

Understanding Vulnerability to Climate Change

Insights from Application of CARE's
Climate Vulnerability and Capacity Analysis (CVCA) Methodology



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Front page photo: In Malan Ada village in Niger, women work together with CARE to develop a hazard map that shows climate change risks to their families and community.

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Executive Summary

People all over the world are being confronted with the reality of climate change. For some, climate change is simply a matter of changes in weather patterns: things are a bit hotter, a bit colder, a bit more uncertain. For others, it is already a matter of survival: too little water or too much, not enough food to go around, risks to safety and security. The real injustice of climate change is that those who have contributed least to its causes are suffering most from its effects.

In the international climate change negotiations, some progress has been made towards recognition of this global injustice. The global community is beginning to grasp the scale of funding needed to support adaptation in developing countries, and there is some agreement that funding and support should be targeted to those countries, communities and people who need it most. The extent of adaptation needs is typically associated with the degree of vulnerability to climate change.

At the international level, discussions tend to focus on identification of the most vulnerable countries. However, experience has shown that vulnerability to climate change differs within countries, within communities and even within households. Current approaches to assessing vulnerability for the purposes of allocating adaptation funds do not capture these differences, and therefore risk excluding the very people that adaptation resources must benefit if they are to be used effectively.

The purpose of this report is to provoke thought, dialogue and debate by practitioners and policy makers on the issue of vulnerability to climate change and on approaches to vulnerability assessment in policy and in practice. Three case studies provide snapshots of the realities of vulnerable communities in Vietnam, Peru and Ghana that are already feeling the effects of climate change. The case studies provide context for a series of reflections on vulnerability, which draw on the case studies as well as on CARE's broader experience in analyzing vulnerability to climate change with communities around the world, using our Climate Vulnerability and Capacity Analysis (CVCA) methodology. The key insights emerging from the process are summarized below.

Access to information is a major factor determining ability to act on adaptation.

Adaptation is a process. Ongoing learning, analysis, planning and adjustment are required to respond to an evolving context and changing risks. To do this effectively requires availability of appropriate, timely and locally relevant climate information such as weather forecasts, seasonal forecasts and early warnings for climate hazards. It also requires that this information is made accessible to the people and institutions that need it, including the most vulnerable groups within communities.

For adaptation policies and programs to reach the most vulnerable, they must have a voice in the process.

Vulnerable people are vulnerable in part because they are left out and do not have a voice in decision-making on policies and allocation of resources in their communities, regions and countries. Engaging all relevant stakeholders, including the most vulnerable communities and populations, in national and local level planning can help to ensure that investment is directed to the most vulnerable populations. Participatory decision-making promotes empowerment and transparency, as well as accountability of policy makers to citizens. Giving vulnerable people a voice in decision-making will ensure that adaptation initiatives are responsive to their needs, priorities and aspirations. This is critically important in the development of National Adaptation Plans if they are to be effective in reaching the most vulnerable populations with adequate and appropriate support.

Insecure rights to resources exacerbate vulnerability.

Adaptation efforts often emphasize changes in livelihood strategies to respond to changing climate conditions. However, these approaches to adaptation assume that people have access to the resources needed to put these strategies in place. For the most vulnerable people in many communities, this is simply not the case. Access to and control over resources such as agricultural and forest lands and water sources is an essential determinant of vulnerability. When people do not have secure access to these critical livelihood resources, their options are limited and they are less able to act on adaptation.

Existing coping strategies are ineffective or unsustainable, and may exacerbate vulnerability to climate change over time.

The most vulnerable people to climate change are most often the poorest, who lack effective coping strategies to deal with shocks and stresses and who have had to resort to ineffective responses. This suggests that we need to analyze not only what risks people are exposed to, but also the quality of the options they have for coping and how they are ultimately managing risks. This understanding can facilitate identification of the most vulnerable groups and can also create opportunities to identify indigenous strategies that are effective and sustainable, and can be built upon for longer-term adaptation. It also suggests that adaptation for the most vulnerable must involve the creation of safety nets, in the form of social protection schemes and improved emergency response mechanisms.

The most vulnerable people lack access to services that would facilitate adaptation.

In many communities, access to basic services remains a challenge. This is particularly true for poorer households, women and socially marginalized groups. When people are unable to meet basic needs such as health care and safe water, it is very difficult for them to think beyond their immediate needs, much less to make plans for longer-term adaptation. Access to services, including health, agricultural extension and financial services, must therefore be a consideration in determining the feasibility of different adaptation actions.

Gender matters when it comes to vulnerability to climate change.

Women and men play different roles in household livelihoods, and therefore they experience the impacts of climate change differently. Possibly more importantly, women and men have differing abilities to respond to the threat that climate change poses to their lives and livelihoods, and it is often women who are at a disadvantage when it comes to adaptation. This is not to say that all women are particularly vulnerable—there are also many examples where women are using their knowledge and capacities to protect their families and communities from the adverse impacts of climate change. The point is that effective, equitable adaptation requires an understanding of the dynamics of vulnerability. Gender influences these dynamics, and therefore vulnerability assessment must take gender differences into account. Further, this must lead to planning, implementation, monitoring and evaluation of adaptation that reflects the differing roles, responsibilities and power that men and women have, and that seeks to overcome gender inequality.

These insights illustrate the complex array of physical, environmental, social, economic and political factors that determine people's vulnerability to climate change. In order for adaptation efforts to be successful, vulnerability assessment must go beyond identification of vulnerable countries. Processes for vulnerability analysis and adaptation planning must involve all relevant stakeholders, including local communities and in particular the most vulnerable members of those communities. These processes must examine the social, economic and political drivers of vulnerability in order to identify the most vulnerable people within countries and communities and ensure that their needs, priorities and aspirations are reflected. This enables policy makers and adaptation practitioners to target resources and interventions where they are needed most.

List of Acronyms

CBA	Community-Based Adaptation
CBO	Community-Based Organization
CVCA	Climate Vulnerability and Capacity Analysis
DRM	Disaster risk management
DRR	Disaster risk reduction
IPCC	Intergovernmental Panel on Climate Change
NAP	National Action Programme to Combat Drought and Desertification
NGO	Non-Governmental Organization
UNFCCC	United Nations Framework Convention on Climate Change

Introduction

People all over the world are being confronted with the reality of climate change. For some, climate change is simply a matter of changes in weather patterns: things are a bit hotter, a bit colder, a bit more uncertain. For others, it is already a matter of survival: too little water, or too much, not enough food to go around, risks to safety and security. The real injustice of climate change is that those who have contributed least to its causes are suffering most from its effects.

In the international climate change negotiations, some progress has been made towards recognition of this global injustice. The global community is beginning to grasp the scale of funding needed to support adaptation in developing countries. As allocations of funding for adaptation slowly begin to materialize, there is increasing debate as to how these scarce resources should be distributed and what types of mechanisms and processes will deliver the most expedient and effective action on adaptation. There is some agreement that funding and support should be targeted to those countries, communities and people who need it most. The extent of adaptation needs is typically associated with the degree of vulnerability to climate change.

At the international level, discussions tend to focus on identification of the most vulnerable countries.

However, experience has shown that vulnerability to climate change differs within countries, within communities and even within households. Current approaches to assessing vulnerability for the purposes of allocating adaptation funds do not capture these differences, and therefore risk excluding the very people that adaptation resources must benefit if they are to be used effectively. To ensure that adaptation funding reaches the most vulnerable people requires analysis and planning processes that capture these differences and that give the most vulnerable people a say in how funds are allocated and spent.

CARE International has committed to supporting the world's most vulnerable people in their efforts to adapt to climate change. We are using our global network of people and partner organizations to build understanding of the impacts of climate change on poor and marginalized people; to identify and promote effective and equitable responses at international, national and local levels; and to empower vulnerable communities and people to take action. We are particularly concerned with ensuring that women and men are able to access the same resources, opportunities and benefits in adaptation processes. Our strategy recognizes the critical role that knowledge plays in this process.

