



Measuring changes in household resilience as a result of BRACED activities in Myanmar

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Cover Photo: Flood defence built with BRACED funding in Mawlamyine Township, Myanmar. Dave Wilson

Acronyms

BRACED	Building Resilience and Adaptation to Climate Extremes and Disasters programme
CDA	Community Development Association
CRA	Climate Resilience Assessment
CRP	Community Resilience Planning
CRSA	Climate-Resilient Smart Agriculture
DAC	Development Assistance Committee
DFID	UK Department for International Development
DiD	Difference-in-Difference
EA3	Evaluation Activity 3
FGD	Focus Group Discussion
FPC	Finite Population Correction
ICF	International Climate Fund
IP	Implementing Partner
KEQ	Key Evaluation Question
KM	Knowledge Manager
KPI	Key Performance Indicator
LIFT	Livelihoods and Food Security Trust Fund
M&E	Monitoring and Evaluation
MIMU	Myanmar Information Management Unit
MPLCS	Myanmar Poverty and Living Conditions Survey
NAPA	National Adaptation Plan of Action
NECC	National Environmental Conservation Committee
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
PPS	Probability Proportional to Size
ToC	Theory of Change
TPG	Tripartite Core Group
UNFCCC	United Nations Framework Convention on Climate Change
VSLA	Village Savings and Loans Association
WFP	World Food Programme

Executive summary

Background and purpose

The three-year, £110 million UK Department for International Development (DFID)-funded Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED)¹ programme aims to build the resilience of up to 5 million vulnerable people against climate extremes and disasters. It was launched in January 2015 and supports over 120 organisations in 15 consortia across 13 countries in East Africa, the Sahel and Asia.

Understanding the extent to which these projects are able to strengthen the resilience of the households, communities and organisations they work with is critical in ensuring that successful approaches are scaled and replicated. The overall purpose of this evaluation is to determine **to what extent household-level resilience has increased as a result of BRACED interventions.**

This report presents the results of the BRACED Knowledge Manager-led Impact Evaluation of the BRACED Myanmar Alliance project and is aimed at those interested in resilience measurement from government and non-governmental organisations (NGOs), academia and monitoring and evaluation (M&E) practitioners, as well as funders and commissioners of evaluations. It is also intended for other Implementing Partners (IPs) within the BRACED programme that may be considering similar approaches for future resilience-strengthening projects under or outside of BRACED.

Context

The BRACED Myanmar Alliance was a three-year project aiming to ‘build the resilience of 350,000 people across Myanmar to climate extremes’. The project worked in 7 states, 8 townships and 155 communities. The main impact for project populations was intended to be ‘improved well-being and reduced loss and damage despite climate shocks’, and the project sought to do this by addressing immediate hazard-related needs at community level while encouraging longer-term solutions driven and delivered by communities and subnational and national government.

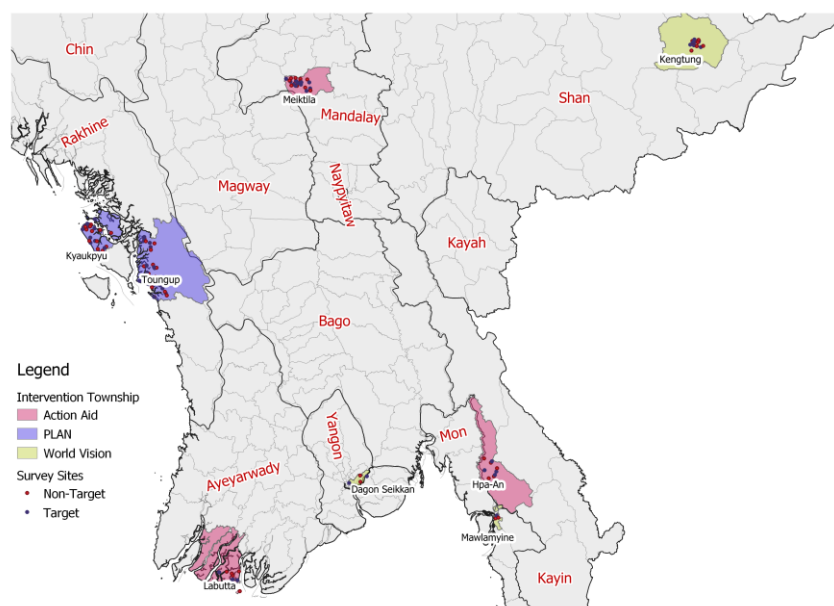
Community Resilience Assessments (CRAs) were the first activities delivered as part of the project, and the list of community-identified needs became the basis from which local-level project interventions were selected. The selection typically involved an **infrastructure** requirement (linked to addressing a natural hazard, and sometimes shared between communities); a **package of livelihood support** (assets and trainings); capacity-building on climate change/resilience topics; and **village savings and loans association (VSLA) support**. A particular emphasis was placed on women’s empowerment, and leadership trainings and support to women’s **self-help groups** were provided. The model of delivery often required a level of reciprocity from communities, especially for infrastructure, which the project part-funded, and trainings, many of which were on a **training-of-trainers model**. The CRA process also encouraged community engagement with township-level government institutions and led to local government contributions to project infrastructure interventions in many cases.

The Alliance consists of six agencies: three IPs with geographic zones for implementation (Plan together with Community Development Association (CDA), World Vision and ActionAid) and three agencies (Myanmar Environment Institute, UN-Habitat and BBC Media Action) provided a series of

¹ www.braced.org

crosscutting support to communities, townships, government bodies, the media and others to build an enabling environment for resilience-planning and decision-making (see Figure A).

Figure A. Map of project sites and their lead IP in the BRACED Myanmar Alliance project



Evaluation design

We used quasi-experimental methods with panel data on the same survey respondents at baseline and endline to quantify the difference made by combinations of interventions. These methods allowed us to identify a counterfactual (what would have happened in the absence of the project interventions) by comparing the difference seen by individuals in counterfactual (non-target) and intervention (target) groups. This provides the basis for making causal claims about the change in participants’ resilience. A summary of the design, including approaches to sampling (design and size) as well as the different measurement indices, can be found in Table A.

Table A. Summary of evaluation design

Evaluation design	Difference-in-difference (DiD) analysis comparing changes between baseline and endline survey results from a panel of households across ‘target’ (treatment) with ‘non-target’ (counterfactual) community
Household survey sample design	Stratified random sampling (based on community size/agro-ecological zone) Spillover effects controlled for via 2–5 km exclusion areas 50% sample of female-headed households targeted
Household sample size (n)	Baseline = 2,377 Endline = 2,589
Composite indices	5 dimensions with 30 indicators; Weighted between 15% and 30% at dimension level and equally within dimensions for each constituent sub-indicator

Analysis: Resilience calculations

Using the project-level composite index (see Table B), we measure changes in resilience at the household level and we can therefore determine whether project interventions made a statistically significant difference to resilience over the period in question (late 2015 to late 2017).

The results presented in Section 5 are based on the changes in this resilience index, derived during the baseline process, composed of the responses to 30 different questions within the household survey. A value of 1 on the resilience index indicates that households had ‘maximum resilience’ across all questions answered; a value of 0 would indicate that households were not at all resilient across any of the indicators. The 30 indicators were grouped into 5 dimensions to construct the resilience key performance index.

Table B. Overview of BRACED Myanmar Alliance resilience index

Key performance index dimension	Variables included
D1: Increased resilience system and livelihoods (weight 30%)	KPIs 1–6; 8–9
D2: Access to communication, access and use of information (weight 20%)	KPIs 10–16
D3: Increased preparedness and coping mechanisms (weigh 20%)	KPIs 17–20
D4: Improved safety nets (weight 15%)	KPIs 21–24
D5: Improved decision-making and planning (weight 15%)	KPIs 25–27; 30

Note: KPI = Key Performance Indicator.

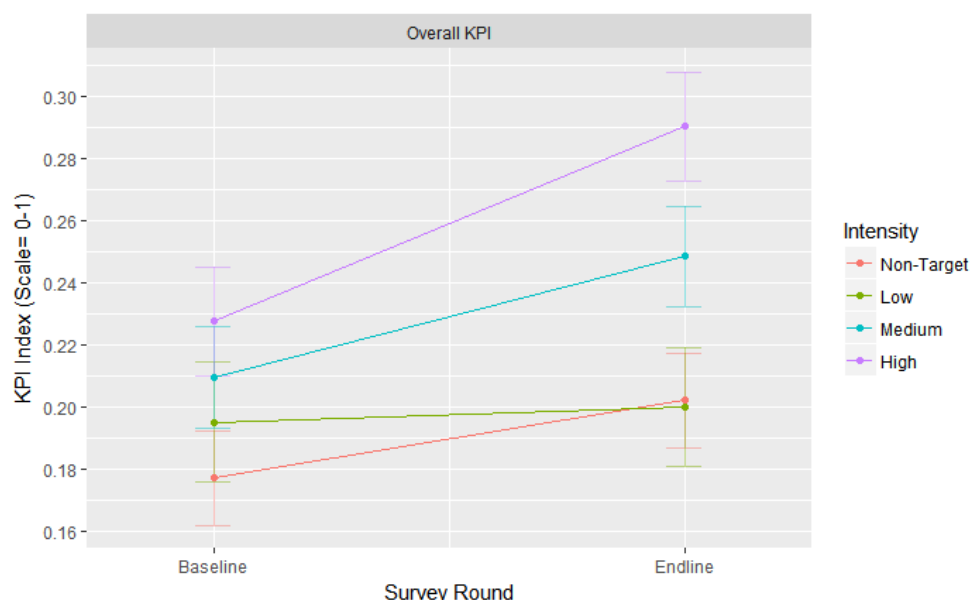
Key findings

Presented below is a sample of the key findings from the impact evaluation organised by key evaluation questions to which they relate with further findings and more detail found in Section 5.

Impact: How has household resilience changed as a result of BRACED interventions?

The overall KPI resilience measure increased significantly more in target (project) sites relative to non-target (counterfactual) sites. In this regard, the BRACED Myanmar Alliance project has had a net positive effect in terms of increasing resilience capacity in its target households (see Figure B).

Figure B. Changes in overall resilience by non-target and target groups (sub-divided by intensity)



However, not all dimensions of resilience have responded in the same way and there are large differences between townships in the way the overall KPI has changed over the life of the programme (see Table C).

The significant increase in D5 (improved decision-making and planning) reflects project success in getting women and children involved in community resilience-planning.

The smaller decline in D1 (increased resilience system and livelihoods) for target relative to non-target sites reflects project success with getting farmers to try new crop varieties or animals but a general decline in confidence in access to basic services in the face of very large covariate shocks such as cyclone Nargis. BRACED has not built, and could not build, resilience to this type of shock in the two years between baseline and endline.

The significance of D3 (preparedness and coping mechanisms) reflects project success in getting target groups modestly improved access to plans, drill practice and preparations to cope with severe shocks (such as the last one experienced) relative to declines in these areas for the non-target group.

Table C. Estimated percent change in means for KPI indicators

KPI domain	Group	% change from baseline to endline	95% CI: lower	Upper	p-value for DiD	Sig*
Overall KPI	Non-target	14.1	10.0	18.2		
	Target	18.4	15.1	21.8	0.002	**
D1: Increased resilience KPI	Non-target	-19.5	-25.9	-13.1		
	Target	-10.2	-15.8	-4.6	0.043	*
D2: Access KPI	Non-target	50.4	45.4	55.5		
	Target	43.8	39.7	47.9	0.486	
D3: Preparedness KPI	Non-target	-9.2	-19.1	0.7		
	Target	5.1	-1.9	12.1	0.009	*
D4: Safety nets KPI	Non-target	1.3	-6.1	8.8		
	Target	1.1	-5.1	7.3	0.991	
D5: Decision-making KPI	Non-target	77.3	55.3	99.2		
	Target	95.3	78.7	111.9	0.001	***

** = significant at 10%; * = significant at 5%; *** = significant at 1%

Effectiveness: Which interventions appear to make the biggest difference?

The more BRACED interventions received, the greater the increase in resilience. It is a ‘package’ of interventions that typically makes the most difference. The 23% of project beneficiaries only reporting infrastructure/water infrastructure benefits are no more likely to report an increased KPI than the non-target (counterfactual) group.

Local context matters

In two townships (Kyaing Ton and Meikhtila), BRACED training has enabled farmers to take advantage of improved government weather forecast information – leading to increases in resilience component D2 in these areas. Yet in Mawlamyine and Dagon Seikkan, improved government provided weather information has simply enabled non-target groups to ‘catch up’ with project groups.

Who has benefited a lot? Who has benefited very little?

Households with more assets – as denoted by higher scores on our constructed asset index (Annex 8) and a proxy for relative wealth or prosperity – had larger positive changes in the overall KPI.

Impacts on food security: How do changes in resilience capacities relate to higher-order well-being?

There is no evidence that BRACED has increased food security over the project life but there has been a significant decline in the proportion of both target and non-target households reporting they have had to go without a meal owing to lack of resources.

1. Introduction

1.1. Building Resilience and Adaptation to Climate Extremes and Disasters: An overview

The three-year, £110 million UK Department for International Development (DFID)-funded Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED)² programme aims to build the resilience of up to 5 million vulnerable people against climate extremes and disasters. It was launched in January 2015 and supports over 120 organisations in 15 consortia across 13 countries in East Africa, the Sahel and Asia.

Understanding the extent to which these projects are able to strengthen the resilience of the households, communities and organisations they work with is critical in ensuring that successful approaches are scaled and replicated. With risks from climate-related disasters increasing and impacts set to plunge an additional 100 million people into poverty by 2030 (Hallegatte et al., 2016), it is an urgent imperative to understand what makes people, households, communities, markets, organisations and countries better able to anticipate, absorb and adapt to climate extremes.

1.2. Quantifying and attributing changes in household resilience under BRACED

All BRACED projects seek to increase the resilience of people vulnerable to climate extremes. This outcome is reported on for International Climate Fund (ICF) Key Performance Indicator (KPI) 4 and is typically captured by a number of variables relating to types of assets and capacities and the ability of people to utilise these in the face of climate extremes (see Box 1).

Box 1. International Climate Fund Key Performance Indicator 4

Each project is mandated by the funder (DFID) to report against ICF KPIs, the most relevant of which for this evaluation is *ICF KPI4: Number of people with improved resilience as a result of ICF support*. Each implementing partner (IP) reports a number against this indicator. The methods by which they arrive at this number varies, with some IPs using baseline, midline and endline household surveys, some using smaller panel surveys (which trace a subset of individuals surveyed at the baseline stage) and others using more qualitative measures. This variation and aggregation of all findings to a single reportable number means that KPI4 alone does not offer sufficient insight into what works to strengthen resilience or even whether changes have benefited different groups in different ways. We used KPI4 outcome measures as an entry point with the IPs, each of which had a list of indicators or scorecard in place to measure resilience changes for this purpose. Indeed, we used ‘KPI4’ or ‘KPI4 index’ interchangeably with the specific resilience measurement indices used by each IP. Under this evaluation, these indices have been refined based on additional analysis working in partnership with each of the IPs. In this way, we aim to go beyond ‘headcounts’ to offer more nuanced and rich analysis of data generated through the course of this evaluation.

However, the nature of resilience-strengthening activities and the fact that they are not operating in a vacuum with outcomes potentially influenced by other (confounding) factors makes it difficult to attribute quantitative changes in the resilience outcome solely to a particular BRACED project or intervention. Simply comparing baseline and end-of-project data does not solve this problem as the observed change may owe to project and external effects. What is missing is a counterfactual – the

² www.braced.org

resilience indicator for project beneficiaries in the absence of the project – that would then enable the attribution of changes only to BRACED interventions.

In an attempt to address the question of attribution, the BRACED Knowledge Manager (KM) has been working with two of the 15 BRACED projects: **SUR1M, Niger, and Myanmar Alliance, Myanmar (the subject of this technical report)**. Together, we have designed and implemented impact evaluations to determine the extent to which household resilience has changed as a result of the project interventions. Known as Evaluation Activity 3 (EA3), this is led by the KM working in close collaboration with the IPs. Each IP has an evaluation designed to be relevant for the context in which it is operating, its implementation plans and its existing monitoring and evaluation (M&E) framework while offering some coherence across all three.³ All involve a large sample household survey and quantitative calculations of changes in resilience as a result of project activities via different methods (BRACED KM Evaluation Plan, 2015).

1.3. Purpose and structure of this report

This report presents results of the BRACED Impact Evaluation in Myanmar. It is designed as a standalone document but also forms the basis of a summary document that will bring together results from other country studies (forthcoming). The report primarily presents quantitative results and findings from a large sample household survey conducted at baseline (2015) and endline (2017) but also draws on qualitative data gathered separately as well as a data triangulation exercise conducted in early 2018.

