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WHAT MATTERS FOR HOUSEHOLDS' RECOVERY TRAJECTORIES FOLLOWING THE GORKHA EARTHQUAKE?

A Two-Year Panel Study

April, 2018

MERCY CORPS

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EXECUTIVE SUMMARY

In April 2015, a 7.8 magnitude earthquake struck Nepal, killing over 9,000 people, destroying or badly damaging more than 800,000 homes and displacing approximately 2.8 million people. Where shocks like earthquakes cannot easily be prevented, strengthening the ability to prepare, respond and recover is critical to maintaining development gains in spite of them. In this context, resilience can be thought of as the combination of pre-existing capacities and the responses used to cope and recover in the aftermath. Ultimately, the ability of households to maintain their long-term wellbeing in the face of shocks depends upon the combination of their capacities and how they are used. To understand what mattered for recovery in the short and long-term, this study followed the same households 10 weeks, one year and two years after the Gorkha earthquake. The analysis will explore what factors mattered most for short-term coping and long-term recovery in order to improve humanitarian response and design of recovery programs in the aftermath of acute disasters.

Key Findings and Recommendations

A SINGLE MAJOR DISASTER CAN BE A CATALYST FOR INCREASED FRAGILITY

The aftermath of the 2015 earthquake was complicated by subsequent environmental and economic shocks and stresses. Most households experienced several shocks in the year following the earthquake, which may explain why households were unable to rebuild their homes and recover their livelihoods at this time. Households also experienced sharp increases in food prices both years after the earthquake, which may have influenced decreases in food security two years post-earthquake. The results demonstrate that earthquake-affected households remained vulnerable to continuing economic and environmental shocks after the earthquake, which strengthens the argument that building resilience against shocks and stresses requires continued intervention beyond the initial shock.

Recommendation: Ensure humanitarian actors are prepared to alleviate suffering in the short-term, while working with government and communities to identify and manage future risks.

FACTORS THAT HELP HOUSEHOLDS IN THE IMMEDIATE AFTERMATH OF A SHOCK MAY NOT SUSTAIN LONGER-TERM RECOVERY:

Timely emergency aid and informal savings helped households mitigate the worst effects of the earthquake in its immediate aftermath, but did not influence long-term recovery trajectories. In the short-term, these factors were associated with decreased negative food coping strategies, improved shelter quality and livelihood recovery, but the effects were negative, or disappeared two years later. This suggests that rapid relief operations and informal savings are important in the immediate aftermath of a shock, but alternative measures are necessary to ensure these effects can last beyond the acute stage of a disaster.

Recommendation: Bolster timely and nimble relief efforts that provide aid within seven days and quickly pivot to building longer-term resilience capacities for rapid recovery.

BOLSTERING KEY RESILIENCE CAPACITIES OVER TIME ALLOWS HOUSEHOLDS TO COPE IN THE SHORT-TERM AND ACHIEVE LONG-TERM RECOVERY:

The study showed that sustained increases over time in key resilience capacities, including access to and use of formal savings, formal credit, household disaster risk reduction awareness and bonding social capital had positive effects on household short and long-term recovery trajectories. Households with formal savings before the earthquake had better food security and poverty outcomes immediately after the earthquake. Seeing positive change in having formal savings or drawing on formal credit over time was related to even larger effects on livelihood recovery, purchasing productive assets and lowering negative food coping strategies in the long-term. Bonding and bridging social capital appeared to not erode over time, despite continued shocks and stresses. Households who saw positive growth in their ability to rely on their own caste for help saw modest improvements in food security in the short and long-term, suggesting that social networks may be the key to bolstering food consumption and access when times are tough. Households who gained new bridging social capital capacity over time saw improvements in their long-term home restoration and livelihood recovery. Households with greater disaster risk awareness before the earthquake and those who developed awareness over time were associated with higher livelihood recovery in the short and long-term.

Recommendation: Support disaster-affected households with an integrated package of resilience interventions, including formal savings and loans, household risk awareness and planning and social capital to speed and strengthen recovery and build a more resilient future.

FORMAL LENDING CONSISTENTLY HELPS HOUSEHOLDS COPE BETTER AND RECOVER FASTER:

Households who accessed formal credit were better off than households who did not borrow, both in the immediate aftermath of the shock, and one and two years later. Access to formal credit mattered the most for food security and recovering livelihoods in the short-term and home reconstruction and livelihood recovery in the long-term. This was not true for informal credit, which appeared to make households worse off in the short and long-term in terms of food coping strategies, dietary diversity and livelihood recovery.

Recommendation: Strengthen preferred lending terms and loan products as part of disaster recovery efforts in order to help households rebuild their lives better and faster and increase their resilience to future shocks and stresses.

RELYING ON GOVERNMENT DISASTER PREPAREDNESS AND RESPONSE CAPACITY IS INSUFFICIENT IN CONTEXTS OF WEAK GOVERNANCE:

Relying on poorly functioning community leadership and plans before the earthquake may have left households less equipped to access food, recover their livelihoods and purchase assets in the short and long-term. However, households with greater disaster risk reduction awareness before the earthquake were able to recover their livelihoods and had better dietary diversity in the short-term. Households who gained disaster risk reduction awareness capacity over time were less likely to be in poverty and more likely to recover their livelihoods in the long-term.

Recommendation: Ensure disaster risk reduction efforts focus on household-level risk awareness and planning capacity, while simultaneously addressing underlying governance constraints to effective public sector-led disaster risk reduction.

CONCLUSION:

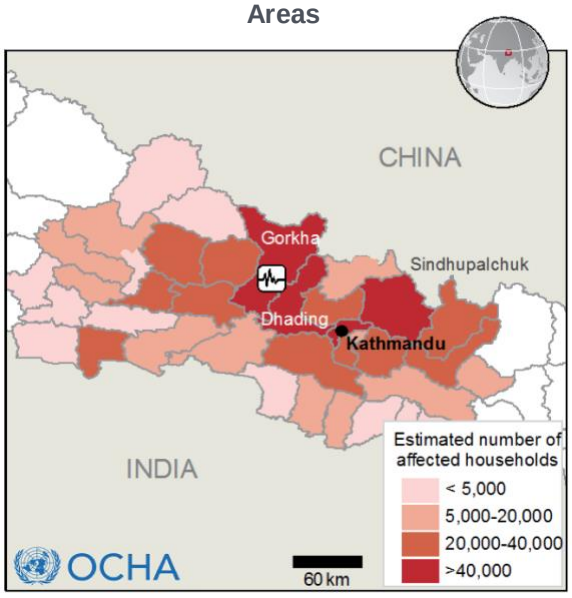
Study findings suggest that humanitarian relief and response efforts must be nimble and adaptive, moving faster toward integrated recovery work. This includes increasing households' access to a holistic and effective package of key resilience capacities over time, allowing them to better manage current and future shocks, rebuild their lives in a complex risk environment and forge a stronger, more resilient future.

BACKGROUND

Description of Research

The Earthquake Recovery Program (ERP) was a privately funded program designed to support the recovery of earthquake-affected households through 22 Village Development Committees (VDCs) of six earthquake-affected districts. As part of its strategy, the program sought not only to ensure recovery of households to pre-earthquake status, but also to enable these households to be resilient to future disasters and crises. Accordingly, the program sought to better understand the critical factors that help communities better manage and reduce the impact of ongoing shocks and stresses they face, and where and how program interventions can best contribute to bolstering these capacities.

Figure 1: Map of Earthquake Affected Areas



Source: UNCS, Nepal Survey Department, UN-Nepal, USGS, Nepal OBS, 2015

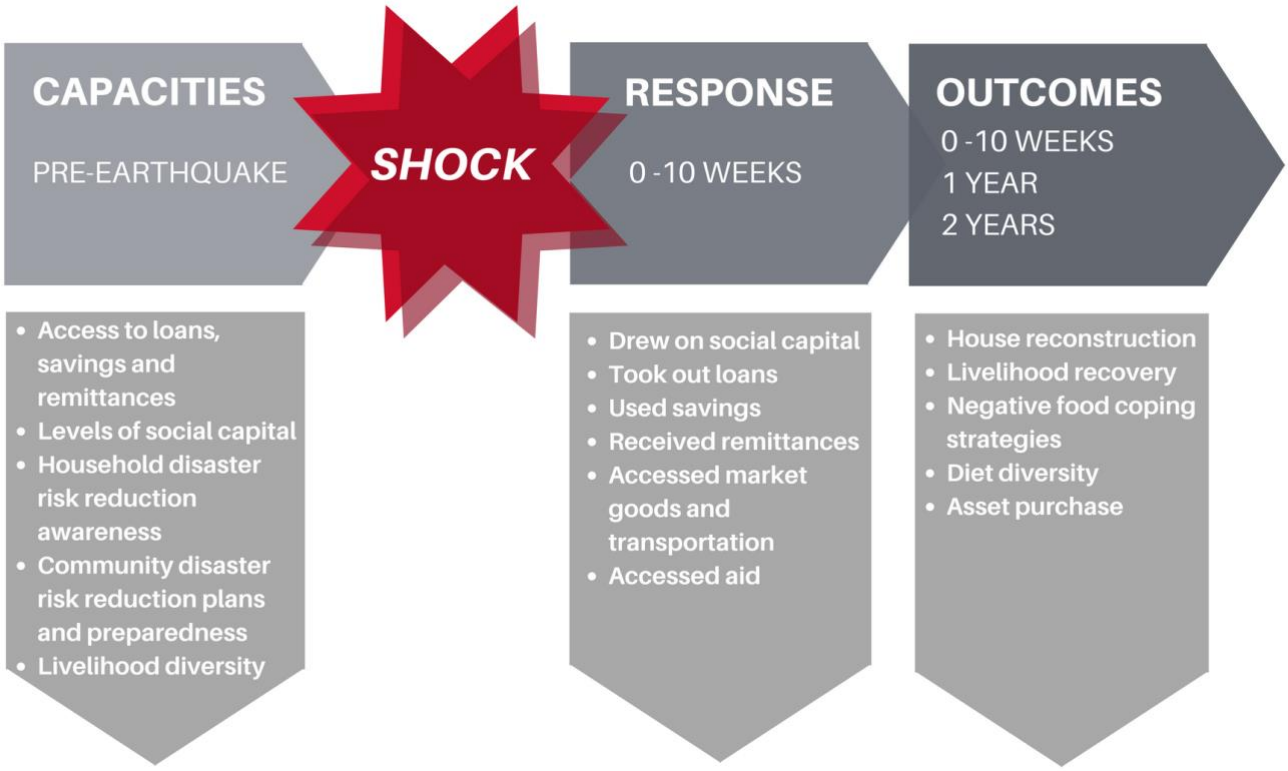
In line with these objectives, and as part of the program's learning agenda, Mercy Corps Nepal (MCN) conducted research in five VDCs of Sindhupalchowk District 10 weeks (round 1), one year (round 2) and two years (round 3) after the Gorkha earthquake. This research provided insight into which factors determined how households were initially affected by the earthquake and how resilience capacities affected households' recovery trajectories one and two years after the earthquake.