As part of our effort to build and share our knowledge in support of effective adaptation, CARE has undertaken a reflection process on vulnerability to climate change. This process draws on our experience working with vulnerable people around the world to reduce poverty and achieve social justice, supplemented by targeted analysis of vulnerability to climate change. This analysis was undertaken using the methodology described in the Climate Vulnerability and Capacity Analysis (CVCA)



Community members in Nan Province, Northern Thailand, are working together to build a dam that will protect them from more frequent flooding in the area.

Handbook, which was developed to help CARE staff and partners to understand the challenge of climate change vulnerability and to identify appropriate adaptation responses for the most vulnerable people.

The purpose of this report is to provoke thought, dialogue and debate by practitioners and policy makers on the issue of vulnerability to climate change and on approaches to vulnerability assessment in policy and in practice. Three case studies are presented to illustrate the reality of climate change and the dynamics of vulnerability in rural communities. The case studies provide context for a series of reflections on vulnerability, which compile some of the knowledge gained to date from CARE's experience in using the CVCA methodology in Africa, Asia, Latin America and the Middle East. These insights provide a basis for further investigation of the drivers of vulnerability. They also lend support to our position that vulnerability analysis must be participatory and must include social, economic and political dimensions in order to ensure that the most vulnerable can engage with adaptation processes and benefit from adaptation funds.

A Closer Look at Vulnerability to Climate Change

According to the Intergovernmental Panel on Climate Change (IPCC), vulnerability to climate change is a function of:

- **Exposure to climate variability and change**, which refers to the degree of climate variability and change that an entity (a country, community, individual or ecosystem) experiences;
- **Sensitivity to climate shocks and stresses**, which is an assessment of the amount of impact climate factors have on the entity; and,
- **Adaptive capacity**, which describes the ability of the entity to manage the negative impacts and take advantage of any opportunities that arise.¹

A variety of approaches have been put forward for assessing vulnerability at different levels, with varying emphasis on these three elements of vulnerability.

Within the United Nations Framework Convention on Climate Change (UNFCCC) negotiations, the focus is on identifying the most vulnerable countries to climate change. At this level, assessment is typically focused on the degree of exposure to climate variability and change; however some of the proposed approaches also consider economic factors, such as poverty data. This process is politically complex and slow to advance; however its lack of progress does not preclude the necessity of highlighting differential vulnerability across spatial scales and socio-economic groups. Rarely does the UNFCCC process consider the critical issue of differential vulnerability within countries and communities based on socio-economic and political factors such as age, gender and social or political marginalization.

Ensuring that adaptation resources go where they are needed most must not stop with the identification of the most vulnerable countries. CARE's primary concern is what happens next—how funding will be allocated within countries and within communities, and how decisions will be made as to how the funds are spent. Our experience has shown that people who are most vulnerable to climate change are often the poorest, and in particular people who face social exclusion, marginalization in their communities and countries, and inequality in terms of rights, power and access to resources and services. Without due attention to identifying and engaging these vulnerable groups, there is a risk that they will also be excluded from adaptation processes, further exacerbating their existing vulnerability.

If adaptation processes are to be effective, understanding the needs, capacities and priorities of the most vulnerable groups must be the primary focus of vulnerability assessments, and these groups must represent the main targets for adaptation funding and support. This implies processes that examine sub-national differences, that are participatory and that seek to uncover the underlying causes of vulnerability to climate change in order to identify vulnerable groups and empower them to engage in decision-making on adaptation.

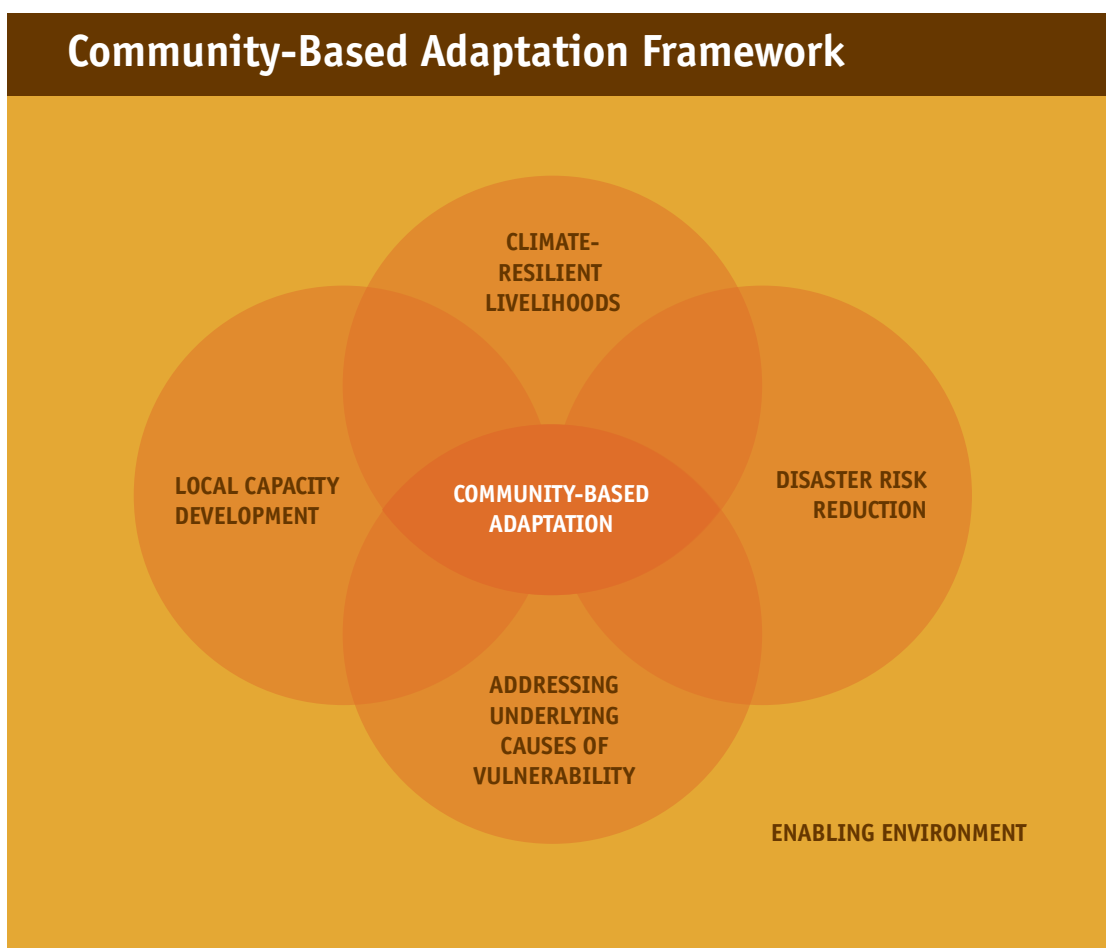
¹ Intergovernmental Panel on Climate Change (IPCC) Working Group (2001). Third Assessment Report, Annex B: Glossary of Terms.

A Tool for Analyzing Climate Change Vulnerability

[The Climate Vulnerability and Capacity Analysis \(CVCA\) Handbook](#) is a tool for community-level vulnerability and capacity analysis. It was developed to help development practitioners understand the implications of climate change for the lives and livelihoods of people targeted by poverty reduction and adaptation initiatives, and to use this understanding to identify groups that are particularly vulnerable. The analysis provides a solid foundation for planning adaptation initiatives that are effective and sustainable and that target those most vulnerable to climate change.

The CVCA Handbook was designed for use by project teams of development and adaptation initiatives; by local partner organizations, including both government and non-governmental organizations (NGOs); and by communities, to support their own processes of analysis and learning on climate change.

