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PAHAL PROGRAM - STRATEGIC RESILIENCE ASSESSMENT (STRESS) REPORT

Promoting Agriculture, Health and Alternative Livelihoods (PAHAL)

MERCY CORPS

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I. List of Acronyms

- BDS—Business Development Services
- CFUG—Community Forest Users' Group
- CSO—Civil Society Organization
- DADO—District Agriculture Development Office
- DCSI—District Cottage and Small Industry Office
- DDC—District Development Committee
- DDRC—District Disaster Relief Committee
- DHO—District Health Office
- DMC—Disaster Management Committee
- DRR—Disaster Risk Reduction
- ENSO—El Nino-Southern Oscillation
- FAO—Food and Agriculture Organization of the United Nations
- FCHV—Female Community Health Volunteer
- FGD—Focus Group Discussion
- GoN—Government of Nepal
- HH—Household
- IO—Intermediate Objective
- IOD—Indian Ocean Dipole
- IRMI—Inclusive Resource Management Initiative
- KII—Key Informant Interview
- LAPA—Local Adaptation Plan of Action
- LDRMP—Local Disaster Risk Management Plan
- NDHS—Nepal Demographic and Health Survey
- NGO—Non-Governmental Organization
- NRM—Natural Resource Management
- NUB—Nirdhan Uthan Bank
- PAHAL—Promoting Agriculture, Health, and Alternative Livelihoods
- RIMS—Resource Identification and Management Society
- SAPPROS—Support Activities for Poor Producers of Nepal
- STRESS—Strategic Resilience Assessment
- TOC—Theory of Change
- TVET—Technical Vocational Education and Training
- USAID—United States Agency for International Development
- USD—United States Dollars
- VDC—Village Development Committee
- WASH—Water, Sanitation, and Health Acknowledgements

II. Acknowledgements

This report is the end result of months of dedicated work by a very large team working through massive earthquakes, crippling blockades, and fuel shortages, as well as the normal bureaucratic obstacles and competing demands on one's time which are endemic to the development field. Mercy Corps Nepal would especially like to thank those who work for PAHAL partner organizations and who participated in field research—Plan International (Keshab Subedi, Shanti Upadhaya, Ramesh Dahal, Indu Sharma, and Nabin Pradhan), iDE (Rudra Thapa, Jung Badahur Gurung, Shailendra Shrestha, and Sulav Paudel), RIMS (Hari Krishna Shrestha), SAPPROS (Lok Shastra Shrestha), Rupantaran (Sohan Shrestha), and Tufts University (Poshan Dahal). The Mercy Corps PAHAL team sent a large contingent to the field: Sagar Pokharel, Sharad Rai, Govinda Acharya, Rachana Rasaily, Ishu Shrestha, Rupa Pandey, Mohan Shrestha, Shambhu Jung Rana, Neelam Ojha, and Keshab Pokharel. Jay Lal led the field research teams. George Wilson led the literature review and data analysis, with crucial support from Aishwarya Rana, while Parmeshwor Amatya and Shreenu Shrestha provided essential logistical support.

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Several other people contributed to the success of the STRESS process as well. All omissions are unintentional and the fault of Mercy Corps; to those who are omitted we extend our apologies and our deepest thanks.

PAHAL Consortium Partners

III. Executive Summary

Background

The Promoting Agriculture, Health and Alternative Livelihoods (PAHAL) program is a $37 million, five-year USAID initiative designed to achieve food security among vulnerable populations in the hill and mountain regions of Midwestern and Far West Nepal. Food insecurity in Nepal persists despite billions of dollars in international assistance to the country over the past 10 years. Accordingly, PAHAL takes a resilience approach to achieve and sustain food security, recognizing that limited development aid effectiveness is at least in part a result of the increasing risks and hazards that also undermine development gains.

Mercy Corps, the lead partner in the PAHAL consortium, defines resilience as the capacity to learn, cope, adapt and transform in the face of shocks and stresses. Resilience capacities include resources—human, natural, social, financial and physical—or strategies applied towards resilience. Capacities can be absorptive—helping people, households or systems better prepare for or recover from shocks and stresses; adaptive—mitigating the presence, nature and impacts of shocks and stresses over time; or transformative—fundamentally changing wider system dynamics to reduce constraints and enable better coping and adaptation.

In order to develop a resilience-specific program theory of change, the PAHAL team conducted a Strategic Resilience Assessment (STRESS) of target areas. In collaboration with a wide range of actors, STRESS analyzed the dynamic social, ecological and economic systems within which communities are embedded and how these conditions determine vulnerability to shocks and stresses and therefore, food security. The process included scoping workshops, secondary literature review, field tool development, field data collection and finally a series workshops to review and analyze data, write the report and revise PAHAL's Theory of Change.

Key Findings

The PAHAL STRESS underscored how ecological and economic constraints to food access, availability and utilization are driven or exacerbated by the shocks and stresses communities face in PAHAL program areas. First, communities in the PAHAL region are plagued by low income, low agricultural productivity and high food prices in part due to the persistent challenges in the economic and ecological environment. Though 80 percent of households rely on agriculture for their livelihood, most plots of land are too small to feed a family. Extension services are virtually non-existent, and farmers can often only afford poor quality inputs. Steep terrain impacts productivity, as well as the ability of farmers to get crops to market. Road density is low at 6.4 kilometers of road per square 100 km, limiting market access.

Already facing such severe constraints, communities are also consistently stressed by low water availability and climate variability – conditions only worsening with climate change. Inter-annual climate patterns induce seasonal droughts that in turn lead to recurrent forest fires. Unfavorable climate conditions increase pest and disease outbreaks. Limited economic options and ecological stresses drive unsustainable farming practices, creating a negative feedback loop whereby increasingly degraded land becomes more susceptible to various natural hazards. Erosion leads to floods and landslides, furthers soil degradation and ultimately limits agricultural productivity and food availability. Low water availability also contributes to poor sanitation practices, leading to disease outbreaks. When natural hazards affect production, food prices are highest, leading to market shocks and limiting food access. Households supplement their income through seasonal off-farm labor, frequently migrating to India or beyond for work. Migration itself can also add burdens and create stress on those left behind.

Mapping the primary shocks and stresses in the PAHAL program area, how they are connected and where they contribute to economic and ecological constraints identified resilience capacities necessary for communities to better absorb these shocks in the short term and adapt to them in the longer term. These include quality health and nutrition services; functioning water, sanitation and hygiene services, strategies and technologies; effective disaster risk management services, strategies and technologies; appropriate and diverse financial services and products; dynamic and responsive agricultural and non-agricultural market systems; and productive natural resources and natural resource management systems. Importantly, STRESS revealed how adaptive and absorptive mechanisms are mutually reinforcing. Households and communities must have access to a range of resources and strategies that allow them to flexibly and continuously apply absorptive and adaptive measures in response to their environment to achieve resilience outcomes.

The STRESS process further highlighted how the ability of communities to build resilience to these shocks and stresses is affected by constraints in social and political systems. More specifically, STRESS revealed how weak formal governance and strict gender and caste norms determine individual, household and community access to resources and the application of strategies that could mitigate exposure and reduce effects of shocks and stresses. Application of STRESS in PAHAL emphasized that building resilience requires working with and through formal and informal structures to influence formal regulations, as well as informal norms, values and practices. These "rules of the game" ultimately determine who can access human, physical, financial, natural and social resources or capital, and how they can apply these resources.

These "rules," therefore, also determine who has the capacity to absorb and adapt to risks. Creating lasting change in rules, norms, values and practices requires working with key stakeholders and institutions on building transformative capacity in order to create an enabling environment for resilience. Transformative capacity can

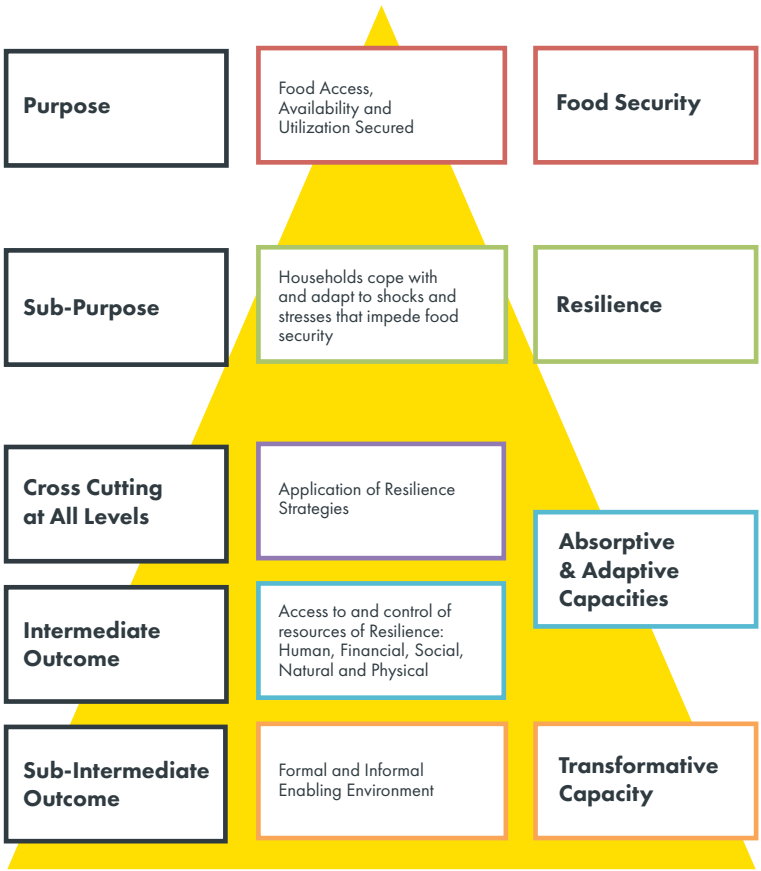

Figure 1: STRESS Process has informed PAHAL's Program Logic.

be seen as the capacity to achieve and sustain the appropriate underlying, enabling governance and social conditions for resilience. It is only when such an enabling environment is achieved that communities can fully access and maximize absorptive and adaptive capacity to mitigate shocks and stresses and ultimately achieve food security.

This finding has critical implications for how resilience programs are designed and implemented. Transformative capacities have been typically viewed as long-term and aspirational outcomes. As a result, resilience programs prioritize strengthening short-term coping mechanisms, followed by medium-term adaptation measures. PAHAL STRESS findings show that coping and adaptation can only be meaningfully achieved and sustained if transformative capacities, or an enhanced enabling environment, are in place. This suggests resilience programs must prioritize promoting transformative change and should do so at the outset of implementation.

Theory of Change

Findings from the STRESS process helped the program team revise and clearly articulate a program theory of change which builds resilience into its core logic. Specifically, the theory of change illustrates how the three pillars of food security, or access, availability and utilization, are underpinned and made possible through a state of resilience, in turn made possible by access to and application of appropriate resilience capacities.

The program's **purposes** correspond to each of the three food security pillars, the desired development outcomes of the program. PAHAL ultimately aspires to three pillars: pillar one—improve health and nutrition status, thus improving food utilization; pillar two—improve income, or achieve food access; and pillar three—increase agricultural productivity and functioning markets, or food availability.

The PAHAL theory of change clearly illustrates that these development outcomes can only be achieved if communities are resilient or cope with and adapt to shocks and stresses that impede food security. The **sub-purpose** level of the theory of change articulates the state of being resilient: Households cope with and adapt to shocks and stresses that impede food security. A state of resilience can only be achieved if appropriate absorptive and adaptive strategies are applied. These are PAHAL's **intermediate outcomes**. Application of resilience strategies in turn requires access to and control of a range of human, financial, social, natural and physical resources. Access to and control of resources is captured as the **sub-intermediate outcomes** of the theory of change.

Finally, per STRESS findings, individuals and households cannot access and control the requisite resources for resilience, nor apply effective strategies, without the support of a formal and informal enabling environment, recognized as transformative capacities for resilience. Accordingly, transformative capacities have been embedded as a cross-cutting, underlying objective at each level of the theory of change. At the sub-intermediate outcome level, access to and control of the five capitals for resilience (financial, physical, human, natural and social) is supported by the following: 1) Enabling rules and regulations; 2) Enabling knowledge systems, attitudes and perceptions; 3) Positive social relationships and networks, also known as social capital; and 4) Increased agency in decision-making. These conditions in turn support transformed governance systems, formal and informal, that are accountable, equitable and effective in supporting communities to apply resilience strategies. Finally, transformed governance and informal systems support vulnerable groups to recover from and adapt to shocks and stresses, supporting the state of resilience and the sub-purpose level.

IV. Introduction

Focus Group Discussion with Men's Group in Lekhparajul VDC (Surkhet) during the STRESS Process.

PAHAL

Despite substantial gains in overall food security and economic wellbeing in Nepal, communities in the rugged hill zones of the Midwest and Far West regions remain in pervasive poverty. A quarter of households cannot afford a basic, nutritious diet, 41 percent of children under five are stunted and rates of acute malnutrition hover at 11 percent.[1] The country is one of the two poorest in Asia, ranking 157 of 187 countries on the Human Development Index. These statistics persist despite the fact that between 2005 and 2014 alone, Nepal received nearly 6.5 billion dollars of official development assistance.[2]

The shortcomings of humanitarian and development program effectiveness in delivering enduring benefits are partially explained by the inability of governments and communities to protect themselves from the increased frequency, severity and unpredictability of shocks and stresses. According to the Global Resilience Partnership, more than one-third of development spending has been lost to crises in the past 30 years, about $3.8 trillion worldwide.[3] Nepal alone, a country of 28 million, suffered USD 177,394,131 of economic losses due to declared disasters between 2005 and 2013.[4] This data does not take into account countless unreported, costly hazards, including conflicts, floods, landslides and price shocks that decimate incomes and force families to sell productive assets, take children out of school and migrate to meet food consumption needs.

The situation is further complicated by the interconnectedness of shocks and stresses and the underlying socio-ecological system conditions that stimulate, perpetuate or exacerbate them. For example, lack of agricultural inputs and weak market access contribute to poor land management, resulting in land degradation that dramatically increases risks of floods and landslides. These conditions destroy crops, assets and incomes, further encouraging unsustainable agricultural practices, increasing degradation and aggravating hazard risks. Global climate change contributes to glacial melt and increased monsoon unpredictability. The reoccurring nature of shocks means vulnerable families are placed on a downward spiral towards crisis.

In response to these growing challenges Mercy Corps and its partners are implementing the five-year USAID Food for Peace-funded Promoting Agriculture Health and Livelihoods (PAHAL) program in 14 of the most food insecure districts of rural Nepal. The program seeks to achieve food security for men, women and children by ensuring they, their communities and the systems they live in and rely on are resilient to the shocks and stresses that impede food security. PAHAL takes a multi-dimensional systems approach to address the underlying socio-political, economic and ecological constraints and the related shock and stress exposure that drive food insecurity in Nepal.

