impact on the frequency and intensity of extreme weather events.

³ This means we can be confident that a difference exists at 95% level of confidence.

on the perception of climate risks could also have influenced subjective resilience levels. More advanced analysis to establish a causal relationship would require the collection of such information over time to further test this correlation.

Nevertheless, the RRR dataset provides a large span of socioeconomic information that offers interesting insights on potential determinants of access to climate information. Further analysis shows that socioeconomic inequalities in Hpa-An are strongly reflected in disparities in access to climate information.

Access to information, like climate perceptions, is highly unequal

In general, households with lower levels of subjective resilience tend to be poorer and less educated (Jones, 2018). As the figures below show, households whose head has no formal education, and households with a high likelihood of being under the national poverty line (a lower POP score),⁴ tend to have less access to long-term climate information. The difference is also striking for access to extreme event warnings: almost all households whose head attained higher education said they had received warnings, against only 58% of households whose head had no education. Similarly, almost two thirds of the richest 20% claimed to have received long-term climate information, whereas less than half of the poorest 20% did so.

Figure 5: Receiving climate change information by household head education level

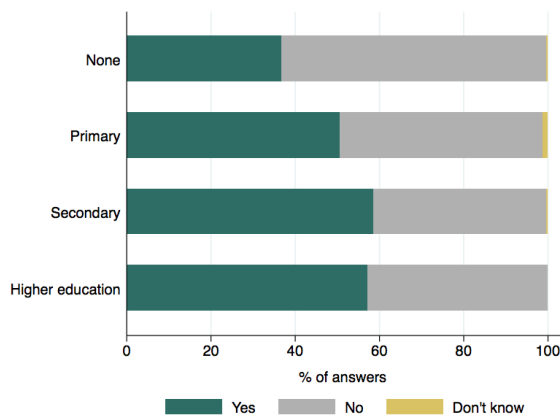
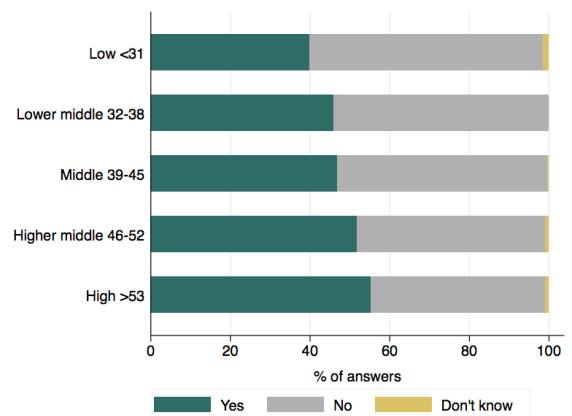


Figure 6: Receiving climate change information by POP score



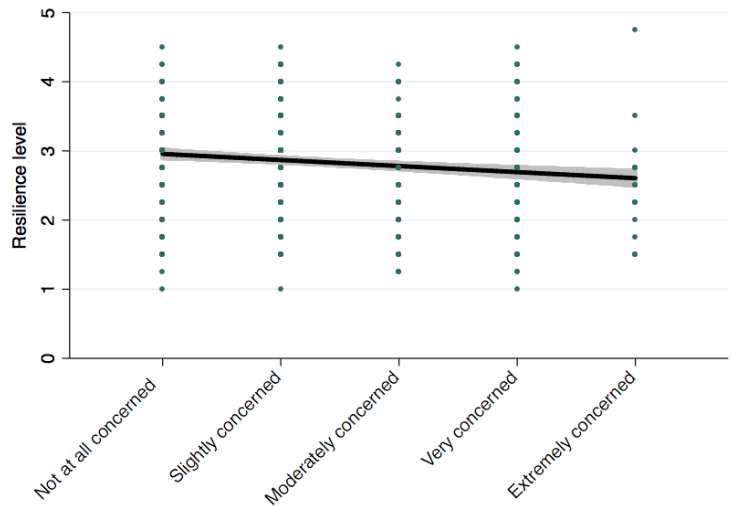
There are no clear disparities between genders in terms of access to long-term climate information and early warning of extreme events.