Research Questions

In order to understand what mattered for recovery and wellbeing in the short-term (10 weeks post-earthquake), medium-term (one year post-earthquake) and long-term (two years post-earthquake), the following research questions were asked during the different survey rounds:

1. How have households' recovery and wellbeing outcomes changed over time?
2. What shocks and stresses are most associated with reduced wellbeing and recovery outcomes one and two years after the earthquake?
3. What pre-earthquake resilience capacities matter most for short, medium and long-term recovery and wellbeing?
4. What immediate resilience responses (within 10 weeks of the earthquake) helped households recover and achieve positive wellbeing in the short, medium and long-term?
5. Are households who saw positive change in resilience capacities and responses over time more likely to have better outcomes two years after the earthquake than households who did not see positive change?

Figure 2: Temporal Relationship between Capacities, Shock Exposure, Responses and Wellbeing Outcomes



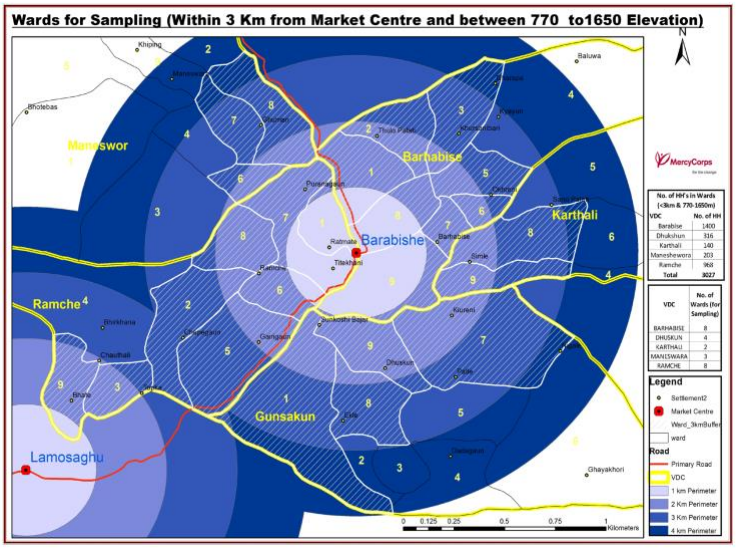
METHODOLOGY

Sampling

Sampling for each survey round is described below.

First Wave (Round 1): 10 Weeks Post-Earthquake

Figure 3: Map of sampled area



Source: UNCS, Nepal Survey Department, UN-Nepal, USGS, Nepal OBS, 2015

The first round of data was collected through a quantitative survey administered in June 2015 (10 weeks after the earthquake) to randomly selected households within five earthquake-affected VDCs: Barhabise, Ramche, Dhuskun, Karthali and Maneswnara. Within these five VDCs, 26 wards[1] were purposively selected for inclusion based on the following criteria: similar levels on the Earthquake Severity Index[2], up to three kilometers away from a market center and between 770 and 1,650 feet in elevation. These criteria were imposed to ensure similar levels of shock exposure as well as roughly the same environmental conditions in terms of access to roads, goods and financial services. By imposing these criteria, any nuances that might exist in various sub-populations in the sample could be better isolated.

Sampling of households was stratified into three caste groups to ensure sufficient representation of castes with lower population representation in the area. The three strata were a combined group of the Brahmin and Chetri castes (considered the most privileged in Nepali society), the Janajati caste (composed of three ethnicities in the earthquake- affected area: Newar, Tamang and Gurung) and the Dalit caste (considered as the untouchables in Hindu culture, and comprising the most marginalized community in Nepal). A total sample size of 1,225 households was reached, and after cleaning incomplete or invalid records, a final sample of 1,177 households remained.[3]

Second wave (Round 2): One Year Post-Earthquake

From the 1,177 households interviewed in 2015, we drew a random sample of 750 households to use in the ongoing panel study in an effort to reduce data collection time and costs. Since the sample size was

1 A ward is an administrative sub-division of a VDC. Rural VDCs are each composed of nine wards.

2 The Nepal Earthquake Severity Index is designed to provide an overview of estimated severity of impacts resulting from the earthquake of 25 April 2015. It estimates severity based on: 1) the intensity of the earthquake; 2) population; 3) vulnerability of housing and population. UNOCHA. *Nepal Earthquake Severity Index (Version 4 - 30 April 2015*), April 2015. Retrieved from https://data.humdata.org/dataset/nepal-earthquake-severity-index

3 For detailed analysis on how social identity (as defined by caste and gender) affected households' ability to cope with and recover from the earthquake, see the round 1 report: *What's Next for Nepal? Evidence for what Matters for Resilience after the Gorkha Earthquake (https://www.mercycorps.org/research/what-next-for-nepal)*

reduced, no sub-group analysis was conducted (including analyzing results by caste and gender)[4]. The observed attrition rate was 15%, yielding a final sample size of 635 households.

Third wave (Round 3): Two Years Post-Earthquake

Two years after the earthquake a third round of data collection was conducted on the remaining 635 households in the study. Of these, 577 respondents (91%) were successfully surveyed for all three survey rounds. Balance tests, descriptive statistics and attrition analysis were conducted to understand how likely demographic changes in the sample would affect outcomes. No issues were found.

Table 1. Attrition Rates per Survey Round

Round/Year	Targeted	Surveyed (% attrition)
Round 1 (June 2015)	1,225	1,117 (9%)
Round 2 (April 2016)	750	635 (15%)
Round 3 (June 2017)	635	577 (9%)

Analytical Approach

The analysis aims to follow a staged approach to understanding the state of recovery for households affected by the earthquake.

Model 1: Trends in Wellbeing and Recovery Over Time

The objective of this section was to identify observable changes in recovery for households across outcome indicators from 10 weeks, one year and two years post-earthquake. Descriptive statistics and comparison of means (t-tests) were utilized to observe how recovery and wellbeing outcomes changed over time. Wellbeing and recovery outcomes were divided into primary and secondary outcomes. Primary outcomes are outcomes that are direct measures of wellbeing and recovery. Secondary outcomes focus on asset purchase in the past 30 days and 12 months, which may approximate household economic recovery, but may not translate into higher-level wellbeing outcomes like food security and poverty status. Only results that were statistically significant at the 95% level or above were included in this section.

[4] Mercy Corps Nepal will publish a synthesis report focusing on gender, social inclusion and resilience in the aftermath and recovery from the 2015 Gorkha earthquake drawing on the earthquake research and the BRIGE research (get actual study name).

Table 2. Summary of Outcomes Used in Analysis

Variable	Description	Round 1: Pre-EQ[5]	Round 1: 10 Weeks	Round 2: One Year	Round 3: Two Years
Primary Outcomes					
House Restored or Improved	Self-reported indicator of current housing conditions			✓	✓
Recovered Livelihood (restarted or started new)	Self-reported indicator of current livelihood status		✓	✓	✓
Probability of Poverty Index	Index measuring likelihood of household poverty	✓	✓	✓	✓
Household Dietary Diversity Score	Qualitative measure of food consumption reflecting household access to a variety of foods		✓	✓	✓
Coping Strategies Index (Adverse)	Measurement of food security and the impact of food aid programs in humanitarian emergencies		✓	✓	✓
Secondary Outcomes					
Factor of Owned Assets	Exploratory analysis to understand changes in asset ownership			✓	✓
HH Purchased Household Assets	Self-reported indicator showing that households have purchased household assets in past 30 days and/or 12 months			✓	✓
HH Purchased Productive Asset	Self-reported indicator showing that households purchased productive assets in past 30 days and/or 12 months			✓	✓
HH Purchased Livestock	Self-reported indicator showing that households purchased livestock in past 30 days and/or 12 months			✓	✓
HH Purchased Any Assets since the Earthquake	Self-reported indicator showing that any asset purchase has occurred since EQ		✓	✓	✓

[5] At Round 1 (10-weeks post-earthquake), households were asked about their current status and how things were before the earthquake.

Model 2: Shocks and Stresses as Predictors of Fragility and Recovery

This section used multilinear regression analysis to identify what economic and environmental shocks across all three time points were associated with reduced recovery outcomes two years after the earthquake. Only results that were statistically significant at the 95% level or above were included in this section.

Model 3: Factors Driving Coping, Recovery and Resilience

This section used multilinear regression analysis to identify what capacities and responses were associated with wellbeing and recovery outcomes at 10 weeks, one year and two years after the earthquake. Only resilience capacities, responses and wellbeing outcome variables that aligned with Mercy Corps' resilience theories of change were included in this study. This section also sought to understand how changes in attaining resilience capacities over two years (from before and shortly after the earthquake to two years later) drove outcomes. Households that gained a resilience capacity at some point after Round 1 got a "1" and those that did not got a "0". Logit regressions were then used to test whether positive change in a resilience capacity was related to better outcomes. Only results that were statistically significant at the 95% level or above were included in this section.

