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Measuring Household Resilience in the Climate Smart Villages in the Philippines, Myanmar and Cambodia

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ABSTRACT

Resilience has traditionally been understood as a function of observable and measurable characteristics. At the household level, resilience is measured in terms of aggregating values in relation to tangible assets or countable indicators. More recently, discussions of household resilience have emphasized the need to pay attention to resilience as a set of capacities. What this paper aims to develop is a framework and a methodology for accounting both tangible and intangible characteristics found in the household, that is, measuring assets, social capital, as well as inherent personal characteristics or traits of the household decision-maker that may or may not predispose a household to be resilient.

A framework from Béné (2014) was used as an analytical framework for both quantitative and qualitative studies. The quantitative study consists of surveying households (n=623) across six climate-smart villages (CSVs) in Myanmar, Cambodia, and the Philippines using the Baseline Resilience Indicators for Communities (BRIC). Three dimensions of household resilience were identified: resilience capacities, subjective resilience, and intra-household gender relations - each consisting of subdomains.

While studies have investigated resilience capacities and ways to promote gender equality which translates into resilience, less studied are aspects of resilience that pertain to the subjective dimension of resilience which “relates to an individual's cognitive and affective self-assessment of the capabilities and capacities of their household, community or any other social system in responding to risk” (Jones & Tanner, 2017). Each dimension of resilience is envisioned to complement the other in order to better understand household-level resilience in the household level. The dimensions are consolidated in order to construct a Household Resilience Score (HRS).

The study confirms that there are strong links found among relationships between the use of CSA initiatives and resilience capacities. Those that use CSA initiatives are usually households that already have assets, but interviews reveal that it is not only assets that allow households to undertake CSA initiatives. Interviews suggest that it is the combination of assets and available time that determines if households will engage in practicing CSA.

What the study reveals is that subjective resilience is equally important in understanding household resilience. There is a strong relationship in how households think they can recover from a shock in relation to specific psychosocial traits such as perseverance, self-efficacy, and conscientiousness. The study also suggests that some prevailing views or assumptions about CSA serves as barriers to scaling up CSA practice (such as CSA being viewed as laborious or time-consuming).
These all lead us to confirm that CSA practices contribute to household resilience, so household resilience must account for both subjective and objective indicators. Overall, the study points to how discussion on subjective resilience in the household level can support program design and implementation.

Keywords
Resilience, resilience metrics, climate smart agriculture, climate smart villages

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ACRONYMS

A-WEAI	Abbreviated Women's Empowerment in Agriculture Index
BRIC	Baseline Resilience Indicators for Communities
CCAFS	Climate Change, Agriculture and Food Security
CSA	Climate Smart Agriculture
CSV	Climate Smart Village
DROP	Disaster Resilience of Place
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussions
HRS	Household Resilience Score
IFPRI	International Food Policy Research Institute
IDRC	International Development Research Centre
IIRR	International Institute for Rural Reconstruction
KII	Key Informant Interviews
MCSAS	Myanmar Climate Smart Agriculture Strategy
RIMA	Resilience Index Measurement and Analysis
USAID	U.S. Agency for International Development
WEAI	Women's Empowerment in Agriculture Index

BACKGROUND

MEASURING RESILIENCE

The term resilience dominates the discussions of climate change, social protection, and sustainable development. It serves as a discussion point to frame these perspectives and analyzing the method of measuring resilience brings forth an opportunity to analyze development interventions. Understanding resilience provides both integrative and analytical functions – that is, it helps shape policy narratives but also helps understand vulnerability in different scales. As the world finds itself in more complex situations where economic volatility is compounded by climate change impacts, immediate and adverse events, and global health issues, there is a need to identify options that would enable impactful results. For example, as development proponents, do we choose interventions that focuses on promoting quicker crop yields or those that promote climate smart agriculture? The need to measure resilience springs forth from this – as we would need to identify, respond and complement to the capacity of communities to respond to adverse events. The challenge is thus centered on characterizing whether or not the unit is "resilient" requires developing an acceptable and appropriate metric (Béné, 2017).

Most approaches dealing with measuring resilience are products of disciplines and sectors that have tapped into using resilience as a narrative. Most approaches utilize an inductive approach that use easily quantifiable characteristics (such as technologicalcapacity, skills, educationand gender indexes,economic status, qualityof the environmentand natural resources,equity and efficiency of management institutions, levels of income and/or assets, political structures and index of good governance, infrastructure, access to knowledge and information and the speed andbreadth of innovation)as building blocks of resilience. As this approach looks at building blocks of resilience, it lacks the ability to look at the complete picture of resilience which is needed if resilience building is to be promoted at systems level. This approach is still valuable, on the other hand, as it allows us to reflect on cases that are more specific, utilize available data, and more readily identify assumptions.

What dominates current frameworks and approaches are quantitative approaches centered on objective indicators of resilience[1]. These indicators typically need complete socio-economic data, which might pose problems to areas of intervention that development partners work with. While there is a need for a multi-scale,

[1] Measuring 'subjective resilience': using peoples' perceptions to quantify household resilience - - Working and discussion papers (weadapt.org)

generic, and multi-dimensional metric for resilience, there is also a need to view resilience at the household level, with a recognition that households are not autonomous and are embedded in a larger communal ecosystem. While recognizing this, there must be a metric that focuses on households and recognizes their capacities in all dimensions. Doing so will help inform development partners of how their interventions could be better evaluated and strategically devised.

What is proposed in the paper is to look at a complementary approach for studying resilience – that is – by integrating the subjective dimensions of household resilience. The study aims to leverage subjective characteristics, arguing that even the most objective indicators are surveyed in a subjective manner. Subjective indicators of resilience rely on perceived behaviors, attitudes, and psychology: factors not easily captured by traditional objective indicators. The measurement of perceived resilience is therefore about how people rate their own resilience and the resilience of the wider community of which they form part[2].

This study acknowledges that there are many different dimensions of resilience. For this study, there are three dimensions have been explored to measure resilience in

Surveys and approaches on measuring each dimension will also be discussed.

[2] Ibid

RESILIENCE CAPACITIES

Resilience capacities are the most widely measured dimension of resilience [3]. The concept of resilience capacity is derived from the Food and Agriculture Organization of the United Nations (FAO)'s "resilience pillars", which further breaks down or categorize resilience capacity into four, namely:

Access to basic services	A proxy for the possibility for the household to access an enabling institutional and public service environment
Assets	Income and non-income-related assets that enable a household to make a living
Social safety nets	The network upon which a household can rely when and if faced with a shock
Adaptive capacity	"Household ability to adapt to the changing environment in which it operates" (FAO 2016, p. 14).

Measuring resilience from the perspective of resilience capacities involves surveying households through the pillars. Resilience Index Measurement and Analysis (RIMA) is a quantitative approach that enables a rigorous analysis of how households cope with shocks and stressors. Comparisons can be made between different types of households (for example, male-headed versus female-headed or urban versus rural) in a given country or area [4]. Measuring resilience capacities often include identifying objective indicators requiring large data sets.

WOMEN EMPOWERMENT

Women empowerment was chosen as another stand-alone dimension to investigate intra-household gender relations. The household resilience study also takes its assumptions on IIRR's Women Empowerment Study in 2021. From the past study, evidence on the ground that program intervention contributed to women empowerment (Versoza, 2021). This study further postulates that women empowerment further contributes to household resilience – that is – women's new knowledge and experience gained from practicing Climate Smart Agriculture (CSA) have increased household's propensity to withstand shock.

[3] FAO. 2020. Comparison of FAO and TANGO measures of household resilience and resilience capacity
[4] FAO. RIMA. About - RIMA (FAO) - Organizations - "FAO catalog"

Empowerment is usually measured quantitatively as well – by surveying quantifiable indicators such as income. The Women's Empowerment in Agriculture Index (WEAI) is a new survey-based index designed to measure the empowerment, agency, and inclusion of women in the agricultural sector. The Women's Empowerment in Agriculture Index (WEAI) is a survey-based tool codeveloped by the International Food Policy Research Institute (IFPRI), the Oxford Poverty and Human Development Initiative, and the U.S. Agency for International Development (USAID) (Alkire et al. 2013). The index was originally designed as a monitoring and evaluation tool for the U.S. government's Feed the future initiative to directly capture women's empowerment and inclusion levels in the agricultural sector [5].

SUBJECTIVE RESILIENCE

Lastly, subjective resilience as a complementary dimension that enables us to look at household resilience in so far as how decisions are made based on the decision-maker of the household. This perspective relies on the subject to assess oneself in terms of how they deal with shocks in relation to their self-knowledge. Unlike resilience capacities, subjective resilience was not borne as an evaluation tool – it is more inductive in its approach (Jones, 2018) [6]. Subjective resilience tries to complement the gap in existing resilience studies in so far as it hopes to ensure that program intervention supports the right types of activities and targets the right people [7].

Attempting to measure subjective resilience is based on the premise that households have a good understanding of their own capacities and limits. Like resilience capacities and women empowerment, subjective resilience can utilize household surveys (Béné et al., 2019). The questions could focus on how a household perceives itself to be resilient – by first determining how it perceives its capacities and then highlighting how it perceives itself to act in a hypothetical situation.

Measuring subjective resilience is fraught with methodological challenges. First, measuring perceptions poses the challenge of instability related to environmental challenges, contextual factors, and those related to emotions. Second, inherent or internal traits may also play differently among persons and in how they self-report themselves. The design of surveys attempts to offset these effects as much as possible.

[5] IFPRI. Women's Empowerment in Agriculture Index (WEAI) | IFPRI : International Food Policy Research Institute
[6] Jones, L. 2018. Resilience isn't the same for all: Comparing subjective and objective approaches to resilience measurement - Jones - 2019 - WIREs Climate Change - Wiley Online Library
[7] Jones, L. 2019. Measuring 'subjective resilience': using peoples' perceptions to quantify household resilience | weADAPT

CLIMATE SMART VILLAGES (CSV) AND CLIMATE SMART AGRICULTURE (CSA)

A CSV is a participatory platform for community-based adaptation that helps address climate change impacts on agriculture in smallholder agriculture communities. It is also a platform to assess in a participatory approach climate vulnerabilities and coping capacities. These assessments served as a basis for identifying options for climate smart agriculture which are ecologically, culturally, and gender-responsive. With a strong emphasis on inclusion, the climate-smart village approach recognizes the differential effects of climate change on women and men. This may lead to the identification of more appropriate CSA responses and outcomes, based on the gendered differences between women and men, their knowledge and beliefs of their environment, as well as their respective needs, and constraints in the access and control of productive resources (Barbon, 2021).

