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# HOUSEHOLD RECOVERY AND RESILIENCE IN CAMBODIA

AFTER THE 2015-2016  
EL NIÑO DROUGHT, ACROSS  
THREE SURVEY ROUNDS

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**Tango International**

Commissioned by:  
**World Food Programme**



**World Food  
Programme**



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Following the drought associated with the 2015-2016 El Niño event, the World Food Programme (WFP), together with the United Nations Children’s Fund (UNICEF) and the Food and Agriculture Organization (FAO), and in collaboration with the National Committee for Disaster Management (NCDM), conducted a national household survey in May 2016. Two subsequent rounds of the national household survey were conducted in December 2016 and August 2017. This report is based on an analysis of all three survey rounds.

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## LIST OF ACRYNOMS

DDS	Dietary Diversity Score
FAO	Food and Agricultural Organization of the United Nations
FCS	Food Consumption Score
HHS	Household Hunger Scale
NCDM	National Committee for Disaster Management
PCDM	Provincial Committees for Disaster Management
rCSI	Reduced Coping Strategy Index
UNICEF	United Nations Children’s Fund
WFP	World Food Programme

# KEY TAKEAWAY MESSAGES

## ***Food Security***

- The findings demonstrate that food security levels remained stable after the El Niño drought with households at baseline (Round 1- May 2016) reporting high food consumption and dietary diversity, and low levels of household hunger and food insecurity. Little to no changes are seen across the three survey rounds.
- However, there was a higher use of negative coping strategies following the El Niño drought, which largely included relying on less preferred/less expensive foods, selling household goods, using savings, borrowing money or food from a formal lender or bank, and/or sending an adult household member to seek work elsewhere.
- This draws attention to the limitations of current food security indicators to understand vulnerability to climatic events within Cambodia.
- Decreases in yearly, monthly, and per capita expenditures are seen across the three survey rounds. Households are allocating a greater percentage of their expenditures towards the purchase of food items. More research is needed to better explain this trend.

## ***Geographic Trends***

- Across the ecological zones, the Plains had the worse food security outcomes after the El Niño drought, but show improvements in Round 2 (December 2016) and Round 3 (August 2017), whereas the Tonle Sap and Coastal zones had worsening food security over the same 15-month period. Additionally, whereas most zones rely less on coping strategies over time, Coastal households increase the use of stress coping strategies more than 15.0 percent across the three survey rounds. This indicates how the impacts of climatic events might be felt more strongly in certain parts of the country compared with others and this corresponds well to historical data that shows the Plains and Plateau zones as being the hardest hit in terms of drought (Figure 1).

## ***Seasonality***

- The third round of the survey was conducted in August, at the start of the lean season, so the worsening food security results over the study period in some zones, such as Tonle Sap and Coastal zones, could be more indicative of seasonal vulnerabilities.

## ***Gender- related vulnerabilities***

- Female-headed households are more susceptible to food security impacts following the El Niño drought than male-headed households. They are also more likely to reduce or change food habits as a coping mechanism.

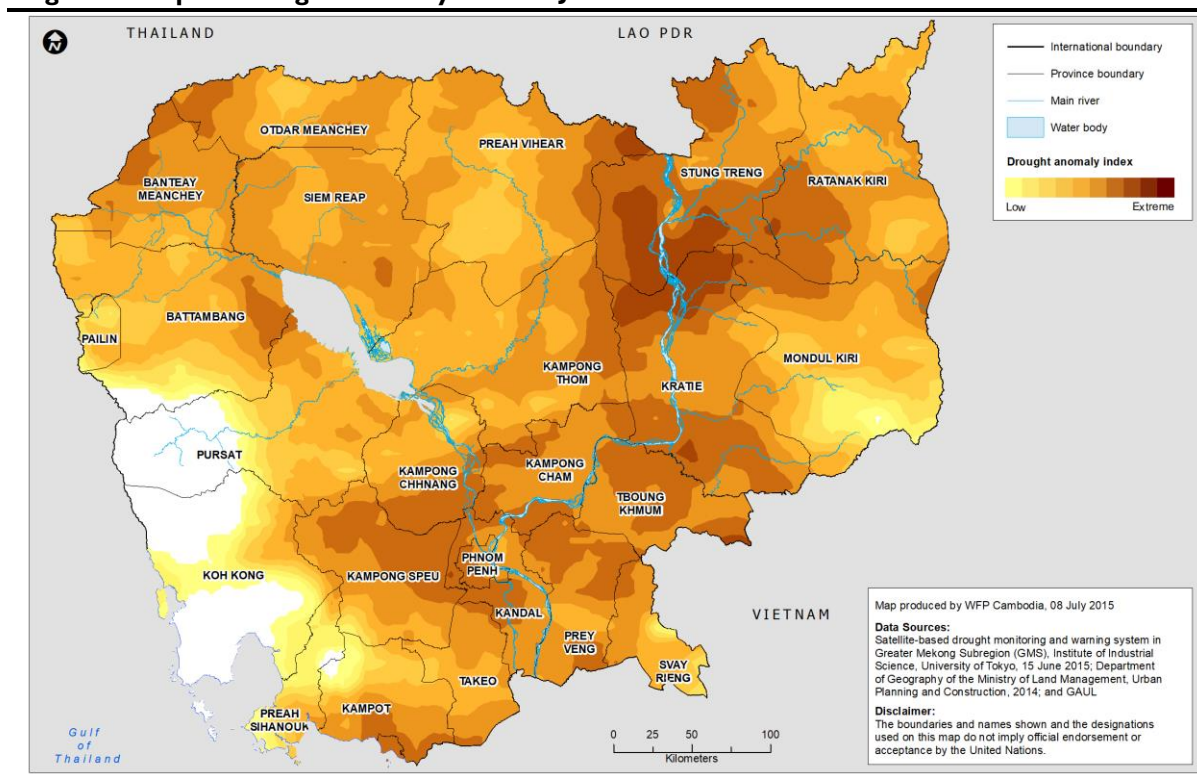
## ***Resilience Capacity***

- Households were grouped according to low, medium and high resilience capacity based on the resilience capacity index. Highly resilient households had better food security outcomes and had higher yearly, monthly, and per capita expenditures. They also spent less toward food purchases and more towards non-food items.
- Indicators used to calculate resilience capacity for Round 3 (August 2017) show that linking social capital (links between households and local authorities and non-governmental organisations), access to information, and social networks provide the greatest contribution towards the overall index. The existing findings indicate that strengthening access to information and community relationships could be important actions to improve resilience. Initiatives at community level that strengthen community cooperation and enhance relationships between households and local authorities could also play a pivotal role.
- It should be noted that community based indicators were not incorporated in this study so more research needs to be done on the role that factors such as access to social assistance, basic services and infrastructure have on improving resilience as it is likely that these would play a key role.

# BACKGROUND

The 2015-2016 El Niño weather phenomenon resulted in unseasonably low precipitation levels and increases in temperature resulting in the worst drought for Southeast Asia in the last 50 years. Cambodia, specifically, experienced crop losses, depletion of fish stocks, and water shortages for households throughout the country. It is estimated that 2.5 million people in Cambodia were severely impacted, triggering a national response of targeted distribution of drinking water and rehabilitation of water sources (Figure 1 shows the drought intensity during the worst period in Mid-June 2015). With the arrival of the rainy season, the Royal Government of Cambodia officially ended the response at the end of May 2016. The impacts of the El Niño event, however, were expected to extend well past the initial drought. In order to better understand how households were affected and their ability to recover (or not recover), the World Food Programme (WFP), the United Nations Children’s Fund (UNICEF), and Food and Agricultural Organization of the United Nations (FAO), in collaboration with the National Committee for Disaster Management (NCDM) and the Provincial Committees for Disaster Management (PCDMs), conducted a nationwide household survey in May 2016. Two subsequent rounds of the national household survey were collected among a panel of households in December 2016 and August 2017 to monitor changes over the 15-month period after the El Niño drought. Data was collected from the four ecological zones of Cambodia (Plains, Tonle Sap, Plateau/Mountain and Coastal), shown in Figure 5 (*in the Technical Annex*).

**Figure 1. Map of Drought Intensity as of 15 June 2015**



The three survey rounds were conducted in May 2016 (Round 1), December 2016 (Round 2) and August 2017 (Round 3), which correspond to different agricultural seasons (refer to Figure 2). In May, households typically start to prepare the land for wet season sowing and transplanting. December is during the dry season when households prepare and sow their land for dry season rice. August is in the rainy season and experiences the greatest number of shocks due to flooding and dry spells. It is also the start of the lean season as main staple crops are not yet harvested. Understanding the seasonality patterns within Cambodia provides greater depth into understanding the results of the analysis discussed further in the Findings section of the report.

**Figure 2. Seasonal Crop and Hazard Calendar, Cambodia**

EVENTS/ CROPS	NOV	DEC*	JAN	FEB	MAR	APR	MAY*	JUN	JUL	AUG*	SEP	OCT
	DRY SEASON						RAINY SEASON					
Flood									Flood			
Dry Spell												
Lean Season										Lean Season		
Wet Season Rice							Land prep & sowing		Transplanting/growing			
	Harvesting											Harvesting
Dry Season Rice	Land prep & sowing			Harvesting								
Maize							Land prep		Growing		Harvesting	

Asterisks (\*) represent the months in which the household questionnaires were administered: May 2016 (Round 1), December 2016 (Round 2), and August 2017 (Round 3).

## OBJECTIVE

The objective of this report is to answer the following questions:

**Question 1:** What impact did the El Niño event and drought have on Cambodian households' food security, coping strategies, and expenditures in May 2016 and how did this change over the subsequent 15 months?