Table 3. Summary of Capacity and Response Variables Used in Analysis

Variable	Description	Round 1: Pre-EQ	Round 1: 10 Weeks	Round 2: One Year	Round 3: Two Years
	Social Capital				
Bonding	Can rely on own caste for help before and after the earthquake	✓	✓	✓	✓
Perma System	Participates in the perma system pre-earthquake. The perma system is a self-help, labor exchange system in Nepal. It applies particularly to agriculture, where an individual works on someone else's land and receives the same favor in return.	✓		✓	✓
Collective Action	Members of community are helping to rebuild the community post-earthquake		✓	✓	✓
Bridging	Can rely on people in other castes for help before and after the earthquake	✓	✓	✓	✓
Linking	Opinions of relationships with community leaders before and after the earthquake	✓	✓	✓	✓
	Financial Services				
Borrowed from Informal Sources	Took a loan from an informal institution (local money lender, employer, credit shop, neighbor) before and after the earthquake	✓	✓	✓	✓

Borrowed from Formal Sources	Took a loan from a formal institution (bank, credit union, microfinance institution) before and after the earthquake	✓	✓	✓	✓
Saved Informally	Saved in an informal institution (invest in crops or livestock, local savings club, in home, with relatives) before and after the earthquake	✓	✓	✓	✓
Saved Formally	Saved in a formal institution (bank, credit union, or microfinance institution) pre-earthquake	✓	✓	✓	✓
Used Savings	Any household member used saving post-earthquake		✓		✓
Received Remittances	Received money from family members working overseas before and after the earthquake	✓	✓	✓	✓
	Market Access				
Market Good Access	Can access food staples, agriculture inputs and construction materials after the earthquake		✓	✓	✓
Market transportation	Transportation to the nearest market available post-earthquake		✓	✓	✓
Livelihood Diversity	Number of diverse sources of livelihoods	✓		✓	✓
	Disaster Risk Reduction (DRR)				
Household DRR	Series of questions about household DRR awareness	✓		✓	✓
Community DRR	Series of questions community disaster preparedness	✓		✓	✓
Community disaster plans	Community had Disaster Management Committee (DMC) or disaster management plan pre-earthquake	✓		✓	✓
	Access to Emergency Aid				
Aid sources	Number of different types of assistance received after the earthquake		✓		
Timeliness of Aid	Received aid within seven (7) days after the earthquake		✓		

RESULTS

Recovery and Wellbeing Trajectories

Key Finding: *Most long-term recovery outcomes show positive recovery trajectories over time, with the most dramatic change occurring by two years after the earthquake. Negative food coping strategies showed the greatest reduction in the first year after the earthquake. Household dietary diversity started to show signs of decline two years after the earthquake.*

a. Outcomes Demonstrating Short-term Wellbeing

Food Security: Negative food coping strategies improved over time; dietary diversity worsened over time.

The coping strategies index (CSI) measures behaviors or coping strategies that people employ when they cannot access enough food. Respondents were asked how often they engaged in these behaviors (never, less than once per week, one to two times a week, three or more times a week and daily) and scores were weighted by the severity of the behavior and how often they engaged in it. The higher the CSI score, the more food insecure a household is (maximum score 112). There was a large, statistically significant decrease in the mean CSI score per household from 10 weeks to one year post-earthquake (from 9.2 to 3.3). This trend continued at two years post-earthquake, but the decrease was smaller (from 3.3 to 2.4); however, this difference was not statistically significant. These figures indicates that households had to rely on negative coping strategies to access food 10 weeks after the earthquake but were able to rely less on these strategies over time. The most frequent negative food coping strategies 10 weeks post-earthquake were: relying on less preferred foods (45%), purchasing food on credit (40%), relying on begging for food (30%) and limiting portion sizes (29%).

Households did not see a similar negative impact on dietary diversity after the earthquake. The household dietary diversity score (HDDS) asks whether household members have consumed 12 different types of food over the past 24 hours. Increasing scores represent improvements in consumption and general dietary diversity. Dietary diversity was not significantly impacted immediately after the earthquake through one year post-earthquake. One to two years after the earthquake, households experienced a slight decrease in diet diversity (roughly 3/4 of a food group), which demonstrate some level of reduced consumption after the initial aftermath of the earthquake. These findings suggest that additional economic and environmental shocks experienced one to two years after the earthquake had a negative impact on household's food consumption (which is explored in the next section of the report).

Figure 4. Reported Average Coping Strategies Index Scores

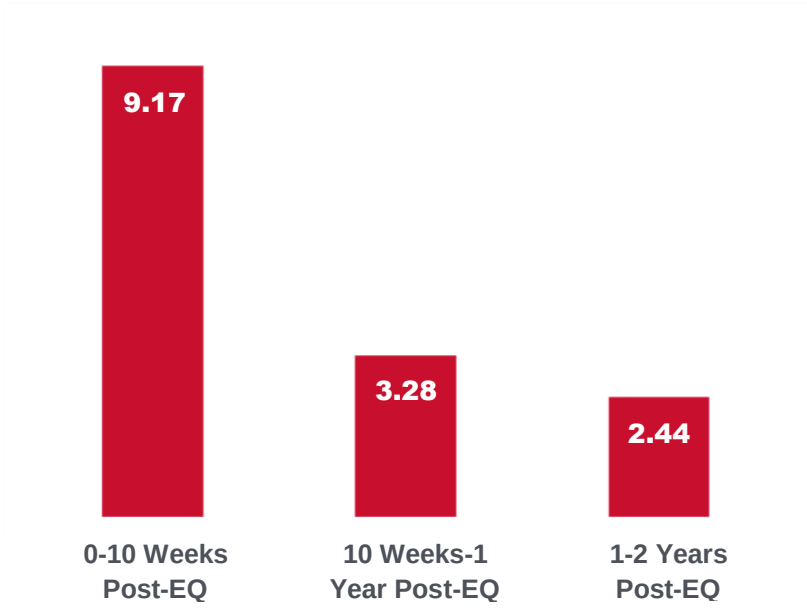


Figure 5. Reported Average HDDS

b. Outcomes that Demonstrate Longer-term Wellbeing and Recovery

Home Restoration: Largest gains occur by two years after the earthquake, but some households still lag behind in recovery.

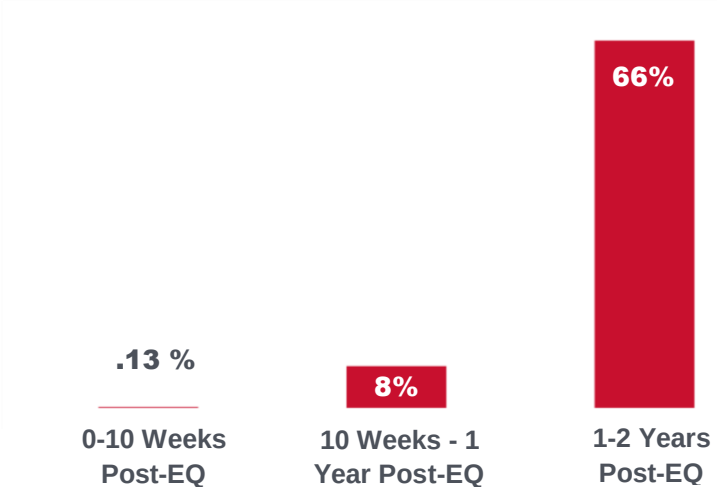
Ten weeks after the earthquake, 47% of the study population reported that their house was either completely destroyed or was standing but with heavy damage (i.e., missing roof and/or walls).

Table 4. Sample Population House Status 10 weeks after Earthquake

Status of House	Percent of Sample
Nothings standing	21%
Standing with heavy damage (missing roof or walls)	26%
Standing with minor damage	27%
Standing no damage	25%

Two years after the earthquake, 66% of participants reported their house was restored to pre-earthquake status or better in comparison to one year post-earthquake, when only 8% of households reported complete restoration. A similar pattern emerges when looking at the proportion of households who report purchasing any assets within the past 30 days (the figure more than doubles from 26% at one year post-earthquake to 60% at two years post-earthquake). Shortly after the earthquake, the government of Nepal announced a loan scheme that would make up to 300,000 NPR (around 3,000 USD) available interest-free to households affected by the April 25, 2015 earthquake for home reconstruction. However, most eligible households (83%) had only received 50,000 NPR as of December 27, 2017[6]. This delay in access to reconstruction funds may partially explain the lag in recovery in the study population.

Figure 6. Proportion of Households Reporting Home as Restored or Improved Since Earthquake .13 8 66



Poverty Rates: Return to pre-earthquake levels two years after the earthquake.

The Probability of Poverty Index[7] calculates how likely a household is to be living below the poverty line by asking 10 questions about their household's characteristics and asset ownership. When scores are

[6] Source: https://www.spotlightnepal.com/2018/01/07/earthquake-reconstruction-loan-delayed-loan-denied/

[7] The probability of poverty index (PPI) is constructed based on meta-analyses of national income/expenditure surveys and is revised over time as economic situations change.

averaged across all households, the mean score approximates the poverty rate in the surveyed population. The 2015 earthquake was a major economic shock that destroyed houses and increased the likelihood of households falling into poverty, which increased their vulnerability. Before the earthquake, 3.5% of households in earthquake-affected areas were living below the poverty line (according to the Probability of Poverty Index). Ten weeks after the earthquake, this figure jumped to 18%. Poverty rates improved at one year post-earthquake and finally returned to pre-earthquake status two years after the shock. The changes in poverty rates from before the earthquake to 10 weeks after were mainly driven by changes in unemployment among male head of households, the number of bedrooms reducing from three or more to one or none, house wall material shifting from cement-bonded bricks/stones to bamboo/leaves, unbaked bricks, wood, mud-bonded bricks/stones or no outside walls, the roof material changing from concrete/cement to straw/thatch/mud and houses reporting they no longer have a toilet.

Figure 7. Poverty Rates Based on Nepal Probability Index Scores

Table 5: Changes in House Construction and Assets Before and After the Earthquake

	Pre-Earthquake	10 Weeks Post-Earthquake
Male head of household does not work	8%	21%
No bedrooms in current house	1%	38%
Walls made of bamboo leaves	46%	88%
Roof made of straw thatch	5%	28%
House does not have a toilet	9%	84%

Recovered Livelihood: 50% of households report livelihood recovery two years after the earthquake, but some still have not recovered.

Nearly all households surveyed 10 weeks after the earthquake (80%) said they lost one or more income sources due to the earthquake. By two years after the earthquake, about 50% of households reported they had restarted an income source they had prior to the earthquake. Only 4% - 9% of households reported starting new income generating activities that they did not have prior to the earthquake across all three survey periods (10 weeks, one year and two years after the earthquake). These trends in long-term recovery outcomes show that the largest improvements happened by two years post-earthquake, but that not all

households have fully recovered. The next section of this report provides insights into what may be contributing to households' stalled recovery.