The CSV design provides a portfolio of CSA practices, technologies, and innovations that address food security, adaptation and mitigation, and support services that are tailored to the unique contexts of the participating communities. IIRR promotes a "portfolio" or "basket of options" approach to CSA promotion in rural communities. This menu of socially inclusive options for all household contexts (with large land areas, in homesteads, women-headed, and very poor) can include:

- technological options, such as promoting stress-tolerant varieties of primary crops,
- new platforms for agriculture production, such as integrating and improving small livestock production and vegetable production in homesteads (the patch of land around the household dwelling, which, in Southeast Asia, can sometimes comprise up to 200–400 square meters of land).
- use of green manure to reduce the footprint of fertilizer use, improving soil health
- integrating trees into the existing farming system to generate new sources of income, and
- creating micro-climates around the farm to protect farms against strong winds during storms. (Hanley, et al, 2021).

In 2021, a gender study was conducted on six CSVs in three countries – Agmalobo and Maloloc Sur in the Philippines, Htee Pu and Taungkhamauk in Myanmar, and Koki Chrum and Me Pai in Cambodia. These villages were selected from among 12 CSVs that have been established by IIRR with support from the International Research and Development (IDRC), Canada and the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

In 2019 and 2020, IIRR provided a small grant facility (termed the CSV Adaptation Fund) to support the implementation and trials of the identified options for two annual production seasons. Alongside the implementation of these CSA options in each of the CSVs, IIRR also supported capacity development, awareness building, and community-based nutrition education activities to maximize the potential of CSA to generate development outcomes. (Hanley, et al, 2021).

The CSV approach was implemented in the Philippines in 2015, and IIRR's CSVs in the Philippines are now part of the network of CSVs in 17 regions in the Philippines (Barbon et al., 2017). The CSVs in Myanmar were introduced in 2016 through CGIAR-CCAFS and IIRR in support of the Myanmar Climate Smart Agriculture Strategy (MCSAS). The MCSAS laid out the long and short-term strategies and priorities to promote climate change adaptation in Myanmar agriculture (Barbon, 2021a). Promotion of CSA in Cambodia was started in 2015, but the CSVs were established in 2018.

Considering that most of the CSVs/CSAs have been operating for more than five years, a comprehensive study to assess the contribution of the CSV approach in promoting household resilience is a significant and important endeavor to recognize the ability of the household and to guide future CSV program strategies.

HOUSEHOLD RESILIENCE SCORE

Constructing the Household Resilience Score

I. Resilience Index Measurement and Analysis

A recognized resilience measurement approach, as mentioned earlier, is the Resilience Index Measurement and Analysis (RIMA) of FAO. Comparisons can be made between different types of households (for example, male-headed versus female-headed or urban versus rural) in a given country or area. There are two versions of RIMA currently: RIMA-I and RIMA-II.

Both RIMA-I and RIMA-II methodologies estimate resilience through a set of pillars, which are then aggregated through latent variable models. RIMA-I and RIMA-II answer questions such as: who is most in need? where should investment focus in terms of geographical location? which dimensions of resilience need to be supported? to what extent have interventions increased or decreased target populations' resilience?

A more updated methodology, RIMA-II, is said to be a more responsive methodology as it estimates resilience directly and indirectly. RIMA-II estimates household resilience to food insecurity with a comprehensive pack which includes both direct and indirect measures because: (i) direct measure suits descriptive purposes; (ii) indirect measure provides causal inference; (iii) shocks are considered exogenous and included into a regression model for estimating their impact on food security and on resilience; (iv) food security indicators are the outcome of resilience and are not included in the resilience estimation model.

II. Baseline Resilience Indicators for Communities (BRIC)

The BRIC metric was developed to serve as community proxies comprising of 49 indicators divided into six resilience subdomains (social, economic, institutional, infrastructure and housing, community capital, and environmental). This is based on the theoretical framework of the Disaster Resilience of Place (DROP) model, which looks into the interaction of social systems, natural systems and the built environment. It takes into consideration how these factors play into the vulnerabilities and resilience in relation to place prior to the occurrence of an event. The BRIC metric is the quantification of the DROP model (Scherzer, et al., 2019).

III. Other approaches

Other approaches in developing a resilience index or score rely on developing a score while using weights after values are normalized. This is seen as the simplest form of aggregation but what is challenging in this measurement is determining how weights would be appropriated.

WHAT THE HOUSEHOLD RESILIENCE SCORE AIMS TO UNCOVER

This study draws inspiration from the article of Béné et al. (2019) "'Perception matters': New insights into the subjective dimension of resilience in the context of humanitarian and food security crises". The article presents the opportunities found in studying less tangible elements of resilience such as psychosocial factors. A conceptual framework was presented by the article to map how program interventions could possibly influence both subjective resilience and resilience capacities and influence coping strategies and longer impacts, such as food security.

Resilience capacities are the most tangible assets that we can measure. These range from determining what types of assets a household has, what types of basic services they have access to, what social security nets they have, and what adaptive capacities they can tap into. These are all readily observable and may be counted based on recollection. To a certain extent, even answering these through a survey may require some form of recalling – say recalling how much a household typically make in a month. In a sense – might not be purely objective in nature.

Subjective resilience is measured through psychosocial factors or traits like perseverance, self-confidence, risk perception, conscientiousness, and self-efficacy.

Perseverance. Perseverance is defined as a continued effort to do or achieve something despite difficulties, failure, or opposition [8]. There are some studies that claim that perseverance may lead to purposefulness and later on to resilience [9].

Self-confidence. Self-confidence is defined as a feeling of trust in one's abilities, qualities, and judgment [10]. There are studies that claim that having self-confidence gives you the skills and coping methods to handle setbacks and failure. Self-confidence does not mean you will not sometimes fail [11].

Risk perception. Risk perception refers to people's beliefs, attitudes, judgments, and feelings toward risk, and incorporates the wider social and cultural values, as well as outlook, people adopt toward hazards [12]. Unlike the other subjective resilience subdomains, risk perception is not black or white – some people who exhibit riskier behavior could benefit from it, while others, it could be more detrimental.

Conscientiousness. Conscientiousness is a fundamental personality trait—one of the Big Five—that reflects the tendency to be responsible, organized, hard-working, goal-directed, and to adhere to norms and rules [13].

Self-efficacy. The idea behind self-efficacy theory is that self-efficacy is what allows us to succeed. Efficacy is the ability to make an effect, to make things happen. Self-efficacy is the ability to do that for yourself. It is the ability to move with agency through life toward one's goals. According to Albert Bandura, there are four pillars of self-efficacy. Two of them rely on input from other people. They are as follows: i) Mastery Experiences; ii) Social Modelling; iii) Social Persuasion; and iv) Physiological States (Perlamn, 2017).

[8] Merriam-Webster. Perseverance Definition & Meaning - Merriam-Webster
[9] Psychology Today. 2019. Perseverance Cultivates Purposefulness and Boosts Resilience | Psychology Today
[10] Merriam-Webster. Self-confidence Definition & Meaning - Merriam-Webster
[11] Markway, B. 2018. Why Self-Confidence Is More Important Than You Think | Psychology Today
[12] H.-A. Rother, in Encyclopedia of Environmental Health (Second Edition), 2019
[13] Psychology Today. Conscientiousness | Psychology Today

From the perspective of IIRR, other variables of interest were also worth exploring, such as:

Food security. Food security here is seen as possibly one of the many long-term impacts of CSA. There are several studies that use resilience as an indicator of food security [14]. Climate smart agriculture was explored on how it contributes to food security amidst the pandemic.

Adoption of climate smart agriculture. Climate smart agriculture initiatives is expressed as diversified systems, inclusive of both traditional and introduced modern practices and systems.

Shocks experienced. Shock is defined as a sudden upsetting or surprising event or experience. In this study, we view shocks as a climate-induced hazard or Covid-19 in relation to how it has affected CSVs and food security.
Negative impacts of Covid-19. The negative impacts of Covid-19 experienced is viewed here in relation to agriculture. IIRR has examined the negative impacts of Covid-19 on the agriculture sector and on CSVs (Espino et al., 2020) [15].

Negative impacts of Covid-19. The negative impacts of Covid-19 experienced is viewed here in relation to agriculture. IIRR has examined the negative impacts of Covid-19 on the agriculture sector and on CSVs (Espino et al., 2020) [16].

Coping strategies. Like food security, coping strategies related to food were explored.

Land area used. Land area is used in relation to the size of the area used regardless of land tenure status. Land tenure is the relationship, whether legally or customarily defined, among people, as individuals or groups, with respect to land. Land tenure is an institution, i.e., rules invented by societies to regulate behavior. Rules of tenure define how property rights to land are to be allocated within societies. They define how access is granted to rights to use, control, and transfer land, as well as associated responsibilities and restraints. In simple terms, land tenure systems determine who can use what resources for how long, and under what conditions [17]. For this study, land tenure status and hectare of land used is investigated.

[14] Anash, I., Gadrbroek, C. & Ihle, R. 2018. (PDF) Resilience and household food security: a review of concepts, methodological approaches and empirical evidence (researchgate.net)
[15] Merriam Webster. Shock Definition & Meaning - Merriam-Webster
[16] Espino, A. et. al. 2021. COVID-19 impact on local agri-food systems in Cambodia, Myanmar, and the Philippines.
[17] FAO. 3. WHAT IS LAND TENURE (fao.org)

Beneficiary status. The study also notes if the respondent is a beneficiary or not. Important to note is that whether or not a respondent is a beneficiary or not, a multiplier effect is mostly likely at play – wherein intervention impacts can be seen way beyond the beneficiary status.

RESEARCH QUESTIONS

The key research question is:
How does the practice of CSA contribute to household-level resilience to climate change?

The follow-up question is:
In what ways has the promotion of CSA in the CSVs allowed households to cope with the negative impacts of Covid-19?

To support this postulation, the study utilized 84 questions which are divided among 11 subdomains (perseverance, self-confidence, risk perception, self-efficacy, conscientiousness, subjective resilience, access to basic services, assets, social safety nets, adaptive capacity, and women empowerment), which are based on several surveys.

The above survey subdomains are supplemented by interview guides for the Focus Group Discussion and Key Informant Interview:

FOCUS GROUP DISCUSSIONS

Climate smart agriculture

1. What CSA practices (expressed as diversified systems, inclusive of both traditional and introduced modern practices and systems) do you undertake?
2. Where did you learn CSA practices? Did you receive IIRR support? When did you receive support? What type of support? What practices did you undertake after support?

Covid-19 and shocks

3. What happened in Covid-19? How was your HH affected? Did CSA practices help you in the pandemic? How?
4. Would you continue practicing CSA when things go back to normal after the pandemic? Why?
5. In the past 12 months, did you experience [shocks]? How was your HH affected? Did CSA practices help you in manage the impact of the [shock]? How?