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[1] United Nations Population Fund (UNFPA), Nepal, National Demographic and Health Survey, 2011
[2] World Bank Database 2015
[3] Global Resilience Partnership (GRP)
[4] Prevention Web http://www.preventionweb.net/countries/npl/data/

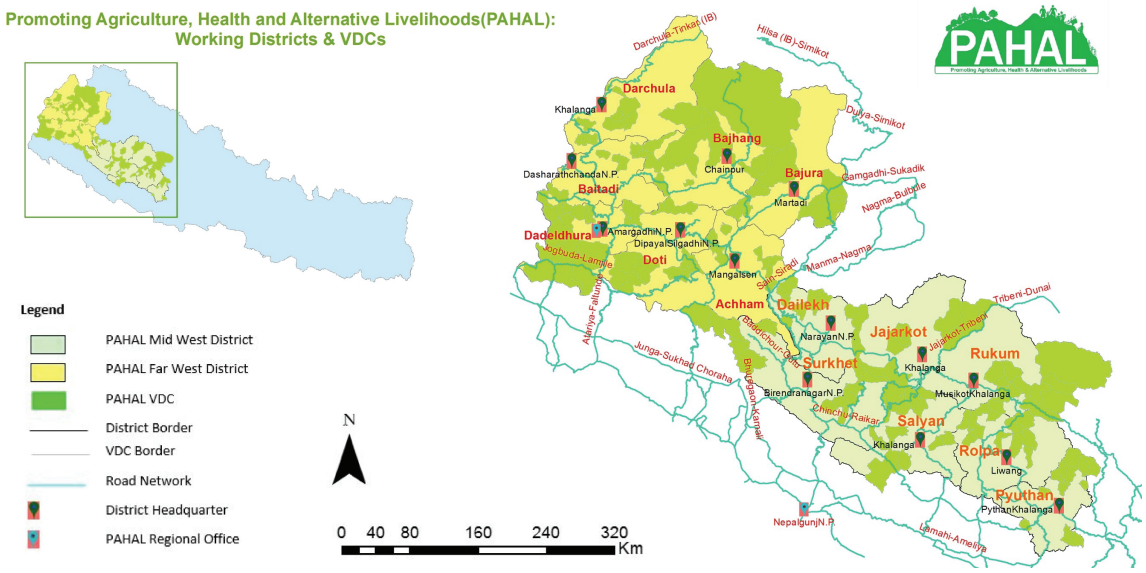

Figure 2: Districts Supported through PAHAL

In order to develop a resilience-specific program theory of change and guide the integration of strategies throughout the program, the PAHAL team conducted a Strategic Resilience Assessment (STRESS) of target areas. STRESS analyzed the dynamic social, ecological and economic systems within which communities are embedded and how these conditions determine vulnerability to shocks and stresses and food security outcomes. The process was structured around four key resilience questions that defined and focused the exercise:

- ***Resilience for whom?*** Vulnerability varies across geography and social groups such as gender, race, ethnicity, caste and age.
- ***Resilience of what?*** The context and boundaries of the assessment, including the target geography; the relevant elements of social, economic and ecological systems within that geography that relate to resilience; and the systemic factors that drive food insecurity and vulnerability.
- ***Resilience to what?*** The risk profile of the assessment area comprised of shocks and stresses that, collectively, threaten various population groups at multiple geographic and temporal scales and across social, economic and ecologic systems.
- ***Resilience through what?*** Access and use of capacities, including resources and livelihood strategies, that enable individuals, households, communities and systems to absorb and adapt to risks over time. Underpinning these are transformative capacities—the governance processes, formal rules and regulations and informal norms, attitudes and perceptions that enable or unlock the full potential of absorptive and adaptive capacities. By mapping socio-ecological systems and the hazard environment, Mercy Corps can understand how different populations may be affected and what capacities they require to bounce back—and "bounce back better"—after a shock.

RESILIENCE AT MERCY CORPS

Mercy Corps defines resilience as the capacity to learn, cope, adapt and transform in the face of shocks and stresses. Capacities can be absorptive - to help people, households or systems better prepare for or recover from existing shocks and stresses; adaptive –mitigating the very presence or nature of shocks and stresses over time; or transformative – enhancing the enabling environment to maximize access to and use of absorptive or adaptive capacities.

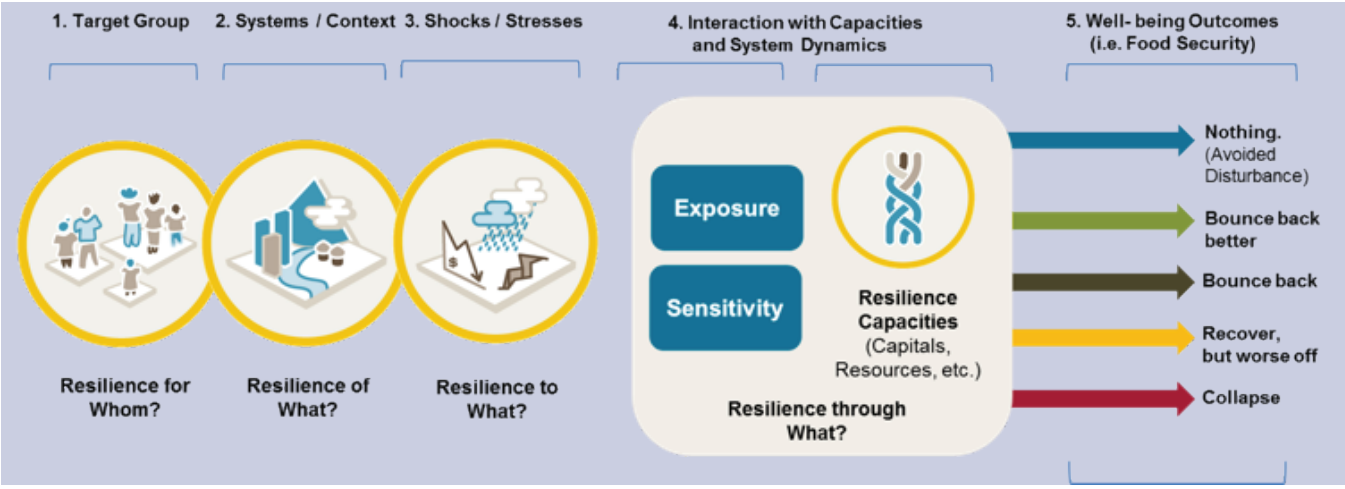

Figure 3: Mercy Corps' Resilience Framework

V. Methodology

The STRESS methodology involves four phases, starting with a Scoping Phase (1) and preliminary literature review to set the assessment parameters and identify core research questions. The Scoping Phase is followed by the Inform (2) and Analyze (3) Phases, which include the collation of secondary data, and collection of field data, as well as data analysis. The last Strategize (4) Phase contributes to the program's theory of change, logframe and intervention design. PAHAL adapted the general methodology in order to properly adjust to program time frames, available personnel, and external circumstances imposed by the April 25, 2015 Gorkha Earthquake.

Phase One: During the scoping workshop, the PAHAL team and Mercy Corps technical advisors established an initial understanding of the program area's social, economic and ecological context through systems mapping. The team articulated the rationale and objectives of the STRESS, identified knowledge gaps and lines of inquiry and designed research methods.

Phase Two: The inform phase involved field data collection and secondary literature review. Plans for field data collection began with determining vulnerability criteria at district, community and household levels. At a district level, survey areas were selected to offer variation in agro-ecological zones and remoteness from major roads and market centers, as these were predicted to affect types of shocks and stresses and levels of vulnerability. After districts were selected based on the variation proposed, the team further selected a range of Village Development Committees (VDCs), the major local administrative unit in Nepal, based on variation in the criteria provided below. Individuals from VDCs were chosen from diverse caste and gender groups in order to obtain an appropriate diversity of perspectives.

SELECTION CRITERIA FOR SAMPLE DISTRICTS, VDCS AND HOUSEHOLDS FROM PAHAL PROGRAM AREAS

District	VDC	Community/HH level
Agro-ecology: Low Mountains, High Hills, Inner Hills	Access to Road Head	Gender
Access to markets/roads	Access to Capitals	Caste
	Vulnerability to Disasters – (Landslides/Floods)	

In order to gain a deeper understanding of systems dynamics and answer the four core questions around STRESS, the team applied four guided focus group discussion tools and three sets of key informant questionnaires. The tools focused on the following topics:

Focus Group Tools	Objectives
Vulnerability Analysis	• Understand the most significant shocks and stresses affecting resources of the community group • Analyze the different levels of exposure and sensitivity within the community group to shocks and stresses • Understand how the shocks and stresses affect the most significant resources
Preparedness and Response	• Understand how different community groups prepare and respond to shocks and stresses • Identify current key preparedness and response strategies • Analyze the effectiveness of existing preparedness and response strategies • Identify barriers and opportunities for improved preparedness and response strategies
Resource Access and Control	• Map resource users and decision-makers around resources • Understand effectiveness of decision-makers and their impact on resource use • Understand how formal rules and regulations and norms and values impact resource access and control
Networks and Institutions	• Understand the major formal and informal groups that communities draw on for support or that impact their well-being positively or negatively • Analyze how these networks impact their preparedness and response to shocks and stresses and their overall well-being • Understand the major power and decision-making structures that determine rules of access and operations in relation to these groups

Focus groups were conducted in each selected VDC with groups of mixed-caste men, mixed-caste women, marginalized caste men and marginalized caste women.[5] Each tool was utilized to unpack vulnerability across caste and gender sub-groups at household levels. The following is a breakdown of group interviews across the various tools:

	Mixed Group Men	Mixed Group Women	Marginalized Caste Men	Marginalized Caste Women	TOTAL
# of FGDs conducted	15	19	15	15	64

[5] The selection of mixed caste groups was done to avoid potential sensitivities around having focus groups exclusively with privileged castes while excluding marginalized castes from those conversations. However, it was correctly predicted that the voice of higher castes would dominate in these conversations. Separate focus groups were thus also conducted with only marginalized castes to allow appropriate space and time for these groups to voice their perspectives. All focus groups were separated by gender.

Key informant interviews in VDCs and district capitals gathered more nuanced understanding of shocks and stresses, specifically how they impact decisions and actions among households, government institutions and market actors. Teams interviewed 28 community members, 30 government and institutional key informants and 23 market actors. In tandem, a team in Kathmandu conducted a literature review.

Phase Three: The analysis phase took place in late June. PAHAL conducted an analysis of field results and literature review via debrief workshops with assessment team leads. These sessions were focused on providing nuanced and in-depth answers to the core research questions.

Phase Four: The final "strategize" phase used the STRESS analysis to adjust program plans. In July, PAHAL revised its theory of change based upon the findings of the STRESS analysis. The theory of change and data from the STRESS process directly informed the log frame, indicators and work plan structure developed in July and August.

Challenges and Limitations

Time constraints and the Gorkha earthquake that struck Nepal on April 25, 2015 were the primary assessment limitations. After the earthquake, PAHAL staff were mobilized for relief work, resulting in a month of delays. Furthermore, fieldwork had to be completed by mid-June, in advance of the monsoon season which renders large parts of Nepal inaccessible. Due to the timing, the PAHAL team elected to conduct field work first, sacrificing portions of the literature review and subject matter expert interviews in Kathmandu. However, the team drew on the existing substantial literature review conducted at the time of program proposal development to analyze and round out the field results.

Time constraints also limited pre-testing of tools and curbed the field schedule. The team was therefore forced to conduct interviews in places which were comparatively easy to access. VDCs that would require a multi-day walk were left off the itinerary. While more remote districts and VDCs were still accessed, the data represents the relatively less remote areas of the PAHAL program area.

Theory of Change

Findings from the STRESS process helped the program team revise and clearly articulate a program theory of change which builds resilience into its core logic. Specifically, the theory of change illustrates how the three pillars of food security (food access, availability and utilization) are underpinned and made possible through a state of resilience, in turn made possible by access to and application of carefully sequenced and integrated resilience capacities. These resilience capacities first include the application of resilience strategies that enables communities to better cope with and adapt to shocks and stresses impeding food security. The application of resilience strategies is subsequently made possible by access to and control over five core resource areas often termed the five "capitals,"—financial, physical, human, natural and social.

Finally, the theory of change articulates how access to and control over resources, the application of resilience strategies and, ultimately, resilience, is made possible by an enabling environment encompassing rules, norms, values and practices. Because Nepal has more than 125 caste/ethnic groups, with 123 languages, a deeply embedded caste system and strict gender roles, the Nepalese people bear numerous identity markers that underpin their status in society and determine the livelihoods and productive resources available to them. Social identity related to caste and gender determines vulnerability to shocks and stresses and food security. Weak local governance, marked by poor capacity, exclusion, lack of accountability and inequitable application of the rule of

law also limit opportunities for households and communities to get ahead. As a result, formal rules and regulations and informal norms and values fundamentally underwrite who has access to resources and strategies required for coping and adapting to shocks and stresses. Accordingly, the program's theory of change statement is:

If vulnerable women, men, girls and boys have increased absorptive and adaptive capacities and are able to act within an equitable and inclusive enabling environment, then individuals and communities will be more resilient to the shocks and stresses that impede food security.

An inclusive enabling environment is made possible by building **transformative capacities** that fundamentally shift the playing field for the most vulnerable, enhancing their access to and use of **absorptive** and **adaptive** capacities—ultimately ensuring food security.

Theory of Change

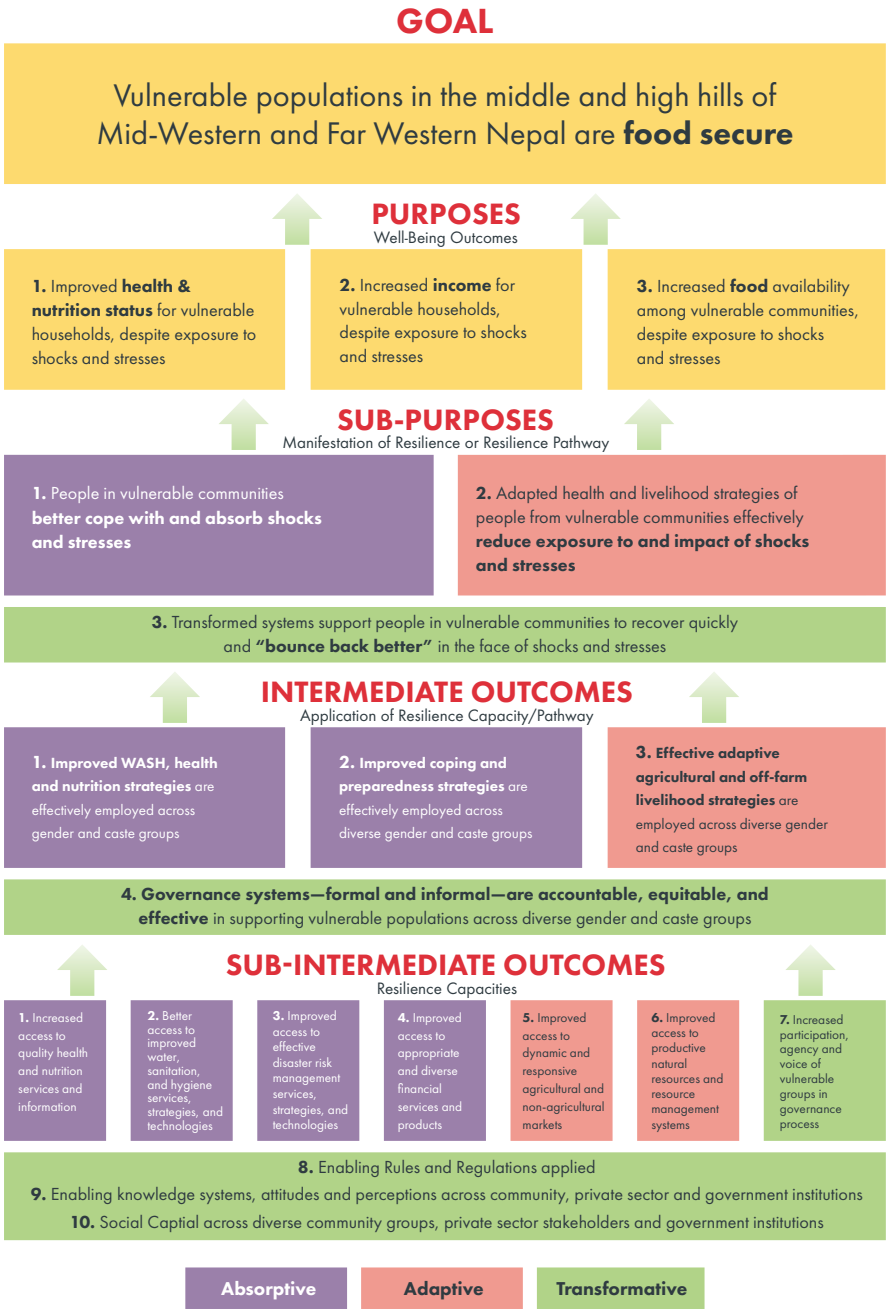

Figure 4: The Theory of Change articulates that an important result at multiple levels is increased social capital. Social Capital refers to the quality and quantity of relationships and networks that people have. Bonding social capital refers to how people connect within a group, based on shared characteristics. This could include gender, caste, or being part of the same neighborhood. Bridging social capital refers to connections across groups and communities to create horizontal networks. Linking social capital refers to how people connect with district, regional or national institutions and those in power.

