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Lund University Master of Science in
International Development and Management (LUMID)
August 2013

On Their Own

Exploring socioeconomic vulnerability and resilience in rural Dry Zone communities in Myanmar

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ACKNOWLEDGEMENTS

My thanks go to the talented people at the Social Policy and Poverty Research Group in Myanmar, particularly Dr. Mike Griffiths, for a great number of reasons. It goes without saying that this thesis could not have come about without the help of SPPRG, and I will always be very appreciative of the highly rewarding internship I was given the opportunity to undertake with them.

Equally indispensable was being awarded the SIDA travel scholarship, without which I probably would have been living off a diet of plain rice and noodles during my six months and two internships in Viet Nam and Myanmar.

Last but in no way least, thanks to all the friends and acquaintances whose company I had the pleasure to keep during those six months in both countries, to my professors in the LUMID programme, and everyone else who helped me get here in the end.

Jarl N.B. Jensen

ABSTRACT

This paper revolves around exploring the underlying trends and relationships in socioeconomic vulnerability and resilience in Myanmar's Dry Zone, with the overarching goal of identifying which are the most and least vulnerable types of households and why. This was done by applying Füssels 2007 conceptual framework for vulnerability to a quantitative data processing/interpretation approach termed Umbrella Modeling (developed by the Social Policy and Poverty Research Group in Myanmar), to study a dataset based on 1785 structured household interviews from the Dry Zone.

After examining the three factors of location, demographics and relationships between the attributes that collectively determine what constitutes vulnerability and resilience, it was found that the extent to which households are socially included (or excluded) by their community appeared to be the most decisive factor. The most resilient households in the sample were those that were closely integrated into formal and informal community institutions, and the most vulnerable were those that, for whatever reason, lived outside of them.

Word Count: 14,978

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1. INTRODUCTION

1.1 Background and Context

A recent report authored by the UNDP in partnership with the government of Myanmar found that while some 10% of Myanmar's population can be classified as living below the national poverty line, transient poverty – a state where households dance precariously on either side of the poverty line – is a phenomenon which is almost three times as prevalent; 28% of households, the majority of which are found in rural areas with significant biophysical challenges such as the Dry Zone, fall under this category (IHLCA 2011a: xi).

In a country where social security is limited to the formal sector (Koehner & Nishino 2011: 6), rural communities – and by extension, households – receive hardly any government assistance and are largely left to fend for themselves. Unsurprisingly, and making matters worse, Myanmar is one of the poorest countries in the world with abysmal UNDP development indicators, ranking 149 (out of 186) in the 2012 Human Development Index (UNDP 2013). The country has only recently begun to recover from decades of mismanagement under military rule, but still faces ethnic tensions; with over 180 recognized ethnic groups and only an estimated 68% of the population being comprised of the Bamar majority ("CIA World Factbook"), intra-state conflict has been prevalent almost ever since the country gained its independence in 1948.

Transient poverty in the Dry Zone, however, has very little to do with ethnic tensions or strife, as the population is almost entirely Bamar (ethnic minorities are concentrated in the periphery regions of Myanmar). The main issue is something as simple as rainfall; there is too little, it is too irregular, and it has only gotten worse in the past decades (WFP 2011: 4). Compounded by the reality of being a region where the majority of livelihoods are based on a rural farm and non-farm economy (WFP 2011: 15), transient poverty is unsurprisingly a common phenomenon.

Transient poverty is in many ways directly linked to socioeconomic vulnerability; the extent to which a household is vulnerable to stressors and shocks can obviously help explain why it finds itself on either side of the poverty line. Yet how and why do some households cope better and worse than others, and are there any particular factors that can be isolated as the 'secret recipe' to resilience in an unforgiving environment? Which households are able to recover from external shocks, and which get caught in cycles of adversity until reaching a point where even something as basic as food becomes unaffordable?

The most popular issue to focus on in the Dry Zone has perhaps quite appropriately been food security. The World Food Programme and The Livelihoods and Food Security Trust Fund (LIFT) approach to the Dry Zone revolves around mitigating food insecurity while also promoting rural development (LIFT 2013a). The issue taken with this prioritization by the author of this paper, however, is that while households suffering from food insecurity are obviously likely to most often directly overlap with most vulnerable, the reason why they are suffering from food security in the first place is likely due to them having been vulnerable long before that *in other regards*. If the indicators of the LIFT Fund are any indicator in themselves, the contextual circumstances of households where things have gotten so bad that they are starving, and where the preventative solutions could be found, are being ignored in favor of ensuring that everyone has enough to eat by essentially working towards increasing agricultural output and creating more jobs in the region (LIFT 2013b).

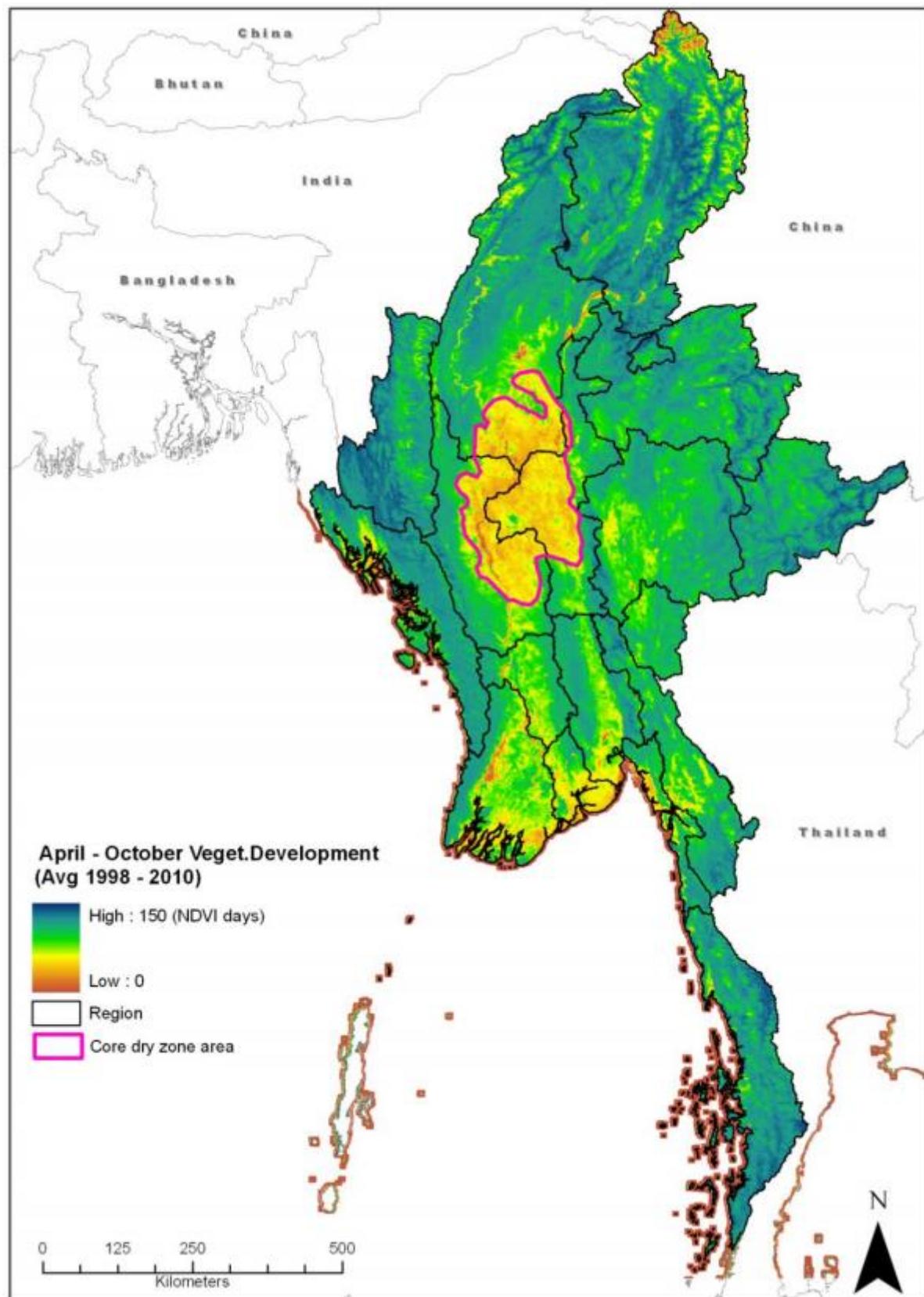
The second issue taken to this approach, but one that also extends more generally to many other projects, is the lack of focus on the households which do not need any help. What can be learned from them?