Overall

6. Overall, did the support (e.g. learning about CSA practices) help/not help your household? In what ways?
7. With CSA, do you feel that you can better feed your family? That they are eating better? How?
8. With CSA, do you feel that your income has improved? How?
9. With CSA do you feel less worried that you will go hungry in case a shock happens? How?
10. In what ways would you like to improve or scale up your own CSA practices? What support do you need?
11. What would hinder you from continuing practicing CSA?

KII Questions

1. Is CSA something that is done by households in your area? To what extent?
2. Based on your observation, what types of households practice CSA?
3. In your opinion, what types of households would benefit from CSA? How would it benefit them?
4. During the pandemic and/or a shock, do you think CSA has helped the community?
5. What is needed to support the practice of CSA? In the household level? Community level?

METHODOLOGY

Analytical Framework

The Household Resilience Study is an attempt to pool together 3 stand-alone dimensions of resilience to constitute a single metric of resilience. It argues that on a household level, resilience capacities, women empowerment, and subjective resilience should be able to account for a comprehensive understanding of resilience. The starting point is the program intervention, and the end goal is resilience, with an assumption of food security overall.

The analytical framework (Fig. 1) introduces the point of departure and outlines the pathways that the study tries to validate. The hypothesis is that a program intervention, such as the introduction of climate smart agriculture, has the potential to influence all 3 dimensions of resilience: resilience capacities, women empowerment, and subjective resilience. If a shock occurs, resilience is triggered and manifested through household food security despite the negative effects of the shock.

Boxes found in the analytical framework are considered indicators. These are represented by questions that can be represented with values and later on normalized so that appropriate analyses can be undertaken to test the pathways in terms of correlation and regression. Likewise, as this study harnessed the potential of both quantitative and qualitative research methods, it acknowledges that while quantitative data can confirm relationships among indicators, nuances can be further explained by qualitative approaches.

The blue boxes signify the inherent traits a household decision-maker has and what it hopes to manifest should a shock strike. These traits focus on i) perseverance; ii) self-confidence; iii) risk perception; iv) self-efficacy; and v) conscientiousness. The grey boxes indicate the household characteristics and the resilience capacities of a household. The resilience capacities are triggered when a shock takes place. A vital dimension, which is part of a household's resilience capacity is women's empowerment.

From the starting point of program intervention, the interjection the study makes is that, based on previous approaches, it can influence a household's resilience capacities. The newer supposition that the study tries to take is the least studied pathway which posits that: i) program interventions work alongside psychosocial indicators; and ii) what is triggered during a shock is also the dimension of subjective resilience.

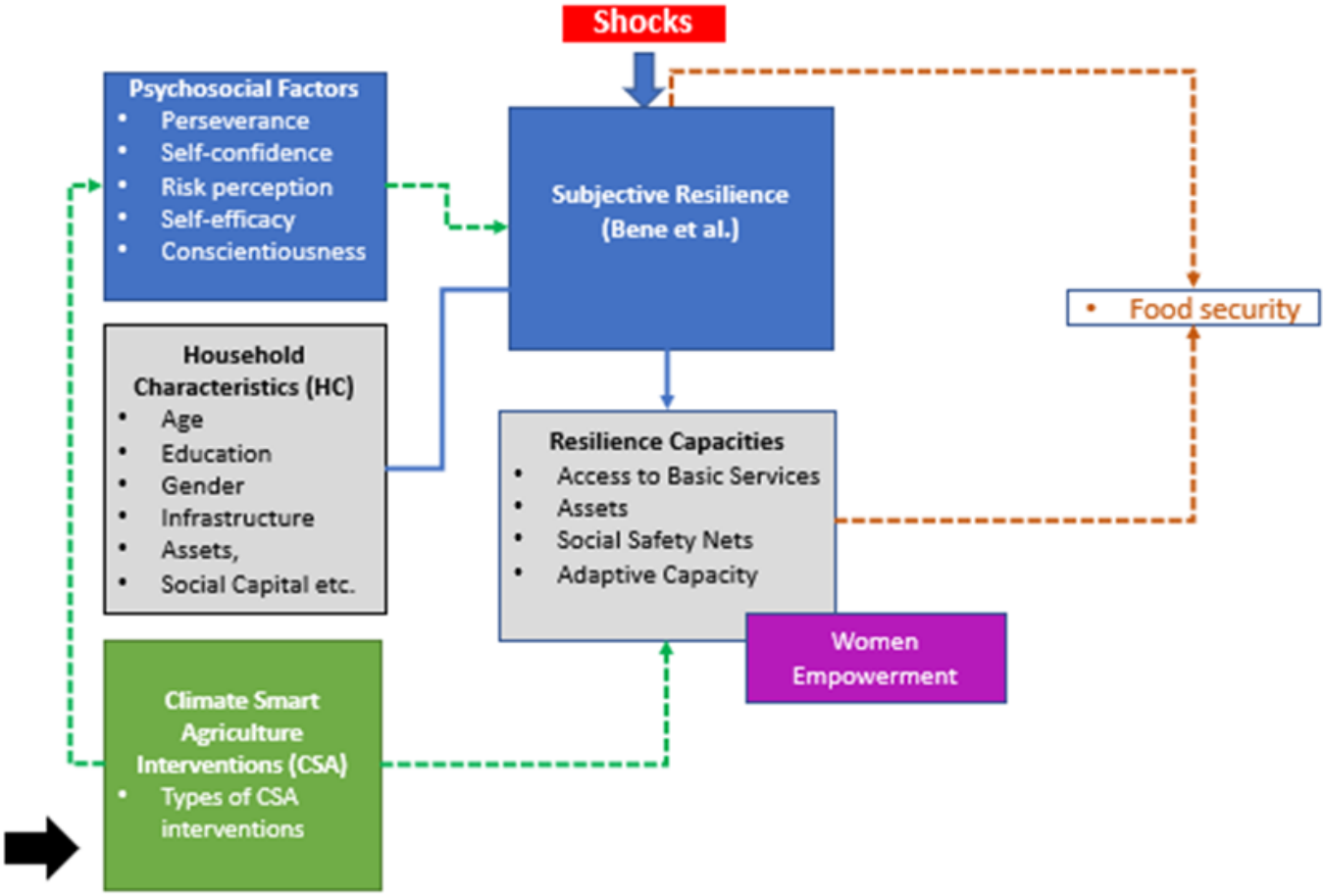

Figure 1. Analytical Framework (Source: Adapted from Béné, 2019)

Overall Research Approach, Survey Design, Research Sites

I. Overall Research Approach

The Household Resilience Score (HRS) is a combination of a total of 84 questions spread of 11 subdomains (Fig. 2). For the HRS, there are 11 subdomains that were surveyed. There are 6 indicators covering the dimension of subjective resilience, namely: i) perseverance; ii) self-confidence; iii) risk perception; iv) self-efficacy; and v) conscientiousness. There are 4 indicators for resilience capacities: i) access to basic services; ii) assets; iii) social safety nets; and iv) adaptive capacity. The last dimension is related to women empowerment. A complete list of all the subdomain questions per country is listed in Annexes A, B, and C.

Similarly, there are other variables of interest that were identified that do not constitute the HRS but were also surveyed and hence could be eligible to be performed analyses on. These include: i) food security; ii) number of climate smart agriculture initiatives used; iii) shocks experienced; iv) negative impacts of Covid-19 experienced; v) coping strategies used; vi) land tenure status; and vi) beneficiary status.

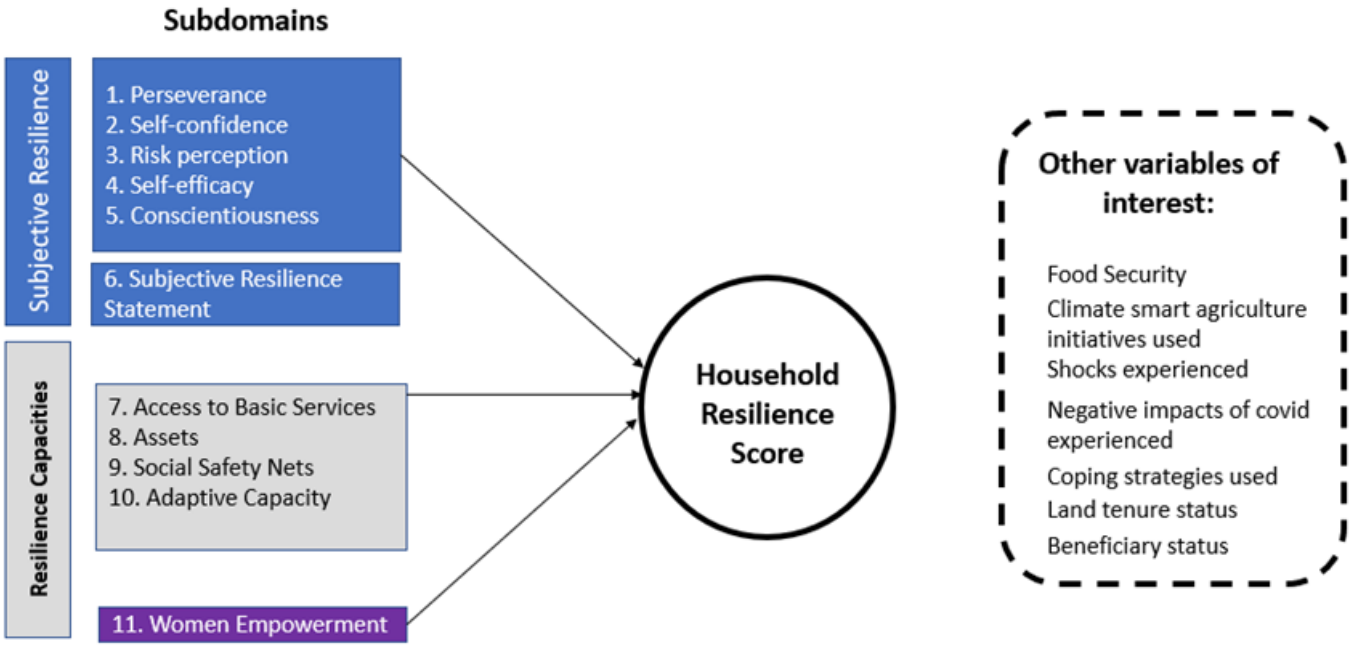

Figure 2. Constructing the household resilience score

II. Survey design

Per subdomain identified based on the 3 dimensions (resilience capacities, subjective resilience, and women empowerment), a series of questions were utilized. For the resilience capacities, FAO's RIMA-II survey questions were used. For women empowerment, A-WEAI survey questions were used. For subjective resilience, various psychometric questions from different sources were used (Table 1).