Perceptions of climate risks and impacts are largely shared across socioeconomic groups: two thirds of respondents declared having no or only a slight concern about climate change. However, the respondents who claimed to be extremely concerned about climate change tended to have lower reported incomes than the overall surveyed population. They were also more likely to derive their livelihoods from farming (almost two thirds).

Moreover, it appears that households with lower resilience scores tend to be more concerned about climate change impacts, further supporting the view that most vulnerable groups are aware of their own vulnerability. Figure 7 shows a small but significant correlation between higher level of concern and lower level of subjective resilience.

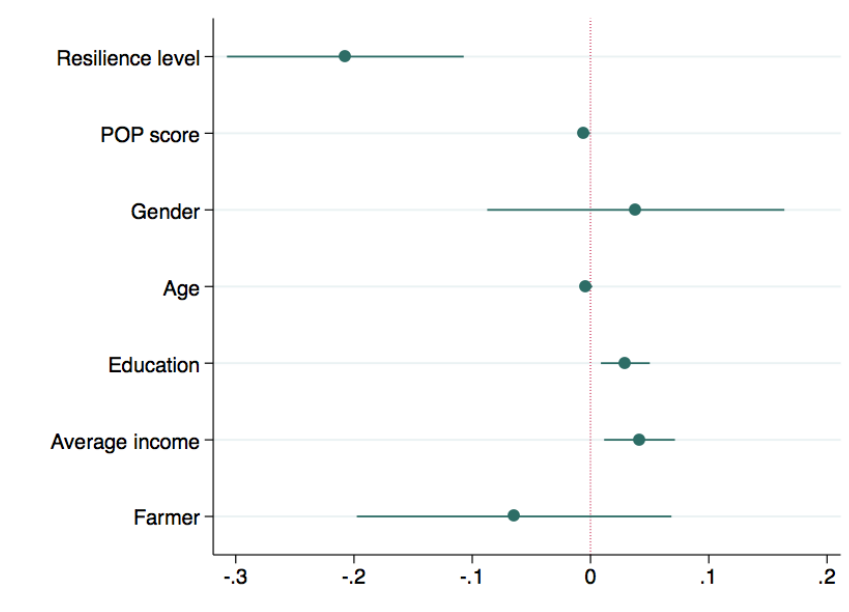
⁴ The Progress Out of Poverty score (POP score) reflects the likelihood of household poverty, with lower scores reflecting a higher likelihood of being under the national poverty line (see Desiere et al., 2015, and Jones, 2018 for further details on the methodology).

Figure 7: Correlation between concern about climate change and subjective resilience level



In order to further explore the relationship between a range of socioeconomic factors and levels of concern about climate change we run a regression analysis. In Figure 8, values show either a positive or a negative association between socioeconomic factors and levels of concern regarding climate change. Horizontal lines represent each coefficient's 95% confidence intervals (negative values = negative association; positive values = positive association). As is clear from the figure, subjective resilience scores increase as the level of concern decreases.⁵ The same is true for levels of poverty. Both relationships are statistically significant.

Figure 8: Marginal effect of various factors on concern about climate change⁶



Overall, it seems that awareness, concern and access to information on climate change is highly unequal between the different socioeconomic groups surveyed. This suggests a need to enhance communication about climate change. It also indicates that climate information should be designed in a manner targeted to reach the most vulnerable, through the design of specific communication products and the use of different communication methods for different groups.

Ultimately, successful communication may lead people at risk to take action as a result of stronger awareness on climate change. Yet it appears that, in Hpa-An, the response of the population to climate change has been limited.

⁵ Since the 95% confidence intervals do not include 0.