This paper addresses food security and livelihoods as only two parts of an holistic 10-point socioeconomic vulnerability model that was built to facilitate analysis of the major stressors and shocks that households in the Dry Zone are exposed to on a regular basis; in short, quantitative indicators of the experienced quality of life. The idea behind Umbrella Modeling, as it is called, is to quite literally paint a picture of how well a particular social unit is faring in terms of fixed scores, but also more importantly, relative to others. The variant of Umbrella Modeling employed in this thesis is based on the same principle, but with a handful more distinctions for households than the original variant, which only distinguished between the vulnerable and non-vulnerable. The objective was to gain insights into which were the vulnerable and resilient among households in the Dry Zone, where those falling into the former category are particularly affected by shocks which they potentially never recover from, while those in the latter ‘bounce back’, as it were, without major difficulties. Comparing the characteristics of the socioeconomic ‘winners’ from the ‘losers’ would then help explain what types of households would typically fall into either category over time.

Employing Füssels’ 2007 conceptual framework on vulnerability to delineate the area of study, and the Social Policy and Poverty Research Group’s Umbrella Modeling as an analytical framework within which to guide the research and analyze the data, the findings broke down the distribution of vulnerability and resilience – in terms of attributes and households – in the sample of 1785 households retrieved from the center of Myanmar’s Dry Zone (Northeastern Magway). The subsequent analysis differentiated the households (classified along categories on a vulnerable-resilient spectrum) along three broad areas – location, demographic features, and attribute composition – to investigate what actually made their circumstances so different.

Whose grandchildren were likely to attend university one day, and whose were likely to die before the age of 5 from malnourishment? This proved a bit more difficult to ascertain than one would have assumed. Being born in the right (or wrong) village was certainly a factor. As was the economic dependency ratio, health issues, and other relatively predictable demographic factors (except gender – as a whole, female-headed households were in fact slightly better off than male-headed ones), but only to a limited extent. The only place where the distinctions became clear-cut was in terms of food security and social participation; by and large, the most vulnerable households in the sample were those that were 1) experiencing food insecurity, but more interestingly, 2) those which were essentially pariahs in terms of their social participation score. On the other hand, hardly any households with a relatively high social participation score were classified as vulnerable, the conclusion being that even in the Dry Zone, you will get by with a little help from your friends. The communities themselves appear to be offer rather effective social safety nets, but only to those who are part of them.

Map 1: Myanmar NDVI (Dry Zone outlined)



(WFP 2011: 13)

1.2 Aim of Study

The aim of this paper is to provide insights into the state and dynamics of transient poverty in Myanmar's Dry Zone through layered analysis of the socioeconomic characteristics of households in the region. This is to be executed through an adaptation of a new approach to analyzing social vulnerability called Umbrella Modeling. Through this approach, it is theoretically possible to identify households which are likely to be more vulnerable to hazards potentially leading to deterioration in their quality of life, as well as those of households which are more resilient towards external stressors and shocks. In doing so, it is technically possible to assess which are the most prevalent socioeconomic characteristics among the most vulnerable and resilient households and thereby form conclusions pertaining to what may appear to be the most common determinants of their state. That said, these findings are not authoritative enough to establish causality on their own; the purpose is merely to identify the strongest correlations, both between specific socioeconomic characteristics of households and to their state of comparative resilience/vulnerability.

1.3 Research Question(s)

What are the characteristics of socioeconomically vulnerable and resilient households (identified through Umbrella Modeling) in Myanmar's Dry Zone and how do they differ?

- 1) Are vulnerability and resilience concentrated within certain groups or scattered throughout the sample population?
- 2) Which attributes, if any, could appear to be strong determinants of a household's overall level of vulnerability/resilience?

2. CONCEPTUAL FRAMEWORK

The word vulnerable stems from the Latin word *vulneratus*, meaning wounded. Though the term eventually evolved into meaning the *capacity* to be wounded in modern discourse (Füssels 2007: 155; Turner et al. 2003: 8074), its etymological roots suggest that one has to be wounded in the first place. Vulnerability, in other words, can be understood as a precondition for *as well as a precursor to* further vulnerability.

This understanding of vulnerability lends to a perspective which underscores the importance of seeking out and targeting the root causes of vulnerability; for instance, it makes little sense to make AIDS/HIV treatment more physically accessible to infected individuals if underlying vulnerabilities, such as social stigmas pertaining to the disease itself and/or homosexuality, or simple ignorance of the disease or being infected, prevent or deter people from seeking treatment.

Equally important is that vulnerability must be viewed holistically; issues such as food security, debt, and health can be tackled more effectively if seen as interdependent problems, rather than prescribing painkiller-solutions to wherever it may be hurting the most as a long-term strategy.

That said, it is beyond the scope and aim of this paper to provide a definitive ‘solution’ to vulnerability in Myanmar’s Dry Zone, where the fundamental problems are essentially biophysical; the Dry Zone is not named so for its people’s sense of humor. Within the scope of this paper, however, is to examine which types of households are relatively more vulnerable than others to become or remain poor as a result of fundamental risk factors, which are relatively more resilient, and by simply comparing their characteristics provide potential clues as to *why*.