Table 1. Subdomains, examples of research questions, and sources of research questions

Sub-domain for Household Resilience Score	Example of Survey Questions	Source of Questions
Access to Basic Services	*Yes* or *No* on type of toilet facility, main source of water and electricity	RIMA - II (FAO, 2016)
	Distance to health services	
Social Safety Nets	Number of furable assets	RIMA - II (FAO, 2016)
	Amount of formal cash/in kind transfers	
	Number of school meals	
	Number of informal transfers	
	Number of associations	
	Number of dependent household members	
Assets	Number of durables/assets/livestock	RIMA - II (FAO, 2016)
	Yes or *No* on use of [inputs]	
Adaptive Capacity	*Yes* or *No* on reading or writing	RIMA - II (FAO, 2016)
	Number of years of education	
	% of household overall income	
	Value of loans	
	Number of different cropts	
	Yes or *No* on using improved seeds	
	Yes of *No* on training	
	Yes or *No* on livestock vaccination	
	Years of traning for women in household	
Women empowerment	How much input did you have in making decisions about food crop farming, cash crop farming, livestock raising, anf dish culture?	A-WEAI (IFPRI, 2017)
Perseverance	I finish whatever I begin.	Grit Scale (Duckworth, et al., 2007)
Self-confidence	On the whole, I am satisfied with myself.	Rosenberg Self-Esteem Scale (1965)
Self-efficacy	I will be able to achienve most of the goals that I have set for myself.	Self-efficacy Survey (Chen et al., 2001)
Risk aversion	I enjoy taking risks in most aspects of my life.	General Risk Propensity Scale (GRiPS) (Zhang et al., 2018)
Conscientiousness	I worl effectively and efficiently.	Big Five Traits (Chen, 2013)
Subjective Resilience Statement	If we experience [climate-induced hazrd], in the next year, my household would be able to recover.	Measuring 'Subjective Resilience': Using Peoples' Perceptions to Quantify Household Resilience (Jones & Tanner, 2015)

III. Research Sites

The survey was administered to at least 100 households per CSV. Should the CSV contain less than a hundred households, 100% of the households shall be surveyed. Two CSVs in Cambodia, Malaysia and the Philippines was surveyed from 1 to 30 March 2022, covering a total of 6 CSVs. In Cambodia, CSV of Kandal and Trapaing Cheeutrav were surveyed. In Myanmar, Htee Pu and Taung Khamauk were surveyed. In the Philippines, Dancalan Caimawan and Sta. Cruz were surveyed.

Data Collection Procedure

A mixed method of quantitative and qualitative data collection was adopted for the study. The quantitative method used BRIC and the qualitative methods consisted of desk review, focus group discussions (FGD) and key informant interviews (KIIs). The desk review was conducted to compare and confirm the findings of the household survey with related research initiatives. The FGDs and KIIs sought to obtain more in-depth information to help explain findings from the survey.

Household Resilience Survey

A total of 623 respondents consisting of 348 (56%) male respondents and 275 (44%) female respondents across the six CSVs. The sampling method is random. For every CSV site, it was agreed upon that at least 100 households would be surveyed per site.

There were 11 subdomains. Eighty-four (84) questions (or otherwise referred to as indicators) were contained in the survey.

The head of the households would have to be the one to answer the survey, or if not entirely possible, at least the subdomains that fell under the subjective resilience domain. For the women empowerment-related questions, the most senior female member of the household was surveyed.

Focus Group Discussion

The FGD consisted of 10 randomly chosen participants. Five belong to those previously surveyed and 5 belong to those not surveyed. If the village consists of all surveyed households, then all 10 randomly chosen participants belongs to those previously surveyed. There is no need to get participants from other villages. This FGD took place after the survey was completed.

Key Informant Interviews

KIIs using an interview guide were conducted with three selected informants from the six CSVs, consisting of the village heads, gender champions, and community leaders of local organizations. The KII sought to gather more in-depth information and complement the primary data collected through the FGDs and fill in gender data gaps from the Desk Review.

Considering the nature of the methods, data collection was conducted face-to face, with pen and paper. The team observed the required health protocols in light of Covid-19 pandemic. All data collection instruments were translated into the local dialects/languages by the field research teams. Prior to the field data collection, an orientation training with a module on gender awareness was conducted for the field research team. The training was based on the field data collection guide with templates for note-taking, data consolidation and analysis.

Data Processing and Analysis

Data processing was done using frequency distribution, analysis of means, and selected correlation and regression analysis to determine the level of significance of the survey findings. The method for data analysis is triangulation of quantitative and qualitative data from the survey, FGD and KII to validate common findings that emerged in the analysis. Content analysis was done by identifying the themes from the FGDs and KIIs, which were analyzed based on the number of times the themes were mentioned in the discussions. For the KIIs, the data collection focused on capturing the comparative experience and knowledge of the informants on the village situation before the CSV started and the present.

Summary tables and cross-tabulations were prepared by the data analyst and the IIRR staff, who participated in the collaborative report preparation for each country study.

I. Baseline Resilience Indicators for Communities (BRIC)

This study constructed hierarchical index using identified indicators from 11 subdomains (perseverance, self-confidence, risk perception, self-efficacy, conscientiousness, subjective resilience, access to basic services, assets, social safety nets, adaptive capacity, and women empowerment) to describe the resilience capacity of the households in six climate smart villages located in Cambodia, Myanmar and Philippines.Initially, a total of 84 indicators for the 11 subdomains were identified and normalized using min-max transformation (0-1 scaling). To ensure that all variables had the same theoretical orientation, that is, higher values corresponding with higher levels of resilience, a number of variables were reverse scaled by subtracting the min-max score from 1. Then, correlation analyses were performed to check if there are multicollinearities among the indicators for each subdomain. Only one between strongly correlated indicators (their bivariate correlation coefficient is greater than 0.70) were included in the construction of the resilience capacity index. A total of 72 indicators were used in the final computation of the resilience capacity index. The numbers of indicators belong to each subdomain are not similar with a minimum and maximum of 3 and 10, respectively.

The subdomain resilience index of each respondent was computed by calculating the average scores among the indicators under each subdomain. Then, the subdomain resilience index of each CSV was computed by getting the average subdomain resilience indexes among respondents belong to that CSV. The total household resilience index was computed by adding the indexes of the 11 eleven subdomains. Based on this formula, the lowest and highest possible values of household resilience index are 0 and the number of subdomains (11), respectively. Each household resilience index was categorized as low, moderate low, moderate, moderate high and high based on the multiplier (< -1.5, [-1.5, -0.49], [-0.50, 0.50], [0.51, 1.50] and > 1.5) of the standard deviation below and above the mean. A table was generated to show the distribution of household by resilience index category by CSV.

The correlation coefficients among the subdomain indices and other variables of interest were computed and indicate whether they are statistically significant per CSV. The mean difference on the household resilience score between IIRR beneficiary and non-beneficiary by CSV was calculated and t-test was performed to determine if their difference is statistically significant. Regression analysis was conducted to determine which among the subdomain resilience indices significantly affect food security index.

One advantage of replicating or adapting the Baseline Resilience Indicators for Communities (BRIC), and not another community resilience framework, has to do with the clear and easily understandable design. Rather than using more complicated statistical methods, such as factor analysis or principal component analysis, to create the index, the BRIC metric is based on a straightforward hierarchical add and average design. The limitation of this study is that the method of the computation of the index in this study was applied in household-level data with a combination of continuous, interval, and nominal (binary) variables compared to the previous studies, which used community-level data with all continuous variables.

The RIMA method is more robust than BRIC metric, but its computation is also more complicated. On the other hand, the BRIC metric is more robust than the method of assigning subjective weights in each indicator and subdomain since there a sound justification for the assigning of weights is needed.

II. Thematic Analysis

Thematic analysis for FGD and KII is undertaken for all the 6 CSVs. Braun and Clarke's (2006) method is used for this study. Analysis is undertaken using the framework, starting on identifying what climate smart agriculture practices have been taught and are being undertaken by the households, psychosocial traits pertaining to subjective resilience, household characteristics referring to resilience capacities, experiences in how using CSA could help in shocks (e.g., pandemic), and how the use of CSA relates to food security or well-being in general.

A hybrid approach was used for coding. Deductive coding was used using a priori codes. Codes were based on the analytical framework: climate smart initiatives; resilience capacities, subjective resilience, shocks, and food security. As coding took place, additional codes were added to highlight relevant themes – such as profile of CSA practitioners, opportunities, and barrier. The NVivo software was used to code themes according to the framework a thematic analysis, word count query, and word cloud query were conducted among all the FGD and KII text.

Risk Mitigation and Informed Consent

To mitigate risks in primary data collection, an Informed Consent Form that was translated into local language that explains the nature of the research was signed by the participants, with assurance of confidentiality of all information provided.

Limitations of the Study

Purpose of the study. The purpose of the study is to propose a method for further researching subjective resilience, and not necessarily to investigate causality. The study, as it is done during a specific window in time, aims to produce a method for evaluation. Data in this report might serve as a good baseline.

Head of the household answers the questions and self-awareness. The study acknowledges that subjective resilience relies on the traits of the household decision-maker. Hence, when the survey was conducted, it was ensured that the household head be the ones to answer the survey as much as possible. In most households where agriculture is the primary source of income, heads of households would usually be out and about the whole day. In these cases, the household head would have to be the one to answer at least the subjective resilience portion.

Comparability of indicators across countries. Recognizing the nuances in and the countries, several survey questions, needed to use a similar point scale where comparable items could be ticked or marked off by the respondent.

Sample size. As the study strived to create a score, the analyses would have to rely on the power of statistical significance. It was agreed on that for each CSV, at least 100 households (or 100% of the households in the CSV if households are less than 100) would have to be surveyed for the analyses to hold water.

Beneficiary status. The study strived to be as random as possible. With the exception of the key informant interview and focus group discussion, the survey was undertaken randomly.

Translations. The other potential limitation relates to the multiple translations from English to the primary language of the country and then to the dialects used in the village and the translation of the content back to the English language. The richness of the discussions may not have been fully reflected in this report as some may have been lost along the translation pathway.

Timing of survey. The sites were surveyed before the rainy season so that perspectives would be more attuned to favorable climatic conditions. However, it is recognized that there is a possibility that survey fatigue was felt because a study on women empowerment was also undertaken in the latter part of 2021.

SOCIO-DEMOGRAPHIC INFORMATION

Profile of survey respondents

The number of respondents in the survey total 623. Across the six CSVs, 274 (44%) were female respondents and 348 (56%) were male respondents. The average age in years of the respondents was 45. The average household number was 4. The average number of working members in a household was 3. The average monthly income in the households was USD 190.

In terms of land tenure, 118 households (19%) owned land. Twenty-five households (4%) rented land. Four hundred thirty households (69%) used common land. Fifty households (8%) rented land.