The CVCA Handbook is organized around the Community-Based Adaptation (CBA) framework, which provides an overall framework for understanding the different dimensions of local adaptation. The framework incorporates four inter-related components within an enabling environment, as shown in the diagram below:



The CVCA Handbook elaborates the CBA framework in a set of guiding questions, which provide the key lines of inquiry for analyzing vulnerability to climate change and existing adaptive capacity using the CVCA process. These questions explore the climate context, including past and current climate as well as future projections; interactions between climate-related hazards and livelihoods, including disaster risks; coping strategies employed to manage the negative impacts of hazards; and potential strategies to address priority adaptation issues. They also address capacity of institutions at community, local and national level to support community-based adaptation. A key feature of the CVCA process is its focus on the underlying causes of vulnerability, including poverty, gender inequality, access to and control over resources, and social and political marginalization. While these issues are not directly linked to climate change, they play an important role in determining vulnerability and capacity to adapt. The framework also recognizes that the success of community-based adaptation relies on an enabling environment at a broader scale, including supportive and equitable policies, availability of resources and capacity to support local adaptation.

The Handbook also includes recommended tools for gathering this information, including both primary and secondary research tools; links to useful sources of information and analytical tools; and field guides for participatory analysis tools.

The CVCA process has been applied by CARE in more than 20 countries in Africa, Asia, Latin America and the Middle East. It has also been used by CARE's partner organizations as well as other international organizations engaged in adaptation.² It has been used as a research tool as well as to inform adaptation planning and policy advocacy.

² Other international organizations who have applied some or all of the methodology include the International Union for the Conservation of Nature (IUCN), Action Contre la Faim (ACF), World Vision International (WVI), WaterAid and World Fish Centre.

Case Studies

The following case studies are drawn from CVCA processes in Vietnam, Peru and Ghana. They are examples from CARE's growing knowledge base on vulnerability to climate change, built from CVCA processes in more than 100 communities around the world. The case studies provide insights into the dynamics of vulnerability in three communities from the perspective of vulnerable people and the organizations that serve them.

Each case study explores four dimensions of vulnerability and adaptive capacity:

Livelihood security: Each of the case study communities has a unique livelihoods system, which is based on the resources available to the community—including human, social, physical, natural and financial resources. Understanding people's existing livelihood strategies, and their limitations, is key to understanding how current and future climate change impacts will affect different people within the community based on their roles, responsibilities and access to resources.

Climate impacts and disaster risks: The case study communities are already facing a range of climate hazards. These hazards include changing conditions such as temperatures and rainfall patterns, as well as hazard events such as droughts and floods which represent disaster risks. The case studies explore the impacts of these hazards on livelihoods, and place this in the context of future climate projections.

Existing coping strategies and adaptation potential: How people are currently managing climate hazards is a key indicator of their capacity to adapt to future climate change. This dimension explores the coping strategies employed in the case study communities and identifies those strategies that are either ineffective or unsustainable. It also highlights existing strategies that have potential to contribute to adaptation, as well as ideas from communities on new strategies that would reduce their vulnerability to climate change.

Underlying causes of vulnerability: In each community, the CVCA process surfaced socio-economic and political issues that have an influence on people's vulnerability to climate change. These are the issues that are often left out of vulnerability assessment. The case studies demonstrate the critical importance of understanding and addressing these issues if efforts to facilitate adaptation are to be successful in reaching those who most need the support.

The information presented in the case studies is drawn from the data collected through the CVCA processes, including both secondary research and participatory analysis with focus groups in the case communities. It is important to note that the CVCA is an iterative process—these are preliminary results, and the analysis will be updated and refined over time. The case studies were selected to illustrate the situation in different regions, ecosystems and livelihood profiles. In each country, the analysis teams adopted different approaches to the CVCA process, so what is presented is a range of examples, not a comparative analysis. The case studies provide a snapshot of vulnerability in the selected communities, not a complete vulnerability analysis. However, from these brief case studies, some common themes emerge. These themes provide a basis for reflection on vulnerability to climate change, and in particular on the social, economic and political drivers of vulnerability.

Vietnam: Na Ngoa Village, Dong Thang Commune, Lang Son Province

The village of Na Ngoa is located in the Northern Region of Vietnam, in Dinh Lap District of Lang Son Province. The Northern Region is a mountainous area on the border with China. Na Ngoa is a small village, inhabited by 86 people of the Dao ethnic group, a minority group in Vietnam.

CARE Vietnam undertook a CVCA process in Na Ngoa between November 2010 and May 2011. The process included policy analysis as well as interviews with government officials from Dong Thang commune, including the vice chair of the Commune People's Committee and the chairwomen of the Women's Union, as well as district-level officials such as the head of the District Farmer's Union and the vice chair of the District People's Committee. Consultations with community members were undertaken through a series of participatory exercises with focus groups. This included exercises with mixed groups of men and women, including the generation of hazard maps, seasonal calendars, historical timelines and vulnerability matrices. Separate groups of men and women also discussed climate change impacts and potential adaptation measures. To provide more depth to our understanding of their experiences with climate change and their efforts to adapt, individual interviews were conducted with four women and three men in the community. The process was conducted by CARE in partnership with local partner organization CIRUM. This process yielded some valuable insights into community livelihoods and power dynamics and facilitated identification of potential adaptation actions for the community.

Livelihood security

Na Ngoa is hilly, with a large stream running through it. There is no bridge over the stream, so the people living on the side away from the central village must cross the stream on foot to reach the main village. The village roads are mostly dirt, and they are often damaged during the rainy season, making travel in and out of the community difficult. The houses range from simple and fragile bamboo structures, to the traditional houses of the region with high ceilings and thick walls made of mud and straw, to sturdy modern structures of brick and cement. The traditional architecture is well-suited to the region, keeping cool in the summer and warm in the winter, and providing storage under the roof for agricultural products, that can keep these assets safe from floods, which occur annually in this community.

Community affairs are supervised by the village leader, currently (and typically) a man, who is elected by the community. He also acts as a liaison with the government authorities at commune and district level. The village leader communicates information, decisions and policies from the higher levels to the community members through village meetings. Health services are available at the commune level, and can be accessed at no charge by poor households, however travel to the commune headquarters can be costly and difficult, particularly during the rainy season when roads are damaged. Consequently, most people rely on traditional healing methods.

According to the village leader, eighty percent of the households in Na Ngoa can be classified as poor. The average income per person is equivalent to less than 10 U.S. dollars per month, with the richest people earning about 15 dollars per month.



A couple from Na Ngoa Village who worked with CARE and its partners to contribute their ideas and perspectives during the CVCA process.

Most households practice subsistence agriculture, with major crops including rice, maize, cassava, sweet potatoes and taros. There is limited cultivation of soy beans, peanuts and a few fruits and vegetables. Most households also practice animal husbandry, raising pigs, poultry and fowl for food and sale. Cattles are raised to work the fields.

The area of the village includes approximately 20 hectares of protected forest. This represents most of the forested area in the village—with the exception of a few areas allocated by the government in previous years, there is very little privately owned forested land. Despite this, many households rely heavily on extraction of timber and non-timber forest products for their livelihoods, supported by traders who visit the village to collect the product. Without land use certificates, these activities go against the rules for protected forests, putting the villagers at risk of punishment and the forest

at risk of over-exploitation. Extraction of forest resources by people or entities from outside the community is sometimes a source of conflict.

There are clear gender roles in Dao household livelihoods. Women tend to take care of the house and the children of the family, while men tend to be the ones to go to the market and to manage the household income. Within agriculture, there is a clear division of labour. For example, in rice cultivation, women are generally responsible for sowing, weeding and tending the plots and harvesting, while men take responsibility for ploughing, pumping water and spraying pesticides on the plants. Similarly, there are distinct roles related to the extraction of forest products, with women gathering *Canarium* tree oil, mushrooms and bamboo shoots and men collecting timber and honey and hunting small animals such as geckos, snakes and squirrels. Beyond agriculture and extraction of forest resources, sources of income in Na Ngoa are limited, particularly for women. In some households, male family members migrate to larger towns to find paid work.