Figure 8. Proportion of Households Reporting Lost Income Source

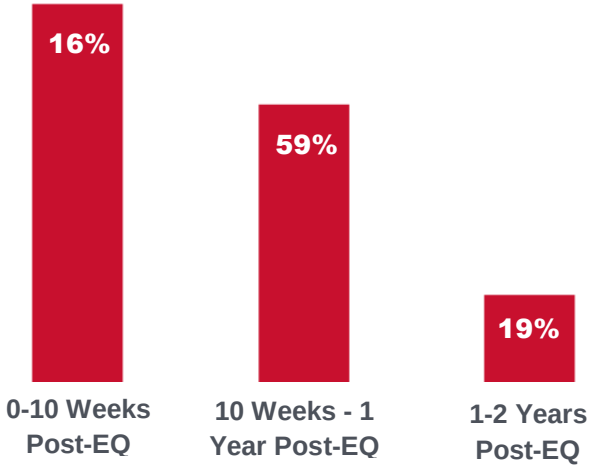


Figure 9. Proportion of Households Reporting Restarting Pre-Earthquake Income Source

Shocks and Stresses as Predictors of Fragility and Recovery

***Key Finding**: Continued shocks and stresses experienced within the first year after the earthquake may explain household's stalled recovery one year after the earthquake. The impact of economic shocks on economic recovery was greater one year after the earthquake, but isolated to the year it was experienced. Both environmental and economic shocks experienced one to two years after the earthquake may partially explain decreases in dietary diversity two years post-earthquake.*

On average, most households experienced more shocks and stresses 10 weeks to one year after the earthquake. The main environmental shocks households experienced within the first year after the 2015 earthquake were drought (64%), earthquakes (38%) and storms (23%). One to two years after the earthquake, the most common climate shocks experienced were landslides (20%), livestock disease (17%) and storms (16%). Most households only experienced environmental shocks within the first year post-earthquake. Very few households (0% - 7%) reported continuously experiencing environmental shocks during both the first and second year after the earthquake (see figure 10 and table 6).

The primary economic shocks experienced within the first year after the earthquake were sharp increases in food prices (87%), increases in input prices (27%) and deflated crop prices (17%). One to two years after the earthquake, the most common economic shocks were sharp increases in food prices (60%), deflated crop prices (21%) and increases in input prices (13%). Interestingly, only 1% - 2% of households experienced economic shocks continuously from 10 weeks to two years after the earthquake, meaning households either experienced them within the first year after the earthquake or the second year, but not both. The exception to this was sharp increases in food prices, where half of all households surveyed (50%)

reported experienced this continuously during the first two years after the earthquake. Figures 10 and 11 below show the proportion of households who experienced climate and economic-related shocks within the first year (10 weeks to 1 year) and second year (1 year to 2 years) after the earthquake.

Figure 10: Percent of Household Reporting Climate Shocks at Different Time Periods after the Earthquake

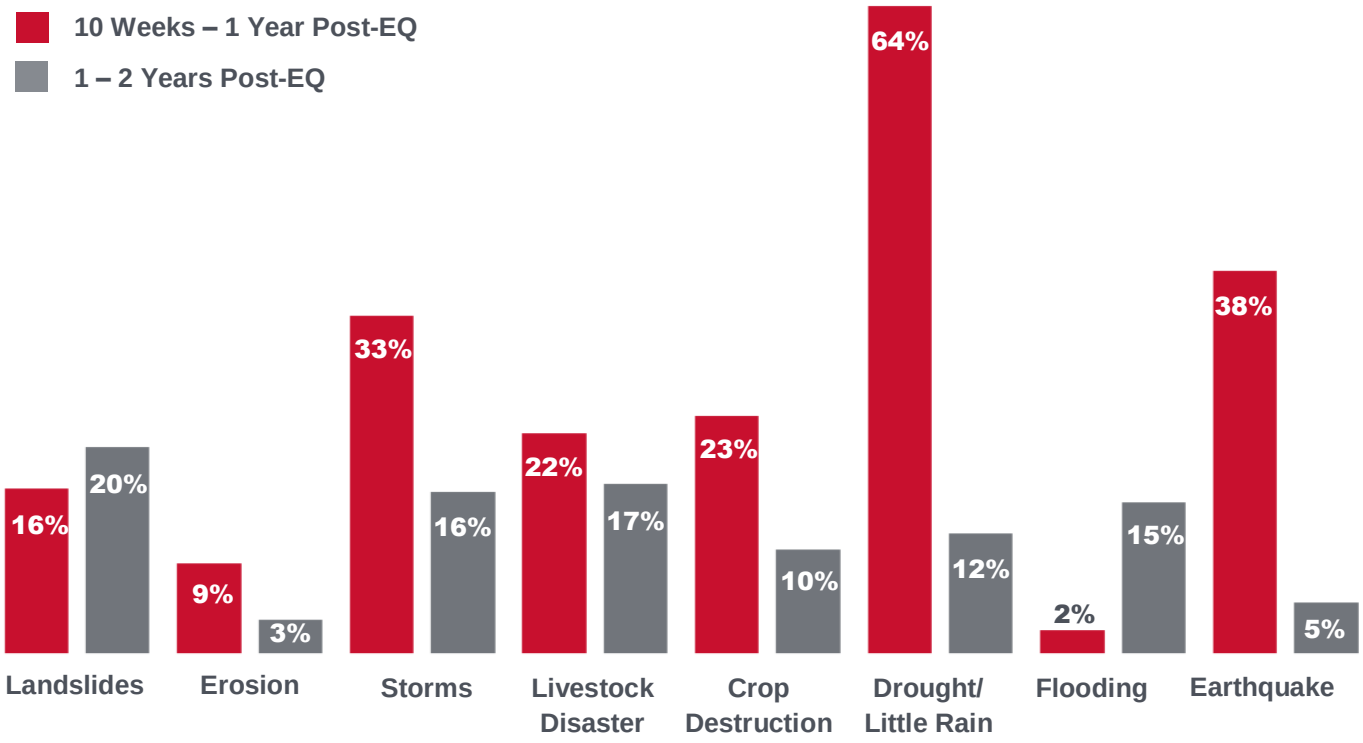


Table 6: Percent of Household Reporting Climate Shocks after the Earthquake (EQ)

Climate Shocks	Never Experienced Shock	Round 2 (10 weeks - 1 Year Post-EQ)	Round 3 (1-2 Years Post-EQ)	Round 2 & 3 (10 weeks - 2 years Post-EQ)
Drought/ Little Rain	30%	59%	6%	5%
Storms	53%	31%	13%	3%
Earthquakes	58%	37%	5%	0%
Livestock Disaster	66%	17%	12%	5%
Landslide Erosion	70%	10%	14%	7%
Crop Destruction	72%	18%	4%	6%
Flooding	83%	2%	14%	1%
Erosion	88%	9%	3%	0%

Figure 11: Percent of Household Reporting Economic Shocks after the Earthquake (EQ)

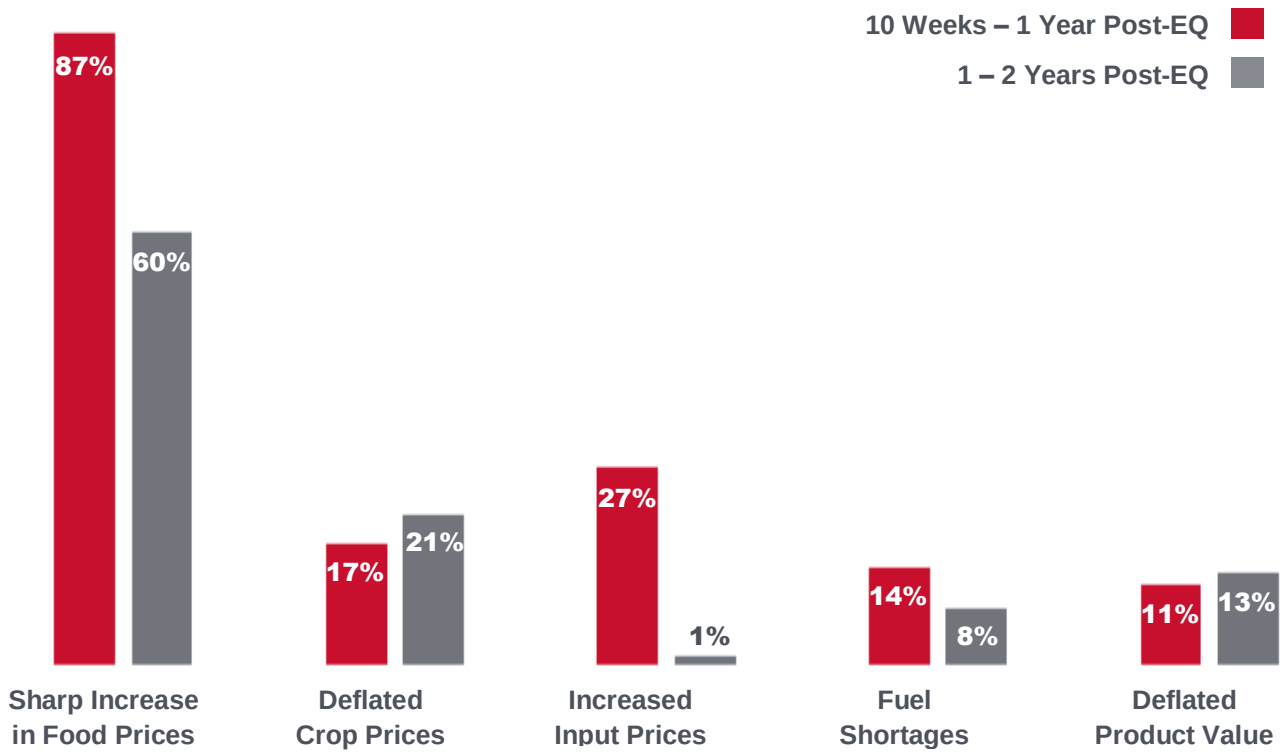


Table 7: Percent of Household Reporting Economic Shocks at Different Time Periods after the Earthquake (EQ)

Economic Shocks	Never Experienced Shock	Round 2 (10 weeks - 1 Year Post-EQ)	Round 3 (1-2 Years Post-EQ)	Round 2 & 3 (10 weeks - 2 Years Post-EQ)
Sharp Increase Food Price	4%	37%	9%	51%
Deflated Crop Price	65%	14%	18%	2%
Increase in Input Price	72%	27%	1%	1%
Deflated Product Value	77%	10%	12%	1%
Fuel Shortages	80%	12%	6%	2%

Relationship Between Shocks and Recovery and Wellbeing Outcomes

Shocks experienced within the first year after the earthquake may explain why recovery was stalled one year post-earthquake. Shocks experienced one to two years after the earthquake had greater impacts on food security outcomes two years after the earthquake.