Across the six CSVs, two hundred sixty-two (42%) are IIRR beneficiaries and three hundred sixty-one (58%) are not IIR beneficiaries (Table 2).

Table 2. Socio-demographic information

Socio-ecoconic	Cambodia		Myanmar		Philippines		All CSVs
	Kandal	Trapaing Chheutrav	Htee Pu	Taung Khamauk	Dancalan Caimawan	Sta. Cruz	
No. of respondents	104	98	100	90	120	111	623
Gender of respondent (%)							
Male	42	52	73	69	36	68	56
Female	58	48	27	31	64	32	44
Total	100	100	100	100	100	100	100
Average age (in years)	39	40	54	44	46	45	45
Average household size (number)	5	5	4	4	4	4	4
Average number of working members	3	3	3	3	3	2	3
Average monthly income (USD)	403	309	80	52	155	135	190
Land tenure (%)							
Owned	92	83	87	91	21	55	19
Rented	3	8	0	1	4	6	4
Use of common land	5	9	0	0	58	32	69
None of the above	0	0	13	8	17	6	8
Total	100	100	100	100	100	100	100
IIRR Beneficiary (%)							
Yes	54	32	43	100	23	11	42
No	46	68	57	0	77	89	58
Total	100	100	100	100	100	100	100

Profile of FGD and KII Participants

Among the 69 participants in the 6 FGDs, more than half identify themselves as farmers (59.70%), and the others are village leaders and workers, housewives, community leaders, and casual workers.More than half (69.57%) have primary schooling; 26.09% percent have secondary and/or middle school level of education. Majority (75.36%) belong to the 31-60 age group.

The 18 informants in the KIIs consisted of 10 women and 8 men consisting of farmers, and community or village leaders. Among the men are 3 community leaders, 4 leaders or members of the village administration, and 1 farmer leader. Among the women are 5 leaders or members of the village administration, 4 community or women leaders, and 1 farmer.

SUMMARY OF FINDINGS: QUANTITATIVE ANALYSIS

Household Resilience Scores across CSVs

Table 3 presents the distribution of the respondents by resilience score. Across all CSVs, 44% of households are considered to have moderate resilience scores, 22% are considered to have moderate to high resilience scores, 19% have moderate low resilience scores, 9% of households are found to have low resilience scores, and 6% are found to have high resilience scores. Around 15% of the respondents indicated that they were directly involved in agriculture.

Table 3. Distribution of respondents (in %) by resilience score category and by CSV

Category	Cambodia		Myanmar		Philippines		All CSVs
	Kandal	Trapaing Chheutrav	Htee Pu	Taung Khamauk	Dancalan Caimawan	Sta. Cruz	
Low	14	31	1	6	3	0	9
Moderate low	27	28	14	36	8	6	19
Moderate	49	40	42	47	49	38	44
Moderate high	6	2	35	12	31	41	22
High	4	0	8	0	8	15	6
Total	100	100	100	100	100	100	100

Correlation Among Subdomain Scores in All CSVs

Using the BRIC method, a correlation analysis was conducted among subdomain scores in all CSVs. Statistical significance – as indicated by asterisk(s) - was found for several scores pitted against each other. This means that values showing asterisks demonstrate correlation or have a relationship. The positive or negative sign of the values show whether the relationship shows a positive or negative relationship, that is, if a value of a subdomain/variable of interest increases, then the value of the other subdomain/variable of interest increases. Table 4 summarizes the correlation scores of the subdomains and variables of interest using the BRIC method.

Table 4. Correlation among subdomain scores in all CSVs

	Climate Smart Initiatives	Household Resilience Score											Food Security	Coping Strategy
		Subjective Resilience Score						Resilience Capacities Score				Women Empowerment Score		
		Perseverance	Self-confidence	Risk Perception	Self-efficacy	Conscientiousness	Subjective Resilience	Access to Basic Services	Assets	Social Safety Nets	Adaptive Capacity			
Perseverance	0.192**	1												
Self-confidence	0.072	0.223**	1											
Risk Perception	0.120**	-0.324**	-0.001	1										
Self-efficacy	0.019	0.281**	0.370**	-0.375**	1									
Conscientiousness	0.097*	0.253**	0.273**	-0.083*	0.362**	1								
Subjective Resilience Statement	0.108**	0.413**	0.244**	-0.399**	0.486**	0.306**	1							
Access to Basic Services	0.018	0.365**	0.218**	-0.403**	0.292**	0.286**	0.465**	1						
Assets	0.472**	0.073	0.186**	0.137**	0.141**	0.141**	0.172**	0.044	1					
Social Safety Nets	-0.056	0.224**	0.128**	-0.246**	0.177**	0.100*	0.407**	0.254**	0.069	1				
Adaptive Capacity	0.248**	0.136**	0.119**	-0.032	0.155**	0.097*	0.221**	0.075	0.381**	0.188**	1			
Women empowerment	0.172**	0.04	0.106**	0.135**	0.061	0.123**	0.117**	0.002	0.190**	0.126**	0.014	1		
Food Security	-0.024	0.124**	0.232**	-0.112**	0.119**	0.166**	0.303**	0.179**	0.177**	0.220**	0.121**	0.260**	1	
Coping Strategy	-0.165**	0.065	0.211**	-0.116**	0.148**	0.178**	0.215**	0.194**	0.127**	0.090*	0.043	0.194**	0.492**	1

*p-value<0.05, **p-value<0.01

Subdomain results are discussed below using the BRIC method:

Perseverance

The subdomain of perseverance is also positively correlated or exhibits a positive relationship to most subjective resilience subdomains. This assumes that households that persevere might also possibly be self-confident, exhibit self-efficacy, etc. A high positive correlation is seen in the values presented in the subjective resilience statement – that is, households that have high perseverance scores would probably be also the ones confident that they will most likely get over a shock or disaster.

Self-confidence

All values show statistical significance except for risk perception. The highest positive relationships are shown with conscientiousness. Self -confidence shows a stronger relationship with self-efficacy. For subdomains outside subjective resilience, self-confidence is related to all resilience capacities.

Risk perception

Here, persons perceived to be more calculating is assumed to be more resilient. Statistical significance is seen in most scores except for adaptive capacity. Generally, negative correlation is seen in the subdomains. What we see here is that when riskier behavior is exhibited, the less of the other subjective resilience and resilience capacity-related subdomains are exhibited. It exhibits a positive relationship with women empowerment and assets. It means if a household exhibits less risky behavior, then women empowerment and assets are also present. This means that households exhibiting less risky behavior exhibit higher assets.

Self-efficacy

Self-efficacy showed statistical significance for all subdomains except for women empowerment. This shows that households exhibiting the trait of self-efficacy most probably also have high subjective resilience traits. In terms of risk perception, values suggest that those household may show riskier behavior. Self-efficacy is strongly correlated to conscientiousness and self-confidence, and scores higher in the subjective resilience statement. This indicates that households that exhibit self-efficacy are conscientious and are confident that they a would most likely be able to withstand a shock, and vice versa. It also exhibits strong negative relationship with risk perception, indicating that those households might demonstrate riskier behavior.

Conscientiousness

Conscientiousness exhibits strong relationships with self-confidence, self-efficacy, and the subjective resilience statement. All values for conscientiousness show statistical significance – indicating that all subdomains relate strongly to a household's trait of being conscientious.

Subjective resilience statement

All values for the subjective resilience statement show statistical significance. Resilience capacities that show strong relationships with this subdomain relate to access to basic services, and social safety nets.

Access to basic services

This subdomain shows strong relationships with perseverance, risk-perception, the subjective resilience statement, and assets. Values suggest that those households that have access to basic services are those that persevere, exhibit relatively riskier behavior, and have assets.

Assets

Strong relationships are shown among subdomains/variables of interest on climate smart initiatives and adaptive capacity, and vice versa. Those that have more assets are likely to be wealthier households that exhibit relatively riskier behavior.

Social safety nets

Strong relationships are seen in perseverance, risk perception, the subjective resilience statement, and vice versa. Less risky behavior is also seen in households with households more social safety nets.

Adaptive capacity

Adaptive capacity is seen to have strong relationships with the use climate smart initiatives, subjective resilience statements and asset.

Women empowerment

Women empowerment presents relationships with the use of climate smart initiatives, self-confidence, risk perception, conscientiousness, subjective resilience, assets, social safety nets, and coping strategies. It exhibits stronger relationships with the use of climate smart initiatives, assets, the use coping strategies. It is positively correlated to risk perception, indicating that households exhibiting less risky behavior also exhibit women empowerment in the household level.

Climate smart initiatives

Several subjective resilience subdomains exhibit statistical significance in relation to climate smart initiatives. Values suggest that households exhibiting perseverance, exhibit relatively riskier behavior, conscientious persons, and persons confident that they would be able to weather shocks may be related to those who use climate smart initiatives, or vice versa. In terms of resilience capacities, those with more assets, those exhibiting more knowledge and training (adaptive capacities), and those exhibiting women empowerment, are most likely those that use climate smart initiatives, or vice versa.

Coping strategies

Coping strategies show positive relationships with self-efficacy, self-confidence, conscientiousness, the subjective resilience statement, assets, and women empowerment.

Food security

Food security does not show statistical significance with the use of climate smart initiatives. However, it shows strong positive relationships with self-confidence, the subjective resilience statement, social safety nets, and women empowerment.

Total Household Resilience and Subdomain Scores by CSVs

The total household score is 5.86. The subdomain of self-confidence shows a score of 0.55. The same goes for the subdomain of conscientiousness where the score is 0.71. Social security nets and adaptive capacity show a score of 0.11 and 0.26, respectively.

Table 5. Total household resilience and subdomain scores by CSV

Country	Climate smart village	Total number of households	Household resilience score	Household Resilience Score							
				Subjective Resilience Score						Resilience	
				Perseverance	Self-confidence	Risk Perception	Self-efficacy	Conscientiousness	Subjective Resilience	Access to Basic Services	Assets
Cambodia	Kandal	104	5.51	0.51	0.56	0.51	0.67	0.68	0.43	0.72	0.38
	Trapaing Chheutrav	98	5.17	0.55	0.56	0.49	0.64	0.63	0.34	0.77	0.27
Myanmar	Htee Pu	100	6.17	0.81	0.56	0.38	0.72	0.8	0.62	0.96	0.37
	Taung Khamauk	90	5.6	0.66	0.49	0.63	0.61	0.65	0.42	0.68	0.36
Philippines	Dancalan Caimawan	120	6.17	0.79	0.55	0.26	0.75	0.74	0.7	0.9	0.28
	Sta. Cruz	111	6.4	0.75	0.59	0.41	0.72	0.73	0.71	0.92	0.38
All CSVs		623	5.86	0.68	0.55	0.44	0.69	0.71	0.55	0.83	0.34

Correlation Between Variables of Interest and Selected Subdomain Index for All CSVs

The household resilience score shows positive relationships with all variables of interest (number of climate smart interventions used, no. of shocks experienced, food security score, coping strategies score, and land area. The number of negative impacts of COVID-19 experienced and beneficiary status, on the other hand, show negative correlation. It does not show a relationship with land area used (Table 6).