**Question 2:** What was the resilience capacity of Cambodian households 15 months after the drought?

## METHODOLOGY BRIEF

*An in-depth description of the methodology is provided in the Technical Annex.*

**Trend Analysis:** Three nationwide surveys were administered among matched households in May 2016, December 2016, and August 2017. A total of 934 households were paired across the three survey rounds. A trend analysis was conducted to compare mean values and proportion levels of key well-being indicators over the 15-month period after the 2015/2016 El Niño event. Data was further disaggregated by sex of head of household and by the four ecological zones of Cambodia (*Figure 5 in the Technical Annex*).

**Resilience Capacity Analysis:** The Round 3 survey was modified to include a full set of resilience questions from which an overall resilience capacity index was created by combining individual, non-duplicate indicators of the absorptive, adaptive, and transformative capacity measures into a single composite index using factor analysis. Terciles of low, medium and high resilience capacity households were created using this index. A total of 1034 households in Round 3 were divided equally across these terciles to examine how different levels of resilience capacity influence key well-being outcomes.

# FINDINGS

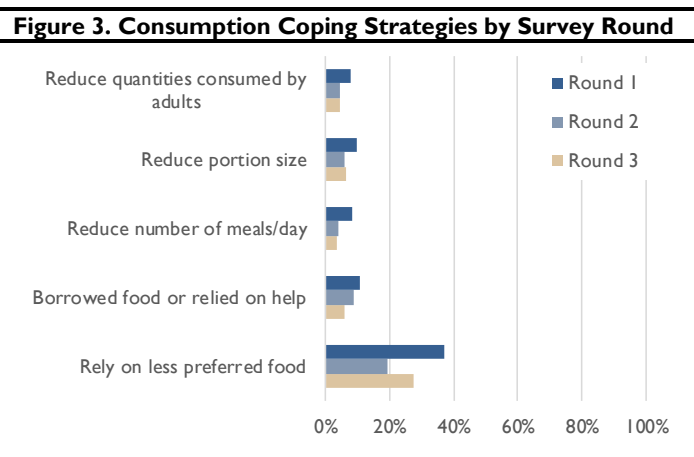
## QUESTION 1: WHAT IMPACT DID THE EL NIÑO EVENT AND DROUGHT HAVE ON CAMBODIAN HOUSEHOLDS' FOOD SECURITY, COPING STRATEGIES, AND EXPENDITURES IN MAY 2016 AND HOW DID THIS CHANGE OVER THE SUBSEQUENT 15 MONTHS?

The 2015/2016 El Niño event had little impact on household food security. Following the drought, the data from Round 1 (May 2016) show that households have high levels of food consumption and dietary diversity, and a large majority report little to no hunger. In the subsequent 15-months there are little to no changes across household food security indicators. Conversely, households in Round 1 use more consumption coping strategies than in subsequent rounds. Decreases in livelihood coping strategies are also observed which is largely attributed to households utilizing less stress coping strategies over time. Across the ecological zones, the Plains had the worse food security outcomes after the El Niño drought, but show improvements in Rounds 2 and 3, whereas the Tonle Sap and Coastal zones had worsening food security over the same 15-month period. Female-headed households are also more vulnerable to food security impacts of the drought than male-headed households and are more likely to use consumption coping mechanisms to manage the effects of the drought.

It would be expected that household expenditures would follow a similar pattern; however, data show that it decreases substantially across each survey round. An in-depth explanation of this trend requires further exploration beyond the scope of this analysis. Interestingly and in contrast to other food security findings, the percentage of households moderately to severely food insecure according to Food Expenditure Share (a measure of household expenditure) show a decrease in Round 2 but an increase in Round 3 to baseline levels. This fluctuation may be attributed to changes in seasonality and crop production due to the timing of the Round 3 survey.

### FOOD SECURITY OUTCOMES AND COPING STRATEGIES

Table 1 provides household food security outcomes following the El Niño drought of 2015/2016 over a 15-month period. At baseline (Round 1), the data show that 92.5 percent of households are within the “acceptable” level for food consumption, over 80.0 percent have medium to high levels of dietary diversity, and 90.0 percent report little to no hunger according to the Household Hunger Scale (HHS). Data from subsequent rounds show little to no changes in food security outcomes. The mean HHS score shows an improvement of 0.2 from Round 1 (May 2016) to Rounds 2 (Dec 2016) and 3 (August 2017). This is a result of an approximate 5.0 percent increase in the percentage of households with little to no hunger and a similar decrease in the percentage of households with moderate hunger. The mean Dietary Diversity Score (DDS) decreases 0.1 from Round 1 to Rounds 2 and 3. When comparing DDS groups, the percentage of households with low dietary diversity significantly increases in Rounds 2 and 3; conversely, the percentage of households with high dietary diversity decreases during the same time-period. The mean Food Consumption Score (FCS) remains stable, with no significant changes from Round 1 to Rounds 2 and 3.



The Reduced Coping Strategy Index (rCSI) is a weighted measure of five consumption coping strategies utilized by households to deal with the lack of food (or money to purchase food) in the seven days prior to the survey. Data from Table 1 show that households, overall, do not often employ consumption coping strategies, and when utilized, they are more likely to rely on less preferred, less expensive foods as their main coping mechanism (Figure 3). As expected, households in Round 1, following the El Niño drought, used significantly more coping strategies than in the subsequent rounds. Correspondingly, livelihood coping strategies saw a similar decrease across the rounds. This is largely attributed to significant changes in stress coping strategies. A decrease of approximately nine percent was observed over the 15-month period. Stress coping strategies include selling

household goods, using savings, borrowing money or food from a formal lender or bank, and sending an adult household member to seek work elsewhere.<sup>1</sup>

**Table 1. Food Security Outcomes by Survey Round, Paired Data**

	By Survey Round		
	Round 1	Round 2	Round 3
<b>FOOD SECURITY OUTCOMES</b>			
Food Consumption Score, FCS (mean, 0-112)	56.6	56.8	55.9
FCS groups			
Poor, scale 0-24.5 (%)	2.7	0.6 *	0.5 *
Borderline, scale 25-38.5 (%)	4.9	1.4 *	1.4 *
Acceptable, scale 39-112 (%)	92.5	98.0 *	98.3 *
Dietary Diversity Score, DDS (mean, 0-7)	5.2	5.1 *	5.1 *
DDS groups			
Low, scale 0-4.4 (%)	18.6	26.5 *	22.6 *
Medium, scale 4.5-6 (%)	73.7	66.3 *	72.1
High, scale 6.1-7 (%)	7.7	7.2	5.3 *
Household Hunger Scale, HHS (mean, 0-6)	0.4	0.2 *	0.2 *
Severe Hunger (%)	0.1	0.1	0.0
Moderate Hunger (%)	9.8	4.6 *	5.1 *
No/Little Hunger (%)	90.0	95.3 *	94.8 *
Reduced Coping Strategy Index, rCSI (mean, 0-56)	2.4	1.3 *	1.4 *
Livelihood Coping Strategies (mean, 1-4)	1.6	1.5	1.5 *
Emergency Coping Strategies (%)	6.9	5.2	6.0
Crisis Coping Strategies (%)	12.9	11.1	11.6
Stress Coping Strategies (%)	27.5	27.0	18.2 *
	<i>n</i>	934	934

Asterisks (\*) represent significance at the 0.05 level comparing Round 1 to Round 2 and Round 3.

## EXPENDITURES

In Table 2, decreases in yearly, monthly, and per capita expenditures are shown over a 15-month period following the El Niño event. Decreases in overall yearly expenditures from Round 1 to Round 3 amount to a mean negative difference of US\$1,346<sup>2</sup>. When disaggregated, data show that households at Round 1 allocate 42.2 percent of their yearly (and monthly) expenditure towards food expenses. This amount increases in subsequent rounds. By Round 3, households allocate 43.2 percent of their yearly (and monthly) expenditures towards the purchase of food items amounting to an increase of 1.1 percent over 15 months. Non-food expenditures, conversely, show a decrease of 1.1 percent over the same time-period. Similarly, total per capita expenditures also decrease from Round 1 to Round 3, for a mean difference of US\$30. When comparing across the per capita expenditure categories, households are increasingly spending more on food and less on other non-food items, with a difference of 2.8 percent over the three survey rounds<sup>3</sup>.

<sup>1</sup> Crisis coping strategies include selling productive assets or means of transport, reducing essential non-food expenditures such as education, health, etc., keeping children home from school temporarily, and/or withdrawing children from school. Emergency coping strategies include selling one's land or house, engaging in illegal income activities, and/or begging.

<sup>2</sup> The exchange rate used for this analysis is 1KHR (Cambodian Riel) to 0.000245USD (US Dollar). This is the average exchange rate of KHR into USD for the three rounds (June 2016, Dec 2016 and Aug 2017). Currency information was obtained from <http://www.xe.com/currencycharts>

<sup>3</sup> Data presented for expenditures show both the mean and median values. The analyses across the paired households in Rounds 1, 2 and 3 are conducted using the weighted mean values.



Food Expenditure Share measures the percentage of household income spent on short-term food expenses, capturing the economic vulnerability of a household. Data from Table 2 show that Food Expenditures Share decreases at Round 2 but increases at Round 3 with no statistical difference between Round 1 and Round 3. This indicates that, despite slight improvements made in the interim round, household economic vulnerability has stabilized over time. Additionally, the percentage of households moderately to severely food insecure calculated using Food Expenditure Share (where greater than 65 percent of a household's income is spent on food) show a decrease in Round 2 but an increase in Round 3. These fluctuations over time may be due to weather changes and crop availability as Round 3 was conducted at the beginning of Cambodia's lean season.