The report itself is organised into the following sections: **background and context (Section 2)**, which describes the prevailing socioeconomic, demographic and climatic conditions during the period of the evaluation; **evaluation framework (Section 3)**, which describes the rationale for method selection and analytical framework; **methods (Section 4)**, which summarises the design of the Impact Evaluation, including the approach to sampling and analysis as well as limitations that it is important to take into account when considering the **results in Section 5**. This section presents the data from the household survey and headline findings and insights made by the team on that basis. It also includes insights from the qualitative data gathered separately. **Section 6, lessons**, discusses the implications for policy and programming of the main findings.

1.4. Note to the reader

This technical report is aimed at those interested in resilience measurement from government and non-governmental organisations (NGOs), academia and M&E practitioners, as well as funders and commissioners of evaluations. It is also intended for other IPs within the BRACED programme that may be considering similar approaches for future resilience-strengthening projects under or outside of BRACED. All attempts have been made to explain technical concepts and results as clearly as possible but the inclusion of technical, statistical or evaluation terms is unavoidable and therefore some understanding of research and evaluation methods will be advantageous.

1.5 Dissemination Plan

³ Full details of the evaluation can be found in the BRACED KM Evaluation Plan (<http://www.braced.org/resources>) and the detailed design document (available on request).

This report has a pre-defined 'learning and uptake plan' which sets out the audience and opportunities to reach and engage with them. In addition to direct submission to DFID advisers within the BRACED team and the Climate and Environment department, a workshop to socialise findings and co-create/validate recommendations has been planned. Based on emerging findings, a side session was conducted at the BRACED Annual Learning Event 2018 to share with BRACED Implementing Partners. The report itself will be shared via the usual communication channels – co-hosted across the BRACED and Itad websites, strategic social media accounts and other channels recommended by the BRACED communications lead, Thomson Reuters Foundation. The authors will also seek opportunities to present at regional and global fora and conferences. A BRACED webinar to share key results of the evaluation with as wide an audience as possible will be hosted in summer 2018.

The report was shared with the lead Implementing Partner, Plan International for comments and accuracy checks. However, as the project team has since disbanded as part of the project exit strategy, none were forthcoming. However, Plan International headquarter staff who do remain are planning a knowledge event to which this work will contribute.

2. Background and context

This section describes the underlying climate risk, socioeconomic, demographic and environmental context in Myanmar, which is important to an understanding of why resilience-building interventions were needed and where external factors may have influenced the results.

2.1. The operating context of the BRACED Myanmar Alliance

2.2.1. Hazard context: Highly vulnerable to the impacts of climate shocks

Myanmar experiences multiple types of regular and serious natural shocks.⁴ Its long, low-lying coastline on the Bay of Bengal makes the west of the country particularly susceptible to regular storm surges and cyclones.⁵ Further inland, drought is common in the Central Zone comprising Mandalay, Magway and Sagaing, but these and other areas also face seasonal riverine and flash flooding, and 261 lives were lost to riverbank erosion between 2014 and 2017. The most recent comprehensive hazard profile for the country also lists fire and earthquakes as major factors leading to loss of life and damage to assets and livelihoods (Union of Myanmar et al., 2009). The combination of multiple shocks within a short timeframe can lead to significant loss and disruption: 1.7 million people were affected by the combination of severe monsoon rains triggering landslides in June and cyclone Komen making landfall in July 2015 (ReliefWeb, 2015).

The impact of cyclone Nargis in 2008 was the most visible recent demonstration of Myanmar's vulnerability to extreme weather events. The cyclone devastated large areas of the Ayeyarwady Delta region, killing approximately 140,000 people (TCG, 2008) (affecting 2.4 million (OCHA, 2012) and significantly impacting 37 townships). Two years post-shock, agricultural and fishing livelihoods remained below pre-Nargis levels while levels of casual labour and debt remained markedly higher (TCG, 2010). The accumulated loss from the single event accounted for over 90% of the country's loss attributable to extreme weather events in the two decades between 1996 and 2015, and ranked it the second most affected country during that period (Kreft et al, 2017).

Climate modelling for Myanmar indicates the likelihood of continued temperature rises, increased monsoon rainfall and sea level rise by mid-century (Horton et al., 2016), all of which are likely to exacerbate many of the existing threats the country faces from water inundation or shortage and heat. Although these models include meteorological and hydrological observations since the 1980s, as with any projection a level of uncertainty remains on the extent and timing of change in different locations within Myanmar (ibid.), which makes planning to reduce the effects more difficult. The government and other actors have improved the national cyclone warning and disaster response systems considerably in the wake of Nargis (IRIN, 2014).⁶ The country's National Adaptation Plan of Action (NAPA) (NECC, 2012) was submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in 2012 and has guided the strategy of the Livelihoods and Food Security Trust Fund (LIFT),

⁴ In 2017, the country scored 8/10 'very high' for natural hazards and exposure on the INFORM index for Risk Management: www.inform-index.org/Portals/0/InfoRM/INFORM%20Global%20Results%20Report%202017%20FINAL%20WEB.pdf?ver=2016-11-21-164053-717

⁵ In the 60 years before Nargis the country had experienced 35 cyclone events (Union of Myanmar et al., 2009).

⁶ This point was also made by BRACED project staff and most communities visited during the qualitative follow-up to this quantitative survey.

the country's largest multi-donor trust fund focused on securing food security.⁷ It is also expected soon to adopt a National Climate Change Strategy & Action Plan for 2017–30 with six accompanying Sectoral Action Plans.⁸ However, like many other developing countries, Myanmar is building its institutional and sectoral capacities in order to implement the climate-relevant strategies and plans it has developed to date.⁹

2.1.2. Socioeconomic profile

As in many countries, it is often the poorest groups that are most affected by climatic events, largely because they have limited capacity to deal with a shock, and/or because they are forced to live in more precarious areas. In the Myanmar Poverty and Living Conditions Survey (MPLCS) conducted in 2015, over three times as many rural as urban households reported experiencing a natural disaster in the preceding 12 months, with their reliance on rain-fed agriculture identified as the major contributing factor (World Bank, 2017).

The percentage of the Myanmar population living in poverty declined from 48.2% in 2004/05 to 32.1% in 2015, and was accompanied by a rise in living standards over the period.¹⁰ Gross domestic product per capita is currently the highest in the South East Asian region – projected to be 7.9% for 2018¹¹ – although matched with the highest inflation rates.¹² There are marked differences between populations in rural areas (38.8% of whom live below the poverty line) and urban areas (14.5%), and a higher headcount rate of poverty exists in the Coastal Zone and the Hills and Mountains Zone than in the Dry Zone and the Delta.¹³ Longitudinal research since 2012 has shown that certain groups are missing out on the improvements in the economy – especially subsistence fishermen in Ayeyarwady and Rakhine and landless groups with few members able to work (World Bank, 2014).

Moreover, because of country's natural context, wealth is no assurance of improved resilience and recent improvements in economic status are fragile. The frequency of natural shocks in Myanmar pulls down those living above the poverty line – and because of this the World Bank highlights that improved economic conditions alone may be insufficient to deal with poverty in the country (World Bank, 2014). There is significant clustering above but near the poverty line – 46% of the population lives within a band bounded by a welfare line 20% higher than the poverty line, raising the prospect that large numbers of people could fall back into poverty as a result of a climate-related shock, particular one with the severity of Nargis.

2.1.3. Pushes and pulls of migration

A sharp increase in internal migration (World Bank, 2016), especially since 2013, is associated with the perception of greater economic opportunities in the recently opened economy, centred around growing urban centres (Yangon, Mandalay) (World Bank, 2014, 2016). From the limited studies on the topic to date, this appears to be largely a coping strategy of those around or below the poverty line and is causally linked to managing risk. World Bank (2014) categorises three groups of migrants: the first is said to use seasonal and longer-term migration to manage anticipated risks by seeking the prospect of assured (if not necessarily higher) incomes in urban areas. The second group comprises

⁷ <https://www.lift-fund.org/climate-change>

⁸ See <http://myanmarccalliance.org/en/mccsap/>

⁹ <http://www.gcca.eu/sites/default/files/gcca-myanmar-cop21.pdf>

¹⁰ Based on the MLCPs conducted in early 2015 (World Bank, 2017).

¹¹ <https://www.adb.org/countries/myanmar/economy>

¹² <https://www.adb.org/countries/myanmar/economy#tabs-0-1>

¹³ *ibid.*

poorer people forced to migrate after experiencing a shock – among this population the study found those suffering the long-term effects of Nargis. A third group is the ‘upwardly mobile’, who are able to use assets (notably land) to finance the cost of education and other requisites for attaining skilled jobs. Remittances were associated with the ability to deal with local shocks, but the decision for a member to migrate is itself a risk for a household, and the cost of failure is found to have the most impact on the poorest.

2.1.4. Natural resource base and environmental degradation

As Myanmar’s economic development continues, the interaction of industrial operations and the natural environment poses challenges that could exacerbate the impact of weather events and climate change. The country is endowed with a wide range of natural capital, especially its forests and mangroves, which help regulate water flow and protect from storm force (Mandle et al., 2016). However, the country is considered as being at a ‘cross-roads’ for the protection of its natural resources as deforestation¹⁴ rates increase alongside pollution associated with increased mining, vehicle and pesticide use (Raitzer et al., 2015). Seven of the eight communities visited as part of the a qualitative follow-up to this study (see section 4 for more details) mentioned man-made factors exacerbating or creating environmental problems; these covered heavy lorries lowering roads (and deepening flood waters); garbage blocking drainage systems during floods; illegal mining adding to riverbank erosion; and the creation of informal settlements next to the river. Efforts are currently underway to reinforce the legislative protection for environmental conservation in Myanmar (Hildén et al., 2016; ADB, 2018).

2.2. BRACED Myanmar Alliance Project theory of change

This section describes how BRACED Myanmar sought to enhance resilience through different interventions and includes characteristics of activities that may be useful for understanding the results in Section 5. A more detailed list of activities by target community can be found in Annex 2.

The BRACED Myanmar Alliance¹⁵ was a three-year project aiming to ‘build the resilience of 350,000 people across Myanmar to climate extremes’. The project worked in 7 states, 8 townships and 155 communities (see Figure 1). The intended longer-term impact for the project was for the targeted population to achieve ‘improved well-being and reduced loss and damage despite climate shocks’. Within the project lifetime, the intended outcome was to for ‘vulnerable communities, driven by women and children and supported by effective institutions, to be more resilient to climate extremes and disasters’. The project sought to do this by addressing immediate hazard-related needs at community level while encouraging longer-term solutions driven and delivered by communities, sub-, and national government.

More specifically, the project Theory of Change (ToC) - summarised in Annex 1 – sets out three pathways through which change is expected to occur and five areas of activity (activity themes) to deliver this change. The three pathways (that became project outputs) are:

¹⁴ The man-made drivers on deforestation are recognised in Myanmar’s NAPA (NECC, 2012).

¹⁵ The Alliance consists of six agencies: three IPs with geographic zones for implementation (Plan together with Community Development Association (CDA), World Vision and ActionAid), and three agencies (Myanmar Environment Institute, UN-Habitat and BBC Media Action) provided a series of crosscutting support to communities, townships, government bodies, the media and others to build an enabling environment for resilience-planning and decision-making.

1. Communities, especially women and children, are equipped with the knowledge, skills and resources to mitigate the risks of and recover from climate shocks and stresses. Gains were expected within 1 – 2 years.
2. Institutions are coordinated, responsive, accountable and inclusive in their management of climate risks. Gains were expected within 1 – 2 years.
3. The evidence base is strengthened and learning on managing climate extremes is disseminated to inform and influence the resilience-related policy strategies and agenda at international, national and subnational levels. Scaling up and out of successful interventions was seen as key for this process and gains were expected within 2 – 3 years.

The five activity themes (shown below) provided the project's strategic areas of work:

- **Activity theme 1:** Integration of resilience into planning processes through the BRACED Resilience planning cycle, processes and implementation;
- **Activity theme 2:** Access and management of climate data, early warning system and development of communications channels;
- **Activity theme 3:** Tackling the root causes of vulnerability through empowering women, children and the most vulnerable;
- **Activity theme 4:** Livelihoods/assets and ecosystem management through greater access to financial services (VSLA/MF), and DRR and CCA services for resilience-building; and
- **Activity theme 5:** Knowledge development, sharing and dissemination to inform policy and replication.

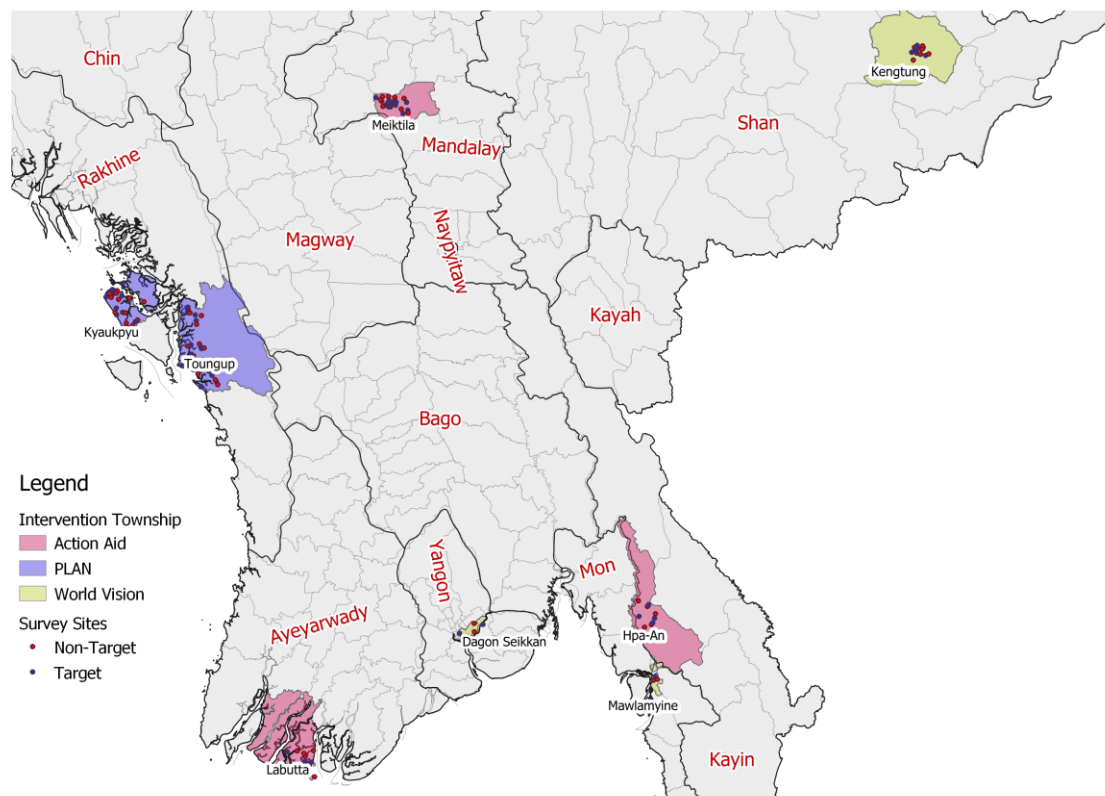
Community Resilience Assessments (CRAs) were the first activities delivered as part of the project, and the list of community-identified needs became the basis from which local-level project interventions were selected. The selection typically involved an **infrastructure** requirement (linked to addressing a natural hazard, and sometimes shared between communities); a **package of livelihood support** (assets and trainings); capacity-building on climate change/resilience topics; and **Village Savings and Loans Association (VSLA) support**. A particular emphasis was placed on women's empowerment, and leadership trainings and support to women's **self-help groups** was provided. The model of delivery often required a level of reciprocity from communities, especially for infrastructure, which the project part-funded, and trainings, many of which were on a **training-of-trainers model**. **The CRA process also encouraged community engagement with township-level government** institutions and led to local government contributions to project infrastructure interventions in many cases. **Support to the enabling environment** for resilience was delivered at the national, regional and township levels and therefore has the potential for broader span of beneficiaries and could, in effect, result in resilience benefits for anyone in Myanmar, but certainly in non-project areas of townships¹⁶.

¹⁶ Community-level interventions by the project could, however, encourage those targeted to participate more actively in township planning and drills.

Table 1. Activities under the enabling environment support at different scales

National	Township
○ Monsoon Forums	○ Disaster management plans
○ Climate Asia Study	○ Environmental assessments
○ Public service announcements	○ Disaster management courses
○ Sharing of environmental management plans	○ Support for creating environmental management plans

Figure 1. Map showing the location of project site by Implementing Partner



2.2.1. Activities in relation to resilience components

When designing the BRACED Myanmar project, the implementing partners invested considerable time working with stakeholders to translate the strategic intervention areas into five dimensions of resilience that could be captured by bundles of indicators within the overall key performance indicator 4 (KPI4). The process through which the project ToC is linked to these five KPI domains or ‘dimensions’ is described in more detail in Section 4. What we note here is that this evaluation draws on the significant work done with local and national stakeholders to map the ToC to the KPI dimensions and the KPI dimensions of resilience are the basis for interrogating the project ToC.