The term vulnerability in and of itself is, however, a problematic one in academic discourse as it is one word with a plethora of definitions, depending on the context it is used in. Climate change scientists typically use the term in the context of a given system’s degree of exposure to natural hazards, though in the field of public health, for example, the focus is naturally on disease, malnutrition and epidemics, while an equally viable ecological definition of vulnerability revolves around the capacity of natural environments to cope with anthropogenic factors. As Füssels (2007: 156) notes, “the diversity of conceptualizations is seen primarily as a consequence of the term ‘vulnerability’ being used in different policy contexts, referring to different systems exposed to different hazards.” Accordingly, the terminology used for this paper is drawn from Füssels’ influential study which proposed a universal framework for defining what is meant by the word vulnerability.

First and foremost, Füssels argues that the conceptual meaning of vulnerability in different academic contexts can be organized along *spheres* and *domains* (Füssels 2007: 158).

Spheres delineate between internal and external factors affecting a given system, which “typically reflects geographical boundaries or the power to influence.” (Füssels 2007: 158). In determining the sphere of a given vulnerability study, the researcher effectively clarifies its scope and level of study. What is considered internal and external depends on the level of study; national policy in Myanmar may for instance be considered internal if the whole country is the system of analysis, yet external if a rural community is the object of study.

Domains distinguish between socioeconomic and biophysical vulnerability factors (Füssels 2007: 158). If spheres indicate where the borders of a study are drawn, domains tell what will be examined within them. Socioeconomic factors are generally those that relate to the social sciences, such as economics, demographics and institutions, while biophysical ones are those investigated in the natural sciences, such as climate and physical geography.

Table 1: Spheres and Knowledge Domains

SPHERE	DOMAIN	
	Socioeconomic	Biophysical
Internal	Household income; social networks; access to information	Topography; environmental conditions; land cover
External	National policies, international aid, economic globalization	Severe storms, earthquakes, sea-level change

(Füssels 2007: 158)

This framework allows for an *internal/external, cross-scale* (both internal and external), and *integrated* (both socioeconomic and biophysical) conceptual delineation of vulnerability (Füssels 2007: 159), incorporating the majority of its definitions while largely mitigating the ambiguities that have traditionally accompanied the term.

While any vulnerability analysis ought to *ideally* consider all four – internal and external, socioeconomic and biophysical – aspects, “real-world data and other constraints invariably necessitate a reduced vulnerability assessment” (Turner et al. 2003: 8076). In other words, a comprehensive vulnerability analysis of Myanmar’s Dry Zone would simply lose focus and therefore utility if it tried to incorporate every single relevant aspect.

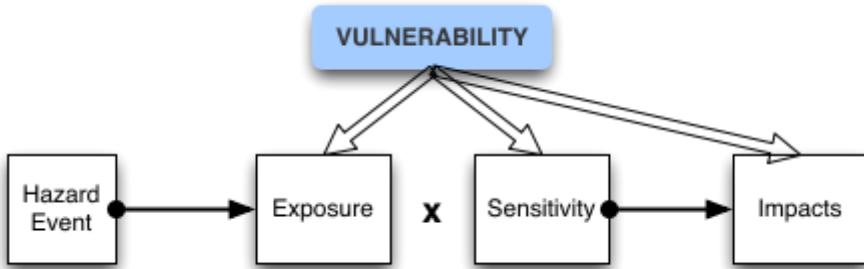
The type and scope of vulnerability being treated in this paper largely fits within what is most commonly and traditionally referred to as *social* vulnerability, where the system of analysis is a population group. This is based on the political economy approach to vulnerability, which is prevalent in international development and poverty research (Füssels 2007: 160). In this field, Adger and Kelly (1999: 253) provide an interesting definition to vulnerability as “the state of individuals, of groups, of communities defined in terms of their ability to cope with and adapt to any external stress placed on their livelihoods and well-being.” Originating out of climate change discourse, they argued that “the socioeconomic and biophysical processes that determine vulnerability are manifest at the local, national, regional and global level but that the state of vulnerability itself is associated with a specific population.” (199: 253). To build on this notion, studying the *causes* of vulnerability can be kept distinct from studying their *effects* on populations; *why* the rural poor in Bangladesh are affected by underlying factors beyond their control, such as rising sea levels and lack of access to social protection, is a distinct field of study from *how* they cope and adapt to them (and the availability of resources to do so). Social vulnerability can, essentially, be defined as how internal socioeconomic (and to some extent anthropogenic-biophysical, such as land degradation and deforestation) factors and processes are affected by external biophysical and socioeconomic ones.

For the intents of this paper however, further elaboration of this argument is required: Social vulnerability, as a state of being, encompasses all relevant internal socioeconomic (and to a lesser extent anthropogenic biophysical) conditions and processes within a population, affected by external biophysical and socioeconomic factors, which reduce the capacity of households, communities or populations to mitigate the impact of shocks and stressors *relative to others*.

This adds a further dimension to social vulnerability in the sense that it is *explicitly relative*; no two individuals, households or populations are equally affected by the same phenomenon, and nuances exist within the population. There are a multitude of factors that mitigate and exacerbate the impact of any given hazard, and it is important to measure resilience in equal proportion to hazard.

The elaborated definition and additional dimension is necessary because this was precisely one of the earlier critiques levied against the traditional Risk-Hazard model (see Figure 1) in that it did not explain how sub-components of a system (or population) are affected differently by the same hazard. Turner et al. (2003: 8075) later came to argue that resilience is based on the concept of *entitlements*, which effectively constitutes the capital (social, political and economic) that a social unit or group can draw upon in times of trouble.

Figure 1: The Risk-Hazard Model



(Based on Turner et al. 2003: 8075)

A definition may now be in place (relative resilience to primarily socioeconomic stressors and shocks within a population), yet further delineation is necessary. In addition to spheres and domains, Füssels argues a universally applicable framework for a vulnerability study is comprised of four more dimensions (2007: 159):

- Temporal reference: current vs. future vs. dynamic
 - Vulnerable system
 - Attribute of concern
 - Hazard

Accordingly, this paper will focus on the *present* state of *internal socioeconomic vulnerability* and resilience of *households and communities* located in *Myanmar's Dry Zone* (specifically Northeastern Magway). The attributes of concern are, in no particular order:

- Dependency
 - Debt
 - Expenditure Allocation
 - Livelihood and Income Sources
 - Assets
 - Food Security
 - Water and Sanitation
 - Health
 - Social Participation
 - Participation in Community Decision-Making

These attributes were selected for the purpose of being able to construct a comprehensive vulnerability assessment, covering a very broad range of facets pertaining to the experienced state of vulnerability. The hazards these attributes can be impacted by are, fundamentally, negative feedback cycles due to a lack of entitlements (socioeconomic capital) and ‘classical’ external shocks and stressors such as, for instance, low rainfall levels, bad health, or loss of income. The underlying notion is, as discussed in the beginning of this section, that vulnerability is a precondition to *and a precursor for* further vulnerability. The negative feedback cycle begins with a lack of resilience of one or more attributes to a given hazard, which both gradually exacerbates a household’s sensitivity to it and potentially ‘infects’ other attributes.