At its highest level, PAHAL's **goal** is to ensure vulnerable populations in the middle and high hills of Midwestern Nepal are food secure. PAHAL's three **purposes** supporting this development goal correspond to the three interlaced pillars of food security: Food utilization, food access and food availability. Reflecting a resilience approach and ensuring food stability, the PAHAL theory of change states that each pillar must be achieved and maintained despite shocks or stresses:

- **Purpose One:** Improved health and nutrition status for vulnerable households, despite exposure to shocks and stresses, reflects enhanced food utilization
- **Purpose Two:** Increased income for vulnerable households, despite exposure to shocks and stresses, reflects improved food access
- **Purpose Three:** Increased food availability among vulnerable communities, despite exposure to shocks and stresses, reflects increased food availability

Achieving the three purposes despite shocks and stresses means communities, households and individuals must absorb and mitigate existing risks, while adapting and confining risk exposure over the long-term. In order to cope and adapt, these groups must be supported by either an enabling environment, or transformed systems, that support resilience. Accordingly, the three sub-purposes reflect the state of resilience:

- **Sub-Purpose One:** People in vulnerable communities better cope with and absorb shocks and stresses.
- **Sub-Purpose Two:** Adapted health and livelihood strategies of people from vulnerable communities effectively reduce exposure to and impact of shocks and stresses.
- **Sub-Purpose Three:** Transformed systems support people in vulnerable communities to recover quickly and "bounce back better" in the face of shocks and stresses.

Resilience is dependent on key capacities. These capacities include first, access to knowledge and resources that support coping and adaptation and second, the application of effective strategies: preventative, responsive and adaptive. PAHAL's theory of change reflects key resilience strategies at the intermediate outcome level, which directly support the sub-purposes. Application of resilience strategies is again supported by improved formal and informal governance that underscores the role of the enabling environment in resilience

- **Intermediate Outcome One:** Improved WASH, health and nutrition strategies are effectively employed across caste and gender groups.
- **Intermediate Outcome Two:** Improved coping and preparedness strategies are effectively employed across diverse gender and caste groups.
- **Intermediate Outcome Three:** Effective adaptive agricultural and off-farm livelihoods strategies are employed across diverse gender and caste groups.
- I**ntermediate Outcome Four:** Governance systems—formal and informal—are accountable, equitable and effective in supporting vulnerable populations across diverse caste and gender groups.

Finally, application of resilience strategies is supported by sub-intermediate outcomes that reflect access to key resources for coping and adaptation—financial, physical, natural and human. The resources needed to engage in resilience strategies were identified and contextualized through the STRESS process and include those required for both short-term coping, and longer-term adaptation. Importantly, they also include social capital, enabling

knowledge, attitudes and supportive rules and regulations—the key transformative capacities that permit access and control over resources required for resilience. These resilience capacities at the sub-intermediate outcome level are presented and discussed in the Resilience Capacity section of this report.

VI. STRESS FINDINGS

The Food Security Context

Food security is affected by the social, political, economic and ecological systems in which individuals, households and communities are embedded. Conditions within these systems determine exposure and severity to shocks and stresses that affect food security, as well as the ability to access resources and apply strategies to mitigate these effects. This section describes and highlights the system constraints that limit food availability, access and utilization in Midwestern and Far Western Hill of Nepal.

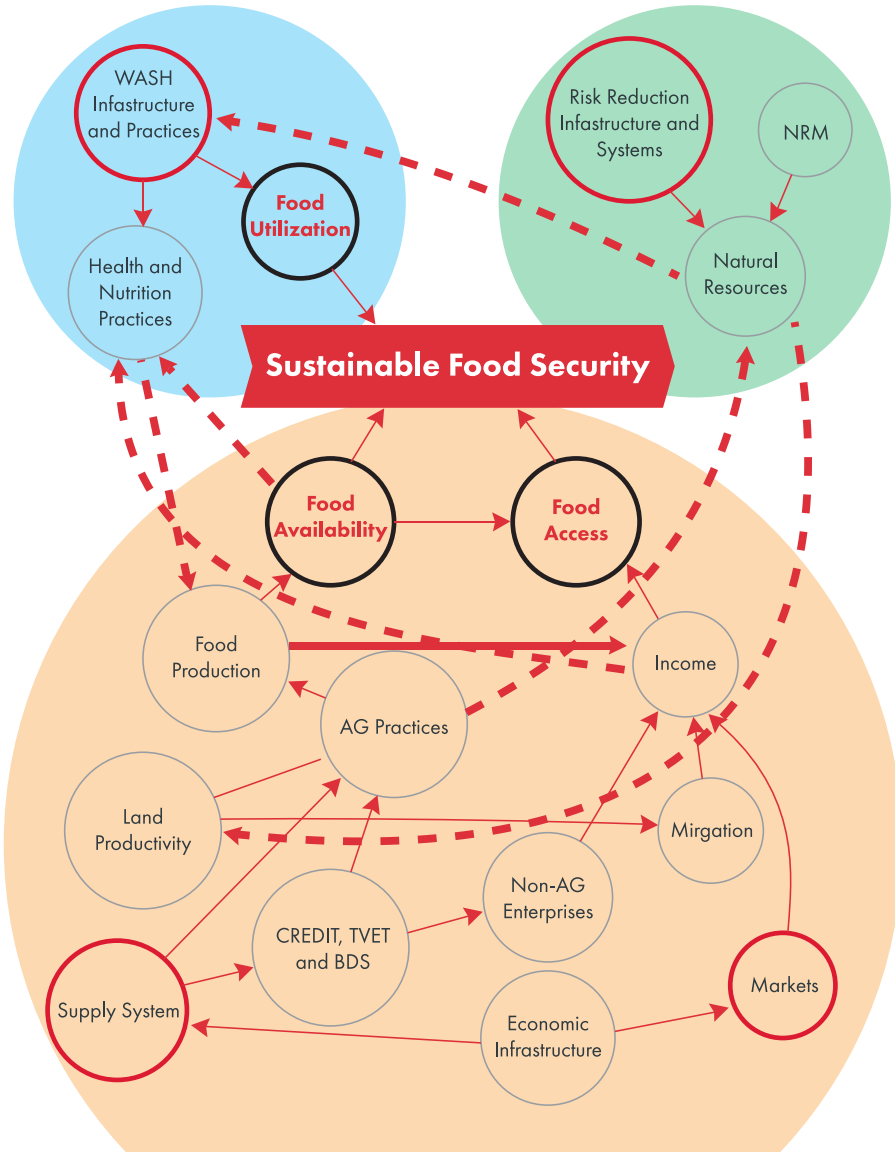

Figure 5: Ecological and Economic Constraints to Food Security. In this simplified map of the PAHAL context, food security is supported by three pillars: utilization, availability and access. Social elements are in blue, economic are in orange and ecologic are in green. The supporting linkages from one element to another are shown using directional arrows. Key linkages across social, economic and ecologic systems are shown in bold and dotted directional arrows.

Availability

Over 80 percent of households in Nepal rely on agriculture for their livelihood.[6] However, the majority of farmers in the PAHAL project area own **plots of land that are too small to produce enough food** for themselves, much less to grow commercial crops.[7] The STRESS process confirmed that **steepness of hills and mountains significantly reduces agricultural productivity** of land in many cases. Productivity also suffers from the use of traditional farm practices, lack of access to irrigation facilities and **poor quality or unaffordability of agricultural inputs**. This situation is further complicated by low water availability, droughts, landslides, floods and other disasters that affect farmers and their land. Focus groups emphasized that **extension services have reached very few farmers in remote areas**. These crucial services could assist farmers with modern, more productive and less destructive farming techniques.

Those farmers who do sell crops face a host of obstacles to market access. **Road density is low** at 6.4 kilometers of road per square 100 km,[8] meaning that crops must be transported to market on the backs of people or livestock, raising costs and bruising or spoiling much of the crop. **Farmers reported a lack of access to accurate market information**, with few links to local buyers and little leverage over the price that is offered. Most produce exported from Nepal to India is subject to **strict quarantine measures**, which further limits profitability.

Many of these same constraints that effect local farmers also limit the availability of food in local markets. Since local production is low, the PAHAL region **relies on expensive imported food** from India.[9] Transporting food across the border is difficult and expensive and is vulnerable to bottlenecks or trade conditions in India, as well as floods or landslides that can cut road access.[10] In addition, if productivity in India suffers, Nepal finds itself with a food deficit and increased food prices that limit food access as detailed below.

Access

The PAHAL region is plagued by low income and high food prices, making an adequate diet inaccessible to many. The poverty rate in the Far West Development Region is 46 percent, the highest in Nepal.[11] A Government of Nepal (GoN)-sponsored nutrition analysis of the country found—unsurprisingly—that increased poverty corresponds to an increase in stunting among children aged less than two years.[12]

As stated above, most households in the PAHAL area rely on subsistence farming on plots that are too small. Key informant interviews and focus group discussions affirmed that most households must supplement their income through seasonal off-farm labor. However, according to statistics, off-farm work contributes only 19 percent of income and is often insufficient to meet basic food consumption needs. Up to a third of households receive remittances in any given year, sent from urban areas within Nepal or abroad. Remittances account for nine percent of income.[13]

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[6] FAO/WFP, "Special Report: FAO/WFP Food Security Assessment to Nepal," 2007

[7] Households in the mountains of Nepal need over 1 hectare of land to produce sufficient food for themselves, while households in the hills need 0.5 hectares. In every district PAHAL is working in, most landholders own less than the minimum necessary for subsistence farming. Furthermore, the size of plots is decreasing: In 2011, 78 percent of landholders had plots smaller than one hectare vs. 67 percent in 1981. Nepal Central Bureau of Statistics, "National Sample Census of Agriculture, Nepal" 2011/12, and G. Thapa, "Smallholder farming in Transforming Economies of Asia and the Pacific: Challenges and Opportunities," International Fund for Agriculture Development, 2009.

[8] International Food Policy Research Institute (IFPRI), "Food and Nutritional Security in Nepal, A Stocktaking Exercise (DRAFT)," August 2010.

[9] Fintrac, Inc. "Nepal USAID – BEST Analysis," USAID, September 2013, pp 11-12. See also Federation of Nepalese Chambers of Commerce and Industry, 2011. "Nepal and the World: A Statistical Profile 2011."

[10] On September 20, 2015, Nepal promulgated its newly passed constitution, prompting border blockades with India that resulted in a severe food crisis and food shortages throughout Nepal. The passing of the new constitution has also resulted in increased political instability and violent clashes in pockets of the country and near the border with India, further affecting trade across the border.

[11] International Fund for Agricultural Development, "Enabling poor rural people to overcome poverty in Nepal," July 2013 http://www.ifad.org/operations/projects/regions/pi/factsheets/nepal.pdf (Accessed June 10, 2014).

[12] Government of Nepal, "Nepal Nutrition Assessment and Gap Analysis: Final Report," November 2009, p. 27.

[13] IFPRI, 2010

While most households need to purchase food from the market, **affording that food is difficult** at best. In Hill and Mountain regions, **food prices are inflated by high transport costs and high demand**. In the Hills, for example, average food prices are 14 percent higher than in the more accessible Terai (plains) region, and in the Mountains, prices are 26 percent higher.[14] Research during the 2008-09 food price crisis showed that the poorest rural families were spending 78 percent of their income on food, making them highly sensitive to food price volatility. When food prices go up, the rate of inflation in the hills and mountains is also higher than national levels. For example, in 2008-09 food prices in the Mountain region shot up by 177 percent.[15]

The situation is complicated by the sheer **difficulty of physically getting to the market**, both for producers and purchasers, due to **steep terrain, low road density** and **frequent road blockages** from floods and landslides. Focus groups among women and disadvantaged castes living in the most remote locations emphasized these difficulties.

Utilization

Nepali household members in the hills and mountains of the Midwest and Far West remain undernourished, not only due to limited access and availability, but also to food consumption practices that further limit dietary diversity and lead to health conditions that affect nutrient retention. These food practices are at least partially driven by social norms and values.

Most rural households obtain over 75 percent of their total caloric intake from staples, and their **diet is deficient in key micronutrients**.[16] More than 70 percent of children under 18 months of age and more than a third of women are anemic. Stunting rates reach 50 percent in the Midwest and 60 percent in the Far West Mountains.[17] Insufficient nutrient intake is a major cause of chronic malnutrition in Nepal. A number of **norms, particularly pertaining to how women and children are required to consume food**, as revealed in focus group discussions and described below, further constrain a proper diet.

Most VDCs in the PAHAL area **lack sufficient water for washing and drinking**. Inputs and infrastructure for effective water management and storage do not exist. **Lack of clean WASH facilities** and resulting poor WASH practices affect micronutrient absorption and are the main causes of under-five mortality: Each year, some 10,500 children under five die of diarrhea.[18] The cost of a simple bar of soap is often prohibitive.

Social and Governance Constraints to Food Security

Caste

Nepal has a deeply embedded caste system with strict codes of conduct. Caste status determines freedom of movement, ability to access public spaces, access to land and other natural resources, occupation and ability to participate in institutions and decision-making structures. The Muluki Ain (National Code) of 1963 and Abolition of Untouchability Act of 2011 were passed in order to promote equality in opportunity across caste and gender groups. However, the formal regulation has done little to curb deeply embedded norms and related practices linked to caste and gender status as revealed by key informants and focus group participants.

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[14] IFPRI, 2010

[15] United Nations Development Program, "2013 Human Development Report: The Rise of the South," 2013, http://hdr.undp.org/sites/default/files/reports/14/hdr2013_en_complete.pdf (Accessed April 4, 2014).

[16] GoN Planning Commission, "Multi-Sectoral Nutrition Plan," 2012.

[17] Population Division, Ministry of Health and Population, "Nepal Demographic and Health Survey, 2011."

[18] State of Children, UNICEF, 2010

The Dalits, so-called "untouchables" who comprise **the most marginalized caste**, largely continue to **have designated occupations**, including iron work, leather work, tailoring, shoe-making and welding, that constrain both their income sources and food production options. Many Dalits have only recently escaped bonded labor status.[19] Combined, these circumstances mean that marginalized castes are often the most dependent on food purchases, least likely to afford them and most constrained in food utilization options. Janajatis, a caste designation that is in fact composed of numerous ethnicities with their own hierarchies, face similar levels of discrimination, though not as pronounced as that of Dalits. Due to their marginalization, these groups often face the greatest barriers in accessing education and information networks, which further perpetuates their social and economic exclusion. Dalits and Janajatis make up just under 50 percent of the population, and restrictions on how these groups can engage in food production limits food availability for all groups.

Across Nepal, **Dalits are historically barred from owning land**. As with other entrenched norms, the recent laws abolishing discrimination have not appreciably changed this practice. For example, focus groups revealed that privileged groups typically will not sell land to Dalits at the risk of being ostracized from their own communities for doing so. Focus group participants further revealed that Dalits often reside on government or communal land, where they lack secure land tenure and perpetually live in fear of eviction. In rare cases **where they do own land, these are often the most marginal plots** on difficult terrain and poor soil, vulnerable to landslides and floods. Dalits and Janajatis, therefore, most often work as sharecroppers or hired laborers. Their limited income and remote locations further mean they are unable to access quality agricultural inputs, and their yields suffer accordingly. Unsustainable farming practices even on marginalized plots have broader ecological implications that exacerbate land degradation, food production and food availability.

Finally, Dalits suffer from a broad assortment of market constraints exacerbated by limited resource access, including basic services. For example, they are typically unable to **sell milk products, which is both a missed income-earning opportunity and a market inefficiency**. Focus groups with Brahmins and Chetris revealed that they themselves don't sell milk in the market, to ensure that Dalits do not come in contact with their milk, which is believed to have negative effects on the productivity of the cow. Dalits are **further barred from accessing water sources used by the upper castes**, which exposes them to greater risk of disease, restricts healthy food utilization practices and reduces human productivity. Perversely, **lower castes are also least likely to physically access health care, let alone afford it**, as they are often in the most remote settlements far from village centers where services are found. It is unsurprising that the infant mortality rate for Dalits is twice that of Brahmins, the least marginalized caste in Nepal.[20]

Gender

Gender discrimination directly undermines food security among women and children. Nepal is ranked 121 of 136 countries in the World Economic Forum's Global Gender Gap report.[21] Due to strict gender roles, women have less access to critical systems such as markets, education, health and financial services. Women also have less decision-making power at the household level which negatively affects their ability to control resources, meaning they are less food secure than their male counterparts.