**Table 2. Expenditures by Survey Round, Paired Data**

EXPENDITURES	By Survey Round					
	Round 1		Round 2		Round 3	
	(median)	(mean)	(median)	(mean)	(median)	(mean)
Yearly Expenditures (USD)	\$3,219	\$5,137	\$3,196	\$4,366	\$2,518	\$3,790 *
Food Expenditures	\$1,705	\$2,165	\$1,604	\$1,858 *	\$1,401	\$1,639 *
Non-Food Expenditures	\$1,289	\$2,971	\$1,414	\$2,508	\$994	\$2,151 *
Monthly Expenditures (USD)	\$268	\$428	\$266	\$364	\$210	\$316 *
Food Expenditures	\$142	\$180	\$134	\$155 *	\$117	\$137 *
Non-Food Expenditures	\$107	\$248	\$118	\$209	\$83	\$179
Per Capita Expenditures (USD)	\$60	\$100	\$61	\$82 *	\$48	\$70 *
Food Expenditures	\$33	\$41	\$32	\$35 *	\$27	\$31 *
Non-Food Expenditures	\$23	\$59	\$26	\$47	\$19	\$39 *
Food Expenditure Share (%)		55.6		52.1 *		56.6
Moderately/Severely Food Insecure, scale >65% Food Expenditure Share (%)		33.2		24.7 *		36.3
	<i>n</i>	934	934	934	934	934

Asterisks (\*) represent significance at the 0.05 level comparing Round 1 to Round 2 and Round 3.

## ECOLOGICAL ZONES<sup>4 5</sup>

The Plains zone had the worse food security outcomes at baseline across the ecological zones<sup>6</sup> (refer to Table 7 in the Technical Annex). However, over the subsequent survey rounds, the Plains show significant improvements in FCS, DDS, and HHS whereas the Tonle Sap and Coastal zones have worsening food security outcomes over the same 15-month period. Most ecological zones, in general, also rely less on coping strategies over time. However, livelihood coping strategies within the Coastal zone significantly increase from Round 1 to Round 2, and the percentage of stress coping strategies utilized by Coastal households increases more than 15.0 percent across the three survey rounds (Table 10 in the Technical Annex).

At Round 1, the ecological zone with the highest yearly, monthly and per capita expenditures is the Plateau and the lowest the Plains<sup>7</sup>. Expenditures, over time, decreased in the Plains and in Tonle Sap. There were no increases in expenditures across zones or rounds.

<sup>4</sup> Refer to Table 7 - Table 10 in the Technical Annex for food security outcomes by ecological zone.

<sup>5</sup> Refer to Table 11 - Table 14 in the Technical Annex for expenditures by ecological zones.

<sup>6</sup> No significance tests were conducted to measure difference in the values between zones.

<sup>7</sup> No significance tests were conducted to measure difference in the values between zones.

## HEAD OF HOUSEHOLD<sup>8 9</sup>

Table 15 (*in the Technical Annex*) show that female-headed households have significantly lower food consumption and dietary diversity scores in Rounds 1 and 2 than male-headed households, yet differences in Round 3 are not significant. This may indicate that during the lean season of Round 3, food consumption and dietary diversity scores for male-headed households dropped to the same level as female-headed households. Additionally, female-headed households have higher HHS than male-headed households largely due to having a greater percentage of moderate hunger across all three survey rounds. This is also true for Food Expenditure Share where more female-headed households are moderately to severely food insecure than male-headed households at 37.9 percent versus 32.0 percent in Round 1 and 41.9 percent versus 34.7 percent in Round 3. Although the data shows that even with significant differences between these two groups across the survey rounds, an average of 89.0 percent of female-headed households report little to no hunger (and almost none reported severe hunger).

Female-headed households are more likely to reduce or change food habits as a coping mechanism than male-headed households for Rounds 1 and 2. However, over the 15-month period, female-headed households rely less on these types of coping strategies and by Round 3, the rCSI scores for both groups are equal at 1.4. Livelihood coping strategies also show no differences between male- and female-headed households.

Male- and female-headed households are significantly different across all survey rounds for yearly and monthly expenditures with female-headed households reporting less spending on food and non-food items. However, there are no differences reported for per capita expenditures. This is attributed to female-headed households having less people residing within their home compared to male-headed households at 3.7 and 5.0 members, respectively.

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<sup>8</sup> Refer to Table 15 in the Technical Annex for food security outcomes by sex of head of household.

<sup>9</sup> Refer to Table 16 in the Technical Annex for expenditures by sex of head of household.

## QUESTION 2: WHAT WAS THE RESILIENCE CAPACITY OF CAMBODIAN HOUSEHOLDS 15 MONTHS AFTER THE DROUGHT?

Not enough data is available in Round 1 and Round 2 to calculate the resilience capacity index and thus, changes in the capacity over the 15-month period cannot be measured. However, certain indicators that were repeatedly captured across the survey rounds show improvements after the El Niño event. These include asset ownership, access to banks, and livelihood diversity. Indicators used to calculate resilience capacity for Round 3 show that linking social capital, access to information, and social networks provide the greatest contribution towards the overall index.

Terciles of the capacity index were created to compare households with low, medium and high resilience across food security outcomes and expenditures. The low resilience capacity group has a greater percentage of female-headed households, have more ID Poor households<sup>10</sup>, have smaller household sizes, and are more likely to reside in the Tonle Sap ecological zone compared to high capacity households. Data also shows that households with higher resilience capacity have better food security outcomes, such as FCS, DDS and HHS, and have greater expenditures. They also spend less on food in comparison to low and medium households. Conversely, because low capacity households spend a greater percentage of their income towards food items than high capacity households, they have a greater proportion of households that are moderately to severely food insecure (as measured by Food Expenditure Share).

### PAIRED RESILIENCE CAPACITY INDICATORS

Absorptive, adaptive, and transformative capacities, along with the overall resilience capacity index, are calculated for Round 3 only. All indicators necessary to compute these capacities are not available for Rounds 1 and 2; however, the indicators available for comparison across the survey rounds (i.e. asset ownership, access to bank/MFI accounts, access to remittances, and livelihood diversity) are presented in Table 3. Data shows that asset ownership and access to banks increases from Round 1 to Round 3. Livelihood diversity also has an overall increase over the 15-month period, but it is important to note that there is a significant decrease from Round 2 to Round 3 although not to or below the levels at Round 1.

**Table 3. Resilience Capacity Indicators by Survey Round, Paired Data**

RESILIENCE CAPACITY INDICATORS	By Survey Round		
	Round 1	Round 2	Round 3
Asset ownership (mean, 0-144)	62.8	65.6 *	66.1 *
Access to bank/MFI accounts (%)	5.7	9.6 *	8.4 *
Access to remittances (%)	39.9	41.4	39.8
Livelihood diversity (mean, 0-14)	2.6	3.3 *	2.8 *
	<i>n</i>	934	934

Asterisks (\*) represent significance at the 0.05 level comparing Round 1 to Round 2 and Round 3.

<sup>10</sup> ID Poor refers to those households that have been identified as poor through the Ministry of Planning's identification of poor households programme.

## RESILIENCE CAPACITY INDEX AND INDICATORS (ROUND 3 ONLY) <sup>11</sup>

Information was collected in Round 3 to measure three dimensions of resilience capacity:

**Figure 4. Resilience Capacity Indicator Contribution, Round 3**

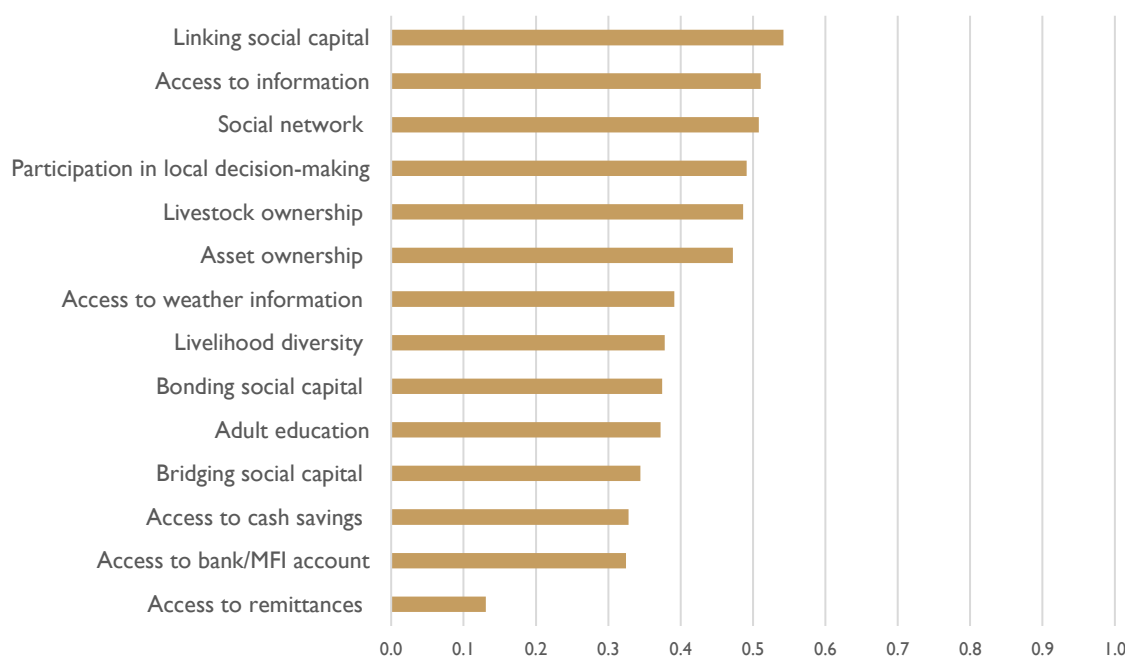


Figure 4 provides the factor loading values for the computation of the overall resilience capacity index using factor analysis. This offers an overview of the total contribution of individual indicators. The “Technical Methodology” in the Annex provides more detailed information on these indicators.