In terms of debt for example, a household with a terrible debt profile (where 100% of its debt is with moneylenders) is relatively less resilient (and therefore more vulnerable) than a household which owes half of its total debt to an NGO and the other half to relatives. Should the former household fall upon hard times (crop failure, loss or disability of an income-earner, loss of assets, social exclusion), it is likely to face far greater issues with its debt than the latter household. It could also simply be that the debt burden has reached a point where it is unsustainable. It may have to take on new debt from the same untenable sources simply to pay off old debt. Other attributes of the household could also easily be expected to be influenced by debt vulnerability; this could involve taking children out of school to contribute to the household’s income, having to spend a larger proportion of its income on debt instead of productive assets and savings, selling their assets, saving on food, and so forth.

The analytical framework upon which the attribute system is based on, and the operationalization of this conceptual framework, is explained in the Methods section.

3. METHODS AND STUDY DESIGN

3.1 Introduction

The design of this research topic is rooted in quantitative methods with an inductive aim to form a hypothesis based on its findings. The specific methods of data collection, processing and analysis are outlined below. Special circumstances pertaining to the national situation in Myanmar, and the fact that the author became part of a larger research process associated with the data that was already underway (and still is), necessarily entailed that the actual field work did not proceed along entirely orthodox lines. Accordingly, this section begins with an overview of the contextual factors which influenced the design of this study.

3.2 Study Design and Analytical Framework

3.2.1 Context

The design of this study was largely dependent on the design of an overarching study on social vulnerability in Myanmar's Dry Zone being conducted by the Social Policy and Poverty Research Group (SPPRG), which has a close association with ActionAid Myanmar.

In late 2012, SPPRG initiated a mixed-methods study of social vulnerability in Myanmar's Dry Zone with the aim of obtaining data that could primarily be used for constructing a socioeconomic vulnerability profile of the region, towards an end goal of producing social protection policy insights.

To this end, a structured household vulnerability survey was designed by SPPRG which was to be conducted by the ActionAid Fellows, who are local Burmese youths associated with ActionAid. The Fellows are recruited from local communities in areas such as the Dry Zone and trained to become 'change-makers', whereupon they are sent back to their home region to promote community-based development. Nichols (2006: 26) notes that it is highly important to match fieldworkers to their community (but depending on the nature of the questions, not their village), particularly in rural areas. The questions comprising the questionnaire were also designed and piloted with the vital input of the Fellows, who already had experience conducting Participatory Rural Appraisals in the area, and were given a three-day training course on how to conduct the survey.

Integrating local knowledge and local workers into the process helped ensure that the questions were relevant and that data collection would be far less problematic (Nichols 2006: 27). The questionnaire can be found in Appendix A.

The survey was ambitious both in terms of width and depth; it aimed not only at including the major facets of social vulnerability outlined in the conceptual framework of this paper, but numerically the number of respondents amounted to nearly 4000 households (and basic demographic information on about 20,000 individuals). Though the accuracy of a sample improves with size, as Nichols notes, there is usually little need for a number of respondents to exceed 1000 for the findings to be statistically accurate (Nichols 2006: 56). The reason for significantly exceeding this number, however, was due to SPPRG's interest in obtaining sufficiently accurate information on sub-groups within the population, such as persons with disabilities.

The questions were formulated to be *closed* (Nichols 2006: 49), as they were intended for statistical use. To this end the answers were also assigned numerical values, allowing them to be *coded* into Microsoft Excel at a later point (Nichols 2006: 44).

Geographically, this survey covered the sizeable area of Magway province which lies within the Dry Zone. The sampling frame was clustered communities where every household was interviewed, rather than a sample of a handful of random households from every village/community in the relevant geographical area (Nichols 2006: 51, 64). This allowed for the possibility to examine socioeconomic facets and dynamics of vulnerability not just on a household-region dimension, but on a household-community one as well.

The author of this paper entered the research project just as the first surveys were arriving at SPPRG headquarters in Yangon, becoming involved in the processing of the data while conducting research related to but separate from that of SPPRG's overarching social protection study.

3.2.2 Source and Type of Data

As elaborated upon above, the data that forms the basis for this paper is, in turn, based on that collected by the structured household vulnerability surveys conducted by the ActionAid Fellows in late 2012. A sample of 1785 households (17 villages) was randomly selected from the overall clustered sample of villages located in Magway province's portion of the Dry Zone. The villages selected were all in the same area within the Dry Zone (Upper Magway) to increase the likelihood of them all having geographically and biophysically similar circumstances. The full sample amounting to 4000 households was not used because the sample of 1785 households across 17 villages, with a total population of 9065, was determined to contain enough spatial variety as well as data on relevant sub-groups (such as female-headed households) to lead to statistically significant findings.

The data that was used in this research, excluding theoretical and conceptual literature, was hence overwhelmingly secondary in nature, based on surveys. That said, there may be a slight overlap in the primary-secondary aspect of the survey data as the author was involved in the interpretation of a significant number of ambiguous survey answers, as well as the overall cleaning and processing of the data. Table 2 below provides basic details on each village.

Table 2: Sample Overview

Name	# Households
Le Khote Phin / လက်ခိုင်	77
Son Gone / စွန်ကုန်	55
Chaung U Toe / ချောင်းဖီးတိုး	94
Myin Ko Thit / မြင်ကိုသစ်	98
Zee Taw Tite / ဒီးတော်တို့က်	88
Chaung Sone / ချောင်းဆုံး	96
Ong Daw / အုန်းတော့	133
A Nauk Daw / အုန်းတော့	161
Let Pan Kyun / အနောက်တော့	181
So Pyin / ဆိုပြင်	88
Ywa Dong She / ရွာဒေါင်း	178
Kan Ka Lay / ကန်ကလေး	136
Sabai (M) / စံယ်(ခြောက်)	118
Kyoe Tan / ကြိုးတန်း	55
San Pya / စံပြု	59
Say Kyine / ဆေးတိုင်း	101
Myay Gyan Taw / မောက်မီးတော့	67

3.2.3 Data Processing

Once the surveys began to arrive, a team of enumerators began coding the survey answers of individual villages into preformatted Excel spreadsheets. Every village and survey was given a code so that they could be easily matched for future reference.

For the purposes of this paper, 17 of these village files were compiled into one total sample. This facilitated the analysis of socioeconomic vulnerability/resilience on both individual village levels and on overall regional/demographic trends.

3.2.4 Data Analysis

As mentioned earlier, the analytical framework utilized in this study is based on Umbrella Modeling. Umbrella Modeling is based on compiling attribute scores (calculated in Microsoft Excel) of 10 different socioeconomic vulnerability indicators: Dependency; debt profile; household expenditures allocation; income sources; food security; water/sanitation; health; assets; social participation; and participation in decision-making. Each attribute in every household is scored based on the answers it provides on a contextualized survey on a scale of 0 to 1. The questions and possible answers are available in the survey found in Appendix A. An overview of the main factors that influence these scores, and the justification for using them as indicators, is provided in Table 3.