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[19] Until recently many lower caste people were trapped in the Kamaya system of bonded labor, passed down over generations. Following the banning of this system in 2002, Kamaya families were to receive farmland of their own, yet most have yet to receive anything. That land which has been parceled out is often located directly next to rivers, greatly increasing vulnerability to floods. Another comparable system, called Haliya, was formally banned in 2008, but without any government program to rehabilitate Haliya families, most still work for their old landlords on a semi-bonded basis. Haliya workers are highly vulnerable to low wages and abuse: 80 percent of Haliya families experience a food shortage for most of the year, and most of their children are stunted. See Department for International Development and the World Bank, "Unequal Citizens: Gender, Caste, and Ethnic Exclusion in Nepal," 2006; Kumar, Subedi, and Suwal, "Forced Labor of Adults and Children in the Agriculture Sector of Nepal," International Labor Organization—Kathmandu, 2013; and Jones and Boyd, "Exploring Social Barriers to Adaptation: Insights from Western Nepal," in Global Environmental Change, Volume 21 Issue 4, October 2011.

[20] DFID/World Bank 2006, ILO 2013

[21] World Economic Forum, Global Gender Gap Report, 2014

First, **women's access to productive resources is highly restricted** by gender norms, practices and even formal rules. For example, regulations of microfinance institutions state that women require guardianship to access bank loans. This is often due to women's limited ownership of assets or land.

Historically, women's inheritance rights have been severely limited.[22] Women in Nepal own land and cattle in only 11 percent and 7 percent of households respectively. Men typically retain household decision-making power even if they have migrated elsewhere for work, since their mothers ensure that household expenditures are managed based on their preferences. Furthermore, focus group discussions revealed that as the role of women in agriculture increases due to male migration, women typically only enjoy some control over food crops, while cash crops such cardamom or coffee remain a male dominated industry. **Women's lack of control over productive resources** dramatically affects food production and availability. In addition, local community **perceptions that farming is an undesirable livelihood**, combined with the **extensive role of women in farming** due to male migration, further reduce the status of women.

Access to food is also constrained by gender restrictions on other livelihoods. **Education is often regarded as economically burdensome and unnecessary for girls** who are seen as caretakers and destined to become wives and mothers. Early marriage is common in the PAHAL area: 81 percent of girls in the Far West region are married by the time they are 18.[23] Thus women are constrained either to household work or to unskilled labor that dramatically limits household income.

Gender norms have a dramatic impact on food utilization among women and girls. At home, **men and boys traditionally eat first**, eating more food and having a more diverse selection. In households that barely meet food consumption needs, this means women and girls are most frequently undernourished. The pervasive ***chaupadi* system** is another contributing cause of malnutrition among women and children, as it denies access to food and sanitation during menstruation and post-natal recovery.[24] Focus groups revealed how women are barred from using toilets during menstruation, even in areas that proclaim to be open-defecation free. Finally, women have less power and autonomy than men in making decisions involving food. Women's inability to control income, which includes that made from remittances, further impacts their ability to make appropriate decisions about health care and food purchases, contributing to malnutrition.

Governance

A poor governance environment in Nepal is evident in low capacity, a discriminatory legal environment, weak accountability mechanisms, unequal participation and widespread corruption. These factors highlight economic, ecological and social constraints to food security.

The STRESS field assessment underscored the extent to which formal governance systems are shaped by informal norms and values and reinforce exclusionary practices that contribute to food insecurity. Property laws dictate that land is passed down from father to son, perpetuating the inability of women to control productive resources and constraining food availability and access. Though caste discrimination is illegal according to national law, the law is rarely applied in rural and remote areas, facilitating the damaging social environment that perpetuates food insecurity.

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[22] Department for International Development and the World Bank, "Unequal Citizens: Gender, Caste, and Ethnic Exclusion in Nepal," 2006

[23] Feminist Dalit Organization, 2011

[24] *Chaupadi* practices, based on the belief that menstruation and child birth are impure and that women undergoing them can convey bad luck to households, force menstruating women and girls to avoid all household assets, including the house itself. This practice also includes women who have just given birth, as well as their newborns. Chaupadi prevents women and girls from accessing improved water sources or sanitation facilities. During this period, their shelter is often a cowshed or similar dwelling, providing minimal protection, and often the only food they are allowed is boiled rice. See Amgain, "Social Dimension of Chaupadi System: A Study from Achham District, Far West Nepal," 2012.

The two most advantaged castes, **Brahmin and Chetris, have historically held positions of power** at national and local levels. Other groups have been largely excluded. Corruption, nepotism and pursuit of financial and political benefits exacerbate the situation. Limited oversight provides opportunities for political elites to grant contracts in exchange for kickbacks or steer infrastructure and development projects towards areas that will be the most politically or financially beneficial to them.

The lack of due process, accountability and poor management at the local level contributes to poor governance. A typical VDC has an average of five, mostly untrained, staff tasked with an enormous list of responsibilities without the necessary funds or capacity to handle them.[25] Local elections have not been held since 1997. Positions in local government are granted based on party affiliation rather than qualifications. Key informant interviews revealed that officials and citizens often avoid lengthy mandatory consultative processes, seen as too long and prescriptive, and instead, rely on existing relationships in order to get things done. Field work further found the majority of VDC secretaries do not physically sit in assigned jurisdictions and are disconnected from the populations they serve.

This environment directly results in **poor public sector investments in infrastructure, public services and market development in the remote and marginalized areas** that need them most, as incentives to perform are simply not there. Government agricultural production programs, especially **extension services, are largely inadequate**. Focus groups, especially among marginalized castes, revealed that the most remote areas are not covered by extension services at all. Other public services that could protect farms against hazards that dramatically reduce food productivity, such as weather information, early warning systems and disaster-mitigating infrastructure are also weak or non-existent. Poor land management that harms agricultural productivity reflects **poor environmental governance**. The coopting of government and private sector resources by already advantaged groups means **those who need income opportunities beyond subsistence agriculture are least able to access them**. Market access remains constrained by **poor investments in roads and market infrastructure** and the control of the private sector by political elites or higher castes. This limits incomes for farmers and accessible food options for others. Market access constraints further affect access to agricultural inputs, reducing food availability. **Poor health care and weak water and sanitation services** affect food utilization and nutrition.

VII. The Hazard Context

Overview

Communities in the PAHAL intervention area experience a range of shocks and stresses, many of which influence and compound one another. Climate is the most important hazard driver in the region. PAHAL communities are consistently stressed by low **water availability** and unpredictable weather, extreme events such as **hailstorms**, **floods** and **landslides**. **These conditions are expected to worsen because of climate change**. Additionally, inter-annual climate patterns frequently cause seasonal or annual droughts. Repeated exposure to abnormally dry conditions in a context of generally low water availability combined with poor farming practices and natural resource management leads to recurrent **forest fires**. Jointly, natural hazards along with other factors, such as deforestation and unsustainable land-use practices, contribute to erosion and **soil degradation**. This creates a feedback loop, whereby increasingly degraded land gradually becomes more susceptible to natural hazards.

[25] Asia Foundation, A Guide to Government in Nepal: Structures, Functions, and Practices, 2012

Climate-related hazards also contribute to other threats, and so communities are often forced to deal with multiple hazards simultaneously. **Pest** and **disease** outbreaks are often induced or aggravated by unfavorable climate conditions. For example, livestock disease outbreaks are more likely to occur during droughts. Crop pest outbreaks are most common during extended periods of humid and cloudy weather. Waterborne illness most frequently occurs when availability of clean water is constrained.

Outbreaks of malaria are most likely when heavy rains and flooding generate large quantities of standing water for mosquito populations to thrive. Community key informant interviews revealed many households are stressed because young male household members have **migrated** in search of work. As a result, households are less able to manage other hazards, placing further hardship on already under-resourced households. Finally, food price fluctuations are influenced by hazards. When production becomes most compromised by natural hazards such as drought, **food prices** are often highest.

Terrain and accessibility are leading factors in the ways and extent to which different disasters affect individual communities. Lower lying communities situated near ephemeral streams and riverbeds are most prone to seasonal flooding. Communities located on steeper, more elevated terrain are most at risk to landslides, erosion and drought. Remote communities face greater price fluctuations than those near market centers.

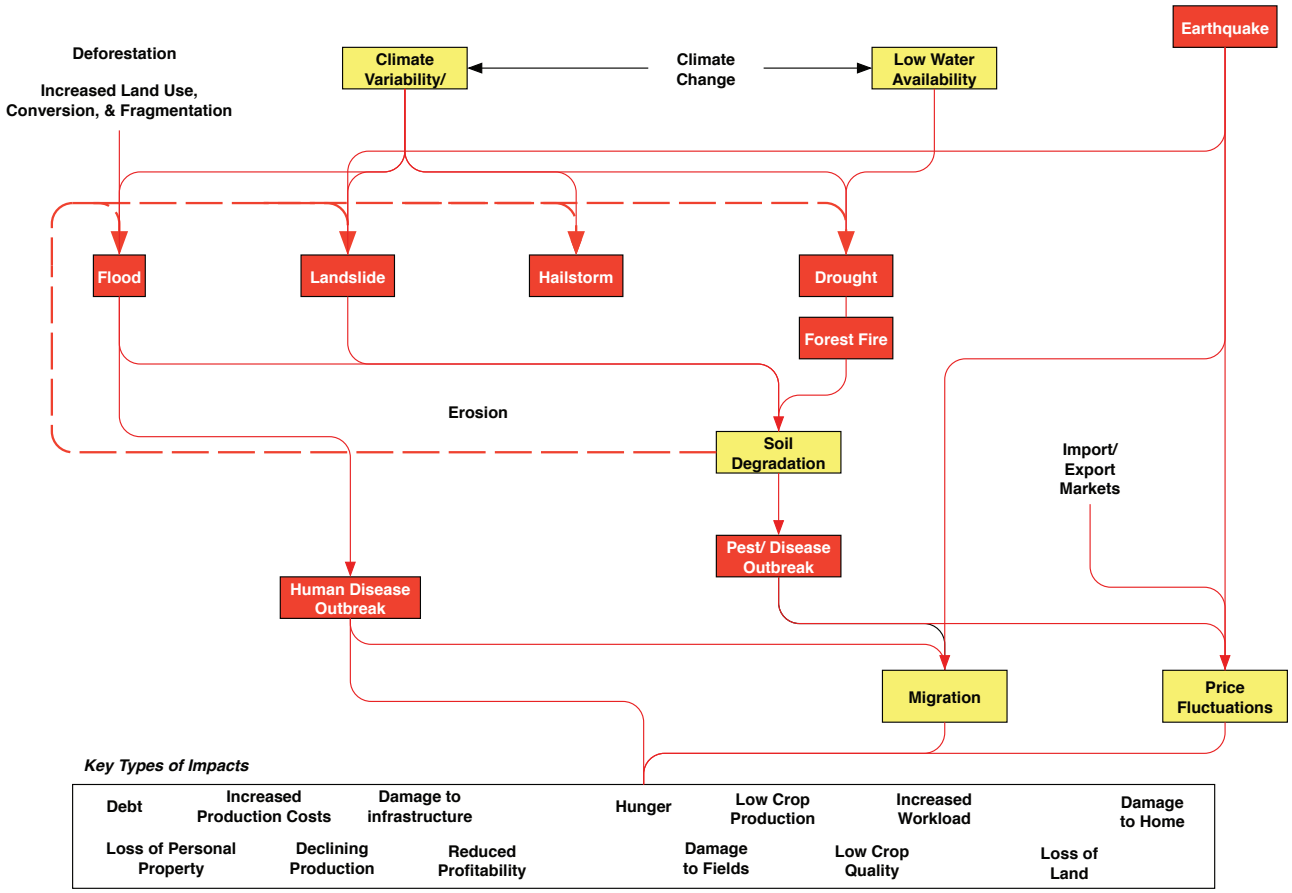

Figure 6: The primary shocks and stresses that PAHAL communities are exposed to are interrelated in many ways. Natural hazards are driven by climate conditions. Natural hazards (in addition to other drivers) influence the occurrence of other hazards such as pests and disease outbreaks and food price fluctuations. Soil degradation induces a feedback loop whereby the impacts of natural hazards (floods, landslides, droughts, etc.) are further amplified creating a cycle of increasing hardship.

Primary Shocks and Stresses

Shocks and stresses that most frequently occur and have the greatest impact on PAHAL communities are briefly introduced and characterized below.

> *"The major shocks impact the small-holder farmers as they have low capacity to cope with such disasters"*
>
> — District Development Committee member in Baitadi.

Landslides: Nepal is especially vulnerable to landslides.[26] The Himalayas are young in geologic terms, resulting in loose soil. An estimated 30 percent of worldwide damage from landslides happens in the Himalayas, and many PAHAL communities live, work and travel in high-risk terrain.[27] From 1971 to 2012, nearly 3,000 landslides were reported to have killed 4,541 people and affected half a million people,[28] and these figures are likely to under-report the true number and impact. Landslides are most likely to occur in July and August as a result of the monsoon rains, but they can also be triggered by earthquakes. Land degradation, deforestation and poorly designed road construction combined with wind and water erosion increase landslide risk.[29] Several government officials mentioned unplanned and haphazard road and house construction as major contributing factors. Landslides were mentioned by 23 focus groups in all five study districts and by both men and women, mixed and marginalized caste. Landslides are perceived as a serious threat and were mentioned as a frequently occurring shock (at least once per year) by the majority of focus groups in all assessed districts.

> *"Our house is built on sloped land. We live in terror of landslides during rainy seasons for the last 4-5 years"*
>
> — 22 year old Baitadi Dalit woman.

Drought and Low Water Availability: Droughts occur frequently in the PAHAL area, triggered both by climate oscillations such as El Nino-Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD) and by topography, particularly local rain shadow effects. However, the PAHAL area has experienced a prolonged drying trend since 2000, possibly related to climate change,[30] and every PAHAL district except Surkhet is at moderate, high or very high risk of drought.[31] Climate change is expected to increase the occurrence of extreme weather patterns and raise temperatures, which will strain the traditional ability of farmers to manage groundwater effectively. "[Rainfall] is not regular, sometimes there is heavy rain in winter and sometimes drought during rainy

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[26] For more on landslides in Nepal, see Mercy Corps, "Estimating Landslide Probability: A Community Based Approach for Rainfall Monitoring," 2012; Government of Nepal Ministry of Home Affairs, "Nepal Disaster Report 2011" and "Nepal Disaster Report 2013"; and UN-OCHA, "Nepal: Vulnerable Hills/Mountain Districts by Landslide Hazard" (map), 2010.

[27] For more on landslides in Nepal, see Mercy Corps, "Estimating Landslide Probability: A Community Based Approach for Rainfall Monitoring," 2012; Government of Nepal Ministry of Home Affairs, "Nepal Disaster Report 2011" and "Nepal Disaster Report 2013"; and UN-OCHA, "Nepal: Vulnerable Hills/Mountain Districts by Landslide Hazard" (map), 2010.

[28] Ministry of Home Affairs, Nepal Disaster Report, 2013

[29] Government of Nepal Ministry of Home Affairs, "Nepal Disaster Report 2011"p. 22

[30] Shih-Yu Wang, Jin-Ho Yoon, Robert R. Gillies, and Changrae Cho: "What Caused the Winter Drought in Western Nepal during Recent Years?" J. Climate, 26, 8241–8256, 2013.

[31] Government of Nepal, Ministry of Environment, "Climate Change Vulnerability Mapping for Nepal," 2010. For more information on drought in Nepal, see Malla, "Climate Change and its Impact on Nepalese Agriculture," The Journal of Agriculture and Environment vol. 9, June 2008; Government of Nepal Ministry of Science, Technology, and Environment, "Economic Impact Assessment of Climate Change in Key Sectors in Nepal," 2014; Pant, "Economics of Climate Change for Smallholder Farmers in Nepal: A Review" in The Journal of Agriculture and Environment, vol. 12, June 2011; FAO, "Assessment of Food Security and Nutrition Situation in Nepal," June 2010; "Nepal Disaster Report 2011"; FAO/WFP, "Special Report: FAO/WFP Food Security Assessment Mission to Nepal," July 2007; and Wang, et al 2013.

season," claimed the District Agriculture Development Officer in Surkhet. Effects vary depending on the timing of rainfall and how it relates to agricultural seasons; crops are most vulnerable during the planting and early growth periods. PAHAL communities perceive drought and low water availability to be a serious threat. They were mentioned as an ongoing stress that is increasingly occurring by the majority of focus groups in all districts assessed across gender and caste groups.