Climate impacts and disaster risks

Dinh Lap District has a tropical monsoon climate, with four distinct seasons. The mean temperature is approximately 21 degrees Celsius (70 degrees Fahrenheit) and the mean humidity is 62%. The region receives 1448 mm of rainfall annually, with the rainy season occurring during the South monsoon (May to September). The village of Na Ngoa is exposed to a range of climate-related hazards, including flash floods, droughts, seasonal flooding of the stream and extreme hot and cold temperatures. During the consultations, community members reported that these events are growing more frequent and intense in recent years. Future climate change scenarios for the Northern region of Vietnam predict an increase in average temperatures of 1.7-3.2 degrees Celsius and an increase in annual rainfall of 4.8-9.3%. However, they also suggest the possibility of reduced rainfall during the dry season. More temperature extremes are also predicted, with an increase in the number of very hot and very cold days.³

³ Ministry of Natural Resources and Environment (MONRE), Government of Vietnam (2009). Climate Change, Sea Level Rise Scenarios for Vietnam.

The people of Na Ngoa are currently experiencing a range of impacts from climate hazards. River floods and flash floods damage arable land by carrying away the topsoil, destroy crops and kill animals, particularly poultry. They also cause damage to houses and roads, affecting the safety of shelter and transport and costing money and labour from community members to repair the damages. Droughts also negatively affect both crops and livestock, reducing the water available for irrigation and watering of animals.

Secondary effects resulting from these scenarios include increased food insecurity. The main food staple in the region is rice, however many households only cultivate one crop per year, as they lack the water resources and irrigation systems needed to produce more. Rice crops are sensitive to a range of climate hazards, including droughts, floods and temperature extremes, as well as to diseases and pests, notably the yellow snail. With all of these factors working in combination, many households face shortages of rice for up to six months of the year. During this time they are required to purchase rice at market.

Existing coping strategies and adaptation potential

Community members in Na Ngoa have developed a range of strategies to manage the short-term effects of climate hazards. A key strategy is to adjust the timing of activities in line with their observations of the weather. This includes postponing planting of rice crops until the weather is warmer and the rains have come, and changing the timing of work in the fields or the forest. Farmers indicated that they are experimenting with different crops, including fast-maturing and drought resistant varieties of rice. Some households have taken the decision to move their houses to higher ground, away from the areas most prone to flooding. Actions have been taken to protect livestock as well, by improving shelter to protect cattle from extreme weather and changing management patterns for poultry. The community has an informal safety net system in place to support people with loans of food or cash in times of crisis, however it was noted that this is being stretched to its limits by recurrent crises. These are actions that have potential to be strengthened and scaled up for longer-term adaptation.

However, a number of unsustainable coping strategies also emerged from the focus group discussions. Several strategies were identified to deal with rice shortages, including: rationing; borrowing money or rice from relatives or wealthier households in the community; selling livestock such as cattle, pigs and chickens to access funds to buy rice; and increased extraction of forest products. While these actions may be effective in managing the crisis in the short term, they have potential negative impacts on the household asset base, health and the local ecosystem.

Decisions to employ the coping strategies described above—both positive and negative—often involve trade-offs. For example, community members reported that the drought-resistant rice varieties tend to be more prone to disease and pests. This leads to increased use of pesticides, which can be environmentally damaging, not to mention costly. Male migration to find paid work is a common strategy in difficult times, but this can have negative effects on the family, with women left behind to care for family and manage the household without the support of their male family members. The absence of men is particularly felt when hazard events occur, because reconstruction and recovery often involve hard physical labour. Despite their awareness that over-exploitation of the forest has negative effects on the ecosystem, many households continue to increase extraction of forest products to make up for crop losses.

Underlying causes of vulnerability

The CVCA process revealed a number of underlying issues which represent challenges for the people of Na Ngoa as they make efforts to adapt to climate change. Equitable access to and quality of services emerged as a key issue for the community. Limitations in access to basic services such as health care and infrastructure represent health and security risks and constrain options for strengthening and diversifying livelihoods to manage climate risks. Gaps in quality and availability were also identified in technical services such as agricultural extension, meteorology and seasonal forecasting that would support adaptation efforts. Services related to disaster risk management were a particular concern. It was noted that the assistance available from the government during and after disasters is limited, with even less support for planning and implementation of risk reduction measures. Focus group participants emphasized the potential for savings and credit programmes to support implementation of adaptation measures. Currently, there are barriers to accessing these services for ethnic minorities, including a lack of information about the services available and a lack of support in planning and managing the funds.

Related to the above is the question of voice in local governance, identified by the community as a critical issue. This was raised in the context of the annual disaster risk management planning process, which has been undertaken with very limited participation by communities. As a result, the quality of the plans is perceived to be weak and they do not respond to local people's needs and concerns. Community members felt that if this process was facilitated more effectively, with appropriate participation of communities, it would contribute to reducing vulnerability to disasters and climate change. Similarly, the National Target Program to Respond to Climate Change, the Government of Vietnam's major initiative on climate change, does not create space for participation of vulnerable communities and people in the planning. Even the District authorities have not been involved in the development of the Provincial action plans under the program. Implementation has therefore not reached remote rural communities like Na Ngoa. Land use policy is a third area where people felt they did not have adequate opportunities to influence the process.

Even when opportunities to participate in decision-making are created, the community is not well-prepared to provide inputs. There are a number of community-based organizations in the village, including associations devoted to women, youth, the elderly and farmers, but these are not active due to a lack of operational resources and capacity. Therefore they do not represent an effective platform for engaging in planning and policy-making. There are further constraints to participation for some members of the community who do not speak the official Kinh language.

The challenges described above affect most members of the community of Na Ngoa, however, they are exacerbated for the women of the village due to gender roles and norms. Despite the critical role that women play in the household, including agricultural tasks, collection of forest products, and caring for children and sick family members, their contribution is often not recognized by their male counterparts. Because women rarely know how to ride motorbikes and are perceived to be less capable of managing money, taking family production to market tends to be a male responsibility. Consequently, men tend to control the household finances, as well as making the major decisions on behalf of the family, including the purchase, use and sale of assets, and how and where houses will be built. Even when services specifically target women, such as loans provided by the Women's Union, it was reported that the decision on how to use the loan was made by the male member of the family, and therefore the money was often spent to support male priorities, including buying buffaloes or ploughing machines. When crises occur, women feel the effects acutely, as their responsibilities to provide food for the family may be impossible to fulfil, causing stress and a sense of failure, particularly

when they have to ask their male counterparts for money to support the family needs. Because women are less likely to speak the dominant Vietnamese language, men tend to represent the household at community meetings and at training sessions offered by the government. This means that men have control of the information received through such engagement. It also constrains the ability of women to voice their concerns and priorities in community affairs and to develop new skills that would support adaptation to climate change.

Although the community of Na Ngoa is considered to be less exposed to climate change impacts than the coastal regions of Vietnam, the community faces significant constraints to individual and collective adaptive capacity, resulting in a situation of high vulnerability. These constraints include a lack of access to basic services and limited opportunities to participate in decisions that affect their lives and livelihoods. Women in the community face particular challenges as they have often had less access to education and opportunities than their male counterparts. As the impacts of climate change become more apparent, these issues undermine the ability of people in Na Ngoa to make choices that will help them to secure their livelihoods in a context of increasing risk.

Peru: Sullucuyoc Village, Santa Teresa District, La Convención Province

A community of approximately 300 people living in 50 households, Sullucuyoc is located in Santa Teresa District in La Convención Province in the Cuzco region of the Peruvian Andes.