When controlling for pre-earthquake capacities and responses 10 weeks after the earthquake, participants who experienced an economic shock within the first year post-earthquake were less likely to purchase assets and rebuild their home to pre-earthquake status or better one year after the earthquake. Similarly, households who experienced climate-related shocks within the first year after the earthquake were less likely to have purchased productive assets (including livestock) and recovered their livelihood one year after the earthquake. Every additional climate shock experienced within the first year after the earthquake is associated with a decrease of 3.4 % in a household's likelihood of recovering their lost livelihood or starting a new livelihood one year after the earthquake. The average number of climate shocks experienced per household was one, so this negative relationship may not have had a large impact. These negative effects seem to be isolated to one year after the earthquake, potentially because less people experienced shocks the second year after the earthquake.

Initially, households who experienced economic shocks within the first year after the earthquake had slightly higher levels of diet diversity one year post-earthquake. However, when controlling for pre-earthquake capacities and responses 10 weeks after the earthquake, economic and environmental shocks experienced one to two years after the earthquake were associated with poor diet diversity and greater negative food coping strategies two years post-earthquake. Participants who experienced environmental and/or economic shocks between one and two years post-earthquake saw their dietary diversity scores drop by 6.7% (equivalent to half a food group) in comparison to those who did not experience any shocks. These results may be partially driven by the sustained inflation of food prices most households experienced both years after the earthquake. These results demonstrate that earthquake-affected households remained vulnerable to continuing economic and environmental shocks after the natural disaster. This strengthens the argument that building resilience against shocks and stresses requires continued intervention beyond the initial shock.

Factors in Coping, Recovery and Resilience

I. Effect of Social Identity and Social Capital on Coping, Recovery and Resilience

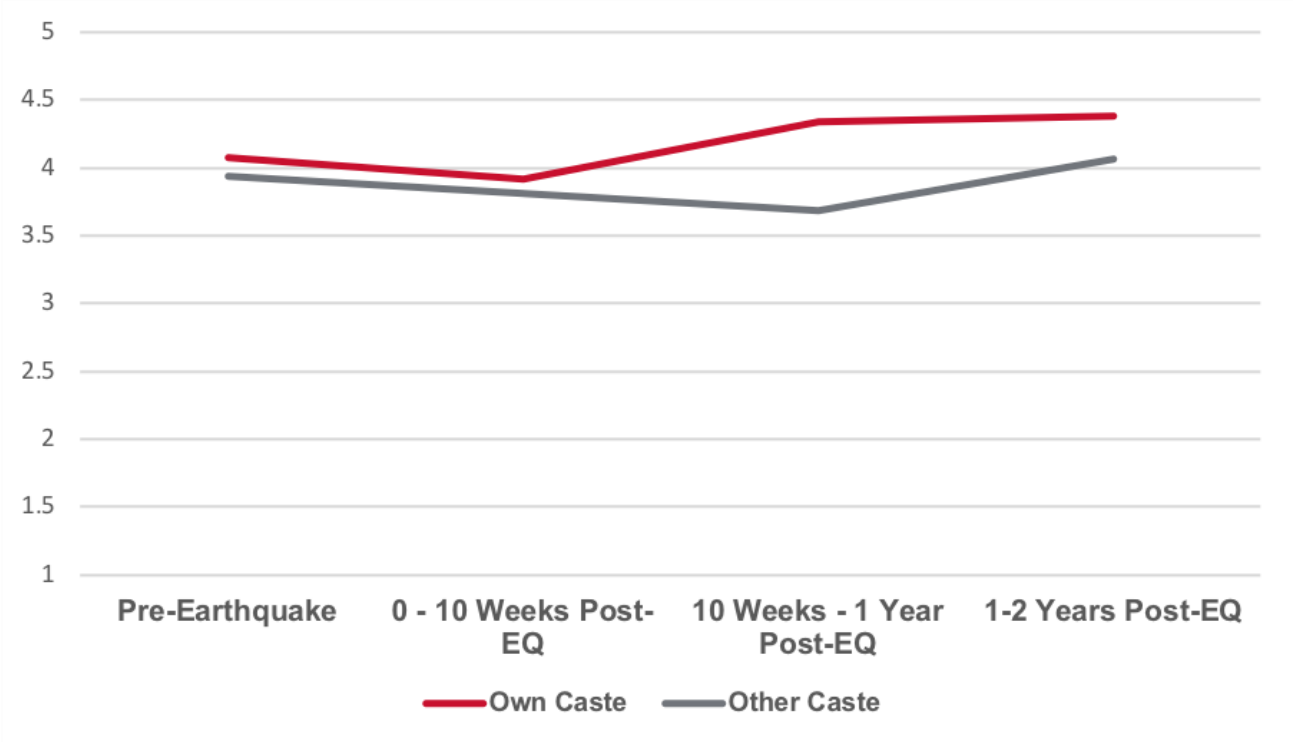
***Key Finding**: Households who saw positive change in both bonding and bridging social capital over time were better off two years after the earthquake. Bonding social capital mattered more for food security in the short and long-term, whereas bridging social capital was related to improved higher-level recovery outcomes (home restoration and livelihood recovery) 2 years after the earthquake. Community governance systems and norms around collective action most likely deteriorated after the earthquake, which may explain why linking social capital and community collective action resulted in worse short-term food security and reduced home restoration in the short and long-term.*

a. Changes in Social Capital Capacity Trajectories

Households were asked whether they agreed they could count on members of their own caste (bonding) or member of other castes (bridging) to help them (with borrowing money or sharing food, for example) when there was a problem. Overall, levels of bonding and bridging social capital were high prior to the earthquake across the sample. Within the 10 weeks after the earthquake, levels of bonding and bridging social capital fell slightly. By the first year following the earthquake, bonding social capital began to rise back to pre-

earthquake levels, whereas bridging social capital continued to fall further. This may indicate that, when faced with the aftermath of a devastating disaster, bonding social capital is more durable than bridging social capital, in this case bridging social capital defined as diverse castes supporting each other's recovery, and bonding referring to assistance within one's own caste. By two years after the earthquake, bonding and bridging social capital both rose to levels higher than what they were pre-earthquake. Other studies (Mercy Corps Ethiopia's recurring monitoring study[8] and the Sichuan earthquake panel study[9]) have found that social capital is a finite resource that can become depleted. In Nepal, we see that, while there is some evidence of depletion of these resources in the short-term, after two years these measures recovered to even greater levels than what they were before the earthquake. This suggests that hardship can both strain and strengthen social bonds and that despite hardship, bonding and bridging social capital did not erode in the long-term.

Figure 12. Households Reporting Reliance-Caste and Non-Caste (Strongly Agree = 5 to Strongly Disagree = 1)



[8] Sagara and Hudner (2017). ENHANCING RESILIENCE TO SEVERE DROUGHT: WHAT WORKS? Evidence from Mercy Corps' PRIME Program in the Somali region of Ethiopia. Retrieved at: https://www.mercycorps.org/sites/default/files/Mercy%20Corps_PRIMEandDroughtResilience_2017_FullReport.pdf

[9] Ziqiang Han , (2017), Social Capital and Changes in Post-Disaster Recovery Process: Observations from China After the 2008 Wenchuan Earthquake, in William L. Waugh, Jr. ,Ziqiang Han (ed.) Recovering from Catastrophic Disaster in Asia (Community, Environment and Disaster Risk Management, Volume 18) Emerald Publishing Limited, pp.15 – 36.

b. Relationship Between Social Capital and Recovery

Bonding Social Capital: Households who relied on their own caste for help saw improvements in food security in the short and long-term.

Households that responded that they could rely on their own caste for help before the earthquake had slightly better dietary diversity scores (0.18 on a 0 – 12 scale) 10 weeks after the earthquake and a lower likelihood of poverty one year post-earthquake as compared to households who relied less on their own caste. Households who improved their ability to rely on their own caste over time (bonding social capital) continued to experience reduced negative food coping strategies in the long-term, but did not see improvements on longer-term recovery measures. Households with better connections within their own caste might rely on those connections to bolster food consumption and access when times are tough. Although these effects are small, they suggest that bonding social capital continued to have a positive impact on food security in the short and long-term.

Collective Action: Participating in community collective action before the earthquake may have held households back from restoring their homes in the short and long-term.

Participating in community collective action prior to the earthquake increased the likelihood of asset purchase (including livestock) in the short and long-term, but decreased the likelihood of home restoration at the same time. This suggests that systems of reciprocal community collective action (i.e., perma) broke down after the earthquake as households became more concerned with their own recovery. Households who may have relied on their community in times of crisis in the past were suddenly unable to draw on this resource. Households who reported higher levels of collective action before the earthquake were also more likely to have a higher probability of poverty (a negative outcome) one year after the earthquake. Overall, there was no relationship between households who reported their community helping to rebuild 10 weeks after the earthquake and recovery and wellbeing outcomes. The exception to this was that these households were more likely to purchase productive assets two years after the earthquake as compared to households who did not report the community helping to rebuild immediately after the earthquake.

Bridging Social Capital: Households who gained new bridging social capital capacity over time saw improvements in their long-term home restoration and livelihood recovery.

Improving relationships with members of other castes over time may improve a range of recovery outcomes over the long-term, including restoration of homes and livelihoods. Households that responded they could rely on other castes for help before the earthquake were less likely (6%) to have rebuilt their home two years after the earthquake. However, this trend was reversed for households who saw positive change in their ability to rely on other castes from before the earthquake to two years after. Households who reported a positive change in their ability to rely on other castes at some point after the earthquake were slightly more likely to have restored their house to pre-earthquake status or better, and to have recovered their livelihood versus those who had not experienced a change. Households with greater connections outside their immediate network may have had better access to the resources they needed for income and shelter recovery. These same households were also more likely to report slightly worse dietary diversity than households who did not report a change in bridging social capital. However, these decreases were, on average, equal to the loss of only one-third of a food group and may not be a meaningful difference.

Linking Social Capital: Households that had positive opinions of local government actors before and immediately after the earthquake (linking social capital) had worse food security outcomes in the short-term.

Households with higher pre-earthquake linking social capital, defined as having positive perceptions of being able to rely on government for assistance, saw much poorer dietary diversity (-1.77 food groups) immediately after the earthquake in comparison to households with less linking social capital. Drawing on linking social capital (opinions of relationships with community leaders after the earthquake) may have held households back from coping better after the earthquake. Households who drew on linking social capital sources immediately after the earthquake were more likely to have worse dietary diversity and food coping strategy scores, and were less likely to have recovered their livelihood 10 weeks after the earthquake. Having higher levels of linking social capital before the earthquake was associated with a few positive outcomes, specifically improved shelter quality immediately after the earthquake and higher likelihoods of asset purchase two years after the earthquake. Relying on low-capacity local government structures before the earthquake may have left households less equipped to access food immediately after the earthquake. These structures were significantly weakened post-earthquake. With their capacity stretched, households who perceived they could rely on these structures but in fact received no assistance may have failed to look for alternative sources of support, and were therefore worse off.