Agricultural Pests and Disease: Pests and diseases are prevalent in the PAHAL area. The most common livestock disease is Hoof and Mouth disease: Between 2000 and 2010, two of the three districts in Nepal most affected by this disease were in the PAHAL area (Bahjang and Achham).[32] Some of the most common crop pests and diseases are blight (for potato), blast (for wheat) and cut worm and butterflies (for vegetables).[33] Diseases such as rust and foliar blight that, in the past, were confined to tropical lowlands have recently moved into higher elevations as a result of global warming.[34] Crop and animal diseases were mentioned by 21 focus groups, in all five districts and by people from both gender and caste groups. Almost all groups said the incidence of disease is increasing and that these diseases are an ongoing problem.

Floods: Between 1971 and 2010, 3,377 people died in floods in Nepal.[35] Floods are concentrated in July and August, at the height of the monsoon. Farmland along rivers and ephemeral streams is heavily impacted. Floods are particularly dangerous in hill and mountain regions because they occur unexpectedly (caused by torrential rain in remote locations or by a glacial lake outburst).[36] Floods were mentioned by 12 focus groups from four districts and by both caste groups and both men and women. Most groups said floods occur annually but were split on whether they are more frequent now than previously.

> *"A flood swept away our farmland. The flood also caused a landslide. The loss of farm land meant we had very low production. Before the landslide, the agriculture products would support 8-9 months of household consumption. However, now, after the landslide and flood, we can only survive for 3 months from the agricultural products. This might also be contributed by increase in household family size. However, landslide is the major reason."*
>
> — 24 year old woman from Bajhang

Human disease outbreaks: It is estimated that 70 percent of deaths in Nepal result from infectious diseases.[37] Disease epidemics spread due to social and ecologic factors. Waterborne diseases peak in May and June, before the start of the rainy season, and in August during the monsoon. Rising temperatures are increasingly shifting lowland diseases like malaria into higher-elevation hill and mountain regions.[38] Poor sanitary practices

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[32] Foot and mouth disease in Veterinary Epidemiology Center, Directorate of Animal Health, "Status of Animal Disease Outbreak and Identification of Provisional Disease-Free Zone/Area," Volume 2 no. 1, February 2012.

[33] Synnott, "Climate Change, Agriculture, and Food Security in Nepal: Developing Adaptation Strategies and Cultivating Resilience," Mercy Corps, 2012 and Malla, "Climate Change and its Impact on Nepalese Agriculture," The Journal of Agriculture and Environment vol. 9, June 2008

[34] Malla, 2008. For more information on crop and livestock diseases in Nepal, see Synnott, "Climate Change, Agriculture, and Food Security in Nepal: Developing Adaptation Strategies and Cultivating Resilience," Mercy Corps, 2012; FAO/WFP 2007; and Veterinary Epidemiology Center, Directorate of Animal Health, "Status of Animal Disease Outbreak and Identification of Provisional Disease-Free Zone/Area," Volume 2 no. 1, February 2012.

[35] Nepal Disaster Report, 2011

[36] Samir, "Community vulnerability to floods and landslides in Nepal," Ecology and Society 18(1): 8, 2013. For more information on floods in Nepal, see "Nepal Disaster Report 2011"; Malla, 2008; Synnott, 2012;; and Ministry of Science, Technology, and Environment, 2014.

[37] Rai, Hirai, and Ohno, 2002

[38] Badu, "Assessing the Impact of Climate Change on Human Health: Status and Trends of Malaria and Diarrhea with Respect to Temperature and Rainfall Variability in Nepal," Kathmandu University Journal of Science, Engineering, and Technology, vol. 9, No. I, July, 2013, pp 96-105

also contribute to the spread of disease in the PAHAL project area.[39] "Due to lack of clean drinking water, diarrheal diseases affects us," said a Community Forest User's Group representative from Sunkuda, Bajhang. In addition, migrants who go abroad for work have a higher risk of sexually transmitted diseases, which can then be passed on to their wives or others.[40] Another informant in Bajhang claimed, "Disease outbreaks are observed in the place where there is high poverty and where there are marginalized population," often because health care services do not extend to these areas or because individuals simply can't afford them. Eleven focus groups mentioned human disease epidemics as a significant shock or stress. This was mentioned in all districts and by both genders and caste groups. Most groups felt that disease is less common than before, due to recent government and civil society initiatives to end open defecation.

> *"Drought (and lack of irrigation facilities), malaria, typhoid are the major shocks in the area. Yes, it has caused negative impact on my family as we hardly produce from agriculture, and it becomes very difficult to cover health expenses for our children when they fall ill."*
>
> — 26 year old Janajati woman from Surkhet

Heavy rain and hailstorms: Hailstorms are unpredictable and can occur most times of year.[41] There is no discernible pattern regarding where and how often hailstorms occur, which reflects localized microclimates, topography and the spatial variability of weather. They can cause significant damage, particularly to crops near harvest time, but also to people, livestock and assets if severe enough. Climate change is expected to increase the occurrence of intense weather events, which could lead to more frequent hailstorms.[42] Heavy rain and hailstorms were mentioned by 11 focus groups, representing all districts and both gender and caste groups.

Forest fires: Forest fires occur regularly in the PAHAL intervention area. Many are started by lightning strikes.[43] Farmers, poachers, grazers and hunters also purposely start many, often in "controlled burns" that get out of hand and spread. A Chief District Officer in Rolpa points to a "lack of awareness and negligence" as the main cause for fires. Drought and low water availability yield conditions that are favorable to forest fires. Climate change is expected to increase favorable conditions as a result of increased average temperatures and longer dry periods. Forest fires were mentioned by several focus groups as occurring on a frequent basis, particularly in the lower elevation districts of Rolpa, Surkhet and Doti. However many perceive the risk to be decreasing over time as a result of recent local forest management initiatives.

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[39] Kunwar et al, "Hygiene Practices in Rural Area of Doti District, Nepal," International Journal of Health Science and Research, 2014. For more information on disease epidemics in Nepal, see Rai, Hirai & Ohno, "Infectious Diseases and Malnutrition Status in Nepal: an Overview," Mal J Nutr 8(2), 2002; Ministry of Health and Population (MOHP) [Nepal], New ERA, and ICF International Inc., "Nepal Demographic and Health Survey 2011"; "Nepal Disaster Report 2011"; Amgain, "Social Dimension of Chhaupadi System: A Study from Achham District, Far West Nepal," Social Inclusion Research Fund, 2012; Smith-Estelle and Gruskin, "Vulnerability to HIV/STIs Among Rural Women in Nepal: A Health and Human Rights Framework," Reproductive Health Matters, 2003; and Pokhrel & Viraraghavan, "Diarrhoeal diseases in Nepal vis-a`-vis water supply and sanitation status," Journal of Water and Health, 2004.

[40] Smith-Estelle and Gruskin, "Vulnerability to HIV/STIs Among Rural Women in Nepal: A Health and Human Rights Framework," Reproductive Health Matters, 2003

[41] "Nepal Disaster Report 2011"

[42] Ministry of Science, Technology, and Environment, 2014.

[43] "Nepal Disaster Report 2011"

Migration: Almost half of all households in Nepal have either a current or former migrant and the number is increasing rapidly.[44] Government data shows that the total number of absentees (gone abroad) in Nepal has reached 1,917,903 in 2011, from 762,181 in 2001.[45] The PAHAL area is amongst the poorest in the country and many households rely on regional and international labor opportunities to make ends meet. Traditionally, seasonal migration to India, which is nearby and does not require a visa, was embraced by (almost exclusively) men as a strategy to generate extra income. In several focus groups and individual interviews, people mentioned household members, relatives or friends who had gone to India to earn money. New destinations, primarily Malaysia and the Persian Gulf, have emerged as alternate options although the vast majority of migrants in the PAHAL area migrate to India.[46] Migration was frequently identified as a less preferred but necessary coping method due to lack of local employment opportunities. Absentee household members were mentioned by several focus groups as causing significant household stress. The literature review revealed increased burdens on women, elderly and children left behind, resulting in increased disease, decreased school attendance rates and significant psychological strain, particularly on children.[47] Remittances are received infrequently and erratically, making household financial planning difficult. Outmigration to Malaysia and the Gulf often requires funds to cover employment agency, permit, passport and travel costs. Income-poor migrants commonly take high-interest loans from local moneylenders, resulting in an initial decrease in household income and contributing to a temporary spike in food insecurity before remittance money starts to flow in.

> *"Two sons went to India for labor work 1 year ago. They earn very little money. We also have a small land plat (6 kattha) in Terai region. We are planning to migrate to increase our income and to look for other opportunities. I cannot manage life here. We face so many difficulties in this area. There are no water storage facilities, no access to transportation, no income opportunities, resources or loans facilities."*
>
> — 35 year old Baitadi male Dalit

Price fluctuations: Prices are unstable and high in the PAHAL area. From 2007 to 2011 food prices increased 64 percent in Nepal. The poorest spend 72 percent of their income on food already, leaving them especially vulnerable to price spikes.[48] The primary reason for frequently erratic market prices is that the area is poorly connected, and transport costs are high. For example, the price of rice is about 177 percent higher than in the Terai. Over-reliance on India for food also leaves the area vulnerable to erratic supply crunches, policy changes, etc. Prices are especially high during the rainy season when mud and landslides block many key transportation linkages. Price fluctuations were mentioned by seven focus groups, particularly women and people from marginalized castes, as a significant issue that is increasing in frequency.

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[44] Hagen-Zanker, Mallett, Ghimire, Ali Shah, Upreti and Abbas, "Migration from the Margins: Mobility, Vulnerability, and Inevitability in Mid-western Nepal and North-western Pakistan," Secure Livelihoods Research Consortium, Overseas Development Institute, October 2014. For more on Migration in Nepal, see Gurung, "Migration from Rural Nepal: A Social Exclusion Framework," Tribhuvan University Central Department of Population Studies, December 2008; Maharjan, Bauer, and Knerr, "Migration for Labor and its Impact on Farm Production in Nepal," Center for the Study of Labor and Mobility, 2013; Sharma and Thapa, "Taken for Granted: Nepali Migration to India," Center for the Study of Labor and Mobility, 2013; and Shrestha and Bhandari, "Environmental Security and Labor Migration in Nepal," paper for presentation at IUSSP's 25th International Population Conference, Tours, France, 2005.

[45] *Governing Labor Migration in Nepal*, 2012

[46] Hagen-Zanker, Mallett, Ghimire, Ali Shah, Upreti and Abbas, "Migration from the Margins: Mobility, Vulnerability, and Inevitability in Mid-western Nepal and North-western Pakistan," Secure Livelihoods Research Consortium, Overseas Development Institute, October 2014. For more on Migration in Nepal, see Gurung, "Migration from Rural Nepal: A Social Exclusion Framework," Tribhuvan University Central Department of Population Studies, December 2008; Maharjan, Bauer, and Knerr, "Migration for Labor and its Impact on Farm Production in Nepal," Center for the Study of Labor and Mobility, 2013; Sharma and Thapa, "Taken for Granted: Nepali Migration to India," Center for the Study of Labor and Mobility, 2013; and Shrestha and Bhandari, "Environmental Security and Labor Migration in Nepal," paper for presentation at IUSSP's 25th International Population Conference, Tours, France, 2005.

[47] Hagen-Zanker, Mallett, Ghimire, Ali Shah, Upreti and Abbas, 2014; Maharjan, Bauer, and Knerr, 2013; Shrestha and Bhandari, 2005.

[48] Shrestha and Chaudhary, 2012.

Earthquakes: Nepal lies lengthwise along the fault line where the Indian subcontinent is crashing into Asia, pushing up the Himalayas and creating tremendous geological stress. Nepal has a long history of destructive earthquakes and the whole country is at risk.[49] There has not been a major earthquake in the PAHAL area since a magnitude 8.5 quake struck in 1505. However, recent research has shown that the 2015 Gorkha quake released some tension along the fault in central Nepal, consequently increasing tension further west along the fault line. Scientists worry that the area from Pokhara west into northern India is primed for a very destructive earthquake.[50] While the frequency of earthquakes is rare, the impacts are severe and far-reaching, as evidenced by the recent Gorkha quake. Due to the infrequent occurrence, earthquakes were mentioned by few focus groups.

Impacts on Food Security

Communities in the PAHAL area deal with specific combinations of shocks and stresses that together comprise their risk profile. This risk profile impacts their ability to achieve and maintain food security. Shocks and stresses are rarely experienced individually. Rather, communities must manage several simultaneously. Furthermore, the way shocks and stresses are experienced by communities, households and individuals also depends on the formal and informal governance environment as defined by rules, norms, values and behaviors within which they operate. These factors can intensify impacts and inhibit individuals, households or communities from dealing with risk effectively. Caste and gender norms in particular affect individual and household capacity to manage risk and, therefore, their ability to achieve and maintain food security.

Since most people in the PAHAL area depend on agriculture for food and income, the impacts of shocks and stresses on crop and livestock production are of primary concern to food security. Reduced food production impacts both food availability and food access in this context because a household is unable to produce enough food either for its own consumption or for sufficient income. If the magnitude of the shock is large enough, local and regional market prices are impacted as well, which raises the cost of food. Finally, the impacts on food utilization can cause immediate and lasting health problems. These in turn inhibit labor productivity, which limits agricultural production.

Impacts on Food Availability

Shocks and stresses impact agricultural productivity and food markets in several ways depending on how widespread disturbances are and when in the crop cycle they occur. Crops are often most vulnerable in the early stages of growth and just prior to harvest. They can be damaged or destroyed by hailstorms and landslides. Growth can be limited and/or plants lost as a result of reduced water availability, pest infestations or outbreaks of disease induced by erratic rainfall, extreme weather events or drought. PAHAL communities are largely subsistence farmers struggling to meet household consumption, and STRESS respondents shared their challenges with food availability. A 46 year old woman from Baitadi said, "Drought has been a great problem. If there would have not been drought, then the crops grown in their own land would have been sufficient throughout the year." Additionally, imported food is subject to sudden price increases, which shocks the purchasing power of households. An 18 year old Dalit woman from Bajhang said, "Wheat production decreased this year to two nanglo from two sacks due to SINDURE disease. Last year we purchased 300 kg of rice. This year, our own production will cover only 8/9 months need, for rest of the period we need to buy from market."

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[49] Nepal Disaster Report 2011.

[50] Rebecca Morelle, "Risk of Future Nepal-India Earthquake Increases," BBC News, August 7, 2015, http://www.bbc.com/news/science-environment-33807791, retrieved on August 22, 2015.

These impacts are intensified in the PAHAL area by several production-related constraints. First, farming plots on prohibitively steep terrain produce little and are at increased risk to landslides, land degradation (from wind and soil erosion) and low water availability (from poor groundwater retention). Second, the use of poor quality inputs puts crops at greater risk to pest infestations and plant disease. Lack of effective extension services inhibits the ability of farmers to manage these hazards and increase profits. Poor road infrastructure, which is more likely to be compromised by weather disturbances, increases the cost of all goods, including inputs, production equipment and food. Migration is also a problem because households have less support at harvest. In addition to destroying crops directly, shocks and stresses can make it difficult or impossible to get crops to market and this is exacerbated by poor road infrastructure, which is more likely to be compromised by weather disturbances.

Impacts to food availability are intensified further as a result of poor governance and social inequality. Because 95 percent of migrants are male, young and middle-aged women have an increasingly vital role in household livelihoods, especially crop production.[51] However, their ability to effectively manage shocks and stresses is compromised because of their limited access to productive assets and income. These are still largely controlled by the husband and in his absence, his mother, who typically represents the husband's interests and preferences, at the expense of others in the household. Because marginalized castes often farm the most marginal land (such as erosion and landslide-prone slopes), their crops are more susceptible to natural hazards, as is their ability to transport crops to market. Reduced access to forest and water resources, health services, markets and lending services means that marginalized castes and women have reduced capacity to cope when agricultural shocks occur and are more susceptible to food price spikes.