Table 3: Overview of Socioeconomic Attributes/Indicators Examined in Umbrella Modeling

Attribute	Contribution to Vulnerability	Indicator	Source & Validation
Dependency	Household members requiring high levels of social or medical care divert human, physical and financial resources away from potentially productive livelihood activities.	Number of household members relative to the number of household members engaged in income-generating activities.	Griffiths (2007)
Debt	High levels of non-productive debt put livelihood assets at risk (collateral); repayments may reduce essential expenditure; high levels of existing debt can reduce ability to access additional credit	Sources of debt (moneylender, NGO, relatives...) and proportion of expenses spent on debt	World Bank (1997)
Expenditure Allocation	A low or negative income : expenditure ratio can lead to reduction in essential spending; increase risk of debt or negative coping responses. High proportion of income spent on non-productive items can lead to under-investment in livelihood, leading to higher risk.	What the household spends its income on. There are positive (for instance livelihood development and education) and negative (for instance debt) expenditures.	World Bank (1997)
Livelihood and Income Sources	Income derived from a single source is more vulnerable to shocks. Multiple sources, or the potential to diversity, can increase protection against shocks affecting main/key livelihoods.	The sources, regularity, and diversity of income	DHS (2006) modified
Assets	Ownership of livelihood assets, convertible assets or crucially, land (in the	The amount and type of assets a household has, including the	Moser (1998)

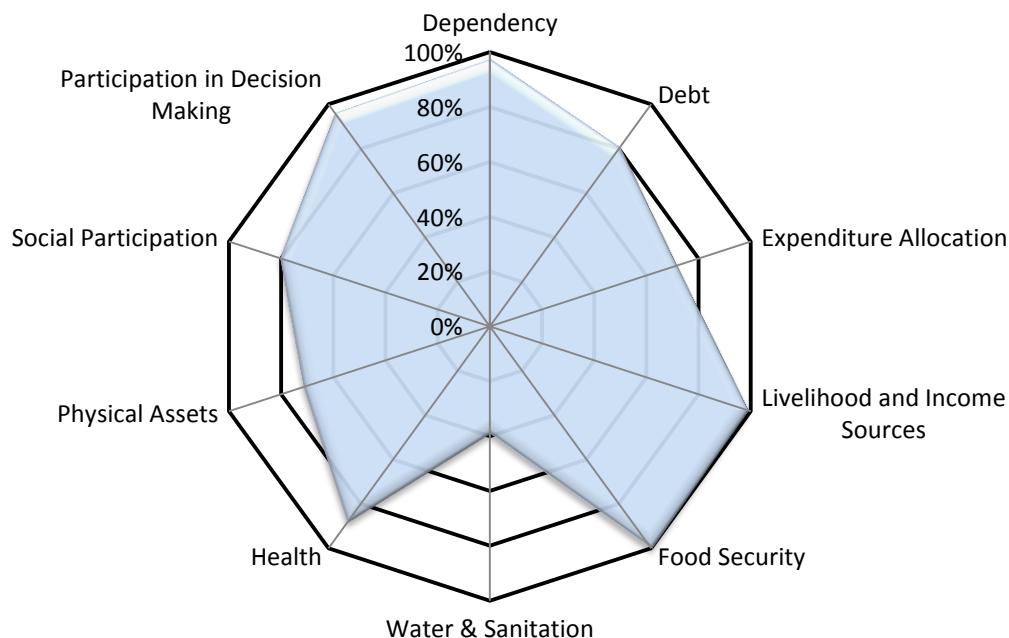
Food Security	form of usage right) can provide short term protection against shocks.	material the house is built of.	
	Current and prior experience of food insecurity is strongly linked with increased vulnerability to future food insecurity. Likewise, food insecurity leading to malnutrition can affect human capital and put livelihoods at risk.	The extent to and frequency which the household has had issues with satisfactory levels of food consumption in the last three months.	UNDP modified
Water and Sanitation	Water is an essential for health and many livelihoods; more time taken to draw water reduces time for other activities.	Time spent daily retrieving water in the Dry and Wet seasons.	DHS (2006)
Health	Chronic or frequent illness in primary earner OR one requiring care threatens livelihood security and reduces income, as well as increasing health expenditure; unplanned health expenditure is a common cause of negative coping (r.g. conversion of livelihood assets to cash)	Health issues and days lost to sickness and caring for sick/disabled household members	UNDP modified
Social Participation	Persons with higher levels of social participation build up social capital, which can increase the likelihood of relief and assistance in times of difficulty.	Extent of social inclusion/exclusion based on frequency of attendance in community social events	Griffiths (2007)
Participation in Decision-Making	Persons with more influence in decision making can have a stronger negotiating position for livelihood related factors such as fair pricing, land and asset use.	Extent of exclusion/inclusion from community decision-making based on how much the household feels they are (able to be) included in the process.	UNDP adapted

(Griffiths & Zin Soe 2011: 3)

The average and standard deviation of the sample scores are calculated in Microsoft Excel. If a household (or village) scores one standard deviation below the sample mean (e.g. are relatively vulnerable) in *three or more* of these indicators, they are classified as generally vulnerable relative to other comparable social units. The scores of the household (or average scores of the sample group) can be visually projected on a 10-point graph in a variety of ways which gives Umbrella Modeling its name (see Figure 2). These findings are subsequently triangulated with the ActionAid Fellows and local community heads to establish overlaps and differences between Umbrella Modeling and personal observations.

Important to note is that for this study, households vulnerability/resilience classifications were based on how they fared against the total sample mean scores, not their village ones. Accordingly there was no reason to use weighted data.

Figure 2: Example Umbrella Model of Le Khote Phin



Once the mean values of each indicator had been ascertained, and households had been grouped along different qualifying scales of vulnerability/resilience (see Table 4), how and to what extent characteristics were similar and divergent, both within and between the groups, became the analytical focus. These findings formed the basis for the ones presented in the Analysis.

Table 4: Vulnerability/Resilience Qualifiers

Classification	Qualifier
Most Resilient	Five or more attributes one standard deviation above the mean
More Resilient	Three or more attributes one standard deviation above the mean
Average	Less than three attributes diverging significantly from the mean
More Vulnerable	Three or more attributes one standard deviation below the mean
Most Vulnerable	Five or more attributes one standard deviation below the mean

3.2.5 Reliability

There are a few *nota bene*'s attached to this analytical framework and methodology, both in terms of its general utilization and how it is utilized in this study, which diverges somewhat from its original purpose.

First and foremost, Umbrella Modeling is a relatively new approach to studying vulnerability. While its potential utility has been demonstrated as being very promising in previous pilot studies and the one currently underway in Myanmar's Dry Zone, it has as of yet not been exposed to external review by anyone except the author of this paper. An evaluation was conducted on behalf of SPPRG by the author, comparing ActionAid's

Participatory Rural Appraisal approach and Umbrella Modeling. The findings indicated that Umbrella Modelling produced very different results in terms of the number of vulnerable households in a village and which households were vulnerable. The most likely reason for this is that vulnerability was defined by different criteria in the two datasets, demonstrating the complexities involved in achieving a common definition even on an internal socioeconomic level of study. However, the findings concluded that Umbrella Modelling appeared to be more internally consistent and transparent than the PRA approach (Jensen 2012: ii), and the strength of Umbrella Modeling relative to PRA is that its findings are based on ‘hard’ quantitative data and qualitative triangulation rather than opinions expressed at participatory discussions.