Disaster Preparedness and Response

***Key Finding**: Disaster risk reduction only starts to provide protection against shocks and stresses when it is practiced at the household level. In contrast, community disaster risk reduction left households worse off in the short and long-term. Accessing timely aid (within seven days) had several positive impacts on short-term coping but is insufficient and potentially detrimental for long-term recovery without other supportive measures.*

c. Relationship Between Disaster Risk Reduction and Outcomes

Household disaster risk reduction: Households with greater disaster risk reduction awareness before the earthquake were able to recover their livelihoods and had better dietary diversity in the short-term. Developing awareness over time was associated with lower poverty likelihoods and higher livelihood recovery.

Households with greater disaster risk reduction awareness before the earthquake were more likely to recover their livelihood and have better dietary diversity immediately (10 weeks) after the earthquake than households with less awareness. However, these households also had (on average) poorer housing quality 10 weeks post-earthquake and bought fewer assets one year after the earthquake than households with less awareness. Households that saw positive change in their disaster risk reduction awareness from before the earthquake to two years post-earthquake were more likely to have recovered their livelihood and had lower probability of poverty scores (i.e., less likely to be in poverty). Households who knew what actions to take to respond to disasters or gained this knowledge over time were probably more likely to actually take those actions when faced with a disaster.

Community disaster risk reduction: Living in communities with disaster risk reduction plans in place led to mixed, but primarily negative effects on outcomes. Households in these communities had worse food coping strategies and livelihood recovery outcomes in the short-term and worse poverty and dietary diversity outcomes in the long-term.

Households who reported their community had disaster risk reduction plans in place pre-earthquake had poorer food coping strategies scores and were less likely to recover their livelihoods immediately after the earthquake (10 weeks). One and two years after the earthquake, these households were also less likely to purchase household and other assets. Households who saw a positive change in their community's establishment of disaster risk reduction plans from before the earthquake to two years after the earthquake had worse poverty and dietary diversity scores two years after the earthquake than households that did not live in communities with disaster risk reduction plans. These households were also more likely to purchase livestock and productive assets two years after the earthquake than households that did see positive change in their communities' establishment of disaster risk reduction plans. It seems that relying on poorly functioning community disaster risk reduction systems overall left households worse off when disaster risk reduction plans did not work after the earthquake. However, since some positive benefits have emerged with this capacity over time, it is possible that community disaster risk reduction plans are starting to improve.

Access to Aid Post-Earthquake

Access to aid: Accessing timely aid (within seven days) had several positive impacts on short-term coping and recovery, but negatively affected livelihood recovery in the long-term.

Households that received aid within the first seven days after the earthquake had better food coping strategy scores and were more likely to recover their livelihoods, invest in assets and have improved shelter quality 10 weeks after the earthquake than households that did not receive timely aid. However, the positive result on livelihood recovery reversed in the long-term. Households who received aid within seven days of the earthquake were less likely (12%) to have recovered their livelihoods two years after the earthquake in comparison to those who did not receive timely aid. Having timely access to aid after the earthquake was helpful for short-term recovery but may have been insufficient and potentially detrimental for long-term recovery without other supportive measures.

Accessing aid from more sources was negatively associated with dietary diversity and the likelihood of households to rebuild their homes (versus receiving aid from fewer sources). However, having more aid sources immediately after the earthquake was associated with reduced probability of poverty scores 10 weeks after the earthquake. Vulnerable households may have been prioritized by NGOs and government organizations to receive aid, which would explain why these households received more assistance.

II. Financial Services

***Key Finding**: Households with formal and/or informal savings before the earthquake had better food security and poverty outcomes immediately after the earthquake. Having the ability to see positive change in formal saving and use savings overtime was related to even larger effects on livelihood recovery, purchasing productive assets and lowering negative food coping strategies two years after the earthquake. Results showed that formal borrowing matters for short and long-term recovery. Access to formal credit mattered the most for recovering livelihoods in the short-term and home reconstruction and livelihood recovery in the long-term. Accessing informal credit either resulted in negative or no effect on short and/or long-term wellbeing and recovery. Households who increased their access to remittances over time were more likely to see positive recovery outcomes two years later.*

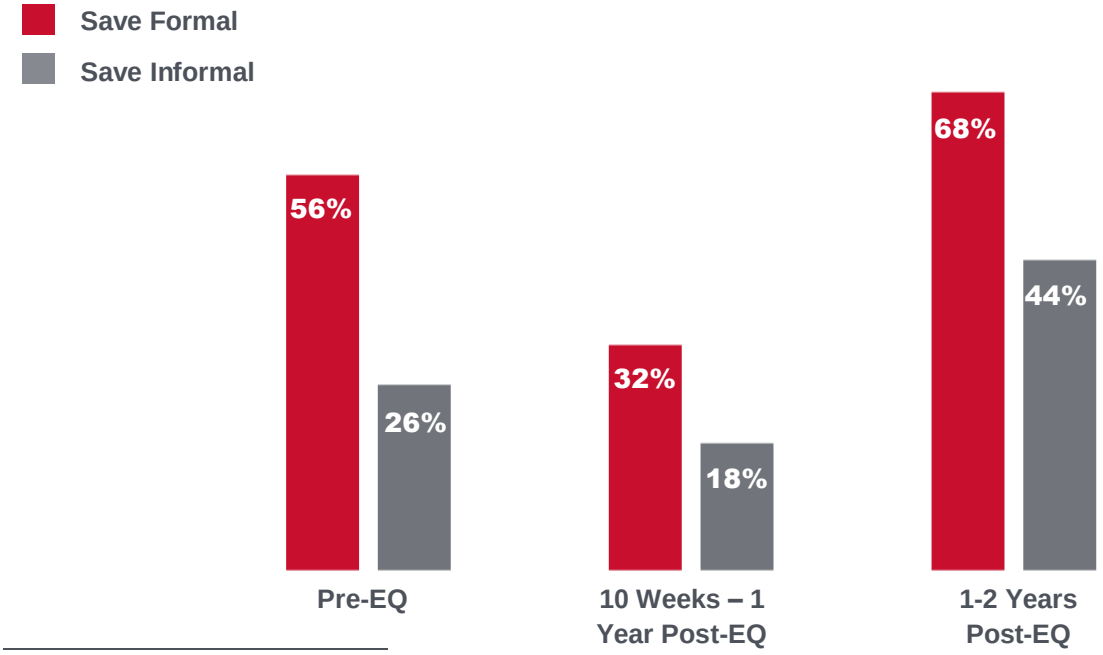
a. Changes in Financial Services Capacity Trajectories

Prior to the earthquake, households saved in formal institutions twice as much as informal institutions. Ten weeks to one year after the earthquake, households saved less overall, but especially less in formal institutions. Households were reporting high losses of income up to one year after the earthquake, which could explain why they were saving less. By one to two years after the earthquake, both informal and formal savings exceeded pre-earthquake levels. Only 25% of households reported using savings immediately after the earthquake despite high levels (70%) of pre-earthquake saving (formal and/or informal). Households did not start to use their savings until one to two years after the earthquake. It is possible that households viewed their savings as a financial safety net that they only felt comfortable using once their income sources had re-stabilized.

Rates of formal and informal borrowing were similar prior to the earthquake. Formal loan institutions were extremely impacted by the earthquake, which is reflected in the sharp drop in formal loan access observed in the community (see figure 9). Two years after the earthquake, households were borrowing from formal sources at higher rates than pre-earthquake. It is possible that this increase was caused by households' ability to access new reconstruction loan products from banks. In contrast, access to informal borrowing remained steady immediately after the earthquake, fell by 10% between the first 10 weeks and one year and then returned to pre-earthquake levels by two years after the earthquake. It is likely that informal lenders living in earthquake-affected areas were still able to operate despite the natural disaster.

Remittance levels fell immediately after the earthquake and slowly returned to pre-earthquake levels by two years after the earthquake. Given that remittances in Nepal made up 31% of its GDP in 2016[10], these reported numbers seem very low. It is possible that households underreported the amount of remittances they received.

Figure 13. Proportion of Households with Formal versus Informal Savings



[10] World Bank. https://data.worldbank.org/indicator/BX.TRF.PWKR.DT.GD.ZS?locations=NP