CARE worked with stakeholders in Sullucuyoc to undertake a CVCA process between January and June 2010. The CVCA analysis formed part of a broader process to facilitate the development of community action plans. The process included focus group discussions with older women, older men, young men and women and village leaders, who completed vulnerability matrices, seasonal calendars, historical timelines and Venn Diagrams. Secondary research included reviews of local government statistics and reports from the Ministry of Health of Peru. The process was supported by the community Steering Committee, who designated a special committee for the CVCA process. Other stakeholders who participated in the process included: members of the committee for water and sanitation and the women's honey producers group; school teachers; a representative from the community health centre; and coffee farmers. Local government representatives from the offices of water and sanitation and of social management were also involved. These stakeholders were engaged through a series of workshops over the course of the community action planning process.

Livelihood security

Sullucuyoc village covers an area with altitudes ranging from 1600 to 2500 metres above sea level, and consequently encompasses a diversity of ecosystems. There are three major rivers that border the community: the Tablada, the Vilcabamba and the Yanantin. Glaciers also play an important role in the hydrology of the region. Sullucuyoc is one of the most important settlements within the Chaupimayo Glacier sub-basin. Located 30 km from Santa Teresa, the district capital, it is a point of commerce and therefore a convergence point for roads and pedestrian trails. However, road access to the community can be difficult, particularly in the rainy season. Houses in Sullucuyoc are built of adobe, with corrugated iron roofing.

Sullucuyoc has a health centre, a pre-school, a primary school and a high school. Since 2009, most households have access to electricity and to water and sanitation systems, with water sourced from mountain springs. Governance of the village activities is led by the General Assembly, which sets rules for community life and controls compliance with those rules. The General Assembly also forms committees to deal with specific issues within the community. These include women's issues, health, schools and water and sanitation. Many of the farmers in the community belong to COCLA, an organic coffee growers cooperative, which represents an important institution in the village as it provides opportunities to learn about and apply sustainable agricultural techniques as well as access to markets for the coffee produced. A system of labour exchange exists within the community, with both women and men participating.

The community is characterized by a mountainous landscape, with steep slopes prone to landslides and erosion. Because of the hilly terrain and the type of soil, agriculture is difficult in the region. There are areas of forest within the village, including some protected areas, but these are under increasing pressure due to slash and burn agricultural practices.

Manioc, corn and some vegetables are produced for household consumption. Most households are engaged in growing coffee, as well as fruits including avocado, passion fruit and banana. Production is sent to markets in Cuzco, the regional capital. Honey production represents an additional source of income for some households. A few also produce small livestock including sheep, hens, ducks and guinea pigs, primarily for sale. Male members of some households provide labour in local government infrastructure projects for extra income. Despite this diversity of livelihood strategies, 66% of the population of Santa Teresa District is considered poor, and malnutrition affects 33% of children under five years old.⁴

Climate impacts and disaster risks

Sullucuyoc is located in subtropical humid forest ecological zone, with four distinct seasons. The temperature ranges between 12 and 25 degrees Celsius (54 and 77 degrees Fahrenheit) and the region receives an average annual rainfall of 1350 mm. The main changes in climate observed by community members are an increase in minimum temperatures (“it is warmer in the evenings”) and changes in rainfall patterns leading to more intense rainfall during the rainy season and a consequent increase in landslides. Scientific climate projections support this, with predictions for 2100 including an increase in rainfall of 10-30% during the rainy season and a decrease of up to 40% during the dry season, as well as increases in average temperature of 2.3-3.1 degrees Celsius, depending on the season.⁵

Community members in Sullucuyoc were able to clearly articulate the impacts of climate-related hazards on their livelihoods. The priority climate-related hazards identified by both women and men were increasing temperatures, changing rainfall patterns and landslides (which are often triggered by heavy rain, therefore indirectly climate-related). Women also noted an increase in diseases transmitted by mosquitoes. The most significant impacts of these hazards cited by community members included lower productivity of coffee, passion fruit and avocado; loss of food crops such as manioc and vegetables; new pests and diseases in plants and animals; and loss of biodiversity through disappearance of plant species. The damage caused by landslides to houses, roads and water and sanitation systems was also noted as a priority concern. Glacial melt was recognized as a hazard, but not identified as a high priority in terms of its effect on livelihoods.



Cristina Olarte Oblitas, Claudia Cárdenas Oblitas and Aurora Champi Dueñas have joined a women’s knitting group and sell the items they make as an alternative livelihood to agriculture.

⁴ FONCODES (2006). Mapa de Pobreza Distrital.

⁵ SENAMHI (2010). Escenarios de Cambio Climático en la Cuenca del Río Urubamba para el Año 2100.

Existing coping strategies and adaptation potential

When asked to describe how they are coping with the impacts of hazards, the people of Sullucuyoc cited a number of strategies that have potential to reduce their vulnerability to climate change. Many households are already practicing sustainable agriculture, including organic coffee production. Some women's groups have taken the initiative to diversify their livelihoods to include non-agricultural strategies, such as honey production and knitting for sale in the Cuzco markets or for export. Santa Teresa Municipality has committed half of its budget to productive projects, such as installation of irrigation systems, promotion of crops as avocado and passion fruit, apiculture and trout farming. While these activities are not explicitly designed to address vulnerability to climate change, they have positive impacts in terms of increasing incomes and food security, which can contribute to building household resilience to shocks and stresses.

The use of drastic coping mechanisms such as food rationing and selling of assets did not emerge from the focus group discussions, suggesting that this community has a certain amount of existing capacity to manage climate hazards.

One seemingly positive outcome of increasing temperatures in the region is the possibility of cultivating crops at higher altitudes. This, combined with population pressures on already scarce agricultural land, has led to increased clearing of the forest cover on the higher slopes. While this does increase the amount of land available for agriculture, community members are aware that decreasing forest cover reduces the stability of the slopes, increasing the risk of erosion and landslides. Consequently, agro-forestry activities, including reforestation of slopes with native species, were identified by focus group members as a high priority to build resilience in the context of increasingly erratic rainfall leading to landslides. They also noted the need for new practices to manage risks and increase productivity of existing land, including crop diversification with heritage varieties, pest and disease control, irrigation systems and improved seed storage.

Underlying causes of vulnerability

As noted above, generally speaking, the community of Sullucuyoc has relatively high adaptive capacity. Despite this, Sullucuyoc can be identified as particularly vulnerable due to its high exposure to landslides and glacial lake outbursts, both of which can be devastating in terms of impacts on lives and on livelihoods. The largest and most recent glacial lake outburst occurred in 1998 and resulted in the relocation of the town of Santa Teresa. In this context, community members expressed concern about the lack of planning and implementation of disaster risk reduction measures, and in particular the lack of early warning systems for landslides and glacial lake outbursts. Development planning at the district level has not effectively integrated disaster risk management and adaptation to climate change. Disaster management efforts that have been put in place have been more oriented towards emergency response than risk reduction and preparedness. Disaster risk reduction is therefore seen by the community as an important entry point for adaptation efforts.

It is also important to note some important variations in adaptive capacity within the community, in particular due to gender inequality. Land is inherited from father to son, with the result that very few women own land. Agricultural production for markets, including coffee production, is typically the domain of men, and as a result they also control the income earned. Women do tend to have control of decision-making in the domains they are responsible for, including growing and preparing food, rearing of small livestock, and family health, for example. However, they are rarely involved in affairs beyond the family, including election of local authorities and participation in development planning and budgeting, and they rarely take on leadership roles in the

community. There are complex reasons for this, but one important dimension is illiteracy—almost one quarter of women over 15 years old are illiterate. As well, many women only speak Quechua, a native language of the region, not Spanish which is the official language in Peru. This represents a significant constraint for women in accessing information and skills training that would facilitate adaptation to climate change.