Poor governance also compromises the ability of households to manage agricultural and market risks. Extension services do not adequately provide farmers with the support they need to effectively produce and sell crops under erratic climate conditions or challenging terrain. Focus groups revealed that government extension services target men of more privileged castes, while women and marginalized castes are most often excluded. Poor delivery of disaster risk reduction services means government fails to provide basic infrastructure support for land to be protected from on-going shocks. For example, a number of communities revealed how they build Gabion walls on their own, though they admit the structures are inadequate as they do not have the technical skills required for this work. Finally, given that marginalized castes reside in the most disaster-prone areas, their lack of participation in governance decisions has a severe impact on their food production ability.

Impacts on Food Accessibility

Locally and externally occurring shocks and stresses impact the ability to buy or otherwise obtain food in the PAHAL area. Because many households consume what they grow, the impacts on food availability previously discussed also significantly impact accessibility. Households in the mountains of Nepal need over 1 hectare of land to produce sufficient food for themselves, while households in the hills need 0.5 hectares. In every PAHAL district, most landholders own less than the minimum necessary for subsistence farming. Dalits are the most disadvantaged, typically forced to farm on .18 to .40 hectares of arable land.[52] Furthermore, the size of plots is decreasing: In 2011, 78 percent of landholders had plots smaller than one hectare vs. 67 percent in 1981.[53] Because overall agricultural productivity of the area is low, incomes and imported food are vital to meeting people's basic food needs. However, food affordability is impacted by high transport costs as well as

[51] Government of Nepal Ministry of Labour and Employment Department of Foreign Employment (2014). Labour Migration for Employment A Status Report for Nepal: 2013/2014

[52] Food and Agricultural Organization of the United Nations, Assessment of Food Security and Nutrition Situation in Nepal, 2010

[53] Nepal Central Bureau of Statistics, "National Sample Census of Agriculture, Nepal" 2011/12, and G. Thapa, "Smallholder farming in Transforming Economies of Asia and the Pacific: Challenges and Opportunities," International Fund for Agriculture Development, 2009.

market price fluctuations. A 2007 FAO survey in the aftermath of nationwide droughts and floods found that 73 percent of households in drought-affected districts within the PAHAL area reduced their food intake and half of respondents did not eat anything at all at least one day per week. Over half of all households borrowed money to meet their consumption needs, more than half had household members who migrated for work, over one-third sold agricultural or household assets and 18.5 percent sold agricultural land.[54]

The incomes of both skilled and unskilled wage earners are particularly susceptible to hazards. Due to occupational restrictions and property rights limitations, Dalit and Janjati castes are particularly affected. Decreased agricultural production limits incomes by reducing the demand for manual labor at harvest. Outbreaks of waterborne disease or malaria limit the ability of people to work. Poor agricultural productivity limits the demand for services such as tailoring, ironwork or welding. Those who depend on forest products for their livelihood—not only farmers looking for fodder and mulch, but also tailors, woodcarvers and basket weavers—suffer when fires burn down the forest.

A focus group of marginalized women highlighted the challenges of food access in households without enough cash. Such households are often unable to pay for simple items such as salt, requiring them to trade one kilo of soybeans, worth 150 rupees, in exchange for salt, worth 20 rupees. These predatory terms of trade further erode food access and availability for the most vulnerable.

The impacts of food price spikes, low labor availability and collapses in agricultural production are intensified in communities that are more remote and inaccessible, particularly those that are frequently cut-off from supply routes during extreme weather events. Dalits and Janjatis are the most affected in these circumstances. Damaged roads limit the availability of goods, which increases food prices for many communities during the monsoon season and limits the mobility of wage earners.

Food accessibility is further limited as a result of poor governance and social inequality. Households with migrating family members are less equipped to cope with shocks because women are overburdened. In the 2015 Gorkha earthquake, for example, households with migrants were less able to obtain relief supplies such as food.[55] This was because many women were unable to leave their children, walk for several hours, keep their place in line at the distribution center and haul heavy bags of food back home. A focus group discussion with women of mixed castes in Surkhet revealed that following a recent disaster, a local non-governmental organization provided cash for work for road reconstruction to help households and communities recover. However, the nature of the cash for work activity, which required travel away from home and long hours, was prohibitive for women's participation. As a result, women were unable to benefit from the activity.

Although earnings from remittances can help with food access and utilization, particularly in times of crisis, focus group discussions revealed that this is often not the case. Women's focus groups revealed that husbands who migrate for seasonal labor do not typically send money home at regular intervals, instead bringing it with them when they return home. Those away for longer time periods do not send at regular intervals, nor always in response to when the income is most needed. Women's lack of control over how to spend remittance income further limits the extent to which families can access food when shocks or stresses hit.

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[54] FAO/WFP, 2007

[55] Nandita Baruah, "Nepal's Missing Gender Lens," in New America Weekly, May 14 2015 (accessed on Nov. 6 2015 at https://www.newamerica.org/the-weekly-wonk/nepals-missing-gender-lens/)

Women also lose access to food when food supplies dwindle and prices go up. This is because women traditionally eat last, after the men and boys of the house. Marginalized castes are more vulnerable to labor shortages because they are much more likely to depend on wage labor for income. Additionally, they are more vulnerable to price spikes because they are less likely to produce sufficient quantities of food to meet household consumption needs on their own. Finally, focus groups revealed that many women are too overworked to maintain social networks, meaning they are less able to rely on neighbors or social groups in dire times. Both women and members of marginalized castes face the greatest challenges of accessing credit, forcing them to contact predatory loan sharks simply to help meet their household food needs.

Impacts on Food Utilization

Hazards to human health are the greatest risk to food utilization. Droughts and floods all contribute to waterborne disease epidemics and malaria. Droughts limit the availability of clean water sources, pushing people to draw water from contaminated sources, while floodwaters simply overwhelm and contaminate all the water sources. Incidences of waterborne disease peaks in July and August when seasonal flooding typically occurs.[56]

The impacts of disease outbreaks are intensified as a result of poor access to safe and adequate water supplies and healthy hygiene and sanitation practices. Poor sanitation and hygiene is linked to malnutrition, particularly stunting in children.[57] For example, open defecation can contaminate drinking water which can cause diarrheal epidemics that severely inhibit the body's ability to absorb and maintain nutrients. Lack of clean drinking water, sufficient water for cooking and cleaning and effective hygiene and sanitation practices contribute to elevated rates of malnutrition and increased exposure to and severity of disease.

The impacts of disease outbreaks on food utilization are intensified further as a result of poor governance and social inequality. Dalits are considered ritually polluting and often cannot used water taps reserved for upper castes, which are frequently safer. Thus, even if there is a healthy water source available during a flood or drought, Dalits may not be able to use it. Members of marginalized castes are also unlikely to be supported by public health services. Women face comparable limitations. While menstruating and after giving birth, girls and women are considered to be ritually impure and, under the *chaupadi* system, expected to live in animal sheds while eating only nutrient-poor foods for 5 – 11 days. One focus group revealed that menstruating women and girls are prohibited from eating dairy products and cannot use family toilets or taps. Instead they are compelled to defecate outside, in holes they dig themselves. This practice explicitly undermines the effectiveness of public campaigns designed to free villages of open defecation. Furthermore, unhygienic conditions, improper protection from the elements and an inadequate diet weakens their immune system, leaving them more vulnerable to disease. Poor governance also compromises the ability of communities to better manage health and nutrition risks since water resources development, water source management, and basic health service provision are inadequately supported.

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[56] Nepal Disaster Report 2001

[57] RICE. The Nutritional Value of Toilets: How Much International Variation in Child Height Can Sanitation Explain? Amston, CT:Research Institute for Compassionate Economics, Inc. (2013).

VIII. Resilience Capacities

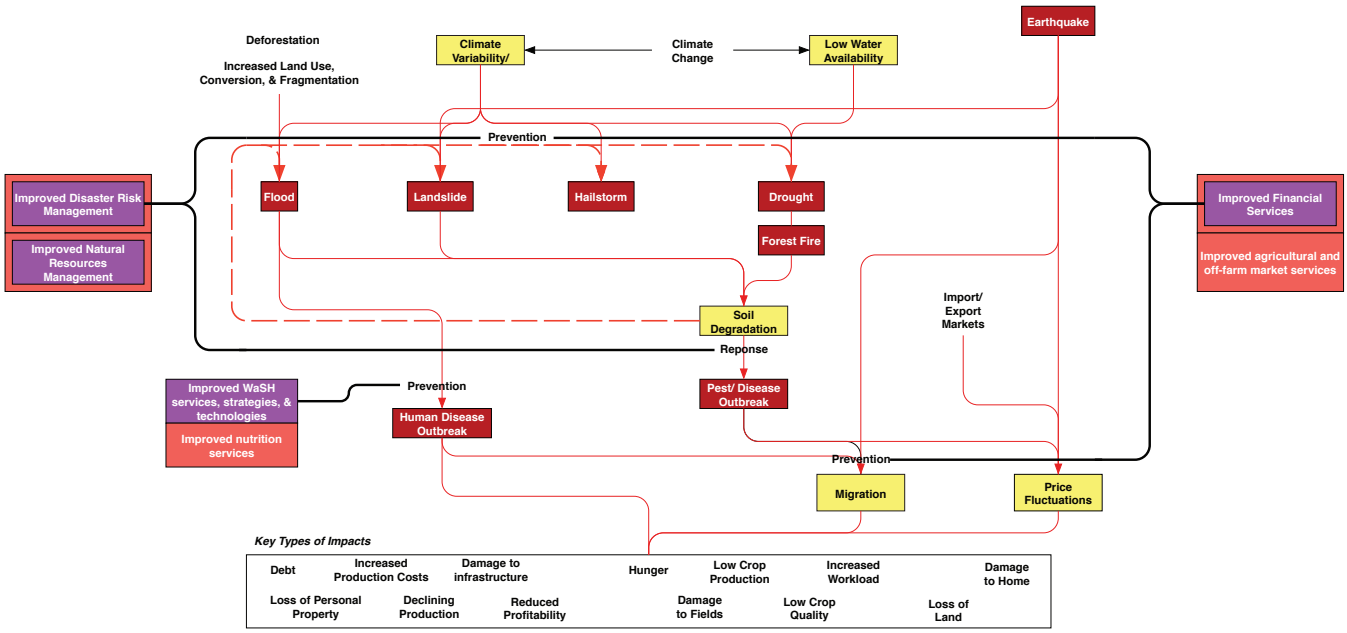

Figure 7: Sets of resilience capacities from the PAHAL Theory of Change are added to the Hazard Map (figure 6). Resilience capacities can either help to prevent the impact of shocks and stresses or help individuals, households and communities respond to them.

Food security in a context of shocks and stresses requires individuals, households and communities to access a set of resources and apply appropriate strategies that enable them to absorb and adapt to risk. These capacities are contingent on a broader enabling environment of social inclusion, supportive relationships and good governance. The STRESS process helped identify a set of six absorptive and adaptive capacities to which communities must have access to build resilience in the PAHAL program context and four transformative capacities that enable access to be achieved.

Absorptive and Adaptive Capacities for Resilience

Quality Health and Nutrition Services and Information

Improving access to quality health and nutrition services can dramatically reduce household risk related to human disease epidemics and serve as an adaptive response to a diverse range of shocks and stresses. Improved health services reduce major financial and time burdens on household members, primarily women, and thus have positive effects on their productivity. Healthier individuals are also more productive in on- and off-farm labor, increasing their ability to participate in the work force.

Access to nutrition services and information can shift household practices away from a rice-based diet (expensive but seen as a status symbol) and support households to grow a variety of vegetables that are more nutritious. In this case, increased nutritional awareness can increase families' disposable income as well as improve nutritional outcomes, while growing diverse vegetable crops can better conserve soil and water resources. Nutrition services and information can therefore mitigate stresses linked to water shortage and land degradation, in addition to mitigating risks posed by disease. Increased consumption of home-grown vegetables and other diverse crops,

or a promotion of kitchen gardens, can reduce their reliance on rice purchases, increasing disposable income for savings or health care that further helps households absorb and adapt to hazards. These practices can also help households manage their food stocks better, reducing the chance that they will go hungry when incomes are threatened during a flood, drought, landslide or food price shock.

> *Behavior change is a major challenge. Although people know... they don't have proper housing, water facilities, no food, etc.*
>
> — DHO Representative from Baitadi districts speaking of Dalit community members

Focus groups and interviews indicated that informal mechanisms, particularly mother's groups and female community health volunteers, currently provide primary access to health and nutrition information in remote areas. In general, effective application of this capacity appears to remain limited. For example, only two focus groups mentioned kitchen gardens as a potential risk mitigating option (and uptake even in those areas appeared low). These same groups also reported limited awareness of the nutritional value of kitchen gardens and their impact on mitigating disease associated with nutrition.

Enhanced WASH Services, Strategies and Technologies

Access to WASH services, strategies and technologies build resilience by helping communities prevent disease epidemics and improve nutrition outcomes. Improved WASH strategies and technologies directly help communities manage contamination risks to drinking water sources, including from floods and landslides. Storing and conserving safe water for drinking, cooking and cleaning can guard against the negative impacts of drought and help communities safely adapt to fluctuations in the water supply.

In PAHAL areas, there has been a significant push by government and non-governmental programs to expand sanitation and hygiene services. District and VDC WASH Coordination Committees and Citizen Awareness Centers were identified as heavy promoters of Open Defecation Free campaigns, including building of toilets. Messages are also transmitted through Female Community Health Volunteers (FCHVs), children's groups, mothers' groups, water user committees, VDC WASH Coordination committees and the Citizen Awareness Center.

> *A recent study revealed E .Coli in 85% of water samples.*
>
> — District Health Office, Baitadi

The effectiveness of these efforts, however, is likely overstated by the government as the fundamental resources needed to employ good practices are inaccessible, incomes remain low and cultural practices limit their effectiveness. The cost of a bar of soap can be prohibitive for many households. Drinking water supply remains a fundamental problem in the PAHAL area. According to NDHS 2011, 58 percent of households in the PAHAL area have drinking water supply on the premises while the rest must walk on average of 30 minutes to an hour, putting an extra burden on women and girls.[58] Many water sources are contaminated, and purification options are largely inaccessible. Dalits are often prevented from accessing clean community water sources. The persistence of the *chaupadi* system means women and teenage girls are prohibited from using toilets and must defecate in

[58] Nepal Demographic and Health Survey 2011

the soil during the menstrual cycle, a practice that contaminates water sources. Water User Groups are more focused on water for irrigation than for drinking, and many focus groups saw these groups as either inaccessible or ineffective. Out of seven WASH committees interviewed, six became inactive after the initial completion of the drinking water supply scheme. Only one group claimed to be continuously engaging in protection of water sources and system maintenance.

Effective Disaster Risk Reduction and Climate Services, Strategies and Technologies

Access to disaster risk management services, strategies and technologies are fundamental in helping communities prepare for and cope with regular floods, landslides, forest fires and droughts, as well as rare but devastating earthquakes. This set of capacities includes functional local committees, early warning systems, risk-mitigating infrastructure and disaster response mechanisms. By limiting the harm that these disasters cause, they also reduce harmful spin-off shocks and stresses, like food price shocks, migration and land degradation. Given that increased climate variability is already being experienced means that access to improved climate information services is a vital capacity to help communities adapt to shifting climate conditions over the medium term.

Despite chronic exposure to these shocks, effective DRR capacity is largely absent from the project area. District Disaster Relief Committees (DDRCs), the primary bodies responsible for DRR activities, are understaffed, underfunded and coopted by political elites. Accordingly, the proliferation of village level DRR committees, a proven model of effective participatory disaster response and planning, remains low, particularly for the marginalized and most vulnerable. In focus group interviews in Surkhet, communities revealed how responses to flash floods are severely delayed, resulting in increased loss of life and property, due to lack of functioning DDRC Committees.