It was observed that the subjective resilience score in relation to all variables of interest are statistically significant. The subjective resilience score (perseverance; self-confidence; risk perception; self-efficacy; conscientiousness, and the subjective resilience statement) is positively correlated to the number of climate smart interventions used, food security, coping strategies, and beneficiary status. The subjective resilience score is negatively correlated to the no. of negative impacts of Covid-19. This could possibly mean that those with high subjective resilience were able to experience fewer negative impacts of Covid-19.

The food security score in relation to all subdomains are statistically significant and positively correlated. This means that an increase/decrease in food security score is related to an increase/decrease in subdomain scores, vice versa. An increase in household resilience score, access to basic services score, social safety net score, adaptive capacity score, women empowerment score, and subjective resilience score indicate an increase in food security score or vice versa. This again, points to how the resilience subdomains do not necessarily explain why households are high in terms of their scores in relation to food security.

Table 6. Correlation between variables of interest and selected subdomain index for all CSVs

	HH Resilience Score	Access to Basic Services score	Social Safety Nets score	Adaptive Capacity score	Women empowerment score	Subjective Resilience score
No. of climate smart interventions used	0.309**	0.018	-0.056	0.248**	0.172**	0.108**
No. of shocks experienced	0.123**	0.084*	0.260**	0.119**	0.02	0.234**
No. of negative impacts of covid	-0.201**	-0.219**	-0.305**	-0.086*	0.06	-0.351**
Food security score	0.351**	0.179**	0.220**	0.121**	0.260**	0.303**
Coping strategies score	0.261**	0.194**	0.090*	0.043	0.194**	0.215**
Land area (ha)	0.044	-0.025	0.013	0.092*	-0.047	-0.015
Beneficiary status (1-yes, 0-no)	-0.106**	-0.379**	-0.091*	0.104**	0.018	-0.137**

*p-value<0.05, **p-value<0.01

Mean Difference of Household Resilience Scores Between IIRR Beneficiary and Non-Beneficiary by CSV

Table 7 might show us that indeed, being a beneficiary (in applicable CSVs) show significant results. At the CSV level, it is not statistically significant. But at the overall level, it is – meaning, there is a difference on the mean household resilience index between IIRR beneficiary and non-beneficiary.

Table 7. Mean Difference of Household Resilience Scores Between IIRR Beneficiary and Non-Beneficiary by CSV

Country	Climate smart village	Mean HH Resilience Score			t-value
		Beneficiary	Non-Beneficiary	Difference (B-NB)	
Cambodia	Kandal	5.55	5.49	0.06	0.392
	Trapaing Chheutrav	5.18	5.17	0.01	0.001
Myanmar	Htee Pu	6.28	6.09	0.19	1.354
	Taung Khamauk	5.61	-	-	-
Philippines	Dancalan Caimawan	6.22	6.17	0.05	0.394
	Sta. Cruz	6.63	6.38	0.25	1.454
All CSVs		5.77	5.94	-0.17	-2.666**

*p-value,0.05, **p-value,0.01; (-) no available data since all of the respondents in this CSV are beneficiaries

Taung Khamauk was not included in the analysis because all of the residents in this CSV are IIRR beneficiaries, rendering their participation insignificant.

Regression Results to Determine Subdomains Affecting Food Security in All CSVs

As previously seen, correlation analysis did not present the hypothesized relationships with other subdomains. Hence, regression analysis was undertaken to give a more comprehensive view of food security. Regression analysis was undertaken to understand subdomains of the household resilience score in relation to the food security score. **The value per subdomain considers the presence of all the other subdomains ceteris paribus or held constant.** What this analysis looks at is how the different subdomains influence food security, taking all the CSVs into consideration.

Table 8 shows the results using the BRIC method. With all things held constant, it shows that among the subdomains, food security is highly negatively correlated to self-efficacy and risk perception. In this sense, household showing food security is related to less self-efficient households and households showing relatively riskier behavior. For the rest, there is statistical significance detected and might present how self-confidence, the subjective resilience statement, assets, and women empowerment play a more critical role in ensuring food security.

Table 8. Regression results to determine the subdomains affecting food security in all CSVs

Subdomains	Coefficient	Std. Error.	t-value
(Constant)	0.223	0.11	2.016*
Perseverance	-0.069	0.056	-1.231
Self-confidence	0.569	0.134	4.253**
Risk Perception	-0.156	0.067	-2.311*
Self-efficacy	-0.283	0.095	-2.988**
Conscientiousness	0.107	0.077	1.388
Subjective Resilience	0.276	0.067	4.104**
Access to Basic Services	0.046	0.1	0.464
Assets	0.167	0.082	2.036*
Social Safety Nets	0.211	0.112	1.881
Adaptive Capacity	0.059	0.102	0.583
Women empowerment	0.271	0.049	5.483**

*p-value,0.05, **p-value,0.01; Dependent variable: Food security; N=623

CONCLUSIONS AND RECOMMENDATIONS

This section presents conclusions and recommendations of the study.

There is a strong link found in assets with the use of climate smart initiatives, and vice versa. This correlation relationship might initially suggest that those practicing climate smart initiatives are those with more assets to invest or that those that have assets will want to undertake climate smart initiatives. Interestingly, through interviews, what we see here is the nuance that even if households have various sources of income, or that they are employed, **it is the available time that determines if they engage in practicing CSA, and not necessarily assets that they have.** This means that a household that puts too much time into non-agriculture employment or off farm jobs, might not simply be able to engage in CSA. Likewise, those that do not have assets might not be able to engage in CSA. It is plausible that **a combination of both assets and available time** that is needed to pursue and sustain the practice of CSA. Future studies building on this may look at the factor of available time in quantitative and qualitative studies.

There is also a relationship of subjective resilience statements with perseverance, self-efficacy, and vice versa. The subjective resilience statement is a hypothetical phrasing of how confident a household thinks it can survive a shock. In this study, it was revealed that households that are more confident (that they would be able to weather shocks in life) are those that are persevering and self-efficient. Self-efficacy is known to be a trait of making things happen for yourself while perseverance connotes being hardworking and having an end goal in mind. This relationship is manifested with interviews that detail how CSA works for their lives and how it contributes to both additional income and as source of food.

Additionally, the subjective resilience statement is connected to conscientiousness. This gives us a purview of households that are also aware of their surroundings and are accountable to others. In terms of resilience capacities, **the subjective resilience statement is linked to social safety nets.** This might mean that households who are aware of the extent of how they can rely on others are also quite confident that they would be able to cope when a disaster rakes place. Lastly, **the subjective resilience statement is related to food security.**

This means that those people that indicate that they are confident that they will survive hardship are also persons who are most likely to be food secure.

Using regression analysis, we see that at least one subdomain per dimension (subjective resilience, resilience capacities, and women empowerment) determines food security. Self-confidence using the BRIC method is one of the more telling subdomains that relate to food security.

A second look at risk perception (which is assumed to be related to being more calculated and less of a risk taker) is recommended – it seems that being cautious is not a black-or-white trait. For example, taking risks using the BRIC method is associated with other subdomains negatively, indicating that perhaps taking calculated risks is not mutually exclusive with being self-efficient and conscientious. Risk is also positively correlated to women's empowerment, possibly suggesting that those households exhibiting higher levels of women's empowerment are more cautious.

Hence, in line with the development hypothesis, we postulate: “IF CSA practices contribute to household resilience, THEN household resilience must account for both subjective and objective indicators.

Barriers related to alternative pathways in thinking of household resilience. Those that have received inputs and training related to CSA often cite the need for more training on the technical aspects and marketing (the neglect of these could affect the continuity of CSA). What the research goes on to suggest is that training can also emphasize strengthening psychosocial traits, hence improving subjective resilience. This claims that perhaps program interventions influence psychosocial traits that may be triggered when a shock takes place. Narratives relay how households have become more confident in their abilities relating to CSA activities.

Targeting the promotion of program interventions to be based also on psychosocial traits. Studying subjective resilience also informs program interventions on how households, prior to intervention, also are inclined to do things based on their personalities – personality traits of the household hear and the level of employment of women in the household. Perhaps, further study could focus on which aspect of promoting CSA certain households are more inclined to. Say, younger generations might not necessarily be inclined to practice CSA but are more attuned to promoting the benefits of CSA via training or social media. Along the value chain, perhaps certain traits might be more viable for households that already have primary sources of income.

Recognizing that households may have different roles in promoting the continuity climate smart agriculture. Households differ in primary sources of income, in managing their time, in the number of inputs and training received, in likes and dislikes, in age and physicality, and in the overall perception of CSA and how it relates to their resilience.

Promoting the use of CSA and how it relates to household resilience may require shifts in mindsets. What was discovered in the qualitative study was how CSA was also perceived to represent certain psychosocial traits – some viewed CSA as undertaken by hardworking households, who (beyond what they are already doing) can manage CSA initiatives and benefit from it. There is also a prevalent view that undertaking CSA might be too time-consuming and can only be done if they have extra time. There is also a view that CSA is not worth the time compared to focusing on a non-farm career.

If self-confidence, self-efficacy, assets, and women empowerment are important determinants of food security, and risk perception can be seen as a strength more than a weakness, program intervention can leverage these traits and capacities in the design of programs. If we postulate that program intervention can directly influence resilience capacity and women empowerment, then we can also influence psychosocial traits through training, and vice versa; psychosocial traits can inform program design.

Promoting CSA options as household adaptation strategy to cushion the impacts of Covid-19 pandemic. Data from FGDs cited that during the pandemic, some household survived from the impact of Covid-19 (food shortage, high cost of food, loss of income) because of the two CSA options -- homestead gardens and small livestock that provided them with food for the household, enabled them to share or sell vegetables to their neighbors, and reserved food for extended lockdowns as a critical Covid-19 adaptation strategy. In the absence of these food provisioning strategies, the impact of the pandemic could have severely impacted the CSVs.

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ANNEX 1. SURVEY INSTRUMENT

Respondent No.: _____

Household Resilience Survey

We are carrying out this survey for the International Institute of Rural Reconstruction to help us understand the situation of the households and their livelihoods as part of the project on climate smart villages (CSVs). The information we collect will be kept confidential. Please be aware that no special support will be given to your household as a result of your responses to the questions. This is for research purposes only. As such, please do your best to be as open and honest as possible.