The people of Sullucuyoc have relatively high adaptive capacity. The village is well serviced, community organizations are functional and people find them useful and most households are employing a range of different livelihood strategies. All of this helps in managing the impacts of changing climate conditions and minor hazard events. However, gender inequality remains a concern and this may limit the ability of women to realize their rights and aspirations. Further, serious landslides and glacial lake outburst floods represent very real risks, which are beyond the scope of the community to manage. As such, the community requires support from the district and higher levels of government to ensure that disaster risk management receives the attention and resources it requires.

Ghana: Farfar Village, Garu Tempene District, Upper East Region

Farfar village is in the north of Ghana. There are approximately 9400 people in the village. The majority belong to the Moar and Bimboa ethnic groups, with Kusaasis' and Fulanis representing a minority. Christianity, Islam and traditional religions are practiced by different members of the community.

The CVCA process in Farfar was conducted between November 2010 and February 2011. CARE worked with community members, as well as representatives from the District Assembly, National Disaster Management Organization (NADMO), Ministry of Food and Agriculture (MoFA), Ghana Health Service (GHS), and traditional leaders to carry out the analysis. The process included focus group discussions with separate groups of older men, older women, younger men, younger women and persons with physical disabilities, as well as a questionnaire for government representatives. The team also reviewed national policy documents, including the Medium Term Development Strategy and the draft Climate Change Adaptation Strategy.

Livelihood security

Farfar is located in the Sudan-Savannah ecological zone, characterized by flat, open land dotted with trees, shrubs and herbaceous grasses. In terms of infrastructure, Farfar is fairly well-developed. It is served by an extensive laterite road network. The community has schools, wells, health clinics, electricity infrastructure, a market and a grinding mill.

Community governance and planning are the responsibility of the village chief and the council of elders. These traditional leaders collaborate with government structures, including the District Assembly, the District Development Planning Unit and the Area Council, to facilitate development planning and decision-making. The community also has a women's leader who participates in these processes. Community-based organizations representing women, youth and farmers, as well as a cultural dance group, play an important role in community mobilization. There are also several village savings and loans groups. Resolution of conflicts, which are fairly common between Farfar and a neighbouring community, is managed by the chiefs of the villages.

Poverty and food insecurity are common in Farfar. Most community members are engaged in smallholder farming and livestock rearing. District-level statistics for Garu Tempene indicate that approximately 62% of the population is engaged in subsistence farming.⁶ Key crops include sorghum, millet and sweet potatoes, as well as rice in some river valleys where the land is wetter. Ground nuts and soya beans are grown for sale. The majority of farmers are reliant on rain-fed agriculture, and productivity levels are typically low. The region has poor soil fertility and inputs such as quality seeds, fertilizers and pesticides are beyond the reach of most poor farmers. Access to traction to work the fields is also a constraint, as few farmers own their own bullocks. Those who don't have their own animals face high competition and high rent to access bullocks to work their fields. Each year, the community faces seasonal food shortages between May and July.

Within agriculture, responsibilities tend to be divided by gender. Men are usually responsible for maize, sorghum, millet, and sweet potatoes, while women are most often in charge of vegetables such as okra, peppers and onions. Both men and women

⁶ Ghana Living Standards Survey, 2000

cultivate and own crops such as groundnuts and soya beans. Complementary livelihood strategies to agriculture also vary based on gender. Women are most likely to be engaged in shea butter extraction, tailoring and brewing of local alcohol. Men practice carpentry, teaching and weaving to supplement incomes from agricultural activities.



With CARE's support, Alempe Akalifa and Atubiga Akalifa are learning new farming techniques that consider the impacts of a changing climate on their crops.

Climate impacts and disaster risks

The people of Farfar recognize six different seasons, including two rainy seasons. In the last 10 years, they have observed that the rainy seasons are shorter, temperatures are higher in the warm seasons and that windstorms are occurring more frequently. Rainfall data for Garu Tempane district indicates that average annual rainfall and the number of days of rain have both increased since the 1990s, by 32.8 mm and 0.26 days per year, respectively. However, rainfall has been highly variable over the last 10 years, with a five-year dry period followed by much higher-than-average rainfall in 2007 to 2009, resulting in flooding.⁷ Temperature records for the district indicate that average minimum and maximum temperatures have been increasing over the last 30 years at an average of about 0.051 degrees Celsius per year.⁸

Climate change projections for the northern part of Ghana suggest that these trends will continue. They predict an increase in mean daily temperatures of 0.96 to 1.01 degrees Celsius in the 2020s and 1.66 to 2.24 degrees Celsius by the 2050s. The change in mean annual rainfall is estimated at between -0.31 and 0.42% in the 2020s and between 0.08 and 1.16% in the 2050s.⁹ Although the estimated changes in the mean annual rainfall are small, annual variability may be large. The projections suggest that this may result in increasingly drier conditions in northern Ghana, owing to more evaporation as a result of higher temperatures. There may also be a decrease in river flows and recharge rates and potential for increased floods as a result of increasingly erratic rainfall.¹⁰

According to community members, the climate hazards having the biggest negative impact on people in Farfar are droughts, floods, windstorms and, according to the men, rising temperatures. Participants in the focus group discussions were particularly concerned with the impacts of climate hazards on crops and on livestock. Delayed rainfall and droughts cause stunted growth and withering of crops, reducing productivity and sometimes causing complete losses. Floods and windstorms may also destroy crops, uproot trees and cause damage to houses. Livestock are affected by these hazards in terms of damage to shelter, reduced

⁷ Stanley, J., & Braimah, I. (2008). *Climate change crisis in north-east Ghana*. Retrieved from Global Planners Network: www.globalplannersnetwork.org/pdf/congresspapers7.pdf

⁸ Based on analysis of data from Garu Tempane meteorological station; the data was obtained from the Ghana Meteorological Agency.

⁹ Based on model data from McSweeney, C., New, M., Lizcano, G., & Lu, X. (2010). Improving the accessibility of observed and projected climate information for studies of climate change in developing countries. *BAMS*, 157-166.

¹⁰ Environmental Protection Agency, Ghana (2000). First National Communication to the United Nations Framework Convention on Climate Change (UNFCCC).

pasture, water shortages and, in the worst cases, injury, illness or death. Conflict, human disease and livestock disease, as well as pests and diseases affecting crops, were also identified as critical issues for the community.

Existing coping strategies and adaptation potential

Currently, the inhabitants of Farfar are employing a wide range of strategies to cope with climate variability and change. They are experimenting with fast-maturing crops to deal with rainfall variability. Some households are engaged in dry season gardening to cultivate vegetables for consumption and sale. Actions to protect crops and livestock include covering roots to stabilize plants in case of wind or heavy rain and keeping livestock in shelters rather than sending them out to graze. Some households practice destocking of livestock, selling their animals before their health deteriorates to a point that they lose their value. Production and sale of charcoal is another strategy to earn money when crops fail or food stores run out. Men indicated that migration to southern Ghana to find work was a common coping strategy. Thanks to a well-developed social network in northern Ghana, many families seek refuge with relatives or friends when crises occur.

These strategies reflect the community's existing capacity to manage the challenges they are facing, however there are some limitations to the scale and effectiveness of these actions, particularly as climate and rainfall patterns become increasingly uncertain. There may also be negative effects resulting from some of the strategies currently practiced to deal with short-term crises, including deforestation from charcoal production, erosion of the asset base due to destocking and potential negative impacts on women left behind when men migrate to find work.