The situation is complicated by cumbersome processes for funding community DRR infrastructure and overlapping mandates of different district level agencies, such as District Soil Conservation Office and District Water Induced Disaster Prevention Office. In order to access financial resources, communities must formalize a proposal that is often funded in subsequent years, if approved, and even then, funds are controlled by district officials. Some focus groups mentioned that DRR infrastructure was not a priority of their local VDC and that preventative infrastructure often failed. The primary reasons cited for this failure included the lack of participatory planning, inappropriate design and poor construction. Lack of effective, accessible local structures and incentives for DRR means PAHAL districts have not been effective in developing or implementing Local Disaster Risk Management Plans (LDRMP) or Local Adaptation Plans of Action (LAPA), part of the Government of Nepal's parallel Disaster Risk Reduction and Climate Change Adaptation strategies. In cases where they exist, their establishment has not been participatory or transparent, meaning national funds for plan implementation flow towards local political elites.

> *"Gabions only work for one year and next year, they all get swept away. The gabions were constructed through the District Development Committee (DDC)'s plan. The DDC had supported 10-15 gabions, which are already swept away. Now, we have been taking loan to buy food items."*
>
> — 24 year old woman from Bajhang

Effective early warning systems in pockets of Nepal have proven effective in providing communities with the lead time to prepare and evacuate belongings before floods, such as in Dadeldhura district. However, such systems are generally non-existent in PAHAL areas. Nepal's Department of Hydrology and Meteorology broadcasts short-term and seasonal climate information via radio, but the information is frequently inaccurate, poorly presented and generally not taken seriously. In the absence of reliable forecasts, farmers rely on indigenous knowledge of weather which is not informed by shifting climate patterns. Male focus group participants in Baitadi revealed how they were increasingly becoming indebted, unable to pay back loans after losing vegetable crops to hailstorms due to lack of appropriate climate information.

Importantly, informal groups were seen as filling the void and taking on DRR activities, including mothers' groups, farmers groups, Community Forest User Groups and international NGOs. While these groups often support infrastructure for DRR, they lack capacity and the result is subpar. In Baitadi, Shivanath VDC, women's groups have established small savings from which members can borrow low-interest loans during difficult times. In Dawang, Rolpa, CFUG members assumed leading roles to control forest fires but have not taken measures towards disaster preparedness.

Appropriate and Diverse Financial Services and Products

As an absorptive capacity, savings, credit, insurance and remittances provide shock-affected households with secure sources of cash for purchasing food and restoring or branching out into new income sources, keeping markets going. Financial services help keep children in school and preserve productive assets, at lower interest rates than those offered by informal moneylenders, a drain on income for many households. In STRESS focus group interviews, households identified the availability of high-interest loans from money lenders to cope with shock as a main stress and source of income decline in their households.

Financial services can also help households adapt to shifting social, economic and ecologic conditions. Savings and credit can foster diversification of income streams, investments in improved shelter and more effective and productive livelihood strategies. For example, access to credit that allows the purchase of an efficient cook stove, better seed storage or fertilizers, means vulnerable households can reduce unsustainable livelihood practices that escalate land degradation, exacerbate flood and landslide risk and lead to health hazards. Improved access to credit for input suppliers and buyers can incentivize their expansion to more remote, riskier markets, increasing the likelihood that households can get goods to market even when faced with shocks.

> *Cooperatives were mentioned as a key source of formal financial services by twelve focus groups, six from mixed caste groups and six from disadvantaged caste groups highlighting their importance.*

Formal financial services in PAHAL target areas primarily take the form of cooperatives at the VDC level and of microfinance institutions, primarily Nirdhan Uthan Bank (NUB). NUB offers loans to "self-reliance groups" composed of 11-40 women who pool their savings. Self-reliance groups receive loans up to 20 times the size of their collected savings—much larger sums and at lower interest rates than afforded by informal loans. Members use their funds for retail shops, livestock and crop production, rather than for consumption. Unfortunately, NUB services do not reach PAHAL areas. The NUB manager in Surkhet claimed to have 22,000 customers in the district, but FGDs did not mention this or other microfinance institutions as a service. Other than NUB, formal financial institutions have very little coverage in the PAHAL area. Insurance providers do not exist.

Many focus groups stated that informal financial services are a key resource in an emergency village level. Cooperatives are an important resource, though their functionality is vulnerable to mismanagement. They are usually formed around an economic sector, such as dairy farmers or vegetable growers within the agriculture sector. The Shiv Shakti Seed Promotion Cooperative in Baitadi, for example, helps farmers through distributing seeds and buying produce from members. The earnings from sales are used to buy seeds and cover technical and logistics expenses for farming.

> *"I want to produce vegetables in my land to increase my income. For this I want training on vegetable farming, use of seeds and their proper management. This year I produced 4 sacks of chilies in the same land where I used to get 1 sack of wheat. I keep a record of household expenses and cooperative saving though I am not formally literate. It would be helpful for me to understand market and its function for this financial management training would be great. I know one thing that our cooperative gets income from the interest of money invested to members."*
>
> — 35 year old Baitadi male Dalit

In PAHAL areas, informal financial services are generally limited and less accessible to the poorest households. Services are generally provided by groups for whom lending is not their primary purpose: mothers' groups, women's groups and farmers' groups. These groups base membership on occupation, gender or age and are thus not broadly accessible. In addition, poor financial literacy, poor knowledge on financial management and limited resources, mean the groups may not have the capacity to meet the diverse range of financial needs of group members. Similarly, people who cannot afford to make regular savings may not be able to join the group, excluding those who most need it.

No providers were reported to give disaster-specific loan products. However, formal financial service providers like NUB reported that they do provide some support to members via debt relief and subsidized loans in case of disaster. Many focus groups also mentioned that informal financial services are a key resource in an emergency. Loans are small and usually for immediate short-term domestic requirements, such as emergencies or expensive social rituals like weddings and funerals. However, informal loans from money lenders in particular carry high interest rates, increasing the debt burden of households and often, their vulnerability to the next shock.

In the case of remittances, some private money transfer services exist in district headquarters (primarily Western Union and Prabhu) but nothing exists in the VDCs. Short term migrant workers coming from districts bordering India simply carry money on their person when they cross the border back to Nepal and sometimes also carry cash from other migrants who couldn't make the trip home.

Dynamic and Responsive Agricultural and Non-Agricultural Markets

Access to dynamic and responsive markets acts as a resilience capacity by allowing households to adapt their livelihoods to hazards they face and diversify their income sources. Importantly, to be resilient, agricultural production and related income generation must be informed by climate information and an understanding of how production affects environmental conditions that can either mitigate or enhance hazard risk. Accordingly, market access for resilience is fundamentally contingent on the function of disaster risk management and natural resource management as resilience capacities.

Improving market functions for resilience in agricultural markets requires improved access to collection centers, market information, buyer networks, agricultural inputs and extension and production technology. In non-agricultural markets, it includes access to improved labor markets and supportive skill sets, safe migration options, and business development services for entrepreneurs.

> *No focus groups or KIIs mentioned agricultural collection centers, market information services or buyer networks as part of the core networks or relationships they rely on to meet livelihood need or mitigate shocks.*

Virtually none of these services exist in PAHAL VDCs. A few exist in district capitals, but there is little to no outreach beyond. Farmers in PAHAL areas are far from roads and markets and must transport their crops to market on foot. Produce gets spoiled or bruised, and transportation costs of livestock add up quickly. Farmers also have little to no connection with potential wholesale buyers. A few buyer networks that focus on seasonal vegetables were found in the capitals of Surkhet and Rolpa but not in PAHAL VDCs. Additionally, lack of access to agricultural inputs, combined with low input, high labor traditional farming practices decreases agricultural production levels, reduces product quality and affects the ability to aggregate production to marketable volumes. Indeed, a fundamental problem is that most farmers in the PAHAL area survive on a subsistence basis and have little or no produce to sell.

In district capitals, agrovet services provide seeds, insecticides, veterinary services and technology to farmers. However, they are too far from remote VDCs to follow up on the effective use of these products. Knowledge on how to apply, handle and transport inputs remains low, and the products themselves are often sub-standard. In key informant interviews, agrovet officers complained about bad roads, remoteness, a lack of irrigation facilities, traditional farming practices and a general reluctance by farmers to grow commercial crops as reasons why they were not able to have a strong presence in the countryside.

Government agriculture extension services have been greatly cut back since the structural adjustment policies of the 1980s and 1990s.[59] The District Agriculture Development Office (DADO) and the District Livestock Service Office are mandated with offering these services, but both offices typically have limited budget or capacity to reach remote areas. Only one focus group mentioned DADO as an institution they rely on, in the context of providing training to the local Agricultural Services Center. Extension services were otherwise not mentioned.

The STRESS field work did not reveal access to services around safe migration and counseling. In focus groups, migration was identified as a response to shocks and an additional stress on households due to the high financial costs and social implications. "Though the impact of migration is positive, community people are not willing to go India if they got opportunity locally." According to respondents, migration is considered a stress that often strains household means: "Due to migration there will be less manpower to work in the field and look after the livestock. It hampers in timely planting and harvesting of the crops which ultimately hampers the productivity of crops." "As males are migrated, female members of family are overloaded." One respondent alluded to a "brain drain" phenomena: "Skilled and active people only can earn more money," meaning communities are bleeding out talent, labor and innovative young minds. It is critical to provide alternative sources of income that do not risk exploitation and keep human capital in communities.

[59] IFPRI 2005.

Lack of availability of and access to diverse Technical and Vocational Training facilities in PAHAL areas is another feature contributing to migration and lack of returns from off-farm income. Existing institutions are normally located in regional and district capitals, offering job-focused training in trades such as plumbing, masonry, hospitality, tailoring, fabrication and beautician. However, the costs of attending these institutes and their distance from remote villages make them inaccessible to most community members. At the district level, the District Cottage and Small Industry (DCSI) Office provides short-term training to members of marginalized groups. Other small institutes offering training in such things as computer skills or watch repair also exist at the district level but again, are unreachable for the vast majority of isolated areas. Only a few focus groups in the STRESS assessment even mentioned government training in small-scale manufacturing (in this case, making baskets) as an income generating option, and this was only accessible for those who had the funds to reach their services.

Productive Natural Resources and Resource Management Systems

Conditions within the natural environment are one of the key determinants of resilience. The state of natural resources often determines how vulnerable communities are to flood, forest fire or landslide risk. Appropriate resource management leads to more productive soil and improved water availability, which in turn improves incomes, reduces incentives for migration, increases savings and credit potential and supports improved conditions for water, sanitation and hygiene.

The PAHAL program is concerned with ensuring access to productive natural resources, supported by sustainable resource management systems, at two levels—communal and individual. In PAHAL areas, communal resources include forests, pastures and common water points, whereas individual resources primarily include farmlands and private water points. Resource management practices in both communal and private areas directly impact soil and water conditions across the wider ecological landscape and therefore, food and water availability and disaster risk at a community level.

Access to communal water points is determined by caste, where higher caste groups, Brahmins and Chettris, use different water points because of cultural practices of untouchability. Dalits are relegated to secondary, often contaminated or distant, water points. Importantly, landscape management practices and water development schemes often prioritize access to water for privileged groups over marginalized entities. Observations and focus group discussions during the STRESS process revealed that marginalized land where Dalits reside is increasingly degraded, with subsequent increased risk of hazards, poorer access to agricultural inputs and reduced groundwater availability. In addition, communal water schemes for both drinking and irrigation even among more privileged castes can determine water levels across a larger landscape, particularly in areas stressed by low water availability.

The dominant institutions for forest and pasture management are Community Forest Management Committees and Community Forest User Groups (CFUGs). CFUGs determine rules around forest resource access to ensure long-term sustainability of forest resources. In a number of districts, CFUGs have been critical in reducing deforestation and land degradation through restoration of vegetation, developing DRR infrastructure and forest fire management. However, pastures in CFUG jurisdictions have generally been not well managed, as CFUGs tend to prioritize forest wood protection over investing in sustainable pasture management.

Overall, CFUGs received high scores from focus groups for inclusiveness and accessibility in mixed caste groups, yet governance and socio-cultural barriers to participation continue to exist. While participation of marginalized groups and individuals is higher than in other formal groups, inclusiveness decreases in higher leadership positions. In addition, small membership fees can be prohibitive for the very poor.

In some cases, management can also be fraught with exclusion, corruption, conflict and elite capture as the resource base—and associated financial returns to the group—they manage is large. A focus group with marginalized castes in Baitadi District revealed how because Dalits were not represented on the working committee of a CFUG in Shivanath VDC, the forest areas near the Dalit community suffered increased degradation, as did their natural water source. Another focus group with marginalized caste males revealed how Dalits were discriminated against in sourcing timber to rebuild their homes following disasters. Because their VDC did not have forest cover, all community members were required to buy timber from the neighboring CFUG. Dalits were sold timber at a higher price, or were unable to obtain it at all, as the quota for the amount of trees that could be sold was prioritized for and used up by more privileged castes.

> *A key informant interview with one farmer in Baitadi revealed how his exposure to intercropping in India made him a highly productive vegetable farmer back in his own village. However, due to poor organization networks among farmers, as well as distances between households and settlements, individuals with greater capacity are often unable to transfer their skills to their neighbors and communities.*

Soil degradation on individual farmland, due to unsustainable cropping practices and use of poor inputs, has implications for the flood and landslide risk of the wider landscape. It can also determine agricultural productivity in others' lands, due to fertilizer, pesticide and silt run off. Farmers recognized that restricted access to inputs and technologies, combined with limited skill sets and knowledge reduced natural resource productivity. Agriculture is still predominantly rain-fed, increasing the risk of crop loss in unpredictable climate conditions. Intercropping is a limited practice. Those who practice it have either been trained by the DADO or were exposed to it when working in India. Improved growing techniques that ensure soil and water conservation are critical as they not only have returns to on-farm productivity, but also reduce flood and landslide risk across the board.

Transformative Capacities for Resilience

Access to resources that support effective resilience strategies, as described above, cannot be achieved without supportive governance and social systems. Social norms around gender and caste, social attitudes towards agriculture and health and formal governance systems undermine access and use of absorptive and adaptive capacities. Based on its analysis, PAHAL has focused on four core, transformative capacities at the sub-intermediate objective level.

PAHAL's Elements of Transformed Systems for Resilience:

- Increased participation, agency and voice of vulnerable groups in governance processes
- Enabling Rules and Regulations
- Enabling knowledge systems, attitudes and perceptions across community, private sector and government institutions
- Social Capital across diverse community groups, private sector stakeholders and government institutions

Increased participation, agency and voice of vulnerable groups in governance processes

The STRESS process highlighted the adverse effect of exclusion —in both formal and informal processes—on resilience, emphasizing the need to enhance participation, agency and voice. Norms related to caste afford rights, privilege and positions of power to upper castes. Because local elections have not taken place since 1997 and appointed officials are playing the role of elected leaders, these norms perpetuate a formal political system that excludes marginalized castes and holds no incentives to represent them. At the same time, the frequent shift of VDC officials and their formal residence in district capitals far from village centers means that local government processes exclude remote communities more broadly. During the STRESS assessment, teams did not find VDC Secretaries in their offices and typically had to schedule interviews with them in district centers. Political patronage within political parties and rampant collusion between parties further perpetuates exclusion.

> *"A major local political party leader obtained funds from the Regional Office of Water Induced Disaster Control and Prevention for construction of a dam. We were later informed through an informal source that he spent all money without consulting the VDC, nor did he do a public audit or public hearing. The construction process has not yet been completed".*
>
> — VDC Secretary of Sunikot, Bajhang

STRESS findings highlighted the real challenges to participation and the impact on access to resilience capacities. FGDs revealed that decisions around local adaptation plans, disaster risk mitigating plans, disaster risk infrastructure projects and even local development programs are all centralized and developed without context analysis or outreach to the village level. Resources for these efforts, whether from national governments or non-governmental organizations, are channeled towards political elites and often squandered. Lack of participation and agency by marginalized groups mean plans and projects do not facilitate access to key resources or risk mitigating measures for those who most need them. Focus group participants from marginalized castes in Baitadi district revealed that every year during the VDC meeting, requests to extend roads to marginalized settlements go unanswered.