It is also worth noting that the overall BRACED programme conceptualises resilience as a composite of three capacities – anticipatory, adaptive and absorptive – known as the 3As framework. These can be correlated to the project-level dimensions identified and are presented together in Table 2.

Table 2. Matrix to show interventions mapped to Myanmar Alliance resilience ToC dimensions and BRACED programme 3As

Dimension 3As	Increased resilience system and livelihoods	Access to communication, access and use of information	Increased preparedness and coping mechanisms	Improved safety nets	Improved decision-making and planning
Anticipatory		Weather information training Public service announcements	Disaster management plans at various levels CRAs		Climate Asia Study Environmental assessments CRAs
Adaptive	Agricultural training			VSLA	Monsoon Forums
Absorptive	Agricultural training		Infrastructure	VSLA	Disaster management plans

The value of any one project activity is often derived from its interaction with another and will potentially touch on a number of the KPI domains. For example, climate-smart agricultural training requires access to weather information in order to know when to harvest, and its adoption and sustainability may be enhanced if planned under an integrated community resilience plan. The limitations of one project’s activities should also be noted. For example, the project supported the raising of access roads to health centres, fulfilling KPI3 ‘Access to basic health care services in the event of a future shock’, which is dependent on many more factors outside the project’s control, such as the number and skill level of nurses.

2.2.2. Timing of interventions

Helpful in contextualising the results presented in Section 5 are the start and end date of the project activities. In most cases, there was not the maximum of three years between implementation beginning and this survey. The project was not uniformly rolled out in the eight townships: broadly, Mawlamyine, Kyaing Ton and Dagon Seikkan started community-level activities in 2015 and had completed their Community Resilience Planning (CRP) activities by the end of that year. Kyauk Phyu and Taungup delivered the bulk of their community-level activities during 2016, although the CRP in Taungup took place in 2017. In Meikhtila, Hpa An and Laputta, savings groups and agriculture pilots were implemented through 2016 and the CRPs took place until December of that year. The infrastructure support in these communities was largely delivered in 2017

2.2.3. Other resilience-related activities in Myanmar

BRACED Myanmar Alliance was the largest project in the country with an explicit focus on building resilience during the period under consideration of this evaluation. Nevertheless, many agencies were working on activities that may have had some influence on specific resilience capacities and associated KPIs measured. In August 2017, just before this study took place, 75% of the 13,784 village tracts in Myanmar had some form of active development project;¹⁷ in March 2016, the proportion was 68% (MIMU, 2017). Health projects outnumbered those in any other sector by a considerable margin – there were 220 health ‘projects’ in the latest survey (ibid.) – although these could only directly influence BRACED’s KPI3 (‘Access to health service during a future shock’) results, and only if these

¹⁷ In the Myanmar Information Management Unit (MIMU), data ‘projects’ may be better read as ‘Interventions’ as an organisation can record multiple activities per project.

projects were building or providing transport to health centres.¹⁸ There were 145 agriculture projects interventions underway and 55 disaster risk reduction interventions, most focused on community-based activities, which were active in 670 villages; the coverage of these had increased in six months before the survey (ibid.).

It is to be expected that the greatest influence would be from another project within the same village but the highest likelihood of overlap would be at the national, state and township levels – a number of organisations are working to build various aspects of government capacity in Myanmar.¹⁹ On specific influence within the target and not-target areas of the survey, households were asked whether they had received any support from another NGO in the past five years (Table 3).

Table 3. Households receiving support from other NGOs in the past five years (%)

Township	Non-target	Target
Dagon Seikkan	12.7	24.3
Hpa An	1.7	9.3
Kyaing Ton	42.4	63.2
Kyauk Phyu	16.9	18.1
Laputta	13.8	16.8
Mawlamyine	0.8	3.6
Meikhtila	29.7	21.8
Taungup	2.8	25.6

2.2.4. Summary

The BRACED project was implemented in a multi-hazard context where the impact of past shocks is still felt and where future shocks, in both the near and the longer term, are expected to increase in magnitude and frequency because of climate change. The human context was also in flux before and during the project’s timeframe; openings in the political and economic context have reduced levels of poverty and facilitated migration while putting new pressures on the natural environment, threatening both protective assets and coping strategies.

The project was the only major initiative in Myanmar explicitly aiming to build people’s resilience. Its activities sought to immediately address the threats people face and to support capacity at household and institutional levels for dealing with future threats and climate uncertainty. In planning for these long-term perspectives, it differed from much of the community-level disaster response or risk reduction work in Myanmar.

As such, BRACED can reasonably be expected to be the main, but not the sole, contributor towards the KPIs measured through this survey. The increasing coverage of development activities in Myanmar has reached, to varying degrees of coverage, all communities of this survey, and many actors are working with the same institutions as BRACED. These factors and interactions likely contribute to the same objectives as BRACED and are difficult to isolate, and so must be borne in mind while reading this report.

¹⁸ And perhaps indirectly to general perceptions of well-being or women’s status linked the predominance of maternal health projects in the country (the high number of any intervention).

¹⁹ In September 2017, there were 105 active project interventions aimed at improving governance in Myanmar; 143 were at the township level.

3. Evaluation framework

3.1. Purpose and scope of this impact evaluation

In line with the mandate of the BRACED KM, the focus of this evaluation is on learning, not on accountability. For this reason, the results are not explicitly organised according to standard evaluation norms (e.g. the Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC) criteria, OECD, 2010), although criteria of effectiveness and impact are thoroughly addressed. The overall purpose of the evaluation is to determine the extent to which household-level resilience has increased as a result of BRACED interventions and provide insights into any differential effects for different groups offered by a range of project interventions funded by BRACED across 8 townships in Myanmar. This is translated into two core evaluation questions:

1. To what extent has beneficiary (household) resilience increased as a result of BRACED interventions?
2. Which interventions worked or failed to work, for whom and why?

Using project-level composite indices, we measure changes in resilience at the household level and we can therefore determine whether project interventions made a statistically significant difference to resilience over the period in question (late 2015 to late 2017). We recognise that this could be positive, negative or neutral (i.e. no change detected).

We are able to say with a specified degree of confidence how resilience has changed for surveyed households because of project activities and interventions. We are also able to say how much resilience has changed for different sub-groups, for example women. We offer insights into what the most important determining factors or interventions are for people's resilience, for example savings, assets or access to climate information.

3.2. Why we selected quasi-experimental methods?

A central issue in the design of these evaluations is that establishing cause and effect in a linear sense (i.e. intervention X results in observable effect Y) is challenging given the complexity of the programmes and resilience as a concept (Stern et al., 2012). It is unlikely that a single cause (treatment/intervention) will lead to increased resilience but rather a combination of interventions in a 'causal package'. Moreover, the package of interventions available to beneficiaries within each project may differ.

In order to capture the effect of a package of interventions, we use a difference-in-difference (DiD) approach. We use quasi-experimental methods²⁰ with (panel) data on the same survey respondents at baseline and endline to quantify the difference made by combinations of interventions. These methods allow us to identify a counterfactual (what would have happened in the absence of the project interventions) by comparing the difference seen by individuals in counterfactual (non-target)

²⁰ Project sites had to be agreed by IPs with government in advance, making it impossible to do a cluster randomised control trial.

and intervention (target) groups. This provides the basis for making causal claims about the change in participant’s resilience.

As noted by Wilson and Yaron (2016), the DiD approach relies on two critically important assumptions: (1) of common time effects across groups – that is, the trend being the same for treatment and control groups – sometimes called the ‘parallel trends assumption’; and (2) no composition changes within each group. Surveying the same people at baseline and endline using a panel survey meets the composition assumption but the parallel trend assumption requires control and treatment communities to face very similar climatic and policy changes. This is explored in Section 4.3.4.

Table 4 presents a summary of the design including approaches to sampling (design and size) as well as the different measurement indices.

Table 4. Summary of BRACED Myanmar evaluation design

Element	Description
Evaluation design	DiD analysis comparing changes between baseline and endline survey results from a panel of households across ‘target’ (treatment) with ‘non-target’ (counterfactual) community
Household survey sample design	Stratified random sampling (based on community size/agro-ecological zone) Spillover effects controlled for via 2–5 km exclusion areas 50% sample of female-headed households targeted
Household sample size (n)	Baseline = 2,377 Endline = 2,589
Composite indices	5 dimensions with 30 indicators Weighted between 15% and 30% at dimension level and equally within dimensions for each constituent sub-indicator

3.3. Analytical framework

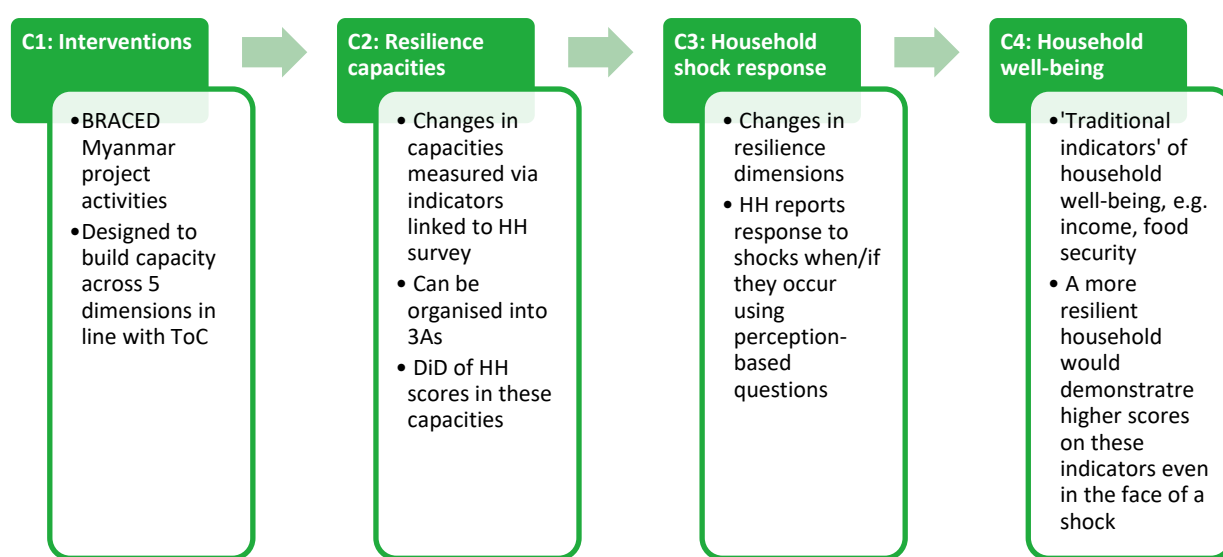
Many different conceptualisations of resilience are available in the literature (see Béné et al., 2015; Cissé and Barrett, 2015; WFP, 2014) but very few of them are formulated with an operational impact evaluation framework in mind. In this study, we follow Béné et al. (2015), who propose one of the only resilience M&E frameworks specifically designed in relation to development objectives. Their work partially draws on recent conceptual advances made in the understanding of resilience in the context of food security (see e.g. von Grebmer et al., 2013; Constanas et al., 2014). In their framework, resilience is defined as ‘the ability of individuals, households, communities, institutions or higher-level systems to adequately deal with shocks and stressors’, where the terms ‘adequately’ refers to the ability to avoid short- and longer-term negative impacts (Béné et al., 2015, p.6).

One of the key principles that underlie recent conceptualisations of resilience is the recognition that resilience should not be seen as the final goal of a development programme, but instead as an intermediate outcome required for achievement of a more fundamental goal related to a longer-term developmental ambition, typically a measure of well-being (e.g. food security, health/nutrition status, poverty). This means that programmes should not have resilience as their ultimate objective. Rather, the ultimate goal of development programmes/projects should remain the improvement of people’s

well-being. A second important principle that emerges from recent progress made on conceptualising resilience for development is that resilience is fundamentally about ability and capacity.

Figure 2 below sets out the analytical framework, which introduces four different components (C1–C4), described or measured as part of the evaluation. C1 refers to interventions deployed in the project that are selected as part of a ToC or programme logic that indicates that these interventions are suitable in the context for building household-level resilience according to the ToC. These activities are designed to achieve a first initial outcome in the form of strengthening the resilience capacities (anticipatory, absorptive, adaptive, transformative) of the target population (C2). This initial outcome should then lead to the intermediate outcomes, which is the adoption of appropriate responses (C3) in the face of shocks and stressors. These appropriate responses lead to the actual improved resilience of the target populations, understood as the ability of these populations to handle shocks without seeing a significant effect on higher-order well-being indicators such as income or food security (C4). This can be measured by assessing effective recovery (the ‘bouncing back better’ element as presented in the DFID initial resilience framework), which eventually is expected to lead to the programme’s ultimate goal – that is, improving the well-being of the target population. The process of formulating such a ToC is also useful as it brings measurement requirements into focus. In particular, it highlights some of the key components that need to be included in the M&E system.

Figure 2. Simplified analytical framework for resilience measurement



Source: Adapted from Béné et al. (2016).

3.4. Deviation from original design

The original design for this evaluation was approved by DFID in September 2015 and is captured in the “Detailed Design Document”²¹. That document sets out the intended design based on discussions with DFID and the Implementing Partner who were at the point of beginning baseline and implementation work when the design was taking place. This section describes and justifies deviation from the design as originally conceived. While overall, the quantitative work has largely followed the original design

²¹ The Detailed Design Document contains sensitive financial and organisational information but a redacted version can be made available upon request.

(see Limitations in Section 4 for details), there was a change in the approach to qualitative data collection.

Reduction in KM led qualitative work: The original plans for qualitative work which were made in September 2015 before the baseline work began assumed that the KM would lead this work. As the project progressed and at the point of planning for the final data collection round in July 2017, it became clear that the lead IP was mandated to collect qualitative data for its final evaluation report (a contractual milestone with the Fund Manager). Any work that we had planned would therefore have been duplicative and instead we worked closely with Plan International to help define questions and lines of enquiry which they then contracted a third party to manage. The end product was the independently produced final evaluation report (referenced as Gee2018) in the report and which we draw upon throughout (see Box 2 for further details).

Some additional triangulation and validation qualitative fieldwork was conducted in January 2018 (see Box 2) when the preliminary quantitative analysis had been completed and results of this are presented via qualitative insights in the Findings section of this report. In addition, and using residual resources, a separate participatory Cost Benefit Analysis (CBA) was conducted, the results of which will be published separately.

4. Methods

This section presents in some detail the method used in this impact evaluation. It describes the composite index and constituent indicators, including limitations with these. It also presents the approach to data collection, including the survey instrument and sampling strategy adopted. It describes the approach to data processing and analysis, including statistical procedures used. Finally, it sets out the limitations that it is important to consider when looking at the results in Section 5.

4.1. Resilience index and constituent indicators

The BRACED Myanmar Alliance ToC sets out five ‘dimensions of change’ for climate resilience. This formed the basis for constructing the KPI resilience measurement index. A longlist of 90 potential indicators was reduced to 30 variables across these 5 dimensions based on 16 focus groups with beneficiaries in 3 climatic zones and in-depth discussions with 14 programme staff and stakeholders. Each KPI was also scored between 0 and 1 but the 5 dimensions were weighted during the focus groups based on the perceived and agreed relative importance of each. While the KM evaluation team did not independently construct the resilience measurement index used in this assessment, the team did review and provide guidance and suggestions to the IP team on the relevance and appropriateness of indicators and were involved in a validation workshop in January 2016.

The results presented in Section 5 are based on the changes in this resilience index, derived during the baseline process, composed of the responses to 30 different questions within the household survey. A value of 1 on the resilience index indicates that households had ‘maximum resilience’ across all questions answered; a value of 0 would indicate that households were not at all resilient across any of the indicators. The 30 indicators were grouped into 5 dimensions presented in *Table 5*.

We discuss here why some individual KPIs were excluded from this final analysis. The final 27 indicators used in our analysis are presented in *Table 5*.

Some indicators were dependent on households having experienced shocks or interviewers being able to speak to female household members. In cases where households provided a valid response at baseline but did not at endline then their baseline responses were carried forward for the composite indicators. Within any particular dimension all indicators are treated as equally important.

As can be seen from *Table 5*, the BRACED Myanmar team made extensive use of subjective, self-assessment indicators (e.g. ‘In the event of future shocks: Does the household feel that they will have access to food?’), rather than trying to measure variable values and set thresholds. Questions were a mix of binary yes/no (e.g. ‘Does anyone in the household have savings?’) and descriptive qualitative scales (e.g. ‘Have you participated in developing the village disaster/climate/resilience plan?’ 1 no, 2 a little, 3 a lot, 4 fully).