- **Absorptive capacity** – the household’s ability to minimize exposure to shocks through preventative measures and appropriate coping mechanisms;
- **Adaptive capacity** – household’s ability to make proactive and informed choices based on an understanding of changing conditions; and
- **Transformative capacity** – the governance mechanisms, policies and regulations, infrastructure, community networks and formal and informal social protection mechanisms that constitute the enabling environment for systemic change.

The specific indicators used to measure the three dimensions of resilience capacity are presented in Figure 4. These indicators are used to compute an overall resilience index using factor analysis. Figure 4 provides the relative contribution of each indicator to the overall resilience capacity.

None of the indicators in Figure 4 have negative values thus inferring that they all positively contribute to the overall resilience capacity index. Linking social capital, defined as the network of interactions between individuals and groups across explicit, institutionalized, and formal boundaries in society, is the largest contributor and most strongly related to the resilience capacity index. Other major contributors include access to information, social networks, participation in local decision making, livestock ownership, and assets. Conversely, access to remittances, access to banks/MFI accounts, and access to banks contribute the least. Further research is required to better understand why this is the case.

<sup>11</sup> Refer to Table 18 in the Technical Annex for resilience capacity index and indicator data for the overall sample and across the three resilience capacity groups (low, medium, and high).

## RESILIENCE CAPACITY GROUPS (ROUND 3 ONLY)

The thresholds for the resilience capacity groups are divided into terciles of equally distributed weighted groups by the resilience capacity index score. Households with low resilience have an index score of 27.11 or below (n=344); medium resilience households have a score between 27.11 to 39.68 (n=345); and highly resilient households score greater or equal to 39.73 (n=345). Characteristic data for each resilience capacity group are presented in Table 4. Overall, low capacity households are more likely to be female-headed and have a higher percentage of IDPoor households, in comparison to high capacity households. They also have smaller household sizes. When comparing across ecological zones, a larger proportion of highly resilient households reside in the Coastal zone while a smaller proportion live in the Tonle Sap (see Figure 7).

**Table 4. Resilience Capacity Group Characteristics (Round 3)**

	Resilience Capacity			
	Low	Medium	High	
<b>RESILIENCE CAPACITY GROUP CHARACTERISTICS</b>				
<b>Household Data</b>				
Female-headed households (%)	27.8	23.1	14.9 *	
IDPoor households (%)	31.6	24.8	16.1 *	
Household size (mean)	4.4	4.7 *	5.1 *	
Age of household head (mean)	48.3	47.7	47.1	
<b>Ecological Zones</b>				
Plains (%)	42.2	38.7	45.6	
Tonle Sap (%)	42.0	41.6	24.7 *	
Plateau/Mountain (%)	12.3	12.9	17.0	
Coastal (%)	3.4	6.8	12.7 *	
	<i>n</i>	344	345	345

Asterisks (\*) represent significance at the 0.05 level comparing Round 1 to Round 2 and Round 3.

Data from Table 18 (*in the Technical Annex*) compares the capacities and their corresponding indicators by households with low, medium and high resilience capacity. All indicators, apart from remittances, show improvements across the resilience capacity groups from low to high.

Table 5 shows that households with higher resilience capacity have better food security outcomes for FCS, DDS, and HHS. Highly resilient households also utilize less reduced consumption coping strategies in comparison to households with lower resilience capacity whereas households categorized as medium resilient rely more heavily on livelihood coping strategies, specifically stress and crisis coping strategies.

**Table 5. Food Security Outcomes by Resilience Capacity Groups (Round 3)**

	Resilience Capacity			
	Low	Medium	High	
<b>FOOD SECURITY OUTCOMES</b>				
Food Consumption Score, FCS (mean, 0-112)	53.6	55.9 *	58.1 *	
FCS groups				
Poor, scale 0-24.5 (%)	1.1	1.6	1.6	
Borderline, scale 25-38.5 (%)	2.9	0.4 *	0.5 *	
Acceptable, scale 39-112 (%)	96.1	99.4 *	99.3 *	
Dietary Diversity Score, DDS (mean, 0-7)	4.9	5.2 *	5.3 *	
DDS groups				
Low, scale 0-4.4 (%)	28.6	19.1 *	18.1 *	
Medium, scale 4.5-6 (%)	67.6	76.3 *	73.6	
High, scale 6.1-7 (%)	3.8	4.6 *	8.3 *	
Household Hunger Scale, HHS (mean, 0-6)	0.3	0.3	0.1 *	
No/Little Hunger (%)	91.9	93.0	99.4 *	
Moderate Hunger (%)	8.1	6.7	0.5 *	
Severe Hunger (%)	0.0	0.0	0.1	
Reduced Coping Strategy Index, rCSI (mean, 0-56)	2.0	1.6	0.5 *	
Livelihood Coping Strategies (mean, 1-4)	1.4	1.6 *	1.4	
Emergency Coping Strategies (%)	4.8	6.7	7.0	
Crisis Coping Strategies (%)	9.8	17.7 *	6.2	
Stress Coping Strategies (%)	14.8	23.6 *	14.9	
	<i>n</i>	344	345	345

Asterisks (\*) represent significance at the 0.05 level comparing Round 1 to Round 2 and Round 3.

Table 6 shows the differences in yearly, monthly, and per capita expenditures by the resilience capacity groups. Overall, households within the high resilience group have more expenditures than the lower resilience capacity households. When comparing the yearly/monthly amount households spend towards food and non-food items, highly resilient households spend 6.4 to 9.7 percent less on food (and the same percent difference on non-food expenditures) than low and medium resilient households, respectively. High capacity households also have more per capita expenditures and spend 6.9 percent less on food than households within the lowest resilience tercile. There are no significant differences between low and medium households for food/non-food per capita expenditures. Data from Food Expenditure Share show that low capacity households spend a greater percentage of their income towards food than more resilient households and thus, have higher risk of food insecurity.

**Table 6. Expenditures by Resilience Capacity Groups (Round 3)**

EXPENDITURES	Resilience Capacity					
	Low		Medium		High	
	(median)	(mean)	(median)	(mean)	(median)	(mean)
Yearly Expenditures (USD)	\$2,007	\$3,033	\$2,444	\$3,135	\$3,173	\$4,597 *
Food Expenditures	\$1,217	\$1,402	\$1,404	\$1,552 *	\$1,677	\$1,830 *
Non-Food Expenditures	\$699	\$1,631	\$943	\$1,583	\$1,355	\$2,767 *
Monthly Expenditures (USD)	\$167	\$253	\$204	\$261	\$264	\$383 *
Food Expenditures	\$101	\$117	\$117	\$129 *	\$140	\$152 *
Non-Food Expenditures	\$58	\$136	\$79	\$132	\$113	\$231 *
Per Capita Expenditures (USD)	\$40	\$62	\$49	\$60	\$57	\$81 *
Food Expenditures	\$24	\$29	\$28	\$30	\$29	\$32 *
Non-Food Expenditures	\$13	\$33	\$19	\$30	\$25	\$49 *
Food Expenditures Share (%)		60.1		57.6		52.3 *
Moderately/Severely Food Insecure, scale >65% Food Expenditure Share (%)		45.3		36.5 *		25.3 *
	<i>n</i>	344		345		345

Asterisks (\*) represent significance at the 0.05 level comparing Round 1 to Round 2 and Round 3.

# RECOMMENDATIONS

## Technical Recommendations:

- For future resilience measurement, matched household data across each survey round should be collected around similar agricultural seasons. Round 3 was conducted in August, which is the beginning of Cambodia's lean season. Cambodia also typically experiences dry spells and flooding during this period. This may account for the fluctuation across the survey rounds in the percentage of households moderately to severely food insecure as measured by Food Expenditure Share, and the little to no improvements across the other food security outcomes.
- Per the scope of this analysis, there are currently no data-driven explanations as to why expenditures decrease over the 15-month period. It is recommended that future research be conducted to help understand this decline.
- As described in the Technical Annex, there is a need for a more robust resilience capacity index in future analyses. No community-level indicators were used to compute transformative capacity in Round 3, thus excluding those components that enable an environment for systemic change, such as governance mechanisms, policies/regulations, infrastructure, and formal and informal social protection mechanisms. Additionally, the availability of more data lends itself to more complex modelling and analysis that will help determine which resilience indicators are significantly associated with food security and expenditure outcomes. This can provide better guidance on programme design and development.
- Review the standard indicators used to measure household food security in Cambodia to identify other possible measurements that can better capture the nuances of vulnerability within the country, for example, understanding affordability of essential needs through the use of indicators such as Minimum Expenditure Baskets (MEBs).

## Programmatic Recommendations:

- Households with greater resilience capacity have better food security outcomes. Programmes should be designed with a focus on supporting or building upon the resilience capacity of households and communities. Improving access to information, building community relationships and increasing community engagement so households have strong social networks and are better connected to their local authorities and non-governmental organisations operating in these areas, are some key actions to improve resilience. Whilst this study did not capture community indicators it is important to consider the role that access to social assistance, basic services and infrastructure could also play in improving resilience.
- Include a differential focus on ecological zones with appropriate strategies by zone. Some zones might face greater seasonal challenges whereas others might be more vulnerable to climatic shocks such as floods and droughts. Note that floods and droughts might impact different areas more strongly and require different risk reduction strategies. Further investment in climate vulnerability analysis is required to identify the appropriate strategy in these areas.
- Focus on addressing the vulnerabilities of female-headed households through gender-focused programming.
- Add a learning agenda component to any programming to understand assumptions around resilience pathways and research determinants of unexpected/unintended changes in resilience capacities uncovered through programme monitoring.