This study diverges from SPPRG’s approach in that the former is based solely on quantitative methods, partly because the triangulation of the data is still underway and partly because, as the aforementioned evaluation demonstrated, the methodological foundations of both this paper and Umbrella Modeling rests on quantitative research which carries invariable implications on what vulnerability *is* and how it can be measured anyway.

Additionally, while the original purpose of Umbrella Modeling is used to measure relative vulnerability, it should also be theoretically possible through similar criteria to measure that which could be considered the opposite, namely relative *resilience*. This was done by reversing formulas to calculate which households were one standard deviation or more *above* the mean values in a given attribute. Accordingly, any households which had three or more attributes that were at least one standard deviation *above* the mean were classified as resilient.

While the ‘three-attribute rule’ could have remained as the only cutoff point, adding an additional cutoff point at *five* attributes which had to be one standard deviation above or below the mean in order for a household unit to qualify as among the *most* vulnerable/resilient was a way of drawing further distinctions within the sample group.

Finally, it had to be considered if using the mean and standard deviation values for these attributes was appropriate, as the distribution of attribute scores was abnormal to one extent or another in several cases. Consequently, in some instances the mean value would be far from an ideal indicator of the central tendency, and therefore a critique of this approach would be that in some attributes, it was easier to qualify as being one standard deviation above the mean while in others, below it (depending on how the scores were distributed).

There are several possible explanations for the abnormal distribution despite the large sample size. While it is quite common to have an abnormal distribution of data in the first place, there are at least three reasons why this was the case for most of the attributes in this study; for one, the data presented in the Findings are scores that have been calculated from the survey answers rather than the raw information from the surveys themselves, and therefore do not reflect the distribution of the original, unprocessed data. Additionally, the limits to the score range (0-1) meant that even if there were differences between households which fared extremely well (or poorly) in an attribute, they would still receive the same extreme score of 1 (or 0), encouraging skewness to the left or right depending on the attribute. Finally, some of these attributes, such as W&S for instance, were not likely to vary significantly within the 17 communities.

An alternative approach could have been using the median values and interquartile ranges, but this would have effectively only served to isolate the households belonging to the top and bottom 25% in any given attribute. Using the quartile-median approach also revealed very little differences in the cutoff points; in health for instance, the mean-standard deviation approach meant that any households scoring under 0,39 were vulnerable while any scoring 1 were resilient. The 1st quartile of the health attribute score distribution was 0,4, with the second and third being 1. A data transformation, such as the Box-Cox method, may also have helped make the

data more normal, but this had the risk of over-abstracting the data which carry with it another set of implications in terms of overall reliability. In short, the choice to use mean-standard deviation on an abnormal distribution certainly merits critique and is certainly something that ought to be addressed in the future development of Umbrella Modeling, and it is important to bear this in mind when assessing the accuracy of the results that came out of it. That said, using statistical tools that are based on assumptions of normality does not necessarily mean that the results they produce are entirely useless if one of the assumptions are not met.

4. FINDINGS

4.1 Introduction

This section presents the data acquired through the first phase of Umbrella Modeling. The findings led to a variety of peculiar observations which formed the basis for the Analysis section. It begins with an overview of the score distribution of each attribute (aided by visual representations in the form of histograms), along with the corresponding average score and standard deviation. This is then followed by an Umbrella Model of the entire sample.

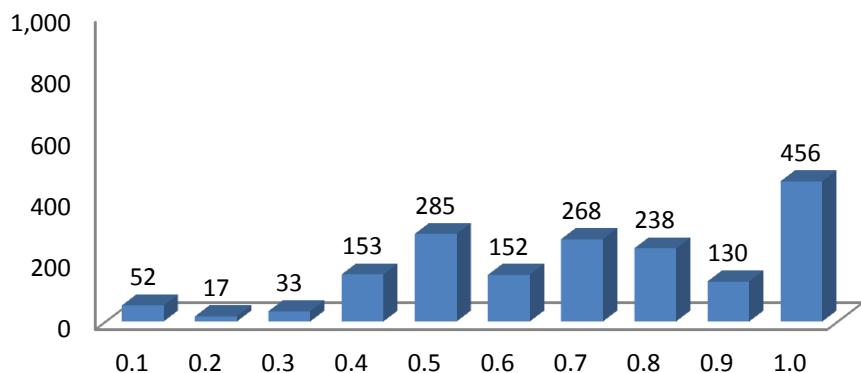
Overall, the findings demonstrated that there is a massive variety and complexity in how individual households are able to cope with the 10 attributes examined in this paper. However, even the superficial findings outlined in this section strongly suggest that vulnerability and resilience are clustered phenomena. Also noteworthy is that there were surprising overlaps in that a number of households could be classified as both vulnerable *and* resilient.

4.2 Dispersion of Scores

4.2.1 Dependency

As outlined in the Methods and Study Design section, a household's dependency score was calculated on the basis of the number of working household members relative the total number of household members. As seen below, the distribution was abnormal.

Figure 3: Dependency Score Distribution

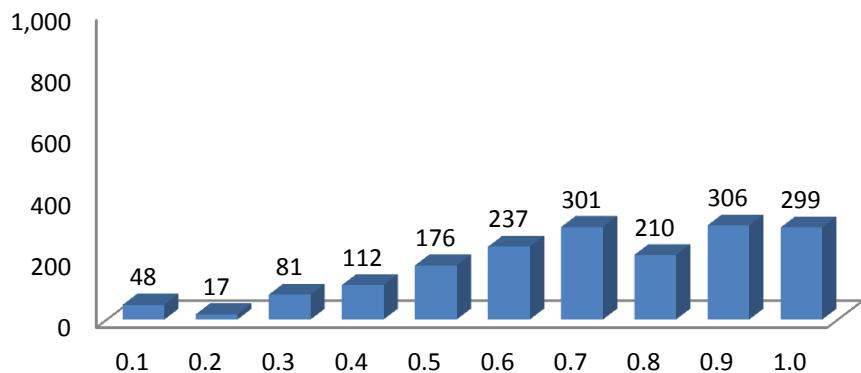


The average Dependency score was 0,69, with a high standard deviation of 0,27. To qualify as vulnerable, a household had to have a score of less than 0,43. To qualify as resilient, a household had to have a score of higher than 0,96. Accordingly, 256 households were classified as vulnerable (14%) and 458 as resilient (24%).

4.2.2 Debt

A household's debt score was calculated on the basis of its sources of debt and proportion of expenses spent on debt repayment. The distribution was skewed, with the majority of households having a relatively good debt score.