Three of the KPI variables proposed at baseline were not included in the endline analysis. KPI17, relating to household income sources, was not collected during the baseline survey. KPIs 28 and 29 were both incorrectly translated during the baseline survey into Myanmar, and it was deemed inappropriate to keep these indicators in the index. These questions related to whether women (KPI28) and children (KPI29) ‘had their voices heard’ during any planning meetings. When preparing for the endline survey, it was found that the translation used at baseline would have been interpreted as whether women and children ‘spoke loudly enough to be heard’.

Table 5. BRACED Myanmar Resilience index by dimension with weighting on parentheses, KPIs and corresponding survey questions

Dimension	KPI ID	Question text
D1: Increased resilience system and livelihoods (30%)	KPI1	In the event of future shocks: Does the household feel that they will have access to food?
	KPI2	In the event of future shocks: Would your house remain safe?
	KPI3	In the event of future shocks: Does the household feel that they will have access to basic health care services?
	KPI4	In the event of future shocks: Does the household feel that they will have access to safe drinking water in less than 30 min walk from home?
	KPI5	In the event of future shocks: Does the household feel that they will have access to fuel/electricity?
	KPI6	Does the household have water for irrigation?
	KPI8	In the past three years have you tried growing a completely new variety of crop?
	KPI9	In the past three years have you tried raising a new type of animal?
	D2: Access to communication, access and use of information (20%)	KPI10
KPI11		Has weather forecast or risk information been used to help you decide on key livelihood decisions (harvesting time and method, choosing seeds/corps, livestock, etc.)?
KPI12		Please remember about the last extreme event (flood, cyclone, drought, landslide, heavy rain, etc.) that affected your household - did you know about it in advance?
KPI13		Was early warning information used to help you prepare for the last severe event?
KPI14		In the past 24 months, have you received or owned any devices (mobile/phone, internet, radio, television or similar other devices) to increase access to weather forecast, risk information and early warning information?
KPI15		Has weather forecast and climate information been used for making decisions and plans with groups and for the village?
KPI16		Climate change refers to 'a change in climate that persists for decades or longer'. Do you think that climate change is happening in area/village?
D3: Increased preparedness and coping mechanisms (20%)	KPI17	In general, are you today better able to cope with the SAME last severe shock?
	KPI18	Does your household have a specific plan about what they will do when shocks come?
	KPI19	In the event of future shocks: Does the household feel that they will have access to safe evacuation place?
	KPI20	In past 12 months, have your household members participated in any disaster preparedness drills/simulations exercise?
D4: Improved safety nets (15%)	KPI21	If your household needs it, would you be able to take loan?
	KPI22	Do you or household member save money?
	KPI23	In the last disaster and climate extreme, did you receive support from the group you approached?
	KPI24	Compared to the last severe shock how is the current situation of your household total income status today compared to before the shock?
D5: Improved decision-making and planning (15%)	KPI25	How many groups are you a member of? (female only)
	KPI26	Have you participated in development of the village disaster/climate/resilience plan? (female only)
	KPI27	Have children participated in development of the village disaster/climate/resilience plan?
	KPI30	How confident do you feel about raising concerns to local committees or authorities?

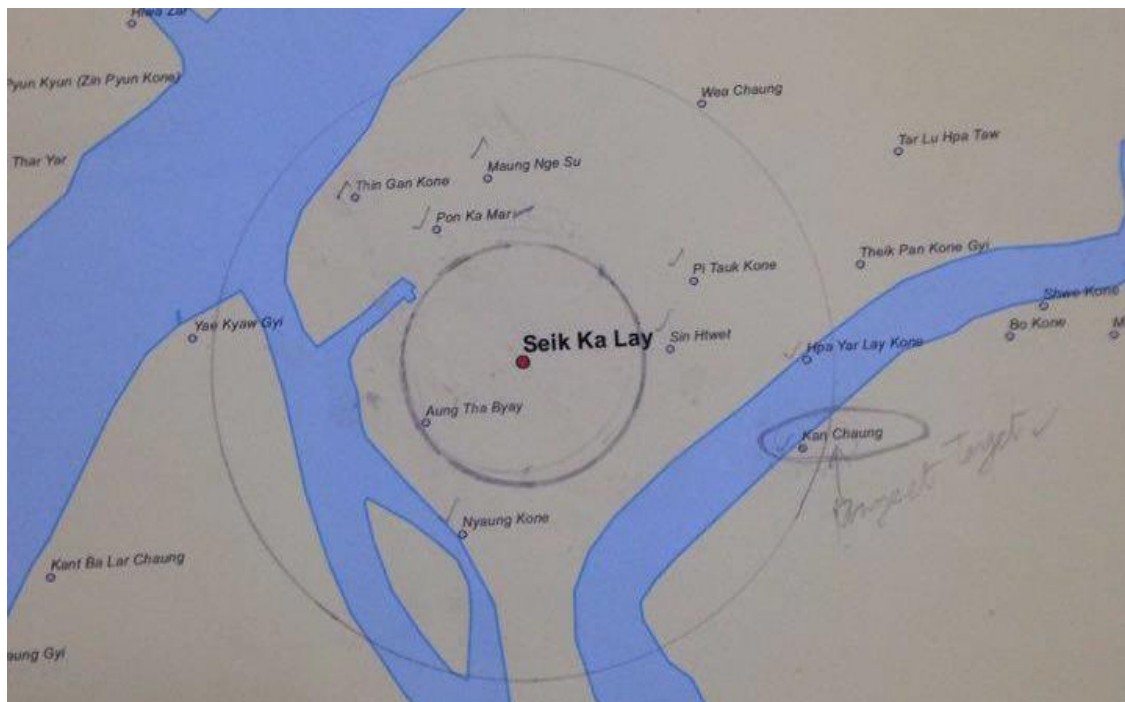
4.2. Data collection

4.2.1. Definition of target and non-target communities

The sampling frame for the target communities was derived from the full list of communities provided by Plan, ActionAid and World Vision in which they were intending to operate during the lifespan of the BRACED project. Within the urban townships (Dagon Seikkan and Mawlamyine), 'communities' refers mostly to urban wards, with some peri-urban villages. Within the remaining six townships, 'communities' refers solely to villages.

To create a counterfactual group, a list of non-target communities from within the same townships were selected based on geographic proximity to the target communities. The intention was to provide a group of non-target communities with similar environmental conditions, specifically in relation to climatic shocks, and similar cultural and socioeconomic contexts to the target communities. Based on GPS coordinates, obtained from Myanmar Information Management Unit (MIMU),²² an exclusion zone of 2 km around each target community was calculated to prevent contamination from the target (treatment) to the non-target (comparison) communities via spillover effects from the project interventions. Then, any communities within a 5 km radius of the target community, but outside the 2 km exclusion zone, were considered for inclusion in the sampling frame for the non-target population (see Figure 3).

Figure 3. Summary of target communities by project township and IP



4.2.2. Sample design

The sample approach was stratified by township, to provide an approximately equal-sized sample within each of the eight townships, regardless of population size. Within each township, a two-stage sampling process was followed for the list of target communities. From the full list of intervention communities, sampling was conducted using probability proportional to size (PPS).

Non-target communities were selected from the list of communities within 2–5 km of each of the selected target communities. These communities were selected non-randomly, and instead selected on the basis of which was the most similar village to the corresponding target community. Three criteria were used to assess similarity: i) history of NGO engagement, ii) expected climatic shocks and iii) population size. The majority of the potential non-target communities had low levels of NGO engagement relative to the target communities, so this process could not fully account for any differences caused by the longer history of NGO involvement in the target villages. However, the non-target communities were able to be well matched with regard to potential climatic shocks and

²² <http://www.themimu.info/>

population sizes. Household selection within all surveyed communities was conducted using circular systematic sampling.

4.2.3. Sample size

First, we calculate the number of sample communities from 155 target communities using equation (1).

$$(1) \quad n_0 = \frac{(Z_{1-\alpha/2})^2 P (1-P)}{D^2} \text{deff}^{23}$$

Where, α is selected at the 5% significance level and a conservative P value of 0.5 is chosen along with a deff value of 1.3. A deff value is used to correct for the effect of having more complex, staged sampling designs, as the size estimation formula assumes a simple random sample and so must be adjusted to account for deviations from a simple random design. A value of 1.3 assumes a relatively high level of homogeneity of communities within the township. The margin of error, D , captures the fact that, when selecting a sample, there is risk that this is not representative of the overall population. The margin of error is selected at 10% and we obtain an initial sample size, n_0 , of 125.

Since the number of target communities is relatively small, finite population correction (FPC) adjustment was required. Using the FPC adjustment formula, equation (2), the adjusted sample size can be calculated. The value of n_0 is taken from equation 1, while N is equal to the total number of target villages, 155. This gives an adjusted sample size of 69.

$$(2) \quad n = \frac{n_0}{1 + \frac{n_0}{N}}$$

Using proportionate allocation, a total sample of 69 communities is allocated according to the number of target communities in each township, ensuring the population of target communities in the respective townships is taken into account in the allocation process. Table 6 presents the number of sample communities in each township.

Table 6. Number of allocated target communities by project township

Implementing Partner	State/region	Climate zone	Township	Urban/rural	# of target communities (total population)	Allocated target communities (sample)
ActionAid	Kayin	Coastal	Hpa An	Rural	10	5
	Ayeyarwady	Coastal	Laputta	Rural	16	7
	Mandalay	Central Dry	Meikhtila	Rural	30	13
Plan	Rakhine	Coastal	Kyauk Phyu	Rural	30	13
	Rakhine	Coastal	Taungup	Rural	40	18
World Vision	Shan	Hilly	Kyaing Tong	Rural	19	9
	Yangon	Coastal	Dagon Seikan	Rural + Urban	5	2
	Mon	Coastal	Mawlamyine	Urban	5	2
				Total	155	69

²³ deff : the design effect of the survey design used, obtained by dividing the variance estimate of the survey design used by the variance estimate of a simple random sample of the same size.

4.2.4. Sampling of households in target and non-target communities

Within the selected target township, sample size calculations were produced to provide estimates at the township level with a margin of error of no greater than $\pm 10\%$ ($D=0.1$) based on a 95% confidence interval ($\alpha=0.05$) around a binary variable. A conservative estimate of 50% was used for the estimated value of the binary variable ($P=0.5$), maximising the sample size. The formula to determine the number of per township is seen in equation (1),

$$(1) \quad n = \left(\frac{Z_{(1-\alpha/2)}^2 P(1-P)}{D^2} \right) \text{ deff} *$$

A response rate of 95% was allowed for, accounting for dropouts between the baseline and endline. The design effect (deff) values shown in column (6) of Table 7 are largely speculative, based on pre-project expected levels of geographical clustering of key response variables across the survey locations. However, relatively low values (<2) were used for the design effect owing to the high proportion of target villages included within the sample, thus making clustered sampling more efficient than it would have been from a larger sampling frame of villages.

The finite population correction factor (equation 2) was also applied at the township level, to adjust for townships with low population sizes.

$$(2) \quad n = \frac{n_0}{1 + \frac{n_0}{N}}$$

Prior to adjusting for response rate, population size and design effect, the sample size required per township was 99 target households and 99 non-target households.

Based on the above considerations, the number of total sample target households to be visited for target communities in each project township with no FPC and RR adjustment is given in column (7) of Table 7. Column (8) gives the sample target households after FPC adjustment and column (9) gives the sample target households to be visited for each project township after allowing for 5% non-response allowance. If the non-response rate is less than 5%, the additional households will only increase the accuracy of the estimate.

The number of households per target community to visit is presented in column (10) and is calculated by dividing the adjusted sample total households in each township, column (9), by the number of chosen sample communities (column 4). The number of communities selected per township was derived by a trade-off process with the survey company (Mekong) providing their own justification for maximum feasible coverage levels. The total sample non-target household total for each project township is the same as the total sample household total in column (7) since no FPC adjustment will be applied as the total non-target population is undefined. By dividing the sample non-target household total by the corresponding number of sample communities in column (4), the average number of non-target households to visit in each non-target community by township is obtained (column 12).

Table 7. Sampling strategy

Township	Rural/urban	# of target villages/wards	# of sample target villages/wards	# of target HH	Design effect	Sample target villages/wards' HH total	Sample target villages/wards' HH total (FPC adjusted)	Sample target villages/wards' HH total with RR of 0.95	Sample average no. of HH per target village/ward	Sample non-target villages/wards' HH total	Sample average no. of HH per non-target village/ward
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Hpa An	Rural	10	5	1,024	1.2	115	104	109	22	115	23
Laputta	Rural	16	7	3,777	1.4	134	130	137	20	134	19
Meikhtila	Rural	30	13	2,688	1.8	173	162	171	13	173	13
Kyauk Phyu	Rural	30	13	7,757	1.8	173	169	178	14	173	13
Taungup	Rural	40	18	13,226	2.0	192	190	200	11	192	11
Kyaing Ton	Rural	19	9	1,456	1.5	144	131	138	15	144	16
Dagon Seikan	Rural/urban	5	2	4,109	1.2	115	112	118	59	115	58
Mawlamyi ne	Rural	5	2	5,340	1.2	115	113	119	59	115	58
	Total	155	69	39,377		1162	1111	1169		1162	

4.2.5. Baseline deviations in sample frame

There were some minor deviations from the original baseline sampling frame. A small re-sample of non-target communities was conducted immediately after the baseline process. This was to account for responses indicating that two of the non-target communities experienced severe shocks that were not present in any of the target communities within their townships. These were replaced from the original sample frame of communities; and the shocks experienced by the replacement communities were much closer to those of the wider population of the target communities within those regions. The communities replaced were Inn Ma in Meikhtila and Ku Seik in Hpa An.

4.2.6. Survey instruments

Three independent survey processes were conducted:

Household-level survey

The household survey consisted of 14 sections, with full details provided in Annex 3.

In this, 2,168 households were successfully interviewed at **both** the baseline (January 2016) **and** the endline (December 2017) survey rounds. A total of 171 (7%) of the households interviewed at the baseline could not be re-identified during the endline survey process.

As a contingency, enumerators did contact replacement households during the endline survey if more than 10% of the original sample could not be relocated. However, only the households included at

both the baseline and the endline were included in the final analysis since the overall attrition rate was less than the 10% (Table 8), which had been accounted for in the sample size calculations.

Table 8. Summary of household respondents by township at baseline and endline

Township	Group	Baseline	Endline*	Attrition rate
All	Non-target	1165	1097	6%
	Target	1174	1071	9%
Dagon Seikkan	Non-target	119	107	10%
	Target	120	100	17%
Hpa An	Non-target	104	102	2%
	Target	103	103	0%
Kyaing Ton	Non-target	144	137	5%
	Target	144	125	13%
Kyauk Phyu	Non-target	182	179	2%
	Target	182	175	4%
Laputta	Non-target	140	128	9%
	Target	140	118	16%
Mawlamyine	Non-target	118	108	8%
	Target	118	104	12%
Meikhtila	Non-target	171	162	5%
	Target	169	164	3%
Taungup	Non-target	187	174	7%
	Target	198	182	8%

Note: * Only counting panel households from baseline.

There was some evidence of households dropping out between the two surveys having slightly lower resilience at baseline than those that continued. However, this was small in practical terms, and not strongly statistically significant ($p=0.042$), and did not vary by whether dropouts came from target or non-target villages. See Table 9 and Annex 6 for more detail on completion and dropout rates.

Table 9. Mean KPI scores for baseline households by endline completion status

Group	Dropped out after baseline	Included in both surveys
Non-target	0.18	0.20
Target	0.21	0.23

Village-level survey

Key informants interviewed from all villages or wards included in the household survey were interviewed regarding changes in village-level planning, infrastructure and perceived resilience to shocks. The survey can be found in Annex 4.

Township survey

Structured interviews were held with key informants from government departments of each of the eight townships. Interviews were held with the Agriculture Department, the Fire Service, the General Administration Department at both baseline and endline in all of the townships. Because of the government restructuring between baseline and endline, the township development organisations no longer existed at the time of the endline. In Hpa An, Kyauk Phyu and Mawlamyine, these were replaced with the Department of Meteorology and Hydrology, but no replacement organisations were found in the remaining five townships. The survey can be found in Annex 5.

Follow-up triangulation work

A small-scale qualitative follow-up to the survey was conducted in January 2018 after initial quantitative analysis, to further understand i) the broader impact BRACED has had beyond the KPI figures and ii) any factors that may explain how the survey was answered and emerging results. The work consisted of a series of focus group discussions (FGDs) and site visits conducted in Hpa An and Dagon Seikkan by one evaluation team member with project staff (Table 10).