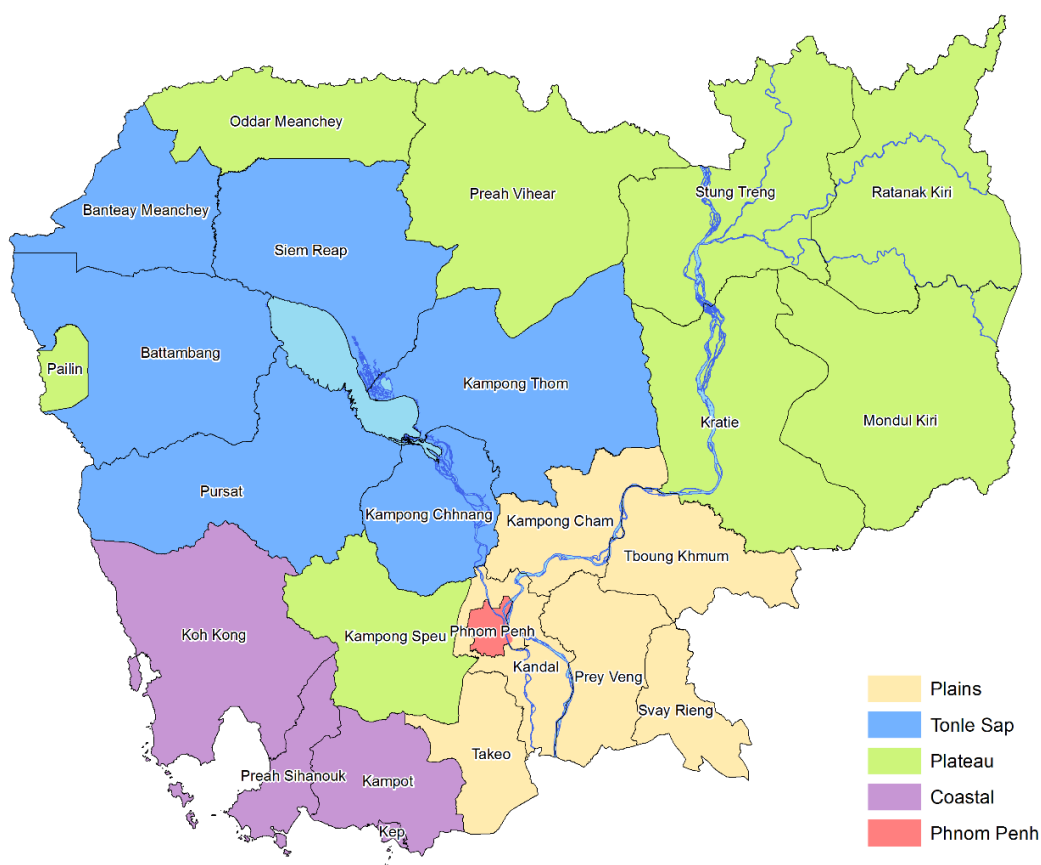
# TECHNICAL ANNEX

## TECHNICAL METHODOLOGY

### Survey Design

The first survey (Round 1, May 2016) used a stratified two-stage cluster sampling design with probability proportional to size. The stratification was done by the four ecological zones (Plains, Tonle Sap, Plateau/Mountain and Coastal), with a total sample of 2,400 households in 160 villages in 24 provinces. Phnom Penh was excluded from the sample. The second survey (Round 2, December 2016) was conducted among the same sampled households (i.e., a panel) from the first survey, with the following exception: of the original 2,400 households, only 1,781 were located and re-interviewed in the second survey, resulting in 619 households that were lost from the panel<sup>12</sup>. To compensate for this, 560 new households in the original villages were randomly selected and interviewed to ensure sufficient sample size for the cross-sectional survey. The third survey (Round 3, August 2017) was carried out with reduction of the sample to 1,038 households in 72 villages in four ecological zones. However, only 934 households from the first and second surveys were re-interviewed in the third survey while 104 households were lost from the panel of three surveys.

**Figure 5. Map of Cambodia by Ecological Zone**



<sup>12</sup> Enumerators did not systematically record the reasons for not being able to locate these households, but anecdotally the most common reasons were the absence of the adult respondent in the household due to migration or field work.



## Trend Analysis

A trend analysis was conducted using three household surveys conducted across a 15-month period after the 2016 El Niño drought. Round 1 was conducted from May 12 to June 6, 2016; Round 2 from December 11-26, 2016; and Round 3 from August 21-September 3, 2017. A total of 934 households were matched and analyzed across a set of key food security indicators, based on calculations provided by WFP. These include:

- Food Consumption Score (FCS)
- Dietary Diversity Score (DDS)
- Reduced Coping Strategies Index (rCSI)
- Livelihood Coping Strategies (stress, crisis, emergency, and overall)
- Household Hunger Scale (HHS)
- Expenditures (yearly, monthly, and per capita)
- Food Expenditure Share

Indicator differences across rounds were tested for statistical significance (paired t-tests/proportions for matched observations). Paired data across the three rounds were also analyzed by the four ecological zones (Plains, Tonle Sap, Plateau and Coastal) and by sex of head of household.

## Resilience capacities

Resilience is viewed as a set of capacities that enable households and communities to effectively function in the face of shocks and stresses and still meet a set of well-being outcomes. The ability to measure resilience involves measuring the relationship between shocks, capacities, responses, and future states of well-being. **Thus, there is no single indicator that measures resilience.** There is a need for a number of variables to be used as part of a measurement framework, as described in further detail below.

Resilience capacities are measured as a set of indices, one for each of the three dimensions of resilience capacity—absorptive capacity, adaptive capacity, and transformative capacity—and one overall index combining these three indexes. Resilience capacity is calculated using the individual components that comprise the absorptive, adaptive, and transformative capacities. Data from Round 3 is used in this analysis.

**Absorptive capacity index.** Absorptive capacity is the ability to minimize exposure to shocks and stresses through preventative measures and appropriate coping strategies to avoid permanent, negative impacts. The absorptive capacity index is comprised of six variables, some of which are themselves indices. The variables used include:

- Bonding social capital
- Asset ownership
- Livestock ownership
- Access to remittances
- Access to bank/MFI account
- Access to cash savings

**Adaptive capacity index.** Adaptive capacity is the ability to make proactive and informed choices about alternative livelihood strategies based on an understanding of changing conditions. This index is comprised of the following nine variables, again some of which are themselves indices. The variables are:

- Bridging social capital
- Linking social capital
- Social network
- Adult education
- Livelihood diversity
- Access to information
- Access to weather information
- Asset ownership
- Livestock ownership

**Transformative capacity index.** Transformative capacity involves the governance mechanisms, policies/regulations, infrastructure, community networks, and formal and informal social protection mechanisms that constitute the enabling environment for systemic change. This index is comprised of three variables, including some that are indices. The variables are:

- Bridging social capital
- Linking social capital score
- Participation in local decision-making bodies

The overall index of resilience capacity was created by combining all indicators under absorptive, adaptive and transformative capacity into a single composite index using factor analysis. Although several indicators are represented more than once across the three capacity measures (e.g., bridging social capital, asset ownership, etc.), indicators are only used once when calculating the overall resilience capacity index, as shown in the formula below.

$$Resilience\ capacity\ index = f \left\{ \begin{array}{l} \textit{Bonding, Bridging and Linking Social Capital} \\ \textit{Asset and livestock ownership} \\ \textit{Access to remittances} \\ \textit{Access to bank/MFI account} \\ \textit{Access to cash savings} \\ \textit{Social network} \\ \textit{Education} \\ \textit{Livelihood diversity} \\ \textit{Access to information} \\ \textit{Access to weather information} \\ \textit{Participation in local decision making bodies} \end{array} \right.$$

Households (n=1034) in Round 3 were then divided into equal percentage terciles (33.3 percent) of low, medium and high resilience capacity and analyzed across the same food security outcomes used in the trend analysis.