Figure 4: Debt Score Distribution

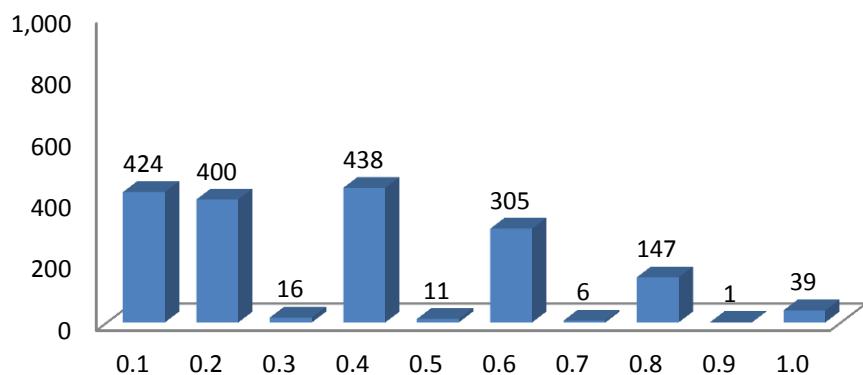


The average debt score was 0,67, with a standard deviation of 0,24. To meet the qualifiers, a household had to score less than 0,43 or more than 0,91 to be categorized as either vulnerable or resilient in this regard. 278 households (16%) were classified as vulnerable and 296 as resilient (17%).

4.2.3 Productive Expenditure

Whether due to the scoring criteria for productive expenditure being harsh or simply due to the likely fact that households in this region are not able to spend high proportions of their income ‘investing in themselves’, this was one of the categories in which households fared the worst. The distribution was highly abnormal, with significant concentration in the middle and lower score ranges.

Figure 5: Productive Expenditure Score Distribution

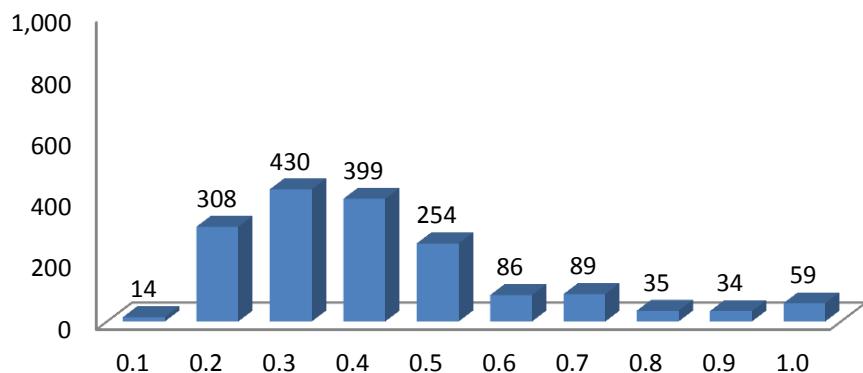


The average score was 0,34, with a standard deviation of 0,27; in other words, a household had to have an expenditure profile that was not just bad, but *horrible*, in order to qualify as vulnerable. Nevertheless, 381 households, or 21% of the sample, scored under 0,07. 193 households, or 11%, scored above 0,61, classifying them as resilient.

4.2.4 Livelihood and Income Sources

In terms of livelihood and income sources, there was a heavy concentration of households in the 0,2-0,5 range. This means that the majority of households had incomes and livelihoods that were primarily seasonal and/or unreliable, while a minority had more solid income streams.

Figure 6: Livelihood and Income Source Distribution

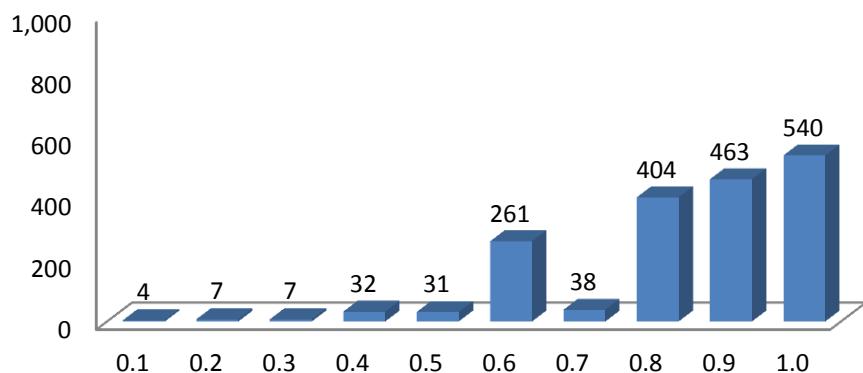


The average score was 0,42 with a standard deviation of 0,32. In other words, it was very difficult to deviate outside the ‘range of normality’, particularly to qualify as vulnerable, where a household had to score below 0,10. Only 14 households were unfortunate enough to do so. On the other hand, 182 households (10%) scored above 0,74, qualifying them as resilient.

4.2.5 Food Security

If any of these attributes were a fundamental indicator of vulnerability, food security would probably be one of the best candidates. Respondents were asked a variety of questions regarding potential issues they may have had in obtaining sufficient levels of food consumption in the past three months. Unsurprisingly, given that this is Myanmar’s Dry Zone, only about one third of all households had had no issues whatsoever in this regard.

Figure 7: Food Security Score Distribution

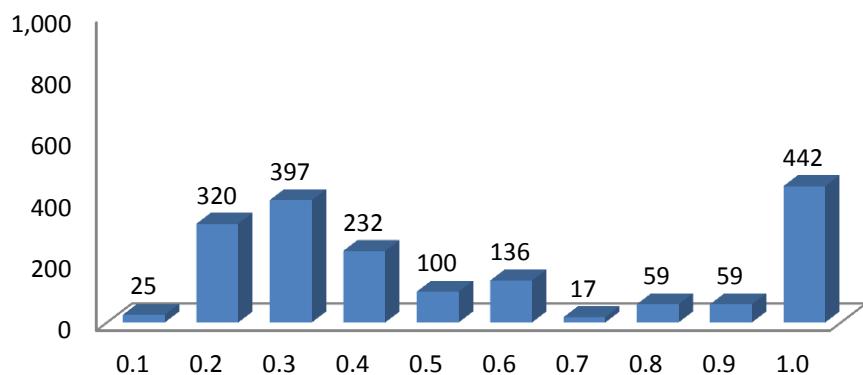


The average score, 0,81 was high, but considering the nature of this indicator, any score below 1,0 could be considered troubling. With a standard deviation of 0,17 however, the number of households classified as particularly vulnerable in this regard (with a score below 0,64) was 342, or 19% of the sample. The 540 households (30%) scoring above 0,98 (effectively meaning any households which had no issues whatsoever with food security) were classified as resilient.

4.2.6 Water and Sanitation

Water and sanitation scores were calculated primarily on the basis of the time it takes a household to obtain a fresh water supply during the Dry and Wet seasons. Of all the attributes, this one was naturally most connected to the situation of individual villages rather than households. Accordingly, the distribution was quite abnormal.