In this context, community members in Farfar have identified a number of strategies that they feel would improve their capacity to adapt to climate change. One such strategy is the construction of boreholes, wells and dams to supply water for livestock and dry season gardening, reducing the reliance on rainfall. Changing agricultural practices, including mixed cropping, cultivation of new crops such as potatoes and scaling up the use of fast-maturing and drought resilient varieties, was also suggested as an important strategy to build resilience in agricultural livelihoods. Interest was also expressed in diversifying livelihoods to strategies that are not dependent on the natural resource base, including petty trading, handicrafts and trades such as carpentry and masonry.

Underlying causes of vulnerability

The community of Farfar already faces high levels of poverty leading to annual food shortages, and climate change projections suggest that this situation will worsen in the coming years. As described above, the people of Farfar have many ideas for improving their situation in the short term and for reducing their vulnerability to climate change in the longer term, however they face constraints in putting these ideas into action. This is especially true for the poorest and most vulnerable people in the community.

Access to financial capital to strengthen existing livelihoods strategies or to diversify to new strategies represents a major challenge to building secure and sustainable livelihoods. Financial services such as savings and credit groups can play an important role in creating opportunities for people to diversify their livelihoods, but currently access to these services is limited for inhabitants of Farfar. This is due to a range of factors, including limited access to information on sources of credit and a lack of collateral to secure bank loans. People also face constraints in capacity to develop business plans and manage financial capital over time.

A related issue is access to land. The poorest households are often landless or have only very small land holdings. While they may own or be able to access small plots of land for cultivation, their production potential is limited. Further, those with access but not ownership of land have insecure tenure, as their access is controlled by wealthier families in the community who own the land. Insecurity of tenure limits the ability of poorer households to put longer-term strategies in place and places their livelihoods in a precarious position, as the land can be taken back by its owners at any point. This is more likely to happen during bad crop years, when land owners or husbands may want to use the land to try to increase yields or to grow what they perceive to be more valuable crops.

For women in the community, some additional challenges emerged from the discussions. While this is beginning to change, traditionally women have been less mobile than men as they tend to stay near the home to care for children and look after the household. This means that men often have better access to information, including about services that may be available, placing them in a better position to access those services. As education of boys is valued over that of girls, men are also likely to be literate and to have achieved a higher level of education. This places them in an empowered position and may lead them to be more assertive in seeking out information and services. Secure land tenure may also be a particular challenge for women, as both cultural norms and policies may inhibit their ownership of land. All of this leads to a situation where men tend to hold the power in their families and in the community.

The people of Farfar are already grappling with poverty and food insecurity. Increasing climate variability is exacerbating existing challenges, placing further limits on agricultural productivity and causing damage to assets. Improved agricultural practices and diversification of livelihoods to include non-agricultural strategies are seen as key strategies to increase security and resilience of livelihoods. Access to financial services and secure land tenure are seen as key factors that would increase the ability of people to put these strategies in place, however these are out of reach for many community members, particularly women, placing them in a situation of high vulnerability as the impacts of climate change become increasingly evident.

Reflections on Climate Change Vulnerability

The case studies provide snapshots of the realities of vulnerable communities that are already feeling the effects of climate change. The people living in these communities are illustrative of the situation of people around the world who are grappling with poverty, marginalization, poor governance, environmental degradation, and now, climate change.

The following reflections draw on the case studies as well as on CARE's broader experience in analyzing vulnerability to climate change with communities around the world. They explore some of the key factors determining vulnerability to climate change, with an emphasis on the political, social and economic factors that may be obscured when vulnerability analysis is conducted at a large scale, without participation of those most at risk from climate change.

Access to information is a major factor determining ability to act on adaptation.

Adaptation is a process. Ongoing learning, analysis, planning and adjustment are required to respond to an evolving context and changing risks. To do this effectively requires availability of appropriate, timely and locally-relevant climate information such as weather forecasts, seasonal forecasts and early warnings for climate hazards. It also requires that this information is made accessible to the people and institutions that need it. This is particularly important given that traditional weather forecasting and planning systems are proving to be less effective with the increased uncertainty brought about by climate change. For populations dependent on agriculture, for example, the lack of information can mean planting too early or too late, and ultimately a failed harvest. Without access to information that facilitates adaptive decision-making, as well as capacity to interpret and use this information, people are unable to manage the dynamic risks to their lives and livelihoods.

The issue of access to early warning systems is an important one, as extreme weather events become more frequent and more intense. This issue was brought out very clearly in the case study villages in both Peru and Vietnam, where a lack of early warning systems was recognized as a key contributor to vulnerability to extreme events. While the negative effects of events such as landslides and flash floods can't be completely avoided, with some warning people are more able to get their families and important assets to a safe place in good time. This highlights the importance of effective and appropriate disaster risk management actions in reducing vulnerability to hazard events.

In addition to weather and climate information, people also require information on appropriate strategies to adapt to climate change, including climate-resilient crop varieties, opportunities for livelihood diversification and measures to reduce disaster risks. Participatory research processes, targeted technical training and capacity building on risk analysis and planning for community members and local institutions can help to fill these information gaps. The assessments being undertaken to develop National Adaptation Plans (NAPs) represent an opportunity to put these types of processes in place.

Even when the needed information is available, the most vulnerable people may lack access to it. This may be due to language or literacy issues, as is the case of the women in Sullucuyoc in Peru who face challenges with literacy and only speak Quechua, not Spanish which is the official language. Constraints in information access can also result from social marginalization, isolation or non-availability of technology. These challenges are often of particular concern for women, who may have received less education and may be less mobile in their community. Consequently, in order for information to be accessible and useful for vulnerable groups, it must be provided in the culturally and linguistically appropriate formats and delivered to women and men using appropriate means of communication.

For adaptation policies and programs to reach the most vulnerable, they must have a voice in the process.

Vulnerable people are vulnerable in part because they are left out and do not have a voice in decision-making on policies and allocation of resources in their communities, regions and countries. This issue was evident in the case study from Vietnam, where ethnic minority communities are often left out of policy decisions, even at local levels. It also emerged in Peru, where women have limited involvement in community affairs, and in Ghana, where land tenure policies restrict ownership of land by women. These examples highlight the particular challenges faced by marginalised groups, and women in particular, in many contexts due to inequitable policies and power dynamics. As a result, policies and programs do not consider the specific constraints faced by these groups and do not enable them to overcome these constraints.

Yet, the people in the case study communities were keenly aware of changes in weather patterns over the last decade or so. In all three communities, some members had taken steps to manage the risks associated with increasing uncertainty and more frequent extreme events. However, these actions are currently limited to those who have the information, skills and resources to undertake them independently or to access available support from government and civil society organizations. Most often these are not the most vulnerable people in the community. In the absence of an enabling environment in the form of equitable policies, supportive institutions and available resources, the opportunity to act on adaptation will continue to be beyond the reach of those who are in most need.

Engaging all relevant stakeholders, including the most vulnerable communities and populations, in national and local level planning can help to ensure that investment is directed to the most vulnerable populations. Participatory decision-making promotes empowerment and transparency, as well as accountability of policymakers to citizens. Giving vulnerable people a voice in decision-making will ensure that adaptation initiatives are responsive to their needs, priorities and aspirations. This is critically important in the development of National Adaptation Plans if they are to be effective in reaching the most vulnerable populations with adequate and appropriate support.

Insecure rights to resources exacerbate vulnerability.

Adaptation efforts often emphasize changes in livelihood strategies to respond to changing climate conditions. Strategies such as conservation agriculture, shifting to drought-resistant crops and installation of irrigation systems have potential to be effective in reducing the vulnerability of households dependent on subsistence agriculture and other ecosystem-based livelihood strategies. Diversification of livelihoods to include activities outside agriculture is also seen as an important strategy for managing climate risks. However, these approaches to adaptation assume that people have access to the resources needed to put these strategies in place. For the most vulnerable people in many communities, this is simply not the case.