**Weighted data by ecological zone**

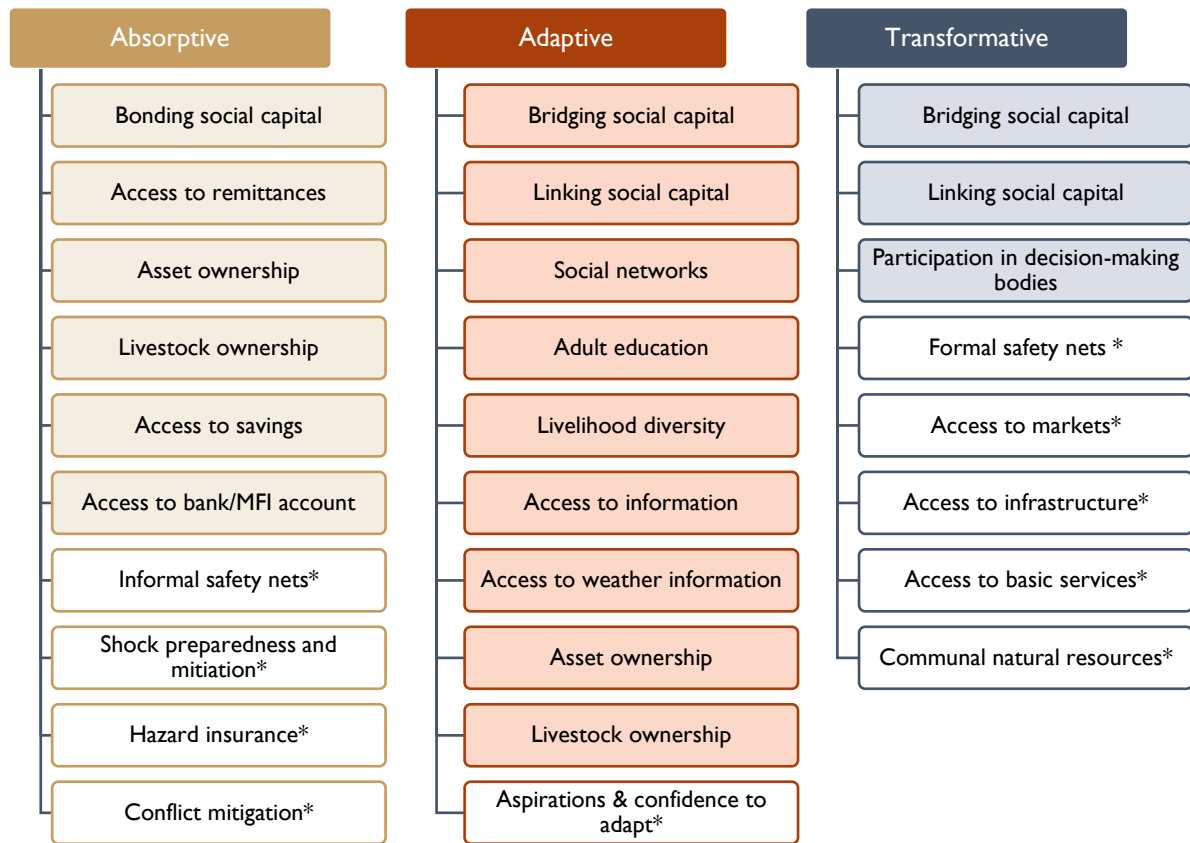
Data were weighted across the ecological zones.

Ecological Zones	Weights
Plains	1.6713
Tonle Sap	1.4201
Plateau/Mountains	0.5578
Coastal	0.3116

**LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESILIENCE CAPACITY ANALYSES**

1. At the time of the analysis, community data was not available to calculate a more robust resilience capacity index, and more specifically the transformative capacity index. Only three indicators, as shown in Figure 6, are used to measure the transformative capacity index which include participation in local decision-making, linking social capital, and bridging social capital. These indicators do not fully capture the community resilience components necessary to enable an environment for systemic change such as social assistance and access to infrastructure. Thus, it is recommended that in future analyses, more community-based indicators under transformative capacity be included to create a stronger resilience capacity index.

**Figure 6. Resilience Capacity Indicators**



Note: Asterisks (\*) represents those indicators not available in Round 3. These indicators are used typically across resilience capacity analyses.

- Other data necessary to run more powerful statistical tests include having a shock module that records the number and severity of shocks households experienced in the time lapse between surveys, or for a specified time period. Household recovery from identified shocks can also be used as an outcome measure for resilience capacity analyses.

## TABLES

### Ecological Zones

#### Food Security Outcomes by Ecological Zone and Survey Round

	Ecological Zone: Plains		
	Round 1	Round 2	Round 3
<b>FOOD SECURITY OUTCOMES</b>			
Food Consumption Score, FCS (mean, 0-112)	52.7 <sup>ac</sup>	54.8 <sup>a</sup>	54.6 <sup>c</sup>
FCS groups			
Poor, scale 0-24.5 (%)	5.5 <sup>a</sup>	1.3 <sup>a</sup>	0.0
Borderline, scale 25-38.5 (%)	10.1 <sup>a</sup>	0.8 <sup>a</sup>	0.0
Acceptable, scale 39-112 (%)	84.5 <sup>a</sup>	97.9 <sup>a</sup>	100.0
Dietary Diversity Score, DDS (mean, 0-7)	4.9 <sup>c</sup>	4.8 <sup>b</sup>	5.1 <sup>bc</sup>
DDS groups			
Low, scale 0-4.4 (%)	29.4	34.0 <sup>b</sup>	23.5 <sup>b</sup>
Medium, scale 4.5-6 (%)	63.4 <sup>c</sup>	63.4 <sup>b</sup>	72.3 <sup>bc</sup>
High, scale 6.1-7 (%)	7.1 <sup>a</sup>	2.5 <sup>a</sup>	4.2
Household Hunger Scale, HHS (mean, 0-6)	0.5 <sup>ac</sup>	0.1 <sup>a</sup>	0.2 <sup>c</sup>
No/Little Hunger (%)	86.1 <sup>ac</sup>	97.1 <sup>a</sup>	95.0 <sup>c</sup>
Moderate Hunger (%)	13.9 <sup>ac</sup>	2.9 <sup>a</sup>	5.0 <sup>c</sup>
Severe Hunger (%)	0.0	0.0	0.0
Reduced Coping Strategies Index, rCSI (mean, 0-56)	2.8 <sup>ac</sup>	0.8 <sup>a</sup>	0.6 <sup>c</sup>
Livelihood Coping Strategies (mean, 1-4)	1.6 <sup>c</sup>	1.5 <sup>b</sup>	1.3 <sup>bc</sup>
Stress Coping Strategies (%)	29.0 <sup>c</sup>	23.1 <sup>b</sup>	13.9 <sup>bc</sup>
Crisis Coping Strategies (%)	10.5	7.6	7.6
Emergency Coping Strategies (%)	5.9 <sup>c</sup>	5.5 <sup>b</sup>	1.7 <sup>bc</sup>
	<i>n</i>	238	238
		238	238

<sup>a,b,c</sup> Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

**Table 8. Food Security Outcomes by Survey Round, Tonle Sap**

	Ecological Zone: Tonle Sap		
	Round 1	Round 2	Round 3
<b>FOOD SECURITY OUTCOMES</b>			
Food Consumption Score, FCS (mean, 0-112)	60.4 <sup>a</sup>	58.8 <sup>ab</sup>	57.3 <sup>bc</sup>
FCS groups			
Poor, scale 0-24.5 (%)	0.0	0.0	0.4
Borderline, scale 25-38.5 (%)	0.4	0.8	1.7
Acceptable, scale 39-112 (%)	99.6	99.2	97.9
Dietary Diversity Score, DDS (mean, 0-7)	5.4 <sup>c</sup>	5.3	5.2 <sup>c</sup>
DDS groups			
Low, scale 0-4.4 (%)	8.8 <sup>c</sup>	20.5 <sup>a</sup>	15.5 <sup>c</sup>
Medium, scale 4.5-6 (%)	83.7 <sup>a</sup>	66.1 <sup>ab</sup>	79.5 <sup>b</sup>
High, scale 6.1-7 (%)	7.5 <sup>a</sup>	13.4 <sup>ab</sup>	5.0 <sup>b</sup>
Household Hunger Scale, HHS (mean, 0-6)	0.3	0.3	0.3
No/Little Hunger (%)	92.9	94.1	94.1
Moderate Hunger (%)	7.1	5.9	5.9
Severe Hunger (%)	0.0	0.0	0.0
Reduced Coping Strategies Index, rCSI (mean, 0-56)	2.0	1.9 <sup>b</sup>	2.4 <sup>b</sup>
Livelihood Coping Strategies (mean, 1-4)	1.6	1.6	1.6
Stress Coping Strategies (%)	22.6 <sup>a</sup>	31.0 <sup>ab</sup>	18.8 <sup>b</sup>
Crisis Coping Strategies (%)	13.8	16.3	17.2
Emergency Coping Strategies (%)	6.7	6.3	8.4
	<i>n</i>	239	239
		239	239

<sup>a,b,c</sup> Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

**Table 9. Food Security Outcomes by Survey Round, Plateau/Mountain**

	Ecological Zone: Plateau/Mountain			
	Round 1	Round 2	Round 3	
<b>FOOD SECURITY OUTCOMES</b>				
Food Consumption Score, FCS (mean, 0-112)	57.1	56.7	55.8	
FCS groups				
Poor, scale 0-24.5 (%)	2.7	0.5	2.3	
Borderline, scale 25-38.5 (%)	3.2	5.0	4.1	
Acceptable, scale 39-112 (%)	94.1	94.6	93.7	
Dietary Diversity Score, DDS (mean, 0-7)	5.3 <sup>c</sup>	5.2 <sup>b</sup>	4.9 <sup>bc</sup>	
DDS groups				
Low, scale 0-4.4 (%)	17.6 <sup>c</sup>	20.4 <sup>b</sup>	33.9 <sup>bc</sup>	
Medium, scale 4.5-6 (%)	74.2 <sup>c</sup>	73.8 <sup>b</sup>	56.6 <sup>bc</sup>	
High, scale 6.1-7 (%)	8.1	5.9	9.5	
Household Hunger Scale, HHS (mean, 0-6)	0.3 <sup>a</sup>	0.2	0.1 <sup>a</sup>	
No/Little Hunger (%)	89.1 <sup>a</sup>	94.1	97.7 <sup>a</sup>	
Moderate Hunger (%)	10.0 <sup>a</sup>	5.9	2.3 <sup>a</sup>	
Severe Hunger (%)	0.9	0.0	0.0	
Reduced Coping Strategies Index, rCSI (mean, 0-56)	2.7 <sup>ac</sup>	1.0 <sup>a</sup>	1.0 <sup>c</sup>	
Livelihood Coping Strategies (mean, 1-4)	1.8 <sup>ac</sup>	1.4 <sup>a</sup>	1.6 <sup>c</sup>	
Stress Coping Strategies (%)	38.9 <sup>ac</sup>	21.7 <sup>a</sup>	17.2 <sup>c</sup>	
Crisis Coping Strategies (%)	14.9 <sup>a</sup>	5.4 <sup>a</sup>	7.2	
Emergency Coping Strategies (%)	12.2 <sup>a</sup>	3.6 <sup>a</sup>	10.4	
	<i>n</i>	221	221	221