A positive shift in governance, however, has happened in the health sector. FGDs revealed that based on recent investments, the quality and accessibility of public health services has been improving significantly. Female community health volunteers have been effective in reaching women and have contributed to reducing infant mortality. This perception existed across different caste groups. However, key informants suggested that a significant level of mistrust continues to exist between users and service providers, resulting in underutilization of health services. Critical public services, including water, sanitation, health and agricultural extension services, suffer from these same challenges. Marginalized communities, without agency, voice or participation are not able to hold government accountable for delivering these critical services that help individuals cope and adapt to risk. An example in Sunkiot, Bajhang showed that community members preferred to pay for a private health service than use the free government health post next door due to poor treatment. Those who could not afford to pay simply avoided health services, further perpetuating their exclusion. In addition, health services often did not reach the most remote settlements, occupied by marginalized castes, and coverage existed at a more central level.

Community Forest User Groups are another critical governance institution that allocates rights to forest resources across the community. Community forests are a critical resource, particularly where markets and the government fail to extend services. The forest provides building materials for houses and animal sheds, firewood to cook food, grazing for domesticated animals and manure for crops. It is a critical source of material for rebuilding houses

and often for food and income following disasters. According to national laws, all community members in a forest catchment area are part of the committee, and the majority of focus groups emphasized that CFUGs are relatively inclusive compared to other groups. Nonetheless, discrimination persists, particularly as marginalized castes are typically excluded from decision-making. Dalit focus group members expressed how lack of ability to inform CFUG decisions, or being excluded from the groups all together, impacted their vulnerability.

Enabling Rules and Regulations

Enabling rules and regulations also underscore access to absorptive and adaptive capacities. One clear positive example of this in the Nepal context is the Central Bank's quota for formal financial institutions to dedicate a portion of their loan portfolio to "deprived sectors," specifically agriculture. If services expand into new urban or peri-urban markets, there must be a correlating expansion into rural areas. Access to financial services is a critical resilience capacity for marginalized groups that lack land holdings and other capital to leverage as collateral.

The Forest Act calls for the periodic closure of forest resources to reduce over-harvesting. The law is enforced by local CFUGs. While designed to ultimately support forest productivity, the cycles of closure after the monsoons are often at odds with when communities most require the resources. In 2014, a flash flood in the Midwest region affected thousands. Families fled to higher lands and returned to find their homes destroyed. CFUGs typically allow community members hard hit by natural disasters to access forest resources to support rebuilding of their homes. However, the closure of forest resources due to the Forest Act prevented households from accessing the resources they needed to recover. Communities lived in temporary shelters for extended periods, delaying the time for reconstruction and resettlement. In this case, the Forest Act can be improved upon by allowing for special provisions for disaster affected households.

The set of formal regulations that governs the actions of DDRCs limit effective coping capacities. The DDRC, a body established to respond and provide relief to people affected by disasters can only access disaster funds after a disaster occurs. This means the committee cannot implement targeted mitigation measures when anticipating a specific shock, based on seasonal patterns or forecasting. There is also poor coordination between the DMC and DDRC.

A study conducted under Mercy Corps' Inclusive Resource Management Initiative (IRMI) found that one community in the district of Dang was unable to obtain forest products like timber from the Community Forest during flooding. Formal policies dictate a fixed schedule for which community forest resources are available to the public and when. The fixed schedule hindered flood affected people from getting necessary forest products to cope and recover from the disaster.

Enabling knowledge systems, attitudes and perceptions across community, private sector and government institutions

Formal and informal rules are often driven by attitudes and perceptions. Creating an environment with positive and enabling perceptions and attitudes can influence these rules, open avenues for participation and inclusion and directly affect access to resilience capacities. The narrative has made a number of references to attitudes and perceptions around caste and gender, driven by norms and values that block access and use of resilience capacities. These same negative perceptions and attitudes restrict productive relationships between market actors: Buyers mistrust producers, viewing them as uneducated or unproductive, and farmers see buyers as exploitative and self-serving. Political elites see Dalits as backward and obstinate to behavior change, justifying their exclusion from governance processes.

The STRESS process also revealed that vulnerable communities must be embedded within knowledge and learning systems that support them to understand and apply resources in a manner that contributes to their resilience. These same knowledge systems provide opportunities to shift perceptions by demonstrating alternatives to the status quo. In the PAHAL area, knowledge exchange is most effective within group structures, including savings and loans groups, mother's groups, and farmer's groups. However, insofar as these groups operate by exclusive rules, the opportunities to fundamentally change perceptions around gender and caste remain limited. Under the SUAHARAA program, a key to enhancing knowledge around nutrition and health was to engage not only women, but also husbands, mother-in-laws and even grandfathers in informal groups. Tapping into norm holders who maintain the status quo allowed the program to overcome key barriers to knowledge and learning among marginalized groups and communities.

Despite the relative efficacy of many informal groups, PAHAL target areas remain challenged by their isolation, severely constraining the flow of knowledge and information. Input suppliers remain unable to train and support farmers on-site. The STRESS test revealed that farmers don't receive market price, epidemic or disaster risk information through local media. However, farmer-to-farmer informal knowledge exchange has been a supportive mechanism for disseminating basic information.

Social Capital across diverse community groups, private sector stakeholders and government institutions

The role of social capital, particularly bonding social capital, was found to be a strong determining factor for resilience in PAHAL areas that supported a range of coping and adaptation strategies. Informal structures within caste and village groups, including mother's groups, savings and credit groups, farmer and livestock groups and CFUGs, were critical in helping communities access the various capacities mentioned above. They were also some of the most critical groups in supporting communities to cope in the aftermath of disasters. CFUGs, for example, assisted in the provision of timber for household reconstruction post disaster. Mother's groups are engaged in planting activities that protect slopes from landslides, and members provide immediate assistance to each other following disaster.

While formal governance structures were marked by severe exclusion, informal structures tended to be more inclusive, although some discrimination still persisted. One mixed caste female focus group in Baitadi reported that Dalits were typically not included in mother's groups' trainings, either because they were not invited or because their traditional household activities prevented them from attending. Bonding among community members within groups was perceived as strong. Nevertheless, bridging social capital or networks and collective action between groups were observed to be limited. This is particularly problematic in an environment where so many diverse groups, often representing a single sector, exist with diverse membership and allegiance. In addition, lack of bridging capital prevents groups with common interests and objectives to come together on a particular issue.

Importantly, the plethora of informal community structures has resulted in an accountability crisis. In its current form, bonding social capital through informal networks replaces the role that financial services, market actors and government services should play. Although these groups could have the power to link to

SOCIAL CAPITAL:

The networks of relationships among people who live and work in a particular society, enabling that society to function effectively. Social Capital has been often broken down into: a) Bonding, or networks and relationships within groups, b) Bridging, or networks and relationships across groups, and c) Linking, networks or relationships with individuals or institutions who have power and leverage.

government to increase their voice and participation in formal decision-making, advocacy capacity and the role of such linking social capital was found to be weak. Instead, groups were more likely to rely on their personal and informal networks. To promote resilience, programs must support accountable and participatory social systems that build equitable relationships between community members while also increasing exchange with market and governance actors. Bonding social capital must be looked at critically to understand how it can be used to promote greater accountability and participation, ultimately leading to improved, equitable relationships and exchange within market and governance systems.

IX. Program Implications

Through the STRESS process, the PAHAL team has identified opportunities to better support individuals, households and communities to absorb, adapt and transform in the face of shocks and stresses. These opportunities have been incorporated into proposed absorptive, adaptive and transformative pathways, highlighted at the output level of the PAHAL Theory of Change.

Absorptive Pathways

The program's absorptive pathways focus on ensuring that health, water, disaster risk reduction, financial services and natural resource management all function in a manner to help communities prepare for, respond to and ultimately, reduce negative effects of recurrent and unpredictable shocks and stresses.

First, to enhance access to and uphold the appropriate use of improved water, sanitation and hygiene services, PAHAL will work with the government to strengthen institutional support for safe sanitation services and facilities. In addition, the program will facilitate access to inputs and technologies for improved community water use systems, while working to transform underlying norms and behaviors to ensure equitable utilization. The program will also focus on the fundamental practices and behaviors, as well as attitudes and perceptions, that impact uptake of water and sanitation services. Through targeted messaging and application of the community-led total sanitation process,[60] PAHAL will combine hardware improvements with activities to shift mindsets and behaviors, aiming to improve sanitation and hygiene.

Effective disaster risk management strategies, services and technologies will be enhanced by facilitating the formation of DRR committees, in line with government plans. DRR committees will be supported to engage at the local level, both by conducting outreach to learn from communities about their on-going challenges and by developing strategies to overcome identified challenges. Through joint local government and community collaboration, PAHAL will support local actors to identify and build more effective infrastructure to mitigate the risk of natural disasters and to integrate improved bio-engineering and farming practices at communal, household and individual levels to reduce disaster risk. In addition, by understanding specific local needs, the DRR committee will serve as a channel for strengthening early warning data collection and dissemination, while training communities on improved short-term response to the most common threats. A central focus will be on ensuring that all DRR mechanisms penetrate from the VDC all the way to the household level. Finally, developing stronger links between villages and district-level offices will strengthen institutional support for effective community-based DRR.

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[60] Community Led Total Sanitation (CLTS) is a participatory methodology whereby community members message the importance of behavior change to eliminate open defecation in a village. See http://www.communityledtotalsanitation.org/page/clts-approach for an explanation of the approach

When faced with frequent shocks and stresses, households often need quick access to cash to avoid destructive coping mechanisms, such as reducing meals, pulling children out of school or selling productive assets. As part of its focus on financial services, PAHAL will work on enhancing formal and informal financial services targeted towards disaster risk reduction so that households can access appropriate products that could help them cope with floods, landslides or crop loss. As part of this, PAHAL will explore micro-insurance markets to see where it would be feasible to enhance access to insurance for remote communities.

Adaptive Pathways

PAHAL's adaptive pathways support communities to fundamentally shift financial and natural resource management practices and livelihood profiles to reduce risk exposure and impacts over time. Specifically, adaptive pathways boost access to nutrition, water, climate information, agricultural and non-agricultural markets, financial services and products and natural resource management practices for long-term resilience.

In order to ensure financial services and products enable adaptive capacity, the program will support enhanced informal savings and loans groups for both on- and off-farm activities and foster stronger links to formal financial services, primarily cooperatives and microfinance institutions. Formal financial services will be supported through opportunities that provide deficit financing to expanding financial institutions and by helping formal and informal financial service providers develop appropriate savings and credit products that meet the unique needs of communities who are diversifying their incomes. The program will also focus on providing improved remittance management services so households can better use this income source for longer-term adaptive measures, as opposed to simply meeting immediate consumption needs. The program will also engage vulnerable populations to increase their basic financial literacy, enabling them to take advantage of financial services for adaptive livelihood shifts.

PAHAL will also strengthen adaptive capacity by increasing access to both enhanced on- and off-farm markets. The program will link farmers with input suppliers and diverse buyers, traders and exporter actors and networks, giving them more options for both production and sales in the face of shifting climatic and market conditions. Given the remoteness of PAHAL target areas, connecting farmers to strengthened farmers' groups and collection centers will be a critical strategy for aggregating production to marketable volume, supporting knowledge exchange on best agricultural practices and linking with buyers. PAHAL's investment in improved market infrastructure will further support these linkages, while improved access to climate information services will enhance seasonal decision-making. Climate information services will also be integrated in DRR committees to combine disaster management and climate adaptation planning at the community level. While farmers' groups and collection centers will be a critical starting point for accessing technology and knowledge for improved farming, PAHAL will also focus on strengthening the plans and practices of CFUGs, such that pasture and forests are better managed to provide supplemental incomes to wider groups of people.

In addition, the program will work on models for expanding small and medium enterprises through innovative co-financing models, which can provide much needed jobs and local off-farm income opportunities. In addition, the program will initiate activities that link beneficiaries to profitable off-farm markets and improved Business Development Services, as well as counseling options for safe migration. This mechanism can help ensure migration is an informed and safer choice, rather than an additional stress upon households.

Expansion of the job market will be complemented with improved access to job platforms and counseling services and through strengthened private suppliers who can assist those seeking off-farm opportunities to make informed choices appropriate for their household's overall risk profile and long-term aspirations. In the process, the program will work directly with beneficiaries and will collaborate with private training institutes and relevant local government bodies.

Transformative Pathways

The transformative pathways promoted by PAHAL aim to shift the formal and informal environment to enable and support resilience. Underlying each absorptive and adaptive capacity, the transformative pathways supported through PAHAL will promote changes to inequitable governance and social systems, ensuring increased inclusion and access for all community members. Strengthening a community's voice means tailoring specific approaches to ensure the meaningful participation of marginalized groups—such as women, youth and ethnic minorities—in all program activities and services. PAHAL will ensure that marginalized caste, ethnic and gender groups have opportunities for dialogue and are linked to structures that define how water, health, financial services, markets and natural resources are accessed. Program activities will seek to increase participation in a range of informal and formal community structures—including water committees, CFUGs, savings and loans groups and DRR committees—while also challenging the power relations and norms that have prevented marginalized groups from having a voice in decision-making. PAHAL will facilitate discussions on how community groups are governed and what can be changed to ensure they are more accountable, transparent and responsive to citizens' needs. PAHAL will work to ensure community groups and other informal and formal governance and market structures conduct outreach with marginalized groups and appropriately tailor services and products to meet their unique needs.

To promote transformation, PAHAL will also work with marginalized groups in "safe spaces" to help build their capacity for collective action and advocacy. This will ensure community members of all ages, castes, ethnicities and genders have the skills and capacity to better understand and engage in processes of public decision-making, and can better advocate for themselves and more effectively take advantage of available participatory governance processes. To complement these efforts, PAHAL will support communities and civil society organizations (CSOs) to hold the government accountable for community-based, demand-driven planning and improved service delivery. By promoting coordination between civil society and local government, PAHAL seeks to build linkages that ensure government actors deliver services more equitably, effectively and efficiently. Finally, PAHAL will strengthen the capacity of local government to incorporate principles of good governance in its structures, rules and regulations.

X. Conclusion

The STRESS process revealed how communities in the PAHAL area face a range of obstacles to food security. These constraints are aggravated by and contribute to ecological and economic shocks and stresses, which generally only further impede food access, availability and utilization. For example, low water availability and climate uncertainty, exacerbated by climate change, cause droughts that degrade soil and water productivity for agriculture. These adverse conditions, combined with poor quality and high costs of inputs and limited agricultural extension services, lead to unsustainable farming practices that advance the stress of land degradation. Land degradation reinforces land susceptibility to frequent shocks such as floods and landslides, further eroding productive soil and placing farmers in a negative feedback loop towards reduced agricultural productivity. In moments when food availability is most restricted due to hazards, food prices are highest, limiting food access and forcing stress migration for off-farm labor that poses an additional set of risks for rural households.

In order to achieve and sustain food security in this environment, communities in the West and Far West must better prepare and respond to shocks and stresses. This means accessing natural, human, financial, social and physical resources and flexibly applying these resources through a range of strategies that contribute to resilience. In Nepal, access and effective application of these resilience capacities is restricted by weak governance, strict informal rules around gender and caste and other potentially harmful socio-cultural attitudes and practices.

Lack of transparency in public fund management and the physical remoteness of government decision-makers from village settlements means disaster risk funds are often diverted or ineffectively applied. The restriction of Dalits touching milk sold at market or drinking water from the same tap as higher castes not only limits resilience opportunities for this vulnerable group, but also has implications for community-level resilience. Similarly, the inability of women to eat a nutritious diet during menstruation or child-birth and their temporary ostracization to the cowshed during these periods not only impacts food utilization, but also restricts their ability to access and manage other household resources on an on-going basis. The perception that agriculture is an undesirable livelihood, reinforced by the fact that it is now primarily practiced by women as most men migrate for off-farm labor, fundamentally affects prospects for long-term food availability.

Accordingly, the STRESS findings highlight the importance of the formal and informal governance environment in building resilience. Unlike current resilience thinking, where transformative change is viewed as an aspirational measure that follows the development of coping and adaptive mechanisms, the PAHAL STRESS research demonstrates that these mechanisms cannot be achieved or sustained without the enabling environment in place. Accordingly, the PAHAL theory of change calls for working on the formal government environment and informal norms, attitudes and perceptions from the outset and at every level of the program. Only when supported by rules, relationships and knowledge systems that enable access to resources and their effective use can individuals, households and communities in Nepal hope to achieve resilience.

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