Figure 8: Water and Sanitation Score Distribution

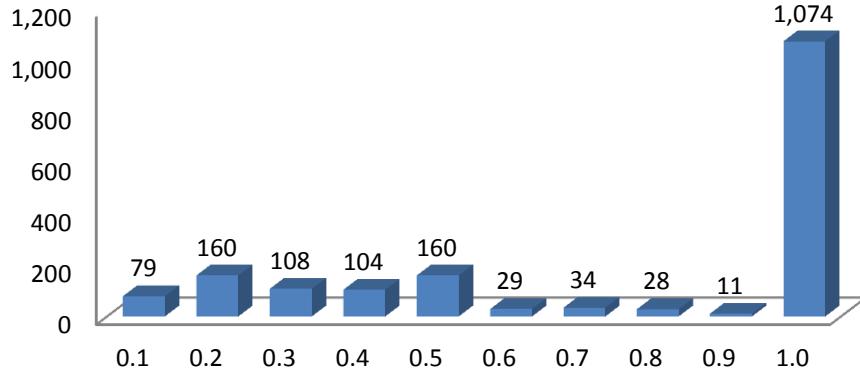


The average score was 0,52, roughly equivalent to spending 30 minutes to fetch drinking water during the Wet season and an hour during the Dry season. The standard deviation was, as Figure 7 would indicate, quite high at 0,33. Households scoring less than 0,19 were vulnerable, which amounted to 225 households or 13% of the sample. Households scoring higher than 0,84 were classified as resilient, amounting to 501 households or 28% of the sample.

4.2.7 Health

Health scores were calculated on the basis of the total amount of days households ‘lost’, either tending for individual sick or disabled household member or for illness/disabilities of individual household members that rendered them unable to work. The score also accounts for any health or disability issues the household members have had in the last year. On the grounds of such queries, the majority of households in the sample had few issues in this regard.

Figure 9: Health Score Distribution

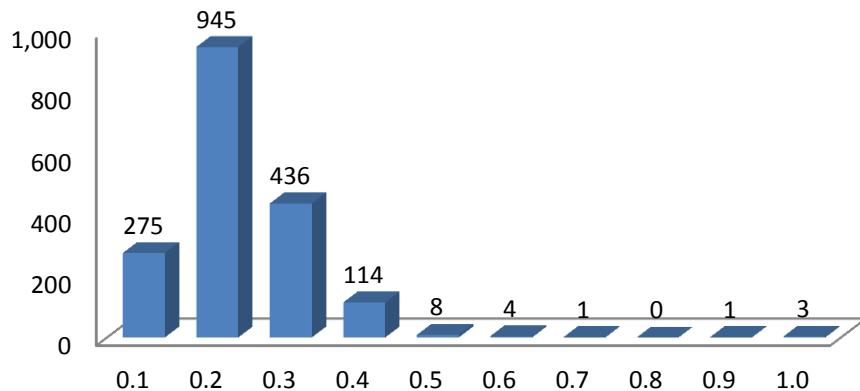


That said, a sizeable minority did. The average score was 0,74, with a standard deviation of 0,35. Vulnerable households were those scoring below 0,39 (435 households or 24%), while resilient households were those with a score of 1 (1074 or 60%). Technically, the qualifying score for resilience was 1,09, but obtaining such a score was obviously not possible.

4.2.8 Assets

Asset scores were calculated on, quite simply, the amount of assets a household had. This included everything from bicycles to chickens to the material their house was built of. Unsurprisingly, rural households in Myanmar's Dry Zone did not fare very well in this regard.

Figure 10: Asset Score Distribution

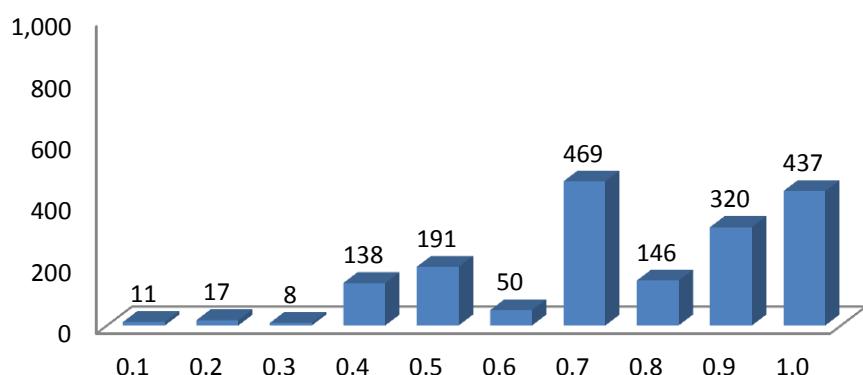


The average score was 0,2. As an general indication, a household scoring 0,2 would typically have a house built of thatch materials with no electric power. Its possessions would be limited to a few hand tools, some 5-10 chickens and perhaps a few other animals. The standard deviation in this category was – for once – quite low, at 0,08. The poorest of the poor, thereby the most vulnerable, were those with a score of under 0,12, commensurate with 276 households or 15% of the sample. The ‘privileged few’, in contrast, were those which just had to score above 0,29: 249 households or 14% of the sample. Less than 1% of the sample scored above 0,5.

4.2.9 Social Participation

Social participation scores are based on a number of questions which basically ask to what extent a household participates in local community events, thereby indicating to what extent they are marginalized or included in their own community. The distribution indicated that there exists a social upper, middle and lower class, and below that, a small sub-group of pariahs.

Figure 11: Social Participation Score Distribution

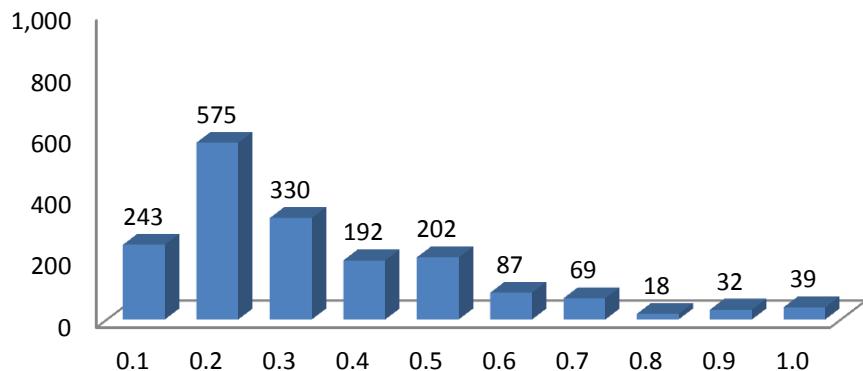


The average score was high, at 0,73, with a standard deviation of 0,22. Vulnerable households were those which scored less than 0,51 – this amounted to 365 households or 20% of the sample. Resilient households were those which scored higher than 0,95 (437 households, or 24%)

4.2.10 Participation in Decision-Making

Finally, we come to participation in decision-making. Households were asked a number of questions pertaining to the extent that they are involved in village planning. Generally, these communities did not appear to have very egalitarian structures of decision-making.

Figure 12: Participation in Decision-Making Score Distribution



The average score was low, at 0,29, with a standard deviation of 0,22. A vulnerable household, scoring below 0,07, was then one which never or almost never participates (or perhaps more likely, is not invited to participate) in any aspect of local community planning. This was the case for 243 households, or 14% of the sample. What could in contrast then be considered the local elite, consisting of those households which scored above 0,51, amounted to 245 households (14%).

4.3 Distribution of Vulnerability and Resilience