Conforme:

Signature of Survey Respondent:

Name of respondent:

Age:

Marital Status:

Position of Respondent in the Household: [Head, Partner of the Head, Eldest: Son/Daughter]

Name of Village:

Name of Enumerator:

Date and Time of Interview:

Beneficiary of IIRR: [yes/no]

I. Household Characteristics

	Gender of household head.	[1=male 2=female]
	Total number of members of the household.	[number]
	Total number of household members of working age (>14 and <65 years old).	[number]
	Province	[open answer]
	Occupation of HH head and other Livelihood Source of HH.	[open answer - 1] [open answer -2] [open answer- 3]
	Average monthly income *In local currency. This can be a range if it is difficult to recall an exact value.*	[monetary value in local currency]

I. Resilience Capacities

A. Access to Basic Services

Is the main source of drinking water for household a piped connection to the household, public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs or rainwater collection?	[1=yes 0=no]
Is the main type of toilet facility used by household members a flush/pour flush (to piped sewer system, septic tank, or pit latrine), a ventilated improved pit (VIP) latrine, a pit latrine with slab, or a composting toilet?	[1=yes 0=no]
Is electricity the main source of energy used in the household for cooking or lighting?	[1=yes 0=no]
How far (one way) is the household dwelling from the closest accessible/functioning [SERVICE listed below] in actual distance?	[kilometers]
• Water source	[kilometers]
• Primary school	[kilometers]
• Public hospital / health facility	[kilometers]
• Livestock market	[kilometers]
• Agricultural/crops market	[kilometers]
• Public means of transport	[kilometers]

B. Assets

How many [ASSETS listed below] do the household members own?	[total number/tally]
[Asset 1]	[place a check mark]
[Asset 2]	[place a check mark]
[Asset 3]	[place a check mark]
[Asset 4]	[place a check mark]
[Asset 5]	[place a check mark]
[Asset 6]	[place a check mark]
[Asset 7]	[place a check mark]
[Asset 8]	[place a check mark]
[Asset 9]	[place a check mark]
[Asset 10]	[place a check mark]
How many [ASSETS listed below] do the household members own *related to agriculture*?	[total number/tally]
[Asset 1]	[place a check mark]
[Asset 2]	[place a check mark]

[Asset 3]	[place a check mark]
[Asset 4]	[place a check mark]
[Asset 5]	[place a check mark]
[Asset 6]	[place a check mark]
[Asset 7]	[place a check mark]
[Asset 8]	[place a check mark]
[Asset 9]	[place a check mark]
[Asset 10]	[place a check mark]
Do the household members use [INPUTS listed below]?	
• Purchased seeds (traditional/local)	[1=yes 0=no]
• Pesticides/herbicides	[1=yes 0=no]
• Fertilizers	[1=yes 0=no]
• Livestock feed	[1=yes 0=no]
What is the total area in hectares of agricultural land (owned, leased or used) that the household uses?	[hectares]
What is your land tenure status? *In the event of multiple statuses - please indicate the dominant status*	[SUse of common land-1 Rented-2 Owned-3]
How many [LIVESTOCK] does the household currently own?	
• Cows/calves or buffalo	[number]
• Sheep, goat	[number]
• Chicken, duck (*exclude chicks)*	[number]
• Pigs	[number]

C. Food Security

In the past four weeks, did you worry that your household would not have enough food?	[1=yes 0=no]
In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	[1=yes 0=no]
In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	[1=yes 0=no]
In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	[1=yes 0=no]
In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	[1=yes 0=no]
In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?	[1=yes 0=no]

In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	[1=yes 0=no]
In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	[1=yes 0=no]
In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	[1=yes 0=no]

D. Social Safety Nets

You may note if transfers are COVID-19 related

What is the total amount of **formal cash transfers**[18] received in the last 12 months by the household members? *Please use local currency.*	[monetary value in local currency]
How often have you or other members of the household received formal cash transfers in the last 12 months?	[1 = daily; 2 = weekly; 3 = biweekly; 4 = monthly; 5 = bimonthly; 6 = quarterly; 7= twice a year; 8 = only once/ lump-sum]
Have the cash transfers been received regularly in the last 12 months?	[Seldom-3 Frequent-2 Very Frequent-1]
What is the total amount of **formal in-kind transfers**[19] received in the last 12 months by the household members? *Please approximate the value of in-kind transfers and use local currency.*	[monetary value in local currency]
How often have you or other members of the household received formal in-kind transfers in the last 12 months?	[1 = daily; 2 = weekly; 3 = biweekly;

[18] **Formal cash transfers**. These amounts include for instance unconditional cash transfers, cash for work, pensions. Please include transfers from the Government, international organizations such as the WFP, FAO, UNICEF, etc., institutions, or non-governmental organizations, like Save the Children, Care International, Mercy Corps, etc

[19] **Formal in kind transfers.** These transfers include for instance relief food, food vouchers, input subsidies, fuel subsidies, asset transfers, etc. Please include transfers from the Government, international organizations such as the WFP, FAO, UNICEF, etc., institutions, or non-governmental organizations, like Save the Children, Care International, Mercy Corps, etc. and convert the amount into an equivalent monetary value, i.e. the amount you would have spent in case you had to buy the in-kind transfer.

	4 = monthly; 5 = bimonthly; 6 = quarterly; 7= twice a year; 8 = only once/lump-sum]
Have the in-kind transfers been received regularly in the last 12 months?	[Seldom-3 Frequent-2 Very Frequent-1]
Have the children in the household received special food assistance (ie. food packs, health packs) from the government or non-government agencies in the last 12 months? If yes, how many?	[number]
What is the total amount of **informal transfers**[20] received in the last 12 months by the household members? *Please use local currency.*	[monetary value in local currency]
Are members of this household formally participating in a local group/association, such as farmers groups, women support groups, youth groups, business associations, unions, coops etc.? If so, how many of these associations can provide support in case of need?	[number of associations] [number of associations that provide help]
How many relatives/friends/family members can the household members rely on in case of need?	[number]

E. Adaptive Capacity

Can the head of the household read and write (in any language / alphabet)?	[1=yes 0=no]
a. How many years has the household head attended formal school?	[number]
b. How many years has the household head attended non-formal?	[number]
a. How many years has the household member with the highest level of education attended formal school?	[number]
b. How many years has the household member with the highest level of education attended non-formal school?*	[number]
On average, how many years have the household members of working age (>14 and <65 years old) attended formal school? *Note down how many years of studying each working member has attended formal school, add these, and divide by the total number of working*	[number]

[20] **Informal transfers.** Please include cash from remittances of relatives or friends, the monetary value of in-kind transfers such as free food/grains/inputs.

Have the livestock owned by the household received any vaccination in the last 12 months?	[1 = yes 0 = no]

F. Shocks

i. Climate change and disasters

Over the past 12 months, how often did you experience the following below? *Please note the frequency per natural hazard.*	[total of frequencies/tally]
• Typhoon/Tropical cyclone [number]	[number]
• Flood [number]	[number]
• Forest fire [number]	[number]
• Heatwave [number]	[number]
• Storm surge [number]	[number]
• Drought or unusual low rainfall [number]	[number]
• Rising land temperature [number]	[number]
• Extreme rainfall [number]	[number]
• Rainfall variability [number]	[number]
In the last 12 months, what are the most severe shocks faced by the household? *Choose from the above list, if the HH remembers more than one severe shock that impacted their household, you can list these as well.*	[open answer]

ii. COVID-19

Which among these did you experience in the past 12 months during the pandemic?

Difficulty in securing inputs owing to the closure of agro-trading shops	[1 = yes 0 = no]
Increase in prices of agricultural inputs	[1 = yes 0 = no]
Loss of credit or financial support due to closure of banks and non-operation by financiers also affected some farmers and fisherfolk	[1 = yes 0 = no]
Reduced sales of farm products	[1 = yes 0 = no]
Difficulty of selling produce due to lack of mobility/transportation	[1 = yes 0 = no]
Decreased cash on hand possibly due to unemployment or inability to sell produce	[1 = yes 0 = no]
Inability of household to purchase food items due to high prices or lack of cash on hand	[1 = yes 0 = no]
Unemployment and/or difficulty seeking employment	[1 = yes 0 = no]
An influx of migrant workers in your community	[1 = yes 0 = no]

II. Psychosocial Indicators

A. Perseverance

I finish whatever I begin.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
Setbacks don't discourage me.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I am diligent.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I am a hard worker.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I have achieved a goal that took years of work.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I have overcome setbacks to conquer an important challenge.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1

B. Self-confidence[22]

On the whole, I am satisfied with myself.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
At times I think I am no good at all.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1

[22] **Note on scoring:** Items 2, 5, 6, 8, 9 are reverse scored. Give "Strongly Disagree" 1 point, "Disagree" 2 points, "Agree" 3 points, and "Strongly Agree" 4 points. Sum scores for all ten items. Keep scores on a continuous scale. Higher scores indicate higher self-esteem.

I feel that I have a number of good qualities.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I am able to do things as well as most other people.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I feel I do not have much to be proud of.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I certainly feel useless at times.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I feel that I'm a person of worth, at least on an equal plane with others.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I wish I could have more respect for myself.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
All in all, I am inclined to feel that I am a failure.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I take a positive attitude toward myself.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1

C. Risk perception

Taking risks makes life more fun.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
My friends would say that I'm a risk taker.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I enjoy taking risks in most aspects of my life.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I would take a risk even if it meant I might get hurt.	Strongly Agree - 4 Agree - 3

members. We want to see the household level of education.	
In the past 12 months, what percentage of the household's overall income was generated by [SOURCES listed below]? *First cross out what is not applicable for the household, then identify the percentage of income coming from the sources that are applicable.*	[%]
• Agriculture, animal breeding, fishing	
• Family business (other than agriculture)	
• Government wage and salary	
• Private sector wage and salary	
• Transfers and social assistance	
• Other	
Over the past 12 months, what is the total value of loan(s) received by household members?	[monetary value in local currency]
How many different crops have the household members grown during the last season?	[number]
Have the household members used **improved quality seeds**[21] during the last season? [Please refer to both rainy and off-season culture].	[1 = yes 0 = no]
a. Have the household members received any training in the last 12 months? (if "Yes", go to question b)	[1 = yes 0 = no]
b. if "Yes", which type of training?	[1 = good agricultural practices 2 = livestock management 3 = agribusiness and value addition 4 = vocational training 5 = other]

[21] Types of "Quality Seeds": Breeder Seed' - this is the seed of a new variety that has the highest purity, and produced, developed, controlled and provided directly by the breeders or their institution for further multiplication. 'Foundation Seed'. - this is the progeny of the breeder seed, produced by trained officers of an agricultural station in conformity with regulated national standards and handled to maintain genetic purity and identity of the variety. 'Registered Seed'. - this is the progeny of the foundation seed grown by selected farmers, handled to maintain genetic purity and identity, and has undergone field and seed inspections to ensure conformity with standards. 'Certified Seed' - this is the progeny of foundation, registered or certified seeds, handled to maintain sufficient varietal identity and purity, grown by selected farmers under prescribed conditions of culture and isolation and subjected to field and seed inspections prior to approval by the certifying agency. Harvest from this class is used for commercial planting.