Table 10. Villages and wards visited in validation FGDs

	Target	Non-Target
Hpa An	Yay Paw Thuang Tuang Kaley	Myaing Ka Lay Upper Nat Kone
Dagon Seikkan	ThaYet Pin Chaung Village 93 Ward	Ywar Thit Ka Lay 89 Ward

The FGDs covered the following:

- Discussions about predominant livelihoods;
- Threats in the area – their impact (before and after BRACED in the project areas) on lives and livelihoods, coping strategies;
- How BRACED support was delivered in the area, with discussion of targeting and modalities (project areas only);
- The difference BRACED has made (project areas only);
- Weather and climate information – sources and usage;
- Remaining problems and suggestions for solving them;
- Questions for interviewer or further information.

In project areas, the FGDs were followed by a walk through the community to BRACED infrastructure/livelihood interventions and hazard points. The exercise has obvious limitations in terms of representativeness of the sample and therefore is used only to illuminate relevant aspects where appropriate; these are highlighted in the text as ‘Qualitative Insights’.

Box 2. Note on qualitative sources referred to in the report

Two Two sources of qualitative data are used throughout this report:

- 1. BRACED Myanmar, Final Evaluation (Gee, 2018):** This summative evaluation was conducted shortly before the survey data collected for this report. It assesses BRACED Myanmar against the OECD DAC criteria using project data and primary qualitative data conducted at village and township level in four of the eight project townships as well as at state level. Information from Gee (2018) has been used in this report where it explains the background to particular survey findings.
 - 2. Follow-up ‘Qualitative Insights’ triangulation exercise:** This is explained above and is put in specific boxes to explain the difference the project has made beyond that quantified in the KPI figures. Each piece of qualitative information in the text of this report has been labelled to show its source.
-

4.3. Limitations

4.3.1. Overall limitations and any deviation from original design

The baseline data was collected some months after the start of the BRACED programme in Myanmar. BRACED began implementation in September 2015 and the baseline data was collected between late November 2015 and January 2016. This delay in baseline activity owed largely to travel and access restrictions related to the historic elections that took place in November 2015.

This may have led to a late-baseline effect in some of the results – particularly in the knowledge- or awareness-based outcomes, if respondents had recently been engaged in or had participated in planning meetings, just before the time of the baseline survey. This may be one factor contributing to the higher baseline results for target communities seen for several of the outcome variables. However, project implementation was delayed in most areas, and this tended to mitigate the late baseline effect.

In addition, many of the effects of the BRACED programme would not be expected to be seen immediately after conclusion of the project activities. For a true test of the extent of their increased resilience, communities would need to have experienced shocks, so that respondents could accurately identify if their ability to cope and recover from the shocks had been affected.

4.3.2. Sample sizes

Given the different IPs, different climates and different urban/rural contexts of the eight townships, many results in the report are presented disaggregated to the township level. However, the sample sizes for the survey are based on having a sufficient power to detect significant changes only when combining the data from all eight townships. Despite this statistical underpowering, there were a number of results indicating highly significant changes over the period within certain townships, particularly. Therefore, a lack of statistical significance, when assessing results at the township level, should not be treated as evidence of a lack of a change within that township.

4.3.3. Village selection

The selection of ‘target’ communities by the project IPs was done in a purposive (i.e. non-random) way, based on whether they had a previous history of being involved with international NGO projects. The evaluation team believes this may owe at least in part to the tight operating restrictions under which NGOs work in Myanmar and the challenges in obtaining permissions.

Non-target communities were selected to be as geographically and culturally similar as possible to the target communities but we could not control for the degree of prior intervention of NGOs. This may be a factor explaining why, on some of the key outcome variables, the baseline results indicate that the target villages were already significantly more resilient than the non-target communities.

4.3.4. Confounding factors – other NGO- and government-led activities

As Gee (2018) notes, government led interventions on resilience building typically rely on planning at a higher level than the township. Where the project was able to influence township disaster plans, these applied both to paired target and non-target communities – as both were within the same township.

The main challenge to the ‘parallel trends’ assumption required for the difference-in-difference analysis comes from potential changes in NGO support provided to target or non-target communities over the project life. What matters here is whether the level of this support changed significantly for target relative to non-target groups between baseline and endline.

There were certainly other interventions taking place within the non-target villages over the two years of the BRACED activities. Most of these interventions were led by local Myanmar NGOs. These additional interventions were generally provided at similar or lower levels in the non-target communities relative to the target communities. Very few of these interventions were directly targeted at resilience-building, but most would have had indirect effects on improved resilience capacities if effective. For example, in Taungup, four of the non-target communities were involved in a government-based microfinance intervention, which was not offered in any of the BRACED

communities. A summary of the non-BRACED interventions is found in Annex 7. Within the target villages, many respondents indicated that the interventions their village had received were coming from a BRACED IP (World Vision, Plan, ActionAid), but they were not able to distinguish between their BRACED activities and their other activities within that community.

In terms of the question of changes for the target relative to the non-target group we compared the proportion of respondents who said they had received any support from other NGOs in last 5 years at baseline and at endline. Table 11 below reveals a decline for both groups but the decline for both is not statistically different ($p=0.354$). Hence this does not present a problem for the DiD analysis.

Table 11. Support from other NGOs over the project life for target and non-target communities. Percentages show response rate when respondents were asked “Have you or household members received any support from other NGOs in last 5 years”

Data collection Point	Target	Non-Target
Baseline	27%	21%
Endline	24%	16%

4.3.5. Shock absence

Between the baseline and endline surveys there were fortunately a relatively small number of shocks experienced by the households as reported through the survey. However, this means that the sample sizes for many of the headline indicators are considerably smaller than the total number of households interviewed, as questions about how households have dealt with and recovered from previous shocks were asked only to households that had experienced shocks. Table 12 indicates how many households reported shocks at baseline (covering any shocks in the previous 10 years) and how many reported shocks at endline (covering any shocks within the past two years – the project implementation period).

Table 12. Households experiencing shocks (%)

Time	Number of shocks experienced	Non-target	Target
Baseline (Shocks: 2005–15)	0	39.4	31.4
	1	57.8	61.2
	2	2.8	4.6
	3	0.0	2.8
Endline (Shocks: 2016–17 during project implementation)	0	81.3	76.3
	1	18.1	22.4
	2	0.5	1.3
	3	0.1	0.0

The recall period for baseline included a longer period of time, leading potentially to a larger recall bias when remembering specific details of the events (

Table 13). This 10-year recall period would also have included the effects of cyclone Nargis. As discussed in the context section of this report (Section 2), the effects of this shock on the households surveyed would have been far more severe, and affected a larger number of households, than any of the shocks occurring between 2015 and 2017.

Table 13. Households affected by shock categories (%)

Shock	Baseline		Endline	
	Non-target	Target	Non-target	Target
Drought	6.5	8.0	0.0	1.4
Irregular rains	0.2	0.3	1.0	0.9
Floods	11.4	27.8	4.4	9.6
Landslides	0.0	0.2	0.2	0.0
Earthquakes	0.3	1.4	0.7	0.6
Saline intrusions	0.2	0.1	0.1	0.0
Tidal surges	0.1	0.1	0.0	0.1
Hurricanes/cyclones/typhoons	43.8	40.3	8.9	7.9
Tsunami	0.2	0.1	0.0	0.0
Thunder storm	0.3	0.0	0.0	0.1
Heavy rains	0.2	0.2	3.3	1.5
Heat and cold waves	0.2	0.0	0.7	1.3
Other	0.1	0.2	0.1	1.5

4.3.6. Capturing improved township engagement from household survey data

Project interventions that build township institutional capacity benefit both target and non-target communities and will not be picked up by the DiD analysis. This will tend to understate project performance. However, we do draw on qualitative evidence to discuss changes in institutional capacity and there are some aspects of township engagement that feed back to target households e.g. township contributions (alongside those of the project and community) to flood protection infrastructure and participation of community members in township planning and drills.

4.3.6. Survey instrument questions

Through the survey piloting process, a number of translation errors that had been carried through from the baseline survey were identified and corrected in the endline survey. All other translation changes were made solely to clarify the meaning of the question, where the translated version could have been ambiguously interpreted. This resulted in an endline survey that was not totally consistent with the baseline survey, so some changes in results may be attributable to changes in question wording rather than underlying changes in the population.

The two main areas where these translations occurred were in references to ‘infrastructure’ and in the section related to weather forecasts. ‘Infrastructure’ does not have a direct translation into Myanmar, and feedback from enumerators suggested the word needed a better translation. In the endline survey, separate questions were asked about ‘weather forecasts’, ‘climate information’ and ‘risk information’, whereas these were combined in the baseline survey. Feedback from the baseline enumerators suggested that this question had been well understood by respondents, in terms of the definition and distinction between these three sources of information.

4.4. Data processing and analysis

Data was collected using android devices, using Survey Solutions (v5.25) for form design and data aggregation. Data analysis was conducted using R (v3.4.1).²⁴

For comparisons made across baseline and endline, data was restricted to **households providing valid data during both baseline and endline surveys**. For results specific to the endline, without comparison to the baseline, results also included a small number of additional households, surveyed as potential replacements in case of low response rates, that were not present at the baseline.

Statistical analysis for key outcomes was conducted through fitting **multi-level linear mixed effects models for the KPI** and its subdomains, with **nested random effects for township, community and household and fixed effects for intervention status of village** (target/non-target), time (baseline/endline) and interaction between the two. These random effects adjust the variance estimates for community-level clustering and repeated measurements from the same households. The intervention effect was assessed by investigating the statistical significance of the interaction between intervention status and time, **equivalent to a DiD approach**. This model was modified to assess the impact of treatment intensity by restricting the data to intervention community only and replacing 'intervention status' with 'treatment intensity'.

Household weights have not been formally calculated for households in the survey. Results at the overall level are adjusted mean values, accounting for the effects from each township equally rather than being reliant on the relative sample size, or population size, coming from each of the townships. The affected populations from each township vary substantially; over half of the affected population was located in the two Rakhine townships (Kyauk Phyu and Taungup). However, project activities and budgets were roughly evenly distributed across the eight townships, regardless of population size. Therefore, analysing the results with **townships** weighted equally enables a more complete evaluation of the project impact, relative to project input; in weighting **households**, the results would be dominated by activities within the most populous townships.

Models for township-level results were also produced using the same structure, with the nested random effects of household and community.

No formal matching process was conducted between the intervention and non-intervention households. The differences between the two samples across a range of socioeconomic indicators showed there were very few major differences in the population of target villages as compared with the non-target villages (see Annex 8 for details).

Categorisation of treatment intensity was defined in conjunction with BRACED IPs and determined based on responses to questions about which interventions households had received (Table 14).

²⁴ <https://cran.r-project.org/bin/windows/base/old/3.4.1/>

Table 14. Treatment Intensity categories and their definitions

Treatment intensity category	Definition
Low	Household in target community, unable to identify any BRACED intervention it had benefited from
Medium	Household in target community, only identifying community-level interventions or only identifying low-level engagement with household- or individual-level interventions
High	Household in target community identifying ongoing engagement with household- or individual-level intervention

5. Findings

This section presents the results of the Impact Evaluation based largely on the quantitative household survey. It combines tables and figures to illustrate the main results and associated findings from the survey data analysis. The results are organised around a set of key questions. The first question is the Key Evaluation Question (KEQ) and focuses on overall changes in household resilience as a result of BRACED interventions – i.e. the net effect. Further subsections present more nuanced analysis and disaggregated data. Not all analysed data is presented here, for brevity purposes, but it is available in the separate technical annexes, in particular Annex 9, with full raw datasets available on request.

Graphical results are presented in the figures below as adjusted mean values plus 95% confidence intervals. Results have been adjusted to take into account village-level clustering effects, and the repeated measurements of the same households at baseline and endline (see Section 4.4.).

FGD data gathered from two townships as part of the endline validation work is presented in boxes throughout to help corroborate or offer ‘Qualitative Insights’ into particular findings where relevant.

As a reminder of the different dimensions of resilience used by the project and discussed in this section, Table 15 summarises these (D1–D5) and the associated indicators (KPIs) used for each.

Table 15. BRACED Myanmar Resilience dimensions and their weighting

KPI Dimension	Variables Included
D1: Increased resilience system and livelihoods (weight 30%)	KPI 1–6; 8–9
D2: Access to communication, access and use of information (weight 20%)	KPI 10–16
D3: Increased preparedness and coping mechanisms (weight 20%)	KPI 17–20
D4: Improved safety nets (weight 15%)	KPI 21–24
D5: Improved decision-making and planning (weight 15%)	KPI 25–27; 30

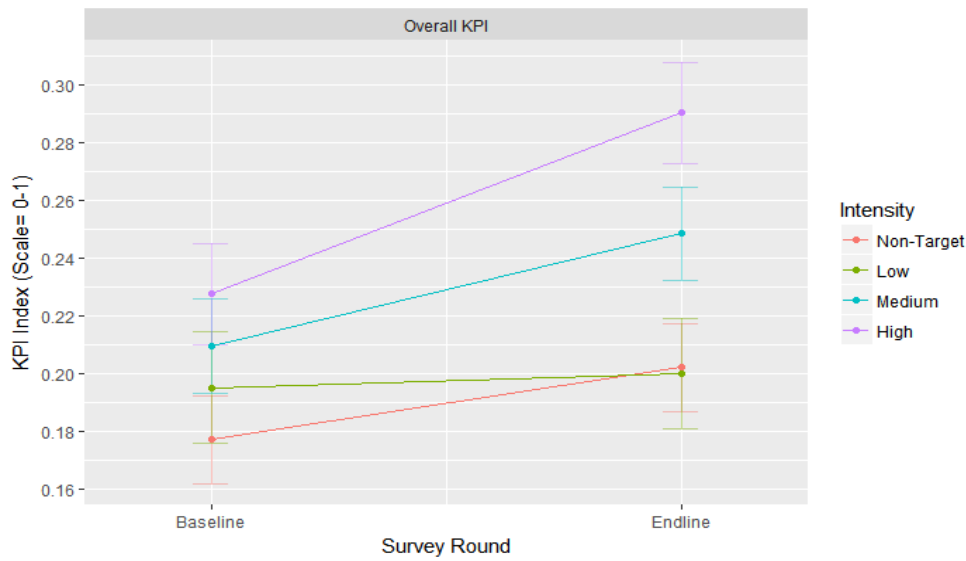
5.1. Impact: How has household resilience changed as a result of BRACED interventions?

Presented here are key findings related to changes in household resilience at project and township level and disaggregated by resilience dimension to reveal differences between them.

Key findings for changes in overall resilience scores across dimensions and townships:

1. **The overall KPI resilience measure increased significantly more in target (project) sites relative to non-target (counterfactual) sites.** In this regard, the BRACED Myanmar Alliance project has had a net positive effect in terms of increasing resilience capacity in its target households. However, not all dimensions of resilience have responded in the same way and there are large differences between townships in the way that the overall KPIs have changed over the life of the project (discussed below).