⁶ The coefficients represented in this graph have not been standardised, thus should not be compared in terms of magnitude.

People acknowledge a change in climate but have not taken action to adapt

For the people of Hpa-An, climate change is a reality, reflected in the overwhelming majority (83%) of households acknowledging a change in climate (Figure 9). More than three quarters of respondents declared that they had experienced either greater rainfall (38%) or warmer temperatures (39%) in recent decades. Moreover, a majority (58%) declared that these changes had negatively affected their livelihoods. However, for most of them this had not resulted in adaptation: almost 90% self-declared as not having taken action to cope with the change in climate in recent decades (Figure 10).

Figure 9: Believing there has been a change in climate in recent decades

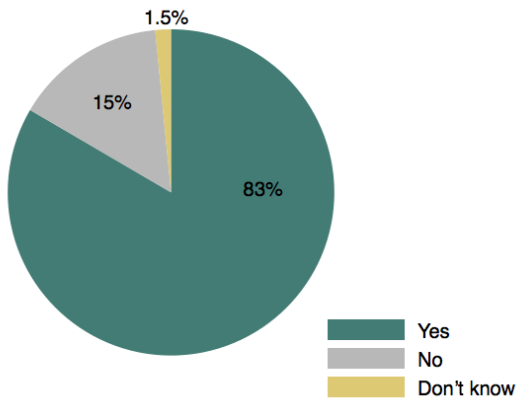
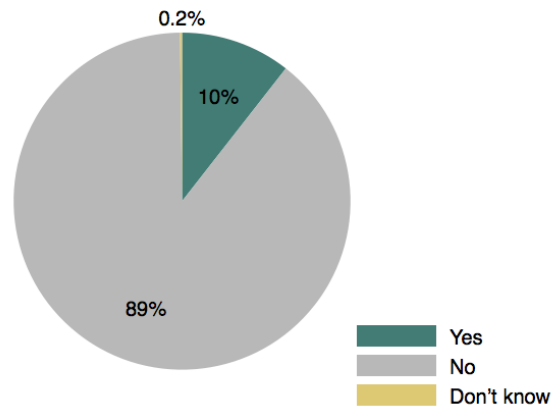
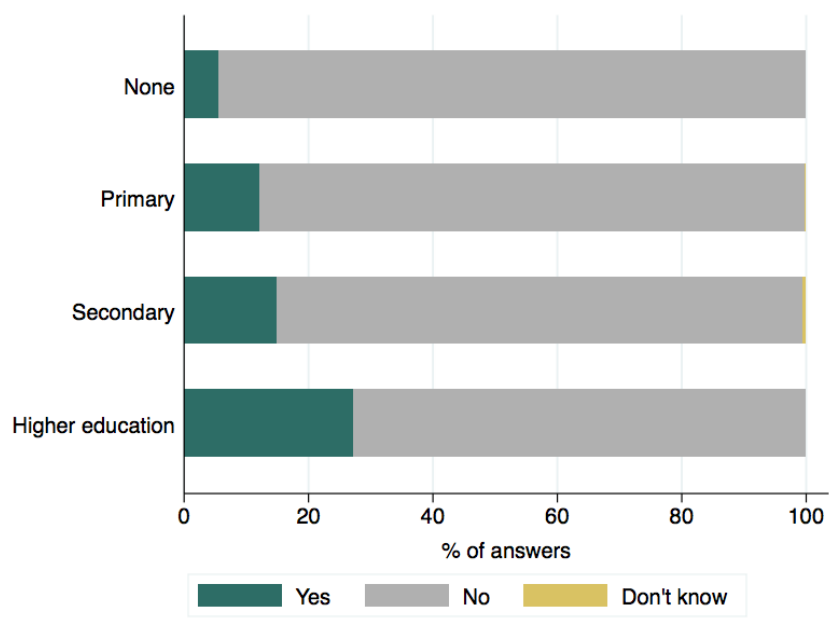