Figure 14. Proportion of Households who have used their Savings

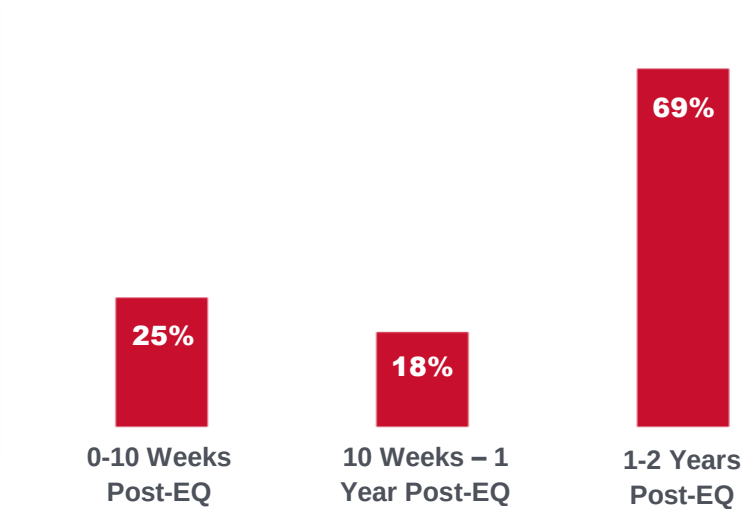


Figure 15. Percentage of Households Reporting Formal and Informal Borrowing

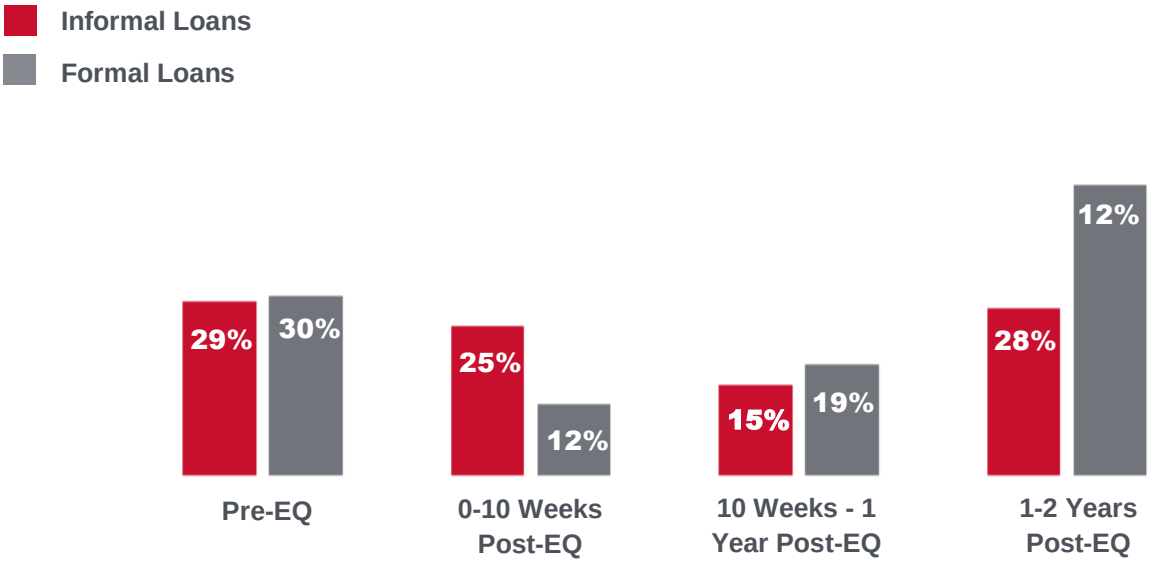


Figure 16. Percentage of Households Receiving Remittances

b. Relationship Between Financial Services and Outcomes

Savings: Formal and informal savings supported households with reduced poverty levels and food consumption in the short-term, while growth in formal savings and use of savings over time continued to prove essential to recovery, allowing households to restore their livelihoods, reduce negative food coping strategies and purchase new productive assets.

Households with formal savings before the earthquake had moderately higher dietary diversity scores 10 weeks after the earthquake than households without formal savings. Households with formal savings pre-earthquake were also slightly more likely to live below the poverty line than households without pre-earthquake formal savings. Households with formal savings before the earthquake also saw longer-term gains in productive and various other asset purchases one and two years after the earthquake in comparison to households without formal savings. This trend continued for households who saw positive change in their ability to invest in formal savings over time. These households were somewhat more likely to purchase productive assets than households who did not save in formal institutions over time.

Households with informal savings before the earthquake were more likely to have lower poverty likelihoods 10 weeks after the earthquake than households who did not have informal savings**.** Households who saw positive change in their ability to invest in informal savings over time (from before the earthquake to two years later) were somewhat more likely to have reported purchasing assets (including household-specific assets) two years after the earthquake.

Households who saw positive change in their ability to draw on any kind of savings from 10 weeks to two years post-earthquake were more likely to have better food coping strategies and to have bought productive assets and recovered their livelihood two years post-earthquake. These positive impacts demonstrate the important role savings plays in household's ability to cope in the short-term and achieve longer-term recovery.

Formal Credit: Access to formal credit immediately after the earthquake was associated with better food security and livelihood recovery in the short-term and long-term, while growth in access to formal credit helped people rebuild their homes two years after the earthquake.

Overall, households that borrowed formally before the earthquake saw no effect on recovery and wellbeing outcomes**.** The exception to this was that households with pre-earthquake debt were slightly less likely (9%) to purchase household and productive assets two years after the earthquake. However, the ability to borrow

immediately after the earthquake resulted in several positive recovery outcomes in the short-term and long-term. If households were able to borrow immediately after the earthquake, they saw an extremely large increase in their likelihood to recover their livelihood one year after the earthquake and a lower (but still large) increase in their likelihood to recover their livelihood two years post-earthquake. Although we did not see significant increases in productive asset or livestock purchases along with increases in livelihood recovery, it is possible that households were using formal loans for other activities that would assist them in regaining their livelihood. These households also saw moderate improvements in their dietary diversity (0.521 HDDS points or half a food group more) than households who did not borrow formally.

Households who saw positive change in their ability to borrow from formal sources before the earthquake to between 10 weeks and two years post-earthquake were somewhat more likely to rebuild their home two years after the earthquake. Households that borrowed from formal sources immediately after the earthquake had better food security outcomes 10 weeks and two years after the earthquake. These findings undergird the argument that access to liquidity immediately following a shock could alleviate a wide range of negative outcomes related to housing, livelihoods and dietary diversity in the short-term.

Informal Credit: Drawing on informal credit immediately after the earthquake was associated with decreased likelihood of livelihood recovery in the long-term. Informal debt supported asset purchase over time but was also repeatedly associated with lower food security scores.

Households that borrowed informally before the earthquake were less likely to invest in assets immediately after the earthquake. The opposite was observed if households were able to see positive change in their ability to borrow informally from pre-earthquake and 10 weeks post-earthquake to two years post-earthquake. These households were more likely to purchase household-specific and other assets two years after the earthquake. Households that were able to borrow from informal sources immediately after the earthquake were more likely to have somewhat worse dietary diversity and food coping strategy scores at the time of borrowing. If households increased their ability to borrow from informal sources from before and 10 weeks post-earthquake to two years post-earthquake their food coping strategy scores remained worse than households who did not borrow informally. Households who borrowed informally immediately after the earthquake were also less likely (12%) to have recovered their livelihood two years after the earthquake. A possible explanation for the increase in asset purchase and decrease in food security is that households may have prioritized restoring household assets over food purchase. Since informal loans have extremely high interest rates (36% to 60%), this may have prevented households from maintaining their regular food consumption. Overall, these findings suggest that borrowing informally made households worse off in the short and long-term in terms of food coping strategies, dietary diversity and livelihood recovery.

Remittances

There were no short-term effects observed among households who received remittances before or 10 weeks after the earthquake. Households who saw positive change in whether they received remittances from before and 10 weeks after the earthquake to two years post-earthquake were more likely to have purchased assets two years after the earthquake. Only households who saw positive change in remittances over a longer timeframe (from before the earthquake to two years later) were more likely to rebuild their house two years after the earthquake.

III. Market Access and Livelihood Diversity

a. Changes in Market Access Capacity Trajectories

It is clear that the earthquake dramatically disrupted the flow of market goods within earthquake-affected communities. Most households reported high availability of market goods prior to the earthquake. Immediately after the earthquake (0 – 10 weeks), most households experienced a dramatic drop in availability of goods. Food staples (lentils, cereals and oil) did not drop as dramatically as other goods (agricultural and construction materials). However, the availability of all market goods, including food staples, declined even further between 10 weeks and one year after the earthquake. It is likely that there were higher reserves of food staples available locally and these only began to run out after the first 10 weeks post-earthquake. The major road connecting Nepal to China was closed after the earthquake, which would have affected the availability of agriculture and construction goods. The fuel crisis that followed the earthquake also disrupted the flow of food stuffs from India. Most households saw a dramatic return of all market goods one to two years post- earthquake after the fuel crisis was resolved and alternative routes were created for delivery of goods.

Figure 17. Percentage of Households Reporting Construction Materials Available in Market

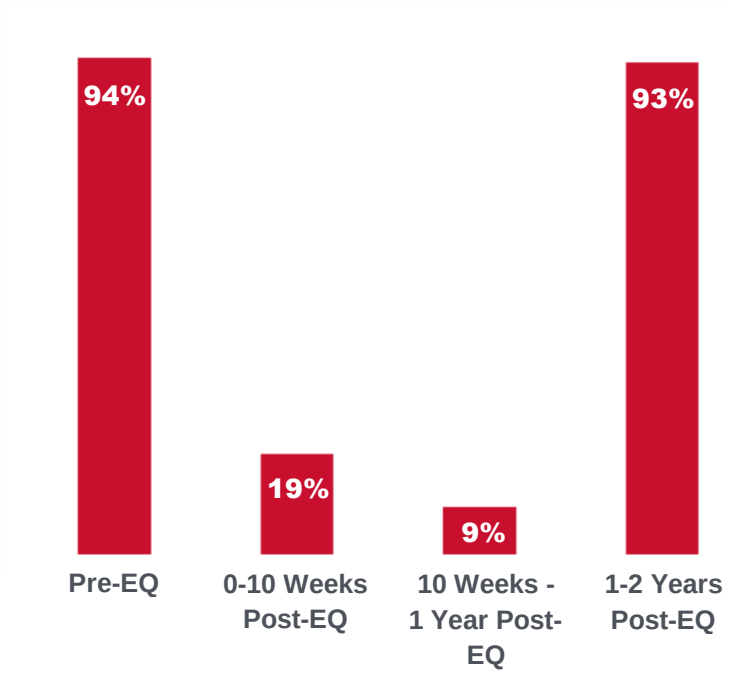


Table 8: Market Goods Available Before and After the Earthquake

Able to access goods in the market	Prior to Earthquake	10 Weeks Post-EQ	1 Year Post-EQ	2 Years Post-EQ
Lentils	97%	65%	7%	100%
Cereals	98%	65%	21%	100%
Oil	97%	61%	10%	100%
Seeds	97%	29%	9%	99%
Agricultural tools	96%	25%	9%	100%
Agricultural and livestock inputs	95%	26%	9%	100%
Plastic sheeting	94%	23%	9%	99%
Construction materials	94%	19%	9%	93%

b. Relationship Between Market Access and Outcomes

Goods Available in the Market: Growth in the availability of market goods over time reduced the likelihood of households being in poverty two years after the earthquake; availability of goods early on was associated with small but statistically significant gains in food security.

Households with access to more goods in the market before the earthquake were less likely to purchase productive assets and livestock two years after the earthquake. Households mainly rely on neighboring communities for livestock purchase (not markets), so these two findings may not be directly related. Households who managed to access more goods in the market 10 weeks after the earthquake reported slightly higher dietary diversity scores (a positive outcome), but also reported higher probability of poverty (a negative outcome) and lower shelter quality scores at this same time. Since households were able to access food staples (lentils, oil and cereals) much quicker than other market items, it is not surprising that their diet diversity was also better 10 weeks post-earthquake. Similarly, since household's access to construction materials was not restored until much later (after one year), this affected their ability to immediately restore their household assets and shelter quality. Households who reported better market transportation immediately after the earthquake were also less likely (12%) to invest in assets at this same time (10 weeks post-earthquake). This most likely reflects that transportation to the market was not the greatest barrier to accessing market goods immediately after the earthquake.