<sup>a,b,c</sup> Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

**Table 10. Food Security Outcomes by Survey Round, Coastal**

	Ecological Zone: Coastal			
	Round 1	Round 2	Round 3	
<b>FOOD SECURITY OUTCOMES</b>				
Food Consumption Score, FCS (mean, 0-112)	60.2 <sup>c</sup>	58.6	56.5 <sup>c</sup>	
FCS groups				
Poor, scale 0-24.5 (%)	0.0	0.0	0.0	
Borderline, scale 25-38.5 (%)	0.0	1.3	1.7	
Acceptable, scale 39-112 (%)	100.0	98.7	98.3	
Dietary Diversity Score, DDS (mean, 0-7)	5.5 <sup>ac</sup>	5.1 <sup>a</sup>	5.0 <sup>c</sup>	
DDS groups				
Low, scale 0-4.4 (%)	7.2 <sup>ac</sup>	23.7 <sup>a</sup>	30.9 <sup>c</sup>	
Medium, scale 4.5-6 (%)	81.8 <sup>c</sup>	69.5	63.1 <sup>c</sup>	
High, scale 6.1-7 (%)	11.0	6.8	5.9	
Household Hunger Scale, HHS (mean, 0-6)	0.0 <sup>ac</sup>	0.3 <sup>a</sup>	0.3 <sup>c</sup>	
No/Little Hunger (%)	99.6	93.6	92.4	
Moderate Hunger (%)	0.4	5.5	7.2	
Severe Hunger (%)	0.0	0.8	0.4	
Reduced Coping Strategy Index, rCSI (mean, 0-56)	1.2 <sup>a</sup>	2.6 <sup>a</sup>	2.1	
Livelihood Coping Strategies (mean, 1-4)	1.6	1.6	1.8	
Stress Coping Strategies (%)	22.5 <sup>ac</sup>	38.6 <sup>a</sup>	39.8 <sup>c</sup>	
Crisis Coping Strategies (%)	18.2	16.1	15.3	
Emergency Coping Strategies (%)	4.7	1.7	10.6	
	<i>n</i>	236	236	236

<sup>abc</sup> Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

## Expenditures by Ecological Zone and Survey Round

**Table 11. Expenditures by Survey Round, Plains**

EXPENDITURES	Ecological Zone: Plains		
	Round 1	Round 2	Round 3
	(mean)	(mean)	(mean)
Yearly Expenditures (USD)	\$4,557 <sup>a</sup>	\$3,661 <sup>a</sup>	\$3,958
Food Expenditures	\$2,139 <sup>ac</sup>	\$1,600 <sup>ab</sup>	\$1,489 <sup>bc</sup>
Non-Food Expenditures	\$2,418	\$2,069	\$2,469
Monthly Expenditures (USD)	\$380 <sup>a</sup>	\$305 <sup>a</sup>	\$330
Food Expenditures	\$178 <sup>ac</sup>	\$133 <sup>ab</sup>	\$124 <sup>bc</sup>
Non-Food Expenditures	\$202	\$172	\$206
Per Capita Expenditures (USD)	\$91 <sup>a</sup>	\$71 <sup>a</sup>	\$75
Food Expenditures	\$42 <sup>ac</sup>	\$31 <sup>a</sup>	\$30 <sup>c</sup>
Non-Food Expenditures	\$49	\$40	\$45
Food Expenditures Share (%)	55.2 <sup>a</sup>	52.3 <sup>ab</sup>	56.0 <sup>b</sup>
Moderately/Severely Food Insecure, scale >65% Food Expenditure Share (%)	30.7	27.7 <sup>b</sup>	35.7 <sup>b</sup>
	<i>n</i> 238	238	238

<sup>a,b,c</sup> Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

**Table 12. Expenditures by Survey Round, Tonle Sap**

EXPENDITURES	Ecological Zone: Tonle Sap		
	Round 1	Round 2	Round 3
	(mean)	(mean)	(mean)
Yearly Expenditures (USD)	\$5,575 <sup>c</sup>	\$4,696 <sup>b</sup>	\$3,104 <sup>bc</sup>
Food Expenditures	\$2,151 <sup>c</sup>	\$1,993 <sup>b</sup>	\$1,592 <sup>bc</sup>
Non-Food Expenditures	\$3,425 <sup>c</sup>	\$3,425 <sup>b</sup>	\$1,504 <sup>bc</sup>
Monthly Expenditures (USD)	\$465 <sup>c</sup>	\$391 <sup>b</sup>	\$258 <sup>bc</sup>
Food Expenditures	\$179 <sup>c</sup>	\$166 <sup>b</sup>	\$133 <sup>bc</sup>
Non-Food Expenditures	\$285 <sup>c</sup>	\$225 <sup>b</sup>	\$125 <sup>bc</sup>
Per Capita Expenditures (USD)	\$108 <sup>c</sup>	\$88 <sup>b</sup>	\$58 <sup>bc</sup>
Food Expenditures	\$40 <sup>c</sup>	\$37 <sup>b</sup>	\$29 <sup>bc</sup>
Non-Food Expenditures	\$68 <sup>c</sup>	\$51 <sup>b</sup>	\$29 <sup>bc</sup>
Food Expenditures Share (%)	56.0 <sup>ac</sup>	51.9 <sup>ab</sup>	58.7 <sup>bc</sup>
Moderately/Severely Food Insecure, scale >65% Food Expenditure Share (%)	36.4 <sup>a</sup>	21.3 <sup>ab</sup>	39.3 <sup>b</sup>
	<i>n</i> 239	239	239

<sup>a,b,c</sup> Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.



**Table 13. Expenditures by Survey Round, Plateau/Mountain**

EXPENDITURES	Ecological Zone: Plateau/Mountain		
	Round 1	Round 2	Round 3
	(mean)	(mean)	(mean)
Yearly Expenditures (USD)	\$6,129	\$5,098	\$5,110
Food Expenditures	\$2,248	\$2,032	\$2,138
Non-Food Expenditures	\$3,882	\$3,066	\$2,972
Monthly Expenditures (USD)	\$511	\$425	\$426
Food Expenditures	\$187	\$169	\$178
Non-Food Expenditures	\$323	\$256	\$248
Per Capita Expenditures (USD)	\$112	\$90	\$90
Food Expenditures	\$41 <sup>a</sup>	\$36 <sup>a</sup>	\$37
Non-Food Expenditures	\$71	\$54	\$53
Food Expenditures Share (%)	54.9	51.1	52.6
Moderately/Severely Food Insecure, scale >65% Food Expenditure Share (%)	29.9	24.0	28.5
	<i>n</i>	221	221
		221	221

<sup>a,b,c</sup> Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

**Table 14. Expenditures by Survey Round, Coastal**

EXPENDITURES	Ecological Zone: Coastal		
	Round 1	Round 2	Round 3
	(mean)	(mean)	(mean)
Yearly Expenditures (USD)	\$4,585	\$5,429	\$3,875
Food Expenditures	\$2,239	\$2,339 <sup>b</sup>	\$1,827 <sup>b</sup>
Non-Food Expenditures	\$2,346	\$3,091	\$2,048
Monthly Expenditures (USD)	\$382	\$452	\$323
Food Expenditures	\$187	\$195 <sup>b</sup>	\$152 <sup>b</sup>
Non-Food Expenditures	\$195	\$258	\$171
Per Capita Expenditures (USD)	\$89	\$100	\$65
Food Expenditures	\$45 <sup>c</sup>	\$43 <sup>b</sup>	\$31 <sup>bc</sup>
Non-Food Expenditures	\$44	\$57	\$34
Food Expenditures Share (%)	57.6	53.8	57.2
Moderately/Severely Food Insecure, scale >65% Food Expenditure Share (%)	37.7	24.6	39.0
	<i>n</i>	236	236
		236	236

<sup>a,b,c</sup> Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

## Head of Household

### Food Security Outcomes by Head of Household and Survey Round

	Round 1		Round 2		Round 3	
	Male HoH	Female HoH	Male HoH	Female HoH	Male HoH	Female HoH
<b>FOOD SECURITY OUTCOMES</b>						
Food Consumption Score, FCS (mean, 0-112)	57.2	54.4 *	57.3	55.2 **	56.1	55.0
FCS groups						
Poor, scale 0-24.5 (%)	2.3	4.0	0.8	0.0	0.6	0.0
Borderline, scale 25-38.5 (%)	3.9	8.6 *	1.2	2.2	0.9	2.4
Acceptable, scale 39-112 (%)	93.8	87.3 *	98.0	97.8	98.5	97.6
Dietary Diversity Score, DDS (mean, 0-7)	5.2	5.0 *	5.1	4.9 *	5.1	5.1
DDS groups						
Low, scale 0-4.4 (%)	17.2	24.1 *	25.4	30.2	23.3	20.2
Medium, scale 4.5-6 (%)	74.0	72.4	66.4	65.6	71.2	75.3
High, scale 6.1-7 (%)	8.8	3.4 *	8.1	4.2	5.6	4.5
Household Hunger Scale, HHS (mean, 0-6)	0.3	0.6 *	0.2	0.3 *	0.2	0.3 *
No/Little Hunger (%)	91.6	84.2 *	96.4	91.8 *	96.0	90.9 *
Moderate Hunger (%)	8.3	15.6 *	3.6	8.0 *	4.0	9.1 *
Severe Hunger (%)	0.1	0.3	0.0	0.0	0.0	0.0
Reduced Coping Strategy Index, rCSI (mean, 0-56)	2.1	3.2 *	1.2	1.8 *	1.4	1.4
Livelihood Coping Strategies (mean, 1-4)						
Stress Coping Strategies (%)	27.3	28.1	25.9	30.8	17.8	19.2
Crisis Coping Strategies (%)	12.4	14.6	11.8	8.8	10.9	14.1
Emergency Coping Strategies (%)	7.4	5.1	5.7	3.6	6.3	5.0
n	741	193	724	210	720	214