Figure 4. Changes in overall KPI4 resilience index over time for different levels of intensity, target (treatment) and non-target (counterfactual) households



2. The dimensions of resilience that have increased significantly ($p < 0.05$ or lower when comparing target and non-target groups baseline to endline) are in Dimensions 1, 3 and 5 (See Figure 5 and Table 16)

Figure 5. Changes in dimensions of KPI resilience measures over time

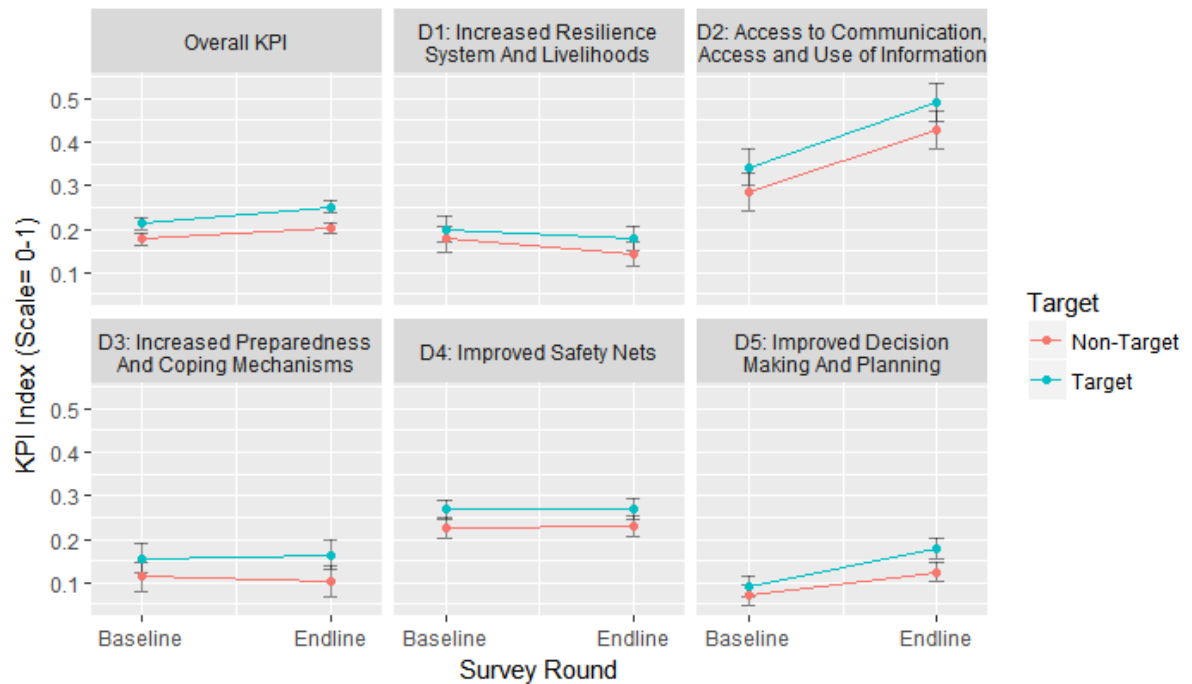


Table 16. Estimated change in means for KPI indicators (%)

KPI domain	Group	% change from baseline to endline	95% CI: Lower	Upper	p-value for DiD	Sig*
Overall KPI	Non-target	14.1	10.0	18.2		
	Target	18.4	15.1	21.8	0.002	**
D1: Increased Resilience KPI	Non-target	-19.5	-25.9	-13.1		
	Target	-10.2	-15.8	-4.6	0.043	*
D2: Access KPI	Non-target	50.4	45.4	55.5		
	Target	43.8	39.7	47.9	0.486	
D3: Preparedness KPI	Non-target	-9.2	-19.1	0.7		
	Target	5.1	-1.9	12.1	0.009	*
D4: Safety Nets KPI	Non-target	1.3	-6.1	8.8		
	Target	1.1	-5.1	7.3	0.991	
D5: Decision-Making KPI	Non-target	77.3	55.3	99.2		
	Target	95.3	78.7	111.9	0.001	***

Note: * = significant at 10%; ** = significant at 5%; *** = significant at 1%

- Results show a decline for both target and non-target groups but a greater fall for non-target groups in the two years between baseline and endline in D1: Increased resilience system and livelihoods.** There are some serious limitations with this component of the resilience index that mean we have to be very cautious interpreting this ‘positive’ result. First, our qualitative research with survey respondents and with enumerators indicates that, when people are asked about access to basic services in the event of a future shock, they typically refer to large covariate shocks such as cyclone Nargis. This presents an extremely ‘high hurdle’ for BRACED interventions to reach to be perceived to have an impact. We were not surprised that interventions reportedly failed to build resilience capacities to this type of shock. Second, a feature of the composite resilience indicator is that the same weight is attached to individual indicators within each dimension. Consequently, variables that the project has some influence on, such as ‘Have you tried a new crop variety or animal?’, which apply only to a small section of households, each count the same as ‘Access to safe water <30 minutes from home’, which has declined for the large majority.
- In D3 (Increased preparedness and coping mechanisms), the 5% increase for the target relative to the 9% fall for the non-target reflects modest increases in target group access to plans and drill practice and better preparation to cope with the last severe shock relative to declines in these areas for the non-target group.**²⁵ There is wide variation across townships. We know from the BRACED Myanmar Final Evaluation (Gee, 2018) that responsibility for disaster planning lies at higher levels than township administrations, and the latter do not have a specific budget for this work. Nonetheless, the evidence suggests the BRACED Myanmar Alliance community planning model has been able to secure increased engagement and action in this area from *some* township administrations as well as modest increases in household preparedness.²⁶ Both Gee (2018) and our FGD validation data suggest there are highly context-specific reasons involved. These include the attitudes of officials involved and the ability to maintain relationships in the face of high levels of staff turnover, but further research is needed in this area.

²⁵ The ‘Access to safe evacuation place’ indicator within this resilience dimension declined for both treatment and control groups. In Dagon Seikkan during the follow-up exercise, this was associated with the increase in population, which has reduced space at the evacuation places.

²⁶ As township administration project partners cover *both* treatment and control groups, it is possible that the gains from this work are understated.

5. **Highly significant increases in scores in D5 (Improved decision-making and planning) indicate greater involvement of women and children in community resilience-planning.** Baseline values for target and non-target groups were similarly low for this resilience dimension.

This suggests that the community planning model used by the BRACED Myanmar Alliance has improved the inclusion of women and children. This is supported by qualitative research undertaken for the project evaluation. Gee (2018) reports that ‘Separate interviews with both men and women indicated that women are much more likely to participate in the decision-making process than prior to the project’ (p.21). Validation FGDs undertaken in Hpa An and Dagon Seikan as part of our data validation exercise also suggested that those who had been directly trained by the project became recognised voices in their community. Given that the process used intensive NGO facilitation, there is a risk that it will not be sustained. However, considerable NGO work in these communities prior to BRACED allowed the project to build on previous female empowerment and climate change training.

Although we find improved decision making and planning for those targeted by the project relative to non-targeted communities, this is likely to understate project benefits as project work on institutional strengthening aimed to benefit both groups. Qualitative evidence from Gee (2018) suggests that *some* efforts in this area have been effective with the CRA process building trust between township officials and communities. However, high levels of government staff turnover made it difficult to build increased resilience capacity within a target township. Secondly, the project could not alter the fact that government planning decisions are primarily based on population density. This means that the most marginalised rural communities are less likely to have proposals accepted and implemented.

6. **The KPI dimensions that have not seen statistically significant changes are D2 (Access to communication and use of information) and D4 (Improved safety nets).** These dimensions include indicators that attempt to pick up changes since the last extreme climate event. This has not occurred over the programme life for most people and this makes it difficult to interpret. We look into the access to weather information dimension in more detail below. It is also worth noting the positive national level evidence on access to communication and information from BBC Media Action surveys. Gee (2018) reports that weather forecast information is accessed by individuals, predominantly on their phones and the number of followers of the Department of Meteorology and Hydrology Facebook page has significantly increased to over 1.1 million over the course of the project. Public Service Announcements (PSAs) have also proved hugely successful for those who have access to TV/Radio. Over 90% found the information in the PSAs useful and over half claimed they or their families had taken action based on the information in the PSAs.
7. **There is substantial variation in impact across the eight townships.**²⁷ There are a number of factors to be taken into account but no evidence of external effects that undermine the difference in difference results.²⁸
8. **Townships with the most statistically significant positive results in target relative to non-target sites were Kyaing Ton and Meikhtila.** It is notable, however, that these two townships also saw

²⁷ The survey sample was designed to be large enough to pick up differences between townships but not to analyse KPI components within townships, hence the lack of statistically significant results at this level may simply reflect small sample sizes.

²⁸ This would occur if non-project activities affect KPI measures particularly in target or non-target sites. There is no evidence of significant differences in non-project NGO support (see Section 4.3.4). We also found, that broader problems of increasing environmental degradation affect both treatment and control groups in Dagon Seikan.

some of the highest levels of reported NGO activity other than BRACED, which could be an explanatory factor.

9. **Kyaing Ton and Meikhtila were the only townships that saw statistically significant increases in D2 (Access to communication and use of information for target groups relative to non-target) (Table 17).** The Government of Myanmar has improved the provision of weather and shock information across the board for both non-target and target groups but, in Kyaing Ton and Meikhtila, training provided by BRACED enabled farming households to *use* this information more effectively. Follow-up qualitative work found examples of trained farmers adjusting their practice in light of this information (see Qualitative Insight 1).
10. **Decreases in resilience KPI measures for target relative to non-target groups in Mawlamyaine and Dagon Seikkan are particularly evident in terms of D2 (Access to communication, access and use of information).** We know from separate case study work on project costs and benefits in both these townships (Yaron and Wilson, forthcoming) that project interventions have made a significant positive difference for beneficiaries in these townships. However, interventions such as pig-breeding or VSLAs affect only a relatively small proportion of intervention households. In contrast, the survey results represent entire target and non-target groups and it seems that government-provided weather information has enabled non-target groups to ‘catch up’ in these areas. Project interventions do not appear to have added value for use of this information as they did in Kyaing Ton and Meikhtila.

Qualitative Insight 1

In our discussions in project village Yay Paw Thuang, farmers spoke of the project initiating their use of radio announcements to know when to harvest early, and estimated that they had cut their annual crop losses from 50% to 10–20% – equating to an average sale value increase of approximately 300,000 MMK (approximately £160) per household. In addition to this, the amount they reinvested in their land and seeds in the season following a flood had reduced. In applying this information to their farms, the communities said they recognised the accuracy of government weather broadcast information and this had reinforced their belief that it was a useful thing to do.

11. **Target communities had consistently higher average resilience scores at *baseline* across all of the KPI domains and within nearly all of the townships, except Meikhtila.** Statistical analysis confirms that households in both groups have very similar socioeconomic characteristics (Annex 8). One possible explanation is that baseline survey work was completed after the project had started. However, implementation in five of the eight townships was largely delayed until well after the baseline and higher resilience starting scores are also seen in these townships. Our qualitative analysis at baseline suggested that the most likely explanation was that the government in Myanmar is prescriptive about which communities international NGOs can work in, and these communities have benefited from a sequence of interventions over a number of years. The DiD analysis is unlikely to have been seriously affected by this as it looks at *changes* between baseline and endline for target relative to non-target groups and there has been substantial variation in these changes between townships, independent of the KPI starting point.

Table 17. Respondents with an improved resilience score at endline (2017) compared with baseline (2015) by KPI resilience domain, township and target group (%)

Domain	Group	Overall	Dagon Seikkan	Hpa-An	Kyaing Ton	Kyauk Phyu	Laputta	Mawlamyine	Meikhtila	Taungup	
Overall KPI	Non-target	59%	63%	61%	36%	74%	49%	73%	60%	56%	
	Target	63%	48%	64%	61%	74%	56%	58%	71%	61%	
<i>Increased resilience system and livelihoods</i>	Non-target	37%	42%	37%	30%	35%	29%	53%	40%	31%	
	Target	43%	38%	44%	40%	37%	24%	52%	68%	42%	
<i>Access to communication, access and use of information</i>	Non-target	63%	65%	64%	46%	73%	66%	72%	50%	69%	
	Target	66%	52%	70%	70%	77%	64%	52%	63%	72%	
<i>Increased preparedness and coping mechanisms</i>	Non-target	33%	31%	35%	25%	38%	19%	48%	43%	29%	
	Target	40%	31%	43%	43%	39%	31%	36%	46%	46%	
<i>Improved safety nets</i>	Non-target	32%	37%	30%	10%	43%	21%	38%	49%	25%	
	Target	33%	29%	37%	18%	44%	26%	33%	52%	21%	
<i>Improved decision-making and planning</i>	Non-target	37%	30%	16%	25%	62%	35%	29%	33%	51%	
	Target	45%	35%	30%	54%	62%	41%	27%	45%	53%	
+++	Strong evidence (p<0.001) of positive 'treatment effect'							Colour coding based on strength of evidence for a DiD treatment effect between target and non-target villages			
++	Evidence (p<0.005) of positive 'treatment effect'										
+	Weak evidence (p<0.05) of positive 'treatment effect' – conventional threshold										
	No evidence (p>0.05) of 'treatment effect'										
-	Weak evidence (p<0.05) of negative 'treatment effect'										
--	Evidence (p<0.005) of negative 'treatment effect'										
---	Strong evidence (p<0.001) of negative 'treatment effect'										

5.2. Effectiveness: Which interventions appear to make the biggest difference?

The BRACED Myanmar Alliance implementing the programme was required to categorise interventions into levels of intensity from low to high in order to report against mandatory ICF KPI1 ('Number of people supported').²⁹ The guidance provided is not categorical about how distinctions between different levels of intensity are made, for example time or spend (£/\$) per beneficiary. For the purposes of our analysis, we agreed with the BRACED Myanmar Alliance team to use the following categorisation, which is broadly aligned with the KPI1 guidance:³⁰

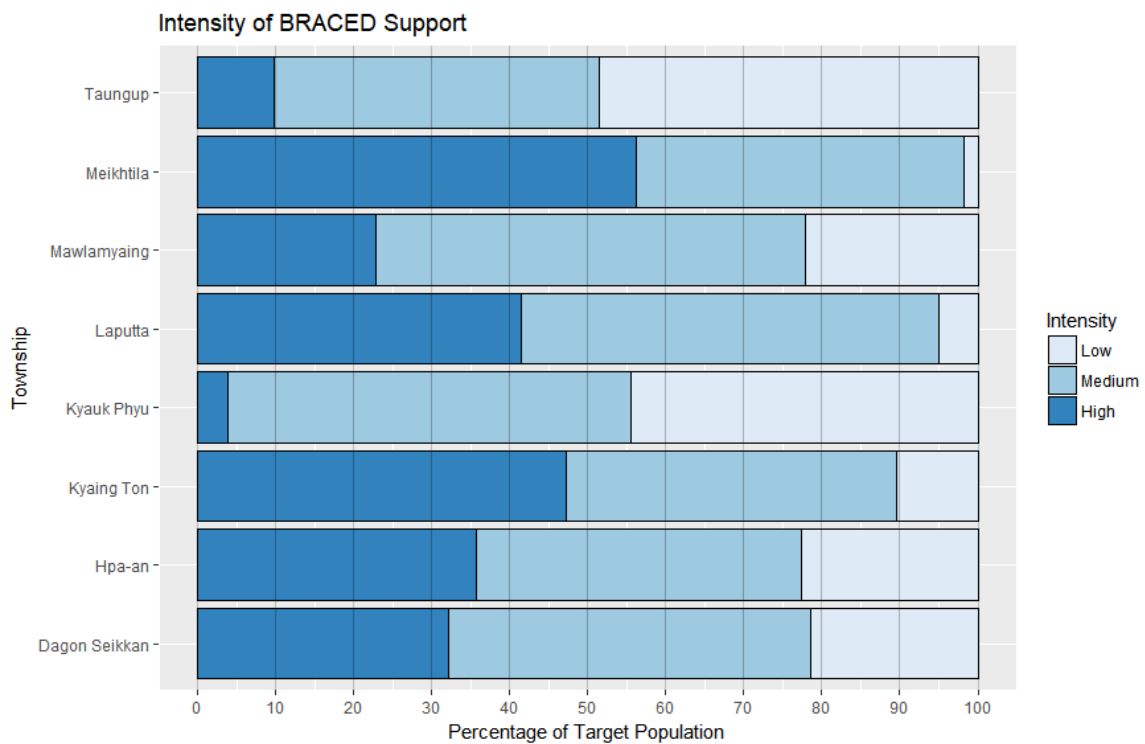
- Low intensity where survey respondents within BRACED intervention areas do not identify any type of project support but support may be provided at the township or community level, for example local government training;
- Medium intensity – only *community-level* BRACED support was provided (infrastructure or access to water) or medium levels of engagement required for some types of microfinance or training or planning meetings;
- High intensity – direct support to recipients or high levels of engagement provided for some types of microfinance and training; attending stakeholder meetings; provision of assets to specific groups; and improved access to the early warning system.

The intensity of intervention by township is shown in Figure 6, with more detail about the intensity of different interventions by township in Annex 10. This demonstrates the variability in intensity across townships. Meikhtila and Kyaing Ton have the highest percentage of the population receiving high-intensity interventions. As discussed in the previous section and presented in Table 17, these two townships showed the largest increases in resilience scores at a statistically significant level across a range of dimensions.

²⁹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/328261/BRACED-KPI-1-guidance.pdf

³⁰ Low: e.g. people falling within an administrative area of an institution (e.g. ministry or local authority) receiving capacity-building support or people within a catchment area of a river basin subject to a water resources management plan; medium: e.g. people receiving information services such as a flood warning or weather forecast by text, people within catchment area of structural flood defences, people living in a community where other members have been trained in emergency flood response; high: e.g. houses raised on plinths, cash transfers, training of individuals in communities to develop emergency plans, training of individuals to develop climate-resilient livelihoods.

Figure 6. Intensity of BRACED intervention by township



Key findings on scale and intensity

1. **The more BRACED interventions received, the greater the increase in resilience** (measured by KPI). Those with four or more interventions reported statistically significantly higher KPI increases than the non-target (counterfactual) group – (see Figure 7 and Table 18).
2. **There is no large or statistically significant difference between resilience outcomes for those households receiving one versus those receiving two or three interventions.** There appear to be incremental changes until some sort of tipping point is reached at four interventions in a package that provides more significant gains.
3. **Programme impact on resilience increases with the intensity of interventions received.** The increase in KPI between baseline and endline is greatest for high intensity relative to the non-target group ($p < 0.005$) although there is still a positive impact from medium-intensity interventions ($p < 0.05$).
4. **Those who are in the target area for the project but do not identify receiving any interventions report a far smaller increase in resilience than the non-target group ($p < 0.05$) – that is, a decline relative to those without project support.** We return to the issue of distribution of benefits in the following subsection.