The issue of access to land was prominent in the case study villages. With limited agricultural land available, people face challenges in achieving food and income security, and their ability to diversify their livelihoods may be constrained. This can lead to unsustainable practices, as is the case in Peru, where people are clearing more forest to access land for agriculture. Not only is this damaging to the ecosystem, it is increasing risks of erosion and landslides, increasing people's exposure to these hazards. Insecurity of land tenure or lack of land ownership is also a limiting factor for adaptation, as people may not see the value of investing in strategies that sustain ecosystems and can improve productivity and resilience over time. This was evident in the case of Vietnam, where people do not have legal access to forest lands and exploitation is increasing at an unsustainable rate. In many contexts, women face particular challenges with land tenure as a combination of policies and

cultural norms may limit their ability to own land, and therefore to invest in longer-term strategies that will build resilience over time.

Access to and control over resources such as agricultural and forest lands and water sources is an essential determinant of vulnerability. When people do not have secure access to these critical livelihood resources, their options are limited and they are less able to act on adaptation.

Existing coping strategies are ineffective or unsustainable, and may exacerbate vulnerability to climate change over time.

The terms coping and adaptation are sometimes used interchangeably. It is true that there are some examples where people are employing coping strategies which have potential to evolve into longer-term adaptation, such as diversification of livelihoods to non-agricultural strategies and using climate-resilient crop varieties. However, CARE's experience has shown that in many cases, particularly for the most vulnerable people, coping strategies are either ineffective or unsustainable over time, and may actually leave populations more vulnerable in the long run. Examples are found in each of the case studies: borrowing money and/or selling off assets in Vietnam; clearing of higher altitude forest to access land for agriculture in Peru; increased production and sale of charcoal in Ghana. While these strategies may be effective in dealing with the immediate crisis, they have negative implications for longer-term resilience. Often people are aware that the strategies are not sustainable, but they don't feel that they have any other options available to sustain their livelihoods when shocks and stresses occur.

A lack of viable alternative livelihood strategies for the most vulnerable people places them in a precarious position, particularly when required to cope with recurrent shocks and stresses. Climate change means that people will be increasingly faced with shocks in the form of extreme weather events, providing little time to recover and eroding the asset base they have managed to accumulate. Ongoing changes in climate conditions, including changing temperatures and rainfall patterns, may also be a source of stress, creating further challenges in achieving secure livelihoods. In this scenario, safety nets become critically important, but too often they are inadequate, inappropriate or too late. As seen in Vietnam, even communities who have developed informal but effective safety net systems are struggling, as the challenges are becoming bigger and more people are affected.

The most vulnerable people to climate change are most often the poorest, who lack effective coping strategies to deal with shocks and stresses and who have had to resort to ineffective responses. This suggests that we need to analyze not only what risks people are exposed to, but also the quality of the options they have for coping and how they are ultimately managing risks. This understanding can facilitate identification of the most vulnerable groups and can also create opportunities to identify indigenous strategies that are effective and sustainable and can be built upon for longer-term adaptation. It also suggests that adaptation for the most vulnerable must involve the creation of safety nets, in the form of social protection schemes and improved emergency response mechanisms.

The most vulnerable people lack access to services that would facilitate adaptation.

In many communities, access to basic services remains a challenge. This is particularly true for poorer households, women and socially marginalized groups. When people are unable to meet basic needs such as health care and safe water, it is very

difficult for them to think beyond their immediate needs, much less to make plans for longer-term adaptation. Access to services must therefore be a consideration in determining the feasibility of different adaptation actions.

Health issues emerged as a concern in all three case study villages, and this is consistent with our experience in many communities where CVCA processes have been conducted. Ill health can reduce the range of options available to a household, with family members, often women, taking time away from other activities to care for sick family members. It can inhibit the ability to invest labour to strengthen livelihoods, and family finances can suffer if affordable health care is not available. The impacts of climate change may also make some health risks more serious. Free (or at least affordable) and equitable access to health services, including both prevention and care, is therefore a right and a basic need that must be met for adaptation to take place.

Access to safe water for household use, as well as for agriculture, is an ongoing challenge for many poor communities, particularly those in remote areas. In many areas, this challenge will be exacerbated by climate change, with changing rainfall patterns and extreme events affecting both the availability and the quality of water. Establishment and improvement of water supply and sanitation systems, taking into account the potential for increased demand and reduced availability resulting from climate change, is a priority in many vulnerable communities. This will reduce the health burden of waterborne disease and can open up possibilities for new or improved livelihood practices.

Access to financial services was seen as important for adaptation in all three case villages. Savings and credit services can provide a buffer in times of crisis and can provide necessary start-up capital for diversification of livelihood strategies. The role of support services including agricultural extension, disaster management and social protection also becomes increasingly important in a changing climate. As evidenced by the Peru and Vietnam examples, women, ethnic minority groups and other particularly vulnerable groups face many barriers in accessing these services, which undermines their ability and power to act on adaptation.

Gender matters when it comes to vulnerability to climate change.

Women and men play different roles in household livelihoods, and therefore they experience the impacts of climate change differently. Possibly more importantly, women and men have differing abilities to respond to the threat that climate change poses to their lives and livelihoods. As described above, the ability to act on adaptation is shaped by access to information, such as early warning systems and seasonal forecasts. It may be determined by control over resources such as agricultural land or household assets. It may be a question of power to influence decisions in the household or community. In each of these examples, it is often women who are at a disadvantage when it comes to adaptation.

This is not to say that all women are particularly vulnerable—there are also many examples where women are using their knowledge and capacities to protect their families and communities from the adverse impacts of climate change. This is evidenced by the women’s groups in Peru who have taken action to diversify their livelihoods to strategies beyond agriculture. It is also not to say that men are not vulnerable. The point is that effective, equitable adaptation requires an understanding of the dynamics of vulnerability. As the case studies demonstrate, gender influences these dynamics, and therefore vulnerability assessment must take gender differences into account. Further, this must lead to planning, implementation, monitoring and evaluation of adaptation that reflects the differing roles, responsibilities and power that men and women have, and that seeks to overcome gender inequality.

Conclusions

The case studies illustrate the complex array of physical, environmental, social, economic and political factors that determine people's vulnerability to climate change. They reveal that vulnerable people are already taking steps to manage the risks associated with climate change, and bring to light the challenges faced in doing so, particularly for the most vulnerable women and men. They demonstrate that many of these challenges relate to structures and systems that limit people's capacity to act on adaptation. They make clear that adaptation is a process, and one that often requires trade-offs. They provide evidence that climate change will be experienced differently by diverse communities and people based on their unique circumstances. They lend support to the idea that effective adaptation must take these differences into account.

In order for adaptation efforts to be successful, vulnerability assessment must go beyond identification of vulnerable countries. Processes for vulnerability analysis and adaptation planning must involve all relevant stakeholders, including local communities and, in particular, the most vulnerable members of those communities. These processes must examine the social, economic and political drivers of vulnerability in order to identify the most vulnerable people within countries and communities and ensure that their needs, priorities and aspirations are reflected. This enables policymakers and adaptation practitioners to target resources and interventions where they are needed most.

Comprehensive and participatory analysis such as that presented in the case studies implies an investment of time and resources—but it also underpins effectiveness and equity. Furthermore, if facilitated appropriately, this can be an empowering process for vulnerable communities and people, representing an important step in building knowledge and capacity to adapt to climate change.

These issues are critically important when vulnerability assessment will drive adaptation planning and resource allocation, such as in the development of National Adaptation Plans. Without identifying the most vulnerable people and ensuring that they have a voice in analysis and planning for adaptation, we run the risk that adaptation efforts will fail to benefit those who most need the resources and support.



In 'El Valle del Tambo' valley in Papallacta, Ecuador, CARE is working with women farmers to protect their crops from increasing cold winds and frost.

Back page photo: In Borana Zone, Ethiopia, Loko is part of a women's group that works to build their resilience—and that of their families and community—to increasing periods of drought.



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