Two years after the earthquake, households who were able to access more goods in the market immediately after the earthquake also had slightly better food coping strategy scores. Households that saw positive change in their ability to access goods in the market over time were more likely to have better probability of poverty scores than households that accessed fewer goods. Although the magnitude of these results was small, they suggest greater market access was most helpful for short and long-term food security and poverty reduction.

Livelihood Diversity

Overall, having greater livelihood diversity (number of different income sources) prior to the earthquake was not associated with short or long-term recovery and wellbeing outcomes. The exception to this was that households who reported having another income source in addition to agriculture before the earthquake were more likely to invest in assets 10 weeks post-earthquake in comparison to households who did not have another income source.

CONCLUSION

Building resilience after a disaster helps communities to bridge the transition between emergency relief and longer-term, sustained development. Some capacities matter more if households have access to them only in the short-term, such as quick access to aid and informal savings. However, this study suggests that factors which are critical in helping households cope better in the short-term may not be the same factors (or are themselves insufficient) to sustain wellbeing over time and ensure resilience in the future. The greatest impact on primary recovery and wellbeing outcomes occurred when households were able to see positive change in resilience capacities and responses over time, throughout the recovery period. Specifically, households that gained access to formal credit, formal savings, household disaster risk reduction awareness and bonding social capital capacities over time saw the greatest impact in their ability to restore their homes, recover their livelihoods, improve their food security and purchase productive assets (including livestock). These findings highlight the need to build resilience capacities necessary for long-term recovery alongside emergency activities. Subsequent shocks experienced after the earthquake may explain stalled recovery, especially among economic recovery outcomes during the first year and food security outcomes two years after the earthquake. These conclusions demonstrate that building resilience against shocks and stresses requires continued intervention that goes beyond direct assistance, and supports sustained access to key resilience capacities beyond the initial shock.

ANNEX 1: Summary of Findings Tables

How to interpret tables

- In Annex Table 1, capacities are the independent variables and recovery and wellbeing outcomes are the dependent variables
- In Annex Table 2, responses are the independent variable and recovery and wellbeing outcomes are the dependent variables
- Most capacities were measured only pre-earthquake (one point in time)
- Positive changes in capacities from pre-earthquake to two years post-earthquake were also measured (change over time) for each capacity and created as a separate independent variable
- Most responses were measured only 10 weeks post-earthquake (one point in time)
- Positive changes in responses from 10 weeks post-earthquake to two years post-earthquake were also measured (change over time) for each response and created as a separate independent variable
- Wellbeing and recovery outcomes were measured at 10 weeks, one year and two years after the earthquake
- The symbol ** means the result was statistically significant at the 95% level and *** means the result was statistically significant at the 99% level
- Results in red boxes show a negative relationship. Results in blue boxes show a positive relationship. Blank boxes show no relationship.

Annex Table 1: Results Summary of Pre-Earthquake Resilience Capacities on Wellbeing and Recovery Outcomes

Pre-Earthquake Resilience Capacities	10 Weeks Post-EQ Outcomes		1 Year Post-EQ Outcomes		2 Years Post-EQ Outcomes		Change in Capacities → 2 Years Post-EQ Outcomes	
	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome
Formal Savings	***Poverty/PPI***	***HDDS*** *(0.64***)*		***Combination of assets (Factor)***		***Combination of Assets (Factor)***, ***Productive Assets*** (OR=2.24**)		***Productive Assets*** *(OR=3.84***)*

Pre-Earthquake Resilience Capacities	10 Weeks Post-EQ Outcomes		1 Year Post-EQ Outcomes		2 Years Post-EQ Outcomes		Change in Capacities → 2 Years Post-EQ Outcomes	
	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome
Informal Savings		***PPI, shelter quality***						***Household Assets*** *(OR=2.27**, OR=3.55***),* ***Any Assets*** *(OR=2.18**, OR=2.72**),* ***Livestock*** *(OR=2.14**)*
Formal Credit					***Household Assets*** *(OR=0.448**),* ***Productive Assets*** *(OR=0.484**)*			***House Restored*** *(OR=2.76***)* , ***Recovered Livelihood*** *(OR=3.16**)*
Informal Credit	***Invest in Assets*** *(OR=0.56**)*						***Food Coping Strategies*** *(1.009**)*	***Household Assets*** *(OR=2.22**, OR=4.32***),* ***Any Assets*** *(OR=2.33**)*
Remittances								***Household Assets*** *(OR=6.28**),* ***House Restored*** *(OR=2.72**)*
Livelihood Diversity		***Invest in Assets*** *(OR=1.85***)*						
Household DRR	***Shelter quality***	***HDDS*** *(0.47***),* ***Recovered Livelihood*** *(OR=1.54***)*	***Combination of assets (Factor)***			***Any Assets*** *(OR=1.52**)*		***Recovered Livelihood*** *(OR=1.61***)* , ***Poverty***

Pre-Earthquake Resilience Capacities	10 Weeks Post-EQ Outcomes		1 Year Post-EQ Outcomes		2 Years Post-EQ Outcomes		Change in Capacities → 2 Years Post-EQ Outcomes	
	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome
Community DRR	***CSI*** *(2.19**),* ***Recovered Livelihood*** *(OR=0.36***)*		***Any Asset*** *(OR=0.47**, OR=0.53**)*		***Household Assets*** *(OR=0.544**),* ***Any Assets*** *(OR=0.417***)*		***Poverty/PPI, Diet/HDDI*** *(-0.50**)*	***Livestock*** *(OR=1.94**, OR=1.68***),* ***Productive Assets*** *(OR=5.05***, OR=3.00**)*
Market Good Availability	*Not Tested*	*Not Tested*			***Productive Assets*** *(OR=0.74***),* ***Livestock*** *(OR=0.87**)*		***Livestock*** *(OR=0.75**)*	***Poverty/PPI***
Can Rely on Other Caste					***House Restored*** *(OR=0.717***)*	***Any assets*** *(OR=1.39**)*	***Diet/HDDS*** *(-0.28***)*	***House Restored*** *(OR=1.47**),* ***Livelihood Restored*** *(OR=1.88**)*
Can Rely on Own Caste		***HDDS*** *(0.18**)*		***Poverty/PPI***				
Linking Social Capital (Factor)	***Diet/HDDS*** *(-1.77***)*	***Shelter Quality***				***Any assets*** *(OR=1.84***, OR=7.04***),* ***Productive assets*** *(OR=1.71***)*		
Collective Action/Perma System		***Invest in Assets*** *(OR=1.26**)*	***Poverty/PPI, Combination of Assets (Factor), House Restored*** *(OR=0.79**)*		***House Restored*** *(OR=0.79**)*	***Livestock*** *(OR=1.18**)*		***Household Asset*** *(OR=1.02**),* ***Productive Asset*** *(1.03**),* ***House Restored*** *(OR=1.01**)*

Annex Table 2: Results Summary of Resilience Responses on Wellbeing and Recovery Outcomes

10 weeks Post-EQ Resilience Responses	10 Weeks Post-EQ Outcomes		1 Year Post-EQ Outcomes		2 Years Post-EQ Outcomes		Change in Responses → 2 Years Post-EQ Outcomes	
	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome
Used Savings (formal or informal)	*Not Available*	*Not Available*	*Not Available*	*Not Available*				***Food Coping Strategies*** *(-1.85**)* ***Productive Assets*** *(OR=3.63***)* ***Recovered Livelihood*** *(OR=3.94***)*
Formal Credit		***Food Coping Strategies*** *(-1.96**),* ***Recovered Livelihood*** *(OR=1.83**)*		***Recovered Livelihood*** *(OR=19.33***)*		***Diet/HDDS*** *(0.52**),* ***Recovered Livelihood*** *(OR=4.74**)*		***House Restored*** *(OR=2.97***),* ***Recovered Livelihood*** *(OR=3.25***)*
Informal Credit	***Food Coping Strategies*** *(2.46***),* ***Diet/HDDS*** *(-0.70***)*				***Recovered Livelihood*** *(OR=0.35**)*		***Food Coping Strategies*** *(0.931**)*	***Household Assets*** *(OR=2.45**)*
Remittances								***Household Assets*** *(OR=3.12***, OR=5.10***),* ***Any Assets*** *(OR=2.63***), (OR=2.57**)*
Livelihood Diversity	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*
Household DRR	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*

10 weeks Post-EQ Resilience Responses	10 Weeks Post-EQ Outcomes		1 Year Post-EQ Outcomes		2 Years Post-EQ Outcomes		Change in Responses → 2 Years Post-EQ Outcomes	
	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome
Community DRR	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*
Aid Availability	***Diet/HDDS*** *(-0.185**),* ***Recovered Livelihood*** *(OR=0.71***)*	***Poverty/PPI***					*Not Available*	*Not Available*
Aid Timeliness		***Food Coping Strategies*** *(-2.60***),* ***Invest in Assets*** *(OR=2.01**),* ***Recovered Livelihood*** *(OR=1.94***),* ***Shelter Quality***			***Recovered Livelihood*** *(OR=0.33**)*		*Not Available*	*Not Available*
Market Good Availability	***Shelter quality, PPI***	***Diet/HDDS*** *(0.15***)*				***Food Coping Strategies*** *(-0.12**)*	***Livestock*** *(OR=0.69***),* ***Productive Assets*** *(OR=0.685**)*	***Poverty/PPI***
Market Transportation	***Investment in Assets*** *(OR=0.56**)*							
Can Rely on Other Caste							***Diet/HDDS*** *(-0.26***)*	***House Restored*** *(OR=1.53**)*
Can Rely on Own Caste								***Food Coping Strategies*** *(-0.56**)*
Community Helped Rebuild						***Productive Assets*** *(OR=1.73**)*		

10 weeks Post-EQ Resilience Responses	10 Weeks Post-EQ Outcomes		1 Year Post-EQ Outcomes		2 Years Post-EQ Outcomes		Change in Responses → 2 Years Post-EQ Outcomes	
	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome	Negative Impact Outcome	Positive Impact Outcome
Linking Social Capital (Factor)	***Food Coping Strategies*** *(1.27***)*, ***Diet/HDDS*** *(-0.29**)*, ***Recovered Livelihood*** *(OR=0.57***)*							

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