Figure 7. KPI score and number of interventions received

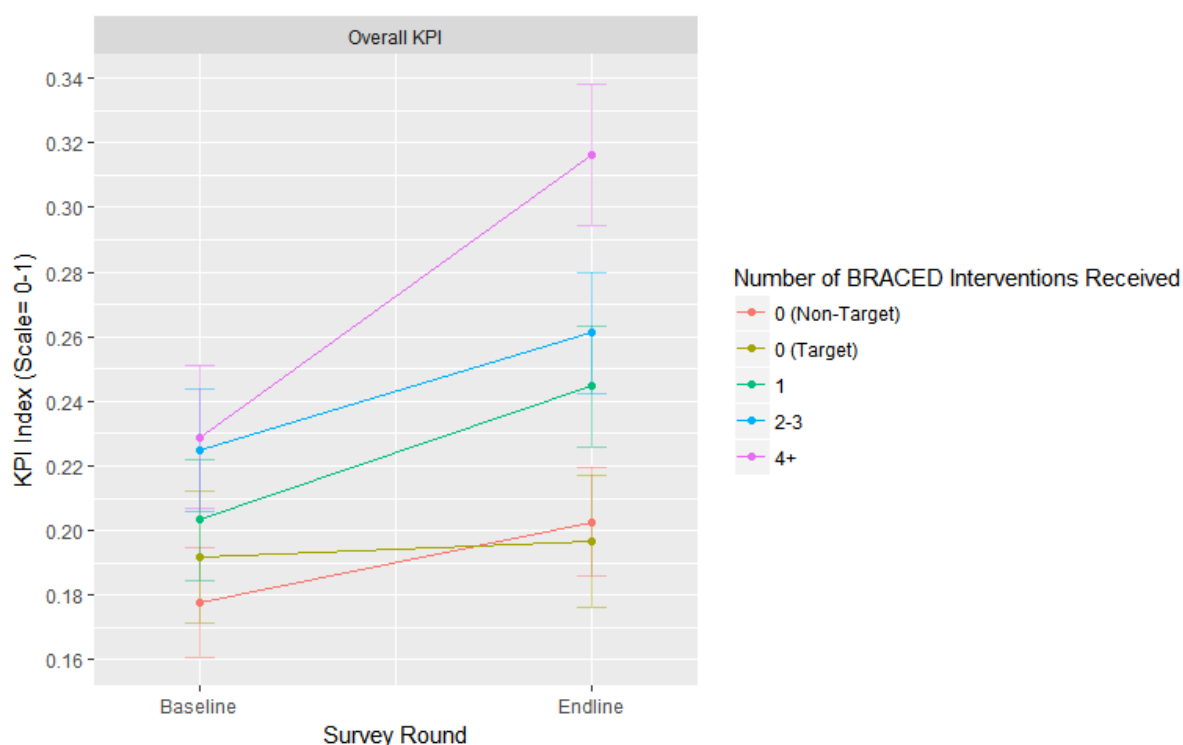


Table 18. Estimated marginal means (95% confidence Interval) for overall KPI: number of interventions

Level of support	Baseline	Endline
0 (non-target)	0.18 [0.16, 0.19]	0.2 [0.19, 0.22]
0 (target)	0.19 [0.17, 0.21]	0.2 [0.18, 0.22]
1	0.2 [0.18, 0.22]	0.24 [0.23, 0.26]
2–3	0.22 [0.21, 0.24]	0.26 [0.24, 0.28]
4+	0.23 [0.21, 0.25]	0.32 [0.29, 0.34]

Key findings for intervention effectiveness

There is also some evidence on which interventions have been most effective. However, this has to be interpreted with caution, for two reasons. First, sample sizes for type of intervention within a particular township can be very small (i.e. below ≤ 30); and, second, interventions are typically combined into packages – making it difficult to isolate specific interventions. With these caveats in mind, we present the main results in Table 19 with the following key findings highlighted:

1. **Overall, infrastructure, self-help groups/VSLA/Microfinance, climate-resilient smart agriculture (CRSA) and training are associated with the greatest statistically significant overall KPI gains for project target groups relative to non-target groups** (see Table 19 below). Qualitative evidence also provides some useful insights here. Gee (2018) identifies carpentry training for more resilient housing as increasing income-generating opportunities for those taking part. FGDs and key informant interviews for the separate cost benefit analysis (Yaron and Wilson, forthcoming) in four townships indicate significant economic returns to infrastructure and microfinance.
2. **It is a ‘package’ of interventions that typically makes the most difference. The 23% of project beneficiaries only reporting infrastructure/water infrastructure benefits are no more likely to report an increased KPI than the non-target group.** Households only reporting other types of

intervention (24% of project beneficiaries and largely high intensity) and those reporting infrastructure plus other interventions (32% of project beneficiaries) have significantly higher KPI gains than the non-target group ($p < 0.001$).

3. **Stakeholder meetings are associated with lower perceived gains in resilience relative to non-target groups.** This suggests diminishing returns. Once you have attended sufficient stakeholder meetings – likely to access a package of interventions – attending more of them is associated with lower perceived resilience gains. However, this was not an issue that emerged from the qualitative studies and more research is needed on this topic.
4. **There is evidence ($p = 0.05$) that access to and use of climate information via early warning systems increases household resilience.** An area that is particularly interesting relates to the use of training to increase the value of government-provided weather forecasts (where access to these forecasts is the same for target and non-target groups). This intervention seems to be particularly relevant for agricultural households, with 43% of target group farmers increasing their usage of weather forecasts compared with 33% of non-target group farmers. There was no significant difference in the change in this KPI for non-farmers across both groups (both increased their usage of weather forecast information by around 20%).
5. **Target group households that had suffered a shock between baseline and endline were more likely to report an increased usage of weather forecast information than non-target group households that had also suffered a shock.** During the qualitative follow-up to the survey, FGD respondents routinely explained that those who did not use weather information had not experienced loss.
6. **Target group households that had suffered no shocks at either baseline or endline were still more likely to report an increased usage of weather forecast information than non-target group households that had suffered a shock between baseline and endline.** There was no difference in the *access* to weather forecasts based on shocks or target group.

Table 19. Effectiveness by intervention type and township (figures in the cells represent the sample, n)

	Overall	Dagon Seikkan	Hpa An	Kyaing Ton	Kyauk Phyu	Laputta	Mawlamyaine	Meikhtila	Taungup
1: Infrastructure	n=575	38	52	134		99	78	174	
2: Water infrastructure (ponds/tanks)	475	71		99		103	55	147	
3: Resilience action planning (CRA)	95		12			31		15	37
4: Self-help groups/VSLA/microfinance	400	22	55	36	60	18	21	159	29
5: Early warning systems (climate info)	87			41		46			
6: CRSA (agriculture)	60					9		51	
7: Training	404	27	43	31	101	23		97	82
8: Loans				12					
9: Participant in village disaster management committee/community-based organisation	12	10		27		14		53	
10: Stakeholder meeting	104	6	36			10		30	
11: Boat							21		
12: Mowing machine							34		
13 Piglets		32							
14: Creative documentation						14			

Very strong evidence ($p < 0.001$) of positive 'treatment effect'	
Strong evidence ($p < 0.005$) of positive 'treatment effect'	
Evidence ($p < 0.05$) of positive 'treatment effect' – conventional threshold	
No evidence ($p > 0.05$) of 'treatment effect'	
Evidence ($p < 0.05$) of negative 'treatment effect'	
Strong evidence ($p < 0.005$) of negative 'treatment effect'	
Very strong evidence ($p < 0.001$) of negative 'treatment effect'	
Intervention not tested	

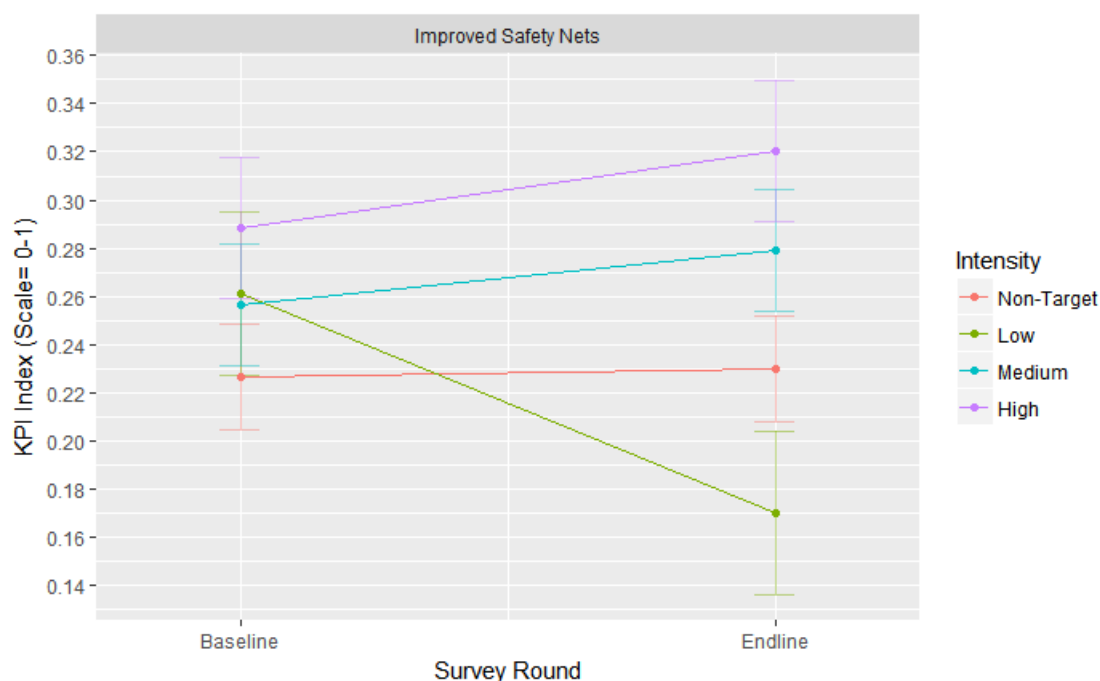
5.3. Who has benefited a lot? Who has benefited very little?

In this section we look at differential benefits across groups. While the overall KPI measure (and three out of five components) rose faster for target than non-target groups (see Table 17 above), these benefits were not seen by all target households. We explore some of these differences here.

Key findings: Differential benefits

- 1. Low-intensity households in target areas experienced decreasing resilience relative to non-target group households between baseline and endline.** That is to say, households in the area targeted by the project that were unable to identify receiving any project interventions did worse in terms of the KPI index than households that were in matched, nearby areas not targeted by the project. This is true for the overall KPI measure but mainly reflects the very poor relative performance of low-intensity households in terms of improved safety nets³¹ (see Figure 8 below).

Figure 8. Changes in resilience scores for improved safety nets between baseline and endline by intensity of intervention



- 2. We find that low-intensity households are clustered in particular communities. They constitute more than 30% of the sample in two townships, just over 20% in three townships and a very small share (<10%) in three townships** (Table 20). A key characteristic of these households, within Kyaing Ton, Mawlamyine and Hpa An, is that a disproportionate number do not speak Myanmar as their first language. In general, they are poorer than other households in the target group (owning fewer assets, with lower education and lower-quality housing). It seems likely that the factors that have made it relatively difficult for the project to work in these communities also tend to make them more vulnerable, and lessons need to be learnt for future work. There is also focus group evidence that some high-intensity mechanisms used by the project (such as demonstration crops) reached very few people (Qualitative Insight 2).

³¹ Based on asset ownership, access to loans and outside help.

Table 20. Intervention intensity by township – percentage of households receiving low-, medium- or high-intensity interventions

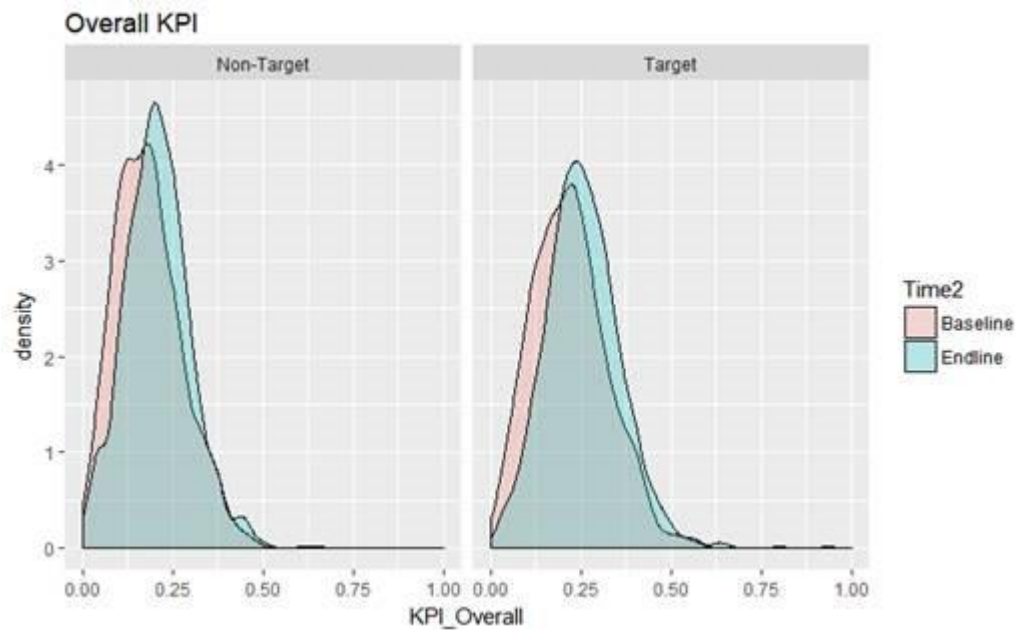
Township	Intervention Intensity		
	Low	Medium	High
Dagon	21.4%	46.4%	32.1%
Seikkan			
Hpa-an	22.6%	41.7%	35.7%
Kyaing Ton	10.4%	42.4%	47.2%
Kyauk Phyu	38.9%	56.7%	4.4%
Laputta	4.3%	54.3%	41.4%
Mawlamyine	22.2%	54.7%	23.1%
Meikhtila	1.8%	42.0%	56.2%
Taungup	32.0%	58.2%	9.8%
Overall	19.8%	50.1%	30.1%

Qualitative Insight 2

In FGDs in Hpa An and Dagon Seikan, local leaders spoke about the selection process applied to identify the recipients of direct training from the project. The criteria were consistent with the requirement that these people train or disseminate the messages within their community later – generally i) interest in the topic; ii) ability to learn; iii) ability to understand and write in Myanmar; and iv) confident in taking a leadership position within the community. As the recipients often had to travel to the township level to receive the training, the selection process appears a logical measure to ensure the lessons would return to the community, which in all instances they had. However, the model does suggest that certain groups are better placed to receive more intensive capacity-building from the project and that later recipients are dependent on the dissemination mechanism used.

3. **Female-headed households in project areas appear to benefit significantly from project interventions relative to non-target groups.** Looking at changes in the overall KPI measure over the project life, we observe greater increases for female-headed households in project areas relative to non-target areas – that is, *project interventions are associated with improved resilience scores for female-headed households*. After adjusting for other factors, this trend was seen not only in Dagon Seikkan but also in Taungup, Mawlamyine and Kyaing Ton.
4. **Households with more assets – as denoted by higher scores on our constructed asset index (Annex 8) and a proxy for relative wealth or prosperity – had larger positive changes in the overall KPI index.** There are reasons to expect this in the non-target group (as wealthier households have more opportunities to increase savings and their housing is less vulnerable to flooding, for example). It appears that this effect has *not* been outweighed by the efforts of the project community planning model aimed at identifying interventions that would particularly benefit vulnerable households.
5. **The KPI distribution has become less skewed for both project and non-target groups over time.** This is shown in Figure 9 below and in the decrease in Gini coefficient calculated for the KPI distribution. This is consistent with wealthier households benefiting from relatively larger KPI increases as a big increase in affordable mobile phone and satellite dish ownership has led to asset inequality falling much faster than KPI (resilience) inequality over the project life.

Figure 9. KPI distribution has become more equal for both project and non-target groups



KPI Gini coefficients (0 = perfect equality; 1 = perfect inequality).

5.4. What do we know about resilience in the face of shocks over the project life?

The analytical framework presented earlier indicates that resilience can only truly be measured in the face of climate shocks and stresses. As discussed in **Section 2**, there were no significant covariate shocks within the lifetime of the project. In certain townships, some households did report experiencing shocks, but the sample size within these groups prohibits meaningful assessment of relative changes between those that did and those that did not experience shocks in terms of outcomes in the resilience and higher-order well-being measures (e.g. food security – see next section). It is worth noting that, for our results, shock information is not completely independent of the KPI score, since certain questions are asked only if households has suffered a shock.