Figure 10: Taking action to cope with the change in climate in recent decades



A larger share of male-headed households (12%) claimed to have taken action as compared with female-headed households (only 8%). Moreover, there seems to be a strong association between level of education of the household head and the likelihood of having taken adaptive action: over a quarter of households headed by people with tertiary-level education said they had taken adaptation action. This contrasts with the very limited number (only 5%) of households with no formal education claiming they had actively adapted (see Figure 11). Similarly, households with a lower average income and a lower POP score seem to be less likely to take action: 6% of respondents with a POP score lower than 36 said they had taken action, whereas 13% of respondents with a POP score higher than 46 said so.

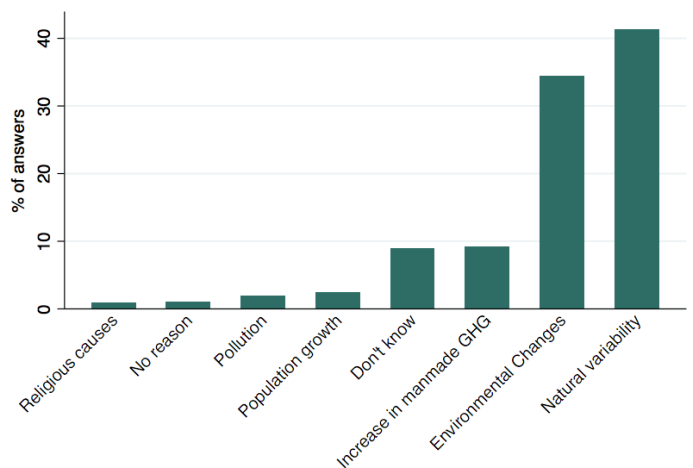
Figure 11: Taking action to cope with climate change, by household head education level



The difference between socioeconomic groups in their tendency to take action seems quite similar to the inequalities in access to climate information between these same groups.

Interestingly, in an open-ended question on the main causes of climate change, three quarters of respondents answered they believed that climate change owed to either natural variability (41%) or environmental changes (34%).⁷

Figure 12: Households' beliefs about the primary cause of climate change



The limited amount of adaptation responses may also reflect a lack of knowledge of possible actions to enhance resilience. Strong awareness-raising and training, to deepen understanding of climate change and accessible adaptation options, appears to be a crucial step to take to enhance the resilience of rural communities in Hpa-An.

3. Conclusion

The RRR provides a number of insights into the role of climate information in supporting resilience. Although it is reassuring to see a positive relationship between access to climate information and subjective resilience, clear disparities across socioeconomic groups are apparent. Vulnerable groups seem to have lower access to climate information, even though they are the most concerned about the effect climate change will have on their lives.

Across the entire survey population, a change in climate has been acknowledged and experienced. Yet, for the majority of households, this has not raised deep concerns and may explain the extremely low share of people taking action to cope with current changes in climate. While it is possible that limited knowledge and understanding of medium- and long-term climate may be responsible, it likely also reflects the priority given to addressing more immediate socioeconomic challenges such as those related to poverty, health and livelihood security. Above all, the findings suggest that enhancing resilience requires a more targeted approach to disseminating climate information and early warning of extreme events.

⁷ It should be noted that respondents may also have a broader understanding of the term climate change as not only anthropogenic climate change but also changes in their environment owing to various human and natural causes. This would suggest that awareness and sensitisation on human-induced climate change and its long-term impacts remain limited in this population.

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The BRACED Knowledge Manager generates evidence and learning on resilience and adaptation in partnership with the BRACED projects and the wider resilience community. It gathers robust evidence of what works to strengthen resilience to climate extremes and disasters, and initiates and supports processes to ensure that evidence is put into use in policy and programmes. The Knowledge Manager also fosters partnerships to amplify the impact of new evidence and learning, in order to significantly improve levels of resilience in poor and vulnerable countries and communities around the world.

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