Asterisks represent statistical significance at the 0.05 (\*) level

**Expenditures by Head of Household and Survey Round**

**Table 16. Expenditures by Survey Round and Sex of Head of Household**

EXPENDITURES	Round 1		Round 2		Round 3		
	Male HoH	Female HoH	Male HoH	Female HoH	Male HoH	Female HoH	
	<i>(mean)</i>	<i>(mean)</i>	<i>(mean)</i>	<i>(mean)</i>	<i>(mean)</i>	<i>(mean)</i>	
Yearly Expenditures (USD)	\$5,581	\$3,434 *	\$4,616	\$3,503 *	\$4,037	\$2,958 *	
Food Expenditures	\$2,300	\$1,647 *	\$1,974	\$1,457 *	\$1,735	\$1,316 *	
Non-Food Expenditures	\$3,281	\$1,786	\$2,642	\$2,046	\$2,303	\$1,642	
Monthly Expenditures (USD)	\$465	\$286 *	\$385	\$292 *	\$336	\$246 *	
Food Expenditures	\$192	\$137 *	\$165	\$121 *	\$145	\$110 *	
Non-Food Expenditures	\$273	\$149	\$220	\$170	\$192	\$137	
Per Capita Expenditures (USD)	\$104	\$86	\$82	\$83	\$69	\$75	
Food Expenditures	\$42	\$39	\$35	\$34	\$30	\$33	
Non-Food Expenditures	\$62	\$46	\$47	\$49	\$38	\$42	
Food Expenditures Share (%)	55.4	56.4	52.1	52.3	56.0	58.6	
Moderately/Severely Food Insecure, scale >65%							
Food Expenditure Share (%)	32.0	37.9 *	23.9	27.3	34.7	41.9 *	
	<i>n</i>	741	193	724	210	720	214

Asterisks represent statistical significance at the 0.05 (\*) level.

Significance tests for Yearly, Monthly, and Per Capita Expenditures are run on the mean differences between male and female head of households per round.

**Table 17. Resilience Capacity Indicators by Sex of Head of Household (Round 3)**

	Round 3			
	Overall	Male HoH	Female HoH	
<b>RESILIENCE CAPACITY COMPONENTS</b>				
Absorptive Capacity (mean, 0-100)	28.8	30.3	23.3	*
Bonding social capital (mean, 0-2)	1.5	1.5	1.5	
Access to cash savings (%)	11.5	11.1	12.8	
Livestock ownership (mean, 0-1120)	59.6	65.9	37.3	*
Asset ownership (mean, 0-144)	66.3	70.8	50.2	*
Access to bank/MFI account (%)	7.9	8.3	6.7	
Access to remittances (%)	38.4	34.0	54.1	*
Adaptive Capacity Index (mean, 0-100)	37.0	38.7	30.9	*
Bridging social capital (mean, 0-2)	1.0	1.0	1.0	
Linking social capital (mean, 0-2)	0.5	0.5	0.4	*
Social network (mean, 0-3)	0.5	0.5	0.4	
Access to weather information (%)	60.0	60.4	58.4	
Access to information (mean, 0-16)	4.8	5.0	4.1	*
Adult education (%)	54.1	56.7	45.0	*
Livelihood diversity (mean, 0-14)	2.8	2.9	2.5	*
Transformative Capacity Index (mean, 0-100)	38.9	39.1	38.0	
Participation in local decision-making (%)	58.7	57.5	62.9	
Overall Resilience Capacity Index (mean, 0-100)	34.6	35.6	30.9	*
	<i>n</i>	1034	807	227

Note: Repeat indicators previously provided under other capacity subheadings are not presented in the table (e.g., asset and livestock ownership under Adaptive Capacity).

Asterisks represent statistical significance at the 0.05 (\*) level.

## Resilience Capacity Indexes and Indicators

**Table 18. Resilience Capacity Indicators by Resilience Groups (Round 3)**

	Factor loading value*	Overall	Resilience Capacity					
			Low	Medium	High			
<b>RESILIENCE CAPACITY INDICATORS</b>								
<b>Absorptive Capacity (mean, 0-100)</b>		<b>28.8</b>	<b>18.2</b>	<b>ab</b>	<b>26.9</b>	<b>bc</b>	<b>41.2</b>	<b>ac</b>
Bonding social capital (mean, 0-2)	.374	1.5	1.1	ab	1.6	bc	1.8	ac
Access to cash savings (%)	.328	11.5	2.6	ab	8.0	bc	23.8	ac
Livestock ownership (mean, 0-1120)	.487	59.6	22.4	ab	53.9	bc	102.5	ac
Asset ownership (mean, 0-144)	.472	66.3	50.7	ab	67.0	bc	81.1	ac
Access to bank/MFI account (%)	.324	7.9	1.0	ab	3.7	bc	19.0	ac
Access to remittances (%)	.131	38.4	35.3		39.6		40.3	
<b>Adaptive Capacity Index (mean, 0-100)</b>		<b>37.0</b>	<b>21.5</b>	<b>ab</b>	<b>36.0</b>	<b>bc</b>	<b>53.4</b>	<b>ac</b>
Bridging social capital (mean, 0-2)	.344	1.0	0.6	ab	1.0	bc	1.3	ac
Linking social capital (mean, 0-2)	.542	0.5	0.1	ab	0.4	bc	0.9	ac
Social network (mean, 0-3)	.508	0.5	0.1	ab	0.4	bc	0.9	ac
Access to weather information (%)	.391	60.0	38.1	ab	62.7	bc	79.1	ac
Access to information (mean, 0-16)	.511	4.8	2.4	ab	4.7	bc	7.4	ac
Adult education (%)	.372	54.1	37.0	ab	53.7	bc	71.9	ac
Livelihood diversity (mean, 0-14)	.378	2.8	2.3	ab	2.8	bc	3.3	ac
<b>Transformative Capacity Index (mean, 0-100)</b>		<b>38.9</b>	<b>17.7</b>	<b>ab</b>	<b>37.4</b>	<b>bc</b>	<b>61.5</b>	<b>ac</b>
Participation in local decision-making (%)	.491	58.7	29.4	ab	61.6	bc	85.1	ac
<b>Overall Resilience Capacity Index (mean, 0-100)</b>		<b>34.6</b>	<b>19.0</b>	<b>ab</b>	<b>33.8</b>	<b>bc</b>	<b>50.9</b>	<b>ac</b>
	<i>n</i>	1034	344		345		345	

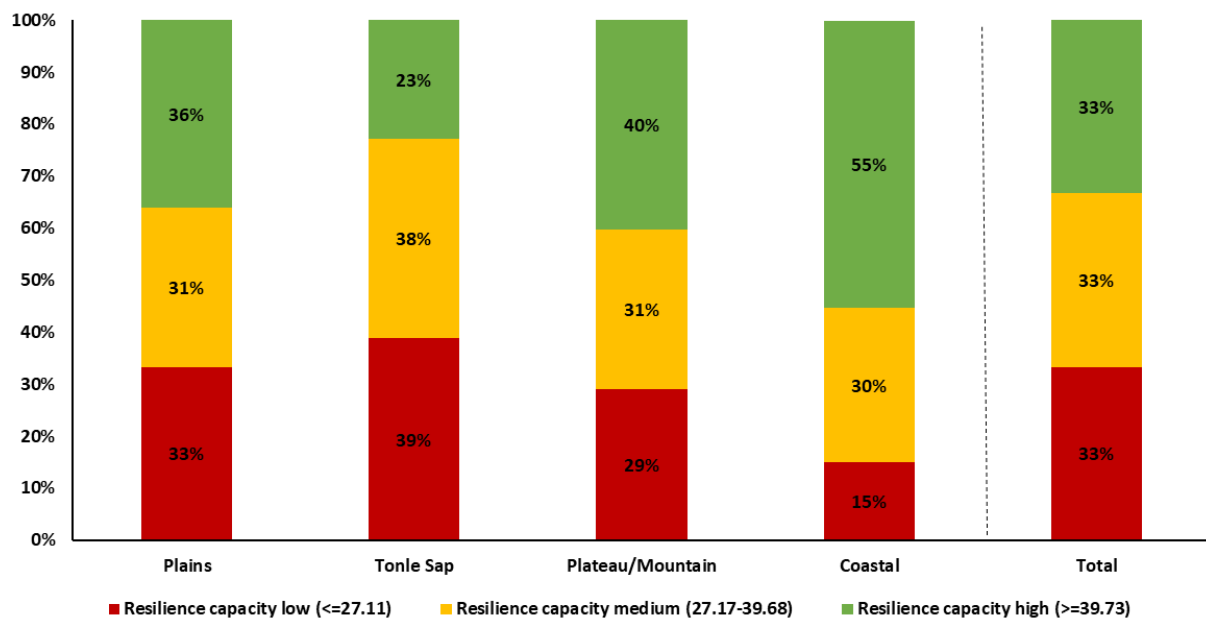
Note: Repeat indicators previously provided under other capacity subheadings are not presented in the table (e.g., asset and livestock ownership under Adaptive Capacity; linking and bridging social capital under Transformative Index).

\*Factor loading values are computed using the total resilience capacity index

The ranges for resilience capacity groups are as follows: low capacity (0-29.10); medium capacity (29.11-41.79); high capacity (41.80-100).

<sup>a,b,c</sup> Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

**Figure 7. Proportion of Households by Resilience Capacity Level in Each Ecological Zone (Round 3)**





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