Key findings: Shocks

1. **Households that had suffered a shock at baseline had a significantly reduced resilience score compared with those that had not suffered a shock at baseline.** This appears to be common to both groups, with no significant difference between target and non-target groups.
2. **Households that reported suffering a shock during the project lifetime had improved resilience scores compared with those that did not suffer a shock at endline.** The increase was significantly larger for non-target households than for target households (i.e. if a non-target household had suffered a shock then the average increase in the resilience score was larger than that for a target household). It is not clear why this is the case.

Qualitative Insight 3

Two striking aspects from FGDs with communities in Hpa An and Dagon Seikkan are the apparent normalisation of regular severe flooding in Myanmar and the level of persistence in people's coping strategies. In many areas, flooding happens annually, sometimes several times in a year, and communities spoke of it lasting up to 15 days each time, covering large areas of villages or wards. However, the threat from water inundation was consistently down-played by the communities in these two areas: 'We are only afraid when storm and flooding happen together,' said one participant, and other spokes of only Nargis-type events threatening them. In FGDs in Dagon Seikkan, inward migration was associated both with rising house prices and with an increase in the number of precarious, informal settlements along the river bank as richer and poorer people respectively arrived to work in the local industries.

However, communities did explain the challenges of regular flooding, many of which involve inherent risks and economic impacts. Ensuring children reached schools (when open) was regularly given as the priority during flooding: as one villager in Hpa An put it, 'If the children don't attend school we perpetuate the cycle of poverty.' It was explained that men carried children through water (in at least one village, waist-high water) to get them to class. Men would also carry people to health facilities, but where this was described it was only for emergency cases, suggesting flooding delays treatment for lesser medical conditions. In the peri-urban area of Dagon Seikkan, most people would still walk through flood water to get work at the factory rather than lose a day's income. The most common risks associated with travelling through the flood water were described as snake bites and the likelihood of people who are unable to swim falling on uneven roads or fields. A river island community had used a fragile boat without cover to protect children from rain.

In some instances, the project has contributed to the complete removal of a flood threat – by raising the main access road or creating an embankment – or has supported a solution, such as a boat, to overcome the major flood impediment. Where the project had raised access points to school and health facilities, in Hpa An and Dagon Seikkan, it allowed the service to remain fully open during the flooding, but people outside of the immediate vicinity will still have to travel through flood water to reach these points. Health and education services are free in Myanmar, although migrant children in Dagon Seikkan were said to have far lower enrolment rates.

5.5. Impacts on food security: How do changes in resilience capacities relate to higher order well-being?

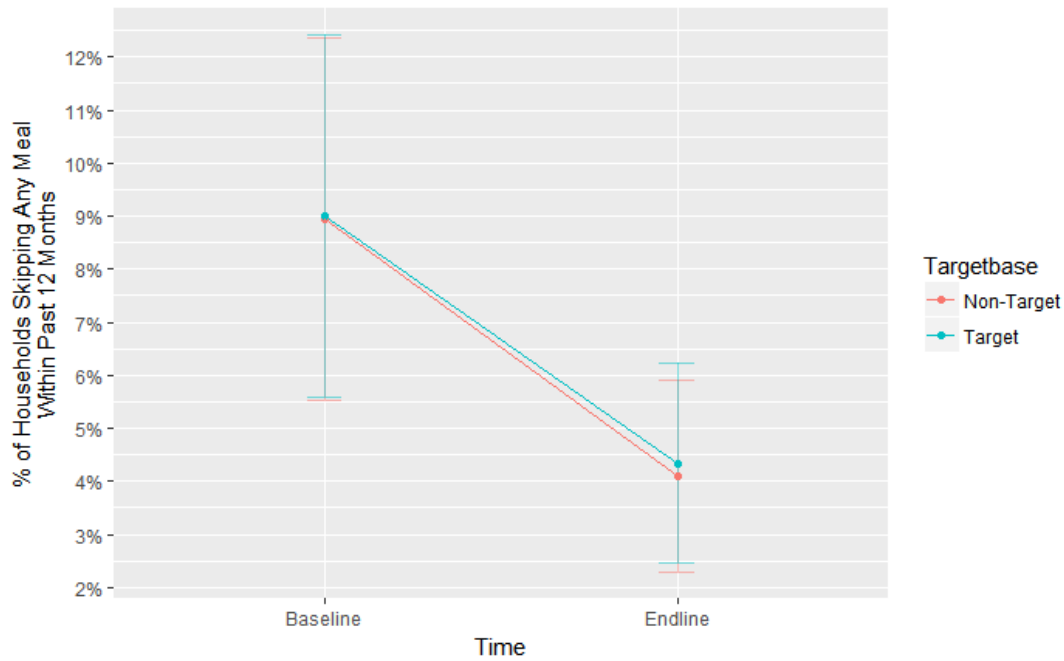
Food security is the higher-order well-being indicator for which we have data where we may expect to see a difference between target and non-target groups in the face of climate shock if resilience interventions have been successful. In the face of a shock, food security can be adversely affected. Theoretically, we would expect the food security of those households benefiting from resilience-building activities to either not be affected or not decrease as much as for those that were not receiving project benefits.

Key findings: Food security

1. **There is no evidence that BRACED increased food security over the project life.** This is not surprising: we did not anticipate that modest increases in resilience capacities would translate to significant increases in food security in the limited time between baseline and endline (two years).
2. **There has been a significant decline in the proportion of households reporting they have had to go without a meal owing to lack of resources** (Figure 10). This reflects improving economic

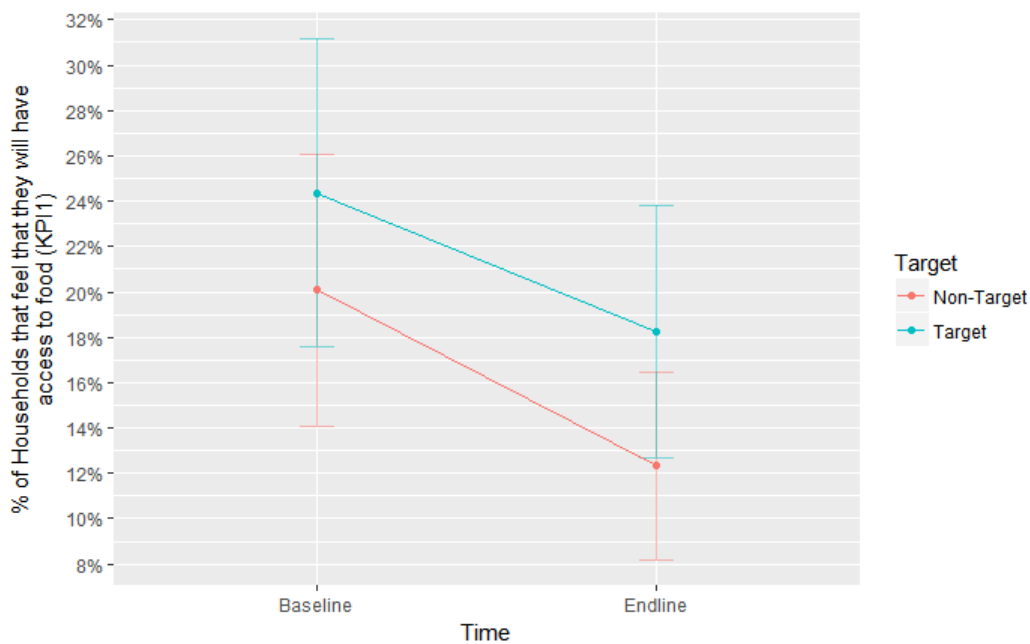
circumstances and the absence of major shocks over the period for *both* project and non-target groups. This result does not change when we consider the intensity of the project support (high, medium or low categories).

Figure 10. Have you had to skip a meal in the past 12 months owing to lack of resources?



We also find that, when we ask people to consider whether they will have access to food in the event of serious shocks, there is no evidence that BRACED beneficiaries are any different from households in non-target groups. In *both* cases, it appears there is a significant *decline* in confidence (see Figure 11). It seems likely this reflects the disaster planning campaigns by government and increasing awareness of the implications of a serious shock.

Figure 11. In the event of future shocks will you have access to food?



6. Lessons

This section presents and discusses lessons based on the findings presented in the previous section. It is organised into subsections that distil the key findings and where relevant are oriented to particular audiences.

The BRACED Myanmar Alliance project has positively affected resilience capacities overall

Our findings indicate that the project had an overall positive net effect on household resilience but there is substantial variability by location and across dimensions. There is good evidence that it has increased resilience to climate shocks as measured by the multidimensional resilience index. However, the increases (while statistically significant) are modest and mainly reflect household **capacities** to anticipate and adapt.

What changes in dimensions tell us about anticipatory, adaptive and absorptive capacities

In terms of the 3As of resilience (Anticipatory, Absorptive and Adaptive – see Bahadur, A. et al. ,2015), project interventions have been most effective at building anticipatory capacity through improving decision-making and planning. The community resilience-planning approach seems to increase participation of women and children in planning fairly rapidly. Securing significant increases in assets and widespread changes in livelihoods required to build adaptive and absorptive capacities would appear to be too high a hurdle for project interventions in a relatively short timeframe. That said, there are localised examples of increased adaptive capacity, with farmers trying new crop types or animals and new livelihood options (drawing on microfinance). The survey evidence suggests it is just not realistic to expect project interventions to deliver the kind of absorptive capacity to build resilience to very large, co-variate shocks in two or three years. Yet qualitative evidence suggests that community planned infrastructure investments can help farmers overcome smaller-scale (idiosyncratic), regular flooding.

It is a ‘package’ of interventions that appears to make the most difference.

This may not be surprising, as the assumptions in the project ToC suggest it is a combination or package of interventions that are likely to have the greatest effect. To see this assumption confirmed in practice and supported by quantitative, statistically significant data indicates that investing in a combination of interventions with high intensity is likely to produce the best results.

Township-specific effects are relevant here so, for example, in Meikhtila, virtually all targeted households benefit from infrastructure plus another intervention. This may indicate that technical interventions are not sufficient by themselves to raise levels of resilience. The strength of the BRACED Myanmar approach lies in pairing infrastructure projects (e.g. raising roads and protecting water access points) with ‘softer’ interventions – for example training around weather information and VSLAs.

Nonetheless, the survey results overall suggest that the major beneficiaries are a sub-group, and a fair proportion of targeted respondents acknowledge the intervention as being ‘a little helpful’ but do not see significant benefits for their own household. This may reflect community action planning identifying interventions that prioritise vulnerable groups (as intended). Or it could reflect the limited scale of community infrastructure investment funded by BRACED.

More intense support has the most effect on resilience

Our findings show that there is only incremental change in terms of resilience gains through offering one or more interventions but that significant gains are offered with a higher level of intensity. This

indicates that, with limited resources, there may be some benefit in focusing on a particular single intervention but that what makes the real difference is being able to offer four or more interventions. There may be limited value in spreading resources thinly across two to three interventions; focusing on well-targeted and effective interventions to a larger number of households could be more beneficial.

Those receiving intensive support (packages of interventions including infrastructure, training and microfinance, for example) see the largest gains but these do not transform resilience or well-being when viewed across all eight townships.

It is important to note that these packages of interventions generate benefits that substantially exceed costs (Yaron and Wilson, forthcoming) and are well worth making. However, policy-makers and funders should recognise that this type of project can only do so much, in the sense of:

1. Significantly increasing self-assessed resilience in the face of regular annual shocks for those benefiting from a combination of infrastructure and high-intensity support, but not in the face of extreme events such as cyclone Nargis;
2. Transforming the well-being of sub-groups of beneficiaries in certain contexts (e.g. successful pig-breeding interventions), but not scaling this to a large proportion of households in target areas in the project lifetime.

Access to and use of climate information in support of improved decision making

Provision of climate information by itself appears to be ineffective as we see a non-significant change in this dimension across households. However, in some communities, training on how to use weather and early warning data seems to add considerable value to the government's efforts to increase the provision of this data. There is also some qualitative evidence to suggest that this information has been actively used to support decision-making in farming households towards more positive coping mechanisms. This is an area that we hope evidence from other BRACED projects will help our understanding of what needs to be in place for this to occur.

Engaging communities in planning and prioritisation of activities appears to be effective.

However, equity issues need to be addressed and funding distribution and limitations need to be recognised. The community planning process used by BRACED Myanmar worked well but there are lessons in maximising access for the marginalised within development programming in Myanmar. We found evidence that communities in the target areas in which Myanmar was not spoken as a first language failed to gain from project interventions. These communities were poorer and less resilient on average. NGOs working in these areas need to ensure they have language capabilities to work with the most vulnerable. Funders need to check for this during the procurement process.

In Laputta, for example, the choice that would benefit the whole community (a cyclone shelter) exceeded the budget available and a cheaper second option (rainwater harvesting) was selected (Yaron and Wilson, 2017). Likewise, in Hpa An, the first choice of the community resilience action planning – reinforced embankments – was beyond the financial capacity of the project.

Align programme timelines with realistic timeframes for change

Higher order well-being indicators (e.g. food security) seem unchanged as a result of project interventions, which may reflect insufficient time to realise the potential of the interventions. One of the lessons we identify for policy and programming is that it is unrealistic to expect project interventions to deliver widespread, significant increases in well-being measures such as food security in the two years between baseline and endline.

Furthermore, the qualitative research indicated that the programme timeline was too short to allow for the project to build engagement with levels of government above the township (which had the principal responsibility for disaster planning). A longer-term programme should engage at a higher level of government to increase the chances of a sustained positive effect on resilience.

Resilience measurement challenges remain

There are lessons to be learnt in how to measure and assess changes in resilience as a result of project interventions.

Firstly, it proved very difficult to ask people about perceived resilience in the face of ‘severe shocks’ as their responses were anchored by the most severe shock they had experienced in the past decade – that is, cyclone Nargis. This was an extreme, once in 100-year, event that was not an appropriate benchmark against which to assess project interventions. The large majority of survey respondents did not face unexpected flood events between baseline and endline and so, when we asked how people would cope with a severe shock, they typically answered in relation to Nargis. As there were no unexpected shocks, it would have been better to include survey questions on regular annual shocks.

Second, the relatively short project life meant we had to leave as long as possible between baseline and endline to pick up project outcomes. This made it impossible to sequence qualitative and quantitative research that would have strengthened the evaluation.

Finally, the absence of significant climate shocks within the implementation period presents a measurement issue and prohibits, in the strictest sense, a full assessment of changes in resilience. Instead, our results measure changes in the capacities that, according to the project and programme theories, should lead to a household being better able to anticipate, adapt to and absorb climate-related shocks

Target communities may not be the most in need of support

Given the systematic higher levels of resilience in non-target communities, our interpretation is that this is the result of long-term and pre-existing support to those communities by the implementing NGOs. This prior history also raises questions about whether BRACED-style interventions can be expected to provide equivalent results if implemented in communities without a history of NGO involvement, given the time spent building capacities and relationships within these communities.

Make BRACED work for the poorest

More thought needs to be given about how to carry out resilience work in very poor communities, as the findings of this report indicate that the poorest are not able to leverage the resilience dividends of BRACED interventions like people with more assets do. This could be because the community planning model has not been successful at identifying interventions effective with vulnerable groups. In two cases, the preferred intervention was outside the scope of the BRACED project resources. Equally, it could emphasise the intractable nature of the impacts of poverty on resilience-building. There could be a threshold – of assets, literacy, etc. – below which participation and meaningful engagement are extremely difficult, even in carefully designed interventions. For these communities, directly tackling poverty may be the most effective way of raising resilience to climate extremes and disasters.

Some reflections on the project Theory of Change

There is evidence of progress in “pathway 1” of the ToC – ‘Communities, especially women and children, are equipped with the knowledge, skills and resources to mitigate the risks of and recover from climate shocks and stresses’. Target communities have seen improvements in certain capacities that contribute

to resilience and female-headed households gained significantly relative to non-target groups. As male and female respondents were asked about resilience of their household, this was the only gender effect identified. Evidence that groups with more assets gained more across resilience capacities suggests that the project ToC should have paid more attention to differentiation by poverty status.

There has been some progress in pathway 2 of the ToC – ‘Institutions are coordinated, responsive, accountable and inclusive in their management of climate risks’. The community resilience assessment (CRA) process did build township engagement with target communities in some townships and there is evidence of increased involvement of women and children in planning. However, the project had limited ability to influence existing resilience planning practice above the township level or high levels of township official turnover. It is not clear that the CRA process will be sustainable. Our view is that the project ToC underestimated the complexity and difficulty of achieving sustainable institutional change.

Changes under Pathway 3 – ‘The evidence base is strengthened and learning on managing climate extremes is disseminated to inform and influence the resilience-related policy strategies and agenda at international, national and subnational levels’ – was always envisaged over a medium rather than short-term period. Nonetheless, results on scaling up and out were expected over two to three years and we have not found any evidence this has occurred.

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