Have the livestock owned by the household received any vaccination in the last 12 months?	[1 = yes 0 = no]

F. Shocks

i. Climate change and disasters

Over the past 12 months, how often did you experience the following below? *Please note the frequency per natural hazard.*	[total of frequencies/tally]
• Typhoon/Tropical cyclone [number]	[number]
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II. Psychosocial Indicators

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I enjoy taking risks in most aspects of my life.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I would take a risk even if it meant I might get hurt.	Strongly Agree - 4 Agree - 3

	Disagree - 2 Strongly Disagree - 1
Taking risks is an important part of my life.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I commonly make risky decisions	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I am a believer of taking chances.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I am attracted, rather than scared, by risk.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1

D. Self-efficacy

I will be able to achieve most of the goals that I have set for myself.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
When facing difficult tasks, I am certain that I will accomplish them.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
In general, I think that I can obtain outcomes that are important to me.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I believe I can succeed at most any endeavor to which I set my mind.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I will be able to successfully overcome many challenges.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I am confident that I can perform effectively on many different tasks.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
Compared to other people, I can do most tasks very well.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1

Even when things are tough, I can perform quite well.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1

E. Big Five Traits [23,24]

I am communicative and talkative.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I am outgoing and sociable.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I am reserved.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I am forgiving.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I am kind and considerate.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I work carefully.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I work effectively and efficiently.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I tend to be lazy.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1

[23] Self-regulatory personality factors (conscientiousness, extraversion) were positive linear predictors of proactive resilience, as well as significant negative predictors of stress factors and symptoms of academic stress. https://www.frontiersin.org/articles/10.3389/fpsyt.2021.600240/full.

[24] https://www.researchgate.net/figure/The-self-assessment-questions-in-the-SOEP-2005-wave_tbl1_251516649.

I am relaxed and handle stress well.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I get nervous easily.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I worry a lot.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I have a lot of new ideas.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
I am open to new ideas.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1

III. Subjective Resilience

If heavy flooding was to occur in my area tomorrow, my household would be able to fully recover from the damage caused by the floods within 6 months.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
If the rate and intensity of flooding was to increase significantly in the next 5 years, my household would have the ability to successfully adapt to the changing threats posed by the floods.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
If heavy flooding was to occur in my area tomorrow, my household would have access to sufficient financial resources to ensure that we fully recover from the threats posed by the floods.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
If heavy flooding was to occur in my area tomorrow, my household would be able to draw on the support of family and friends to ensure that we fully recover from the threats posed by the floods.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
My household has learned considerably from how we have dealt with past drought events. This knowledge is crucial in successfully dealing with future drought events.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1
If heavy flooding was to occur in my area tomorrow, my household would have access to early-warning information to ensure that we are fully prepared for the threats posed by the floods.	Strongly Agree - 4 Agree - 3 Disagree - 2 Strongly Disagree - 1

IV. Climate Smart Agriculture Practices Used

Have you undertaken the following practices in the past 12 months?

Rainwater harvesting	[1 = yes 0 = no]
Alternate wetting drying for rice	[1 = yes 0 = no]
Drip irrigation	[1 = yes 0 = no]
Furrow-irrigated raised bed planting	[1 = yes 0 = no]
Drainage management	[1 = yes 0 = no]
Cover crop method	[1 = yes 0 = no]
Site-specific nutrient management/precision agriculture *Ex. minimizing fertilizer overuse*	[1 = yes 0 = no]
Green manuring	[1 = yes 0 = no]
Integrated nutrient management	[1 = yes 0 = no]
Intercropping with legume	[1 = yes 0 = no]
Crop rotation	[1 = yes 0 = no]
Improved crop varieties	[1 = yes 0 = no]
Seed and fodder banks	[1 = yes 0 = no]
Zero tillage/minimum tillage	[1 = yes 0 = no]
Agro-forestry (planting of trees in the farm)	[1 = yes 0 = no]
Concentrate feeding for livestock	[1 = yes 0 = no]
Fodder management	[1 = yes 0 = no]
Integrated pest management	[1 = yes 0 = no]
Vegetable gardening with fruit trees	[1 = yes 0 = no]
Homestead Livestock raising	[1 = yes 0 = no]
Homestead food production *Example: corn, vegetables, legumes*	[1 = yes 0 = no]
Raising local and native varieties	[1 = yes 0 = no]
Diversification of homestead-based low input production *Examples: vegetable production, duck rearing, fish*	[1 = yes 0 = no]

production in backyard, low input pig/chicken production, coconut husk fiber processing, vegetable gardening with root crops, livestock raising	
Use weather and climate reports by the authorities to decide on what to do with the crops and farms	[1 = yes 0 = no]

A. Types of Coping Strategies

In the past 12 months, if there have been times when you did not have enough food or money to buy food, how often has your household had to (please encircle response):

Food security

Rely on less preferred and less expensive food?	Never - 3 Sometimes - 2 Often - 1
Borrow food, or rely on help from a friend or relative?	Never - 3 Sometimes - 2 Often - 1
Purchase food on credit?	Never - 3 Sometimes - 2 Often - 1
Gather wild food, hunt, or harvest immature crops?	Never - 3 Sometimes - 2 Often - 1
Consume seed stock held for next season?	Never - 3 Sometimes - 2 Often - 1
Send household members to eat elsewhere?	Never - 3 Sometimes - 2 Often - 1
Send household members to beg?	Never - 3 Sometimes - 2 Often - 1
Limit portion size at mealtimes?	Never - 3 Sometimes - 2 Often - 1
Restrict consumption of adults in order for small children to eat?	Never - 3 Sometimes - 2 Often - 1
Feed working members of HH at the expense of non-working household members?	Never - 3 Sometimes - 2 Often - 1
Ration the money you had and buy prepared food?	Never - 3 Sometimes - 2 Often - 1

Reduce number of meals eaten in a day?	Never - 3 Sometimes - 2 Often - 1
Skip entire days without eating?	Never - 3 Sometimes - 2 Often - 1
Temporary migration for work?	Never - 3 Sometimes - 2 Often - 1
Sold assets for cash on hand?	Never - 3 Sometimes - 2 Often - 1
Borrow money?	Never - 3 Sometimes - 2 Often - 1
Grants from external persons/organizations/government?	Never - 3 Sometimes - 2 Often - 1

This is a <u>women-only section</u> that is part of the section on II. Resilience Capacity – please request to interview the most senior female member of the household alone.

As a senior member of the family, we would like you to answer the following section. It would be helpful if you could answer this with us by yourself.

Women Empowerment

How much input did you have in making decisions about: food crop farming, cash crop farming, livestock raising, fish culture?	1 = no input or input into a few decisions, 2 = input into some decisions, 3 = input into most or all decisions
To what extent do you feel you can make your own personal decisions regarding these aspects of household life if you want(ed) to: food crop farming, cash crop farming, livestock raising, fish culture?	1 = not at all, 2 = small extent, 3 = medium extent, 4 = to a high extent
Do you own any of the [ITEMs listed below]? Agricultural land, Large livestock, Small livestock,	1 if the individual, alone or jointly, owns any of that type of

Chicks etc; Fish pond/equip; Farm equip (non-mech); Farm equip (mechanized) Nonfarm business equipment House; Large durables; Small durables; Cell phone; Non-ag land (any); Transport	asset, 0=not
Has anyone in your household taken any loans or borrowed any cash/in-kind in the past 12 months?	1 if the respondent makes, alone or jointly, at least one of the two decisions considered—borrowing or how to use the credit—for that particular source of credit, 0 if individuals live in households that do not use any source of credit are considered inadequate on access to credit.
Who made the decision to borrow/what to do with money/item borrowed from [SOURCE listed below]? Non-governmental organization (NGO); Informal lender; Formal lender (bank); Friends or relatives; or a savings/credit group?	1 if the respondent makes, alone or jointly, at least one of the two decisions considered—borrowing or how to use the credit—for that particular source of credit, 0 if individuals live in households that do not use any source of credit are considered inadequate on access to credit.
How much input did you have in decisions on the use of income generated from: Food crop, Cash crop, Livestock, Non-farm activities, Wage & salary, Fish culture?	1 = no input or input into very few decisions, 2 = input into some decisions, 3 = input into most or all decisions.
To what extent do you feel you can make your own personal decisions regarding these aspects of household life if you want(ed) to: Non-farm economic activities? Your own wage or salary employment? Major and minor household expenditures?	1 = not at all, 2 = small extent, 3 = medium extent, and 4 = to a high extent
Are you a member of any: Agricultural / livestock/ fisheries producer/mkt group; Water; Forest users'; Credit or microfinance group; Mutual help or insurance group (including burial societies); Trade and business association; Civic/charitable group; Local government; Religious group; Other women's group; Other group	1 if an individual is considered adequate if they are an active member of at least one group. 0 = if there are no groups in the community, he/she is inadequate for this indicator.
Worked more than 10.5 hours in previous 24 hours.	1=yes 0=no

ANNEX 2. FOCUS GROUP DISCUSSION INTERVIEW GUIDE

Climate smart agriculture

1.What CSA practices (expressed as diversified systems, inclusive of both traditional and introduced modern practices and systems) do you undertake?
2.Where did you learn CSA practices? Did you receive IIRR support? When did you receive support? What type of support? What practices did you undertake after support?

COVID-19 and shocks

1.What happened in COVID-19? How was your HH affected? Did CSA practices help you in the pandemic? How?
2.Would you continue practicing CSA when things go back to normal after the pandemic? Why?
3.In the past 12 months, did you experience [shocks]? How was your HH affected? Did CSA practices help you in manage the impact of the [shock]? How?

Overall

1.Overall, did the support (e.g. learning about CSA practices) help/not help your household? In what ways?
2.With CSA, do you feel that you can better feed your family? That they are eating better? How?
3.With CSA, do you feel that your income has improved? How?
4.With CSA do you feel less worried that you will go hungry in case a shock happens? How?
5.In what ways would you like to improve or scale up your own CSA practices? What support do you need?
6.What would hinder you from continuing practicing CSA?

ANNEX 3. KEY INFORMANT INTERVIEW QUESTIONS

1. Is CSA something that is done by households in your area? To what extent?

2. Based on your observation, what types of households practice CSA?

3. In your opinion, what types of households would benefit from CSA? How would it benefit them?

4. During the pandemic and/or a shock, do you think CSA has helped the community?

5. What is needed to support the practice of CSA? In the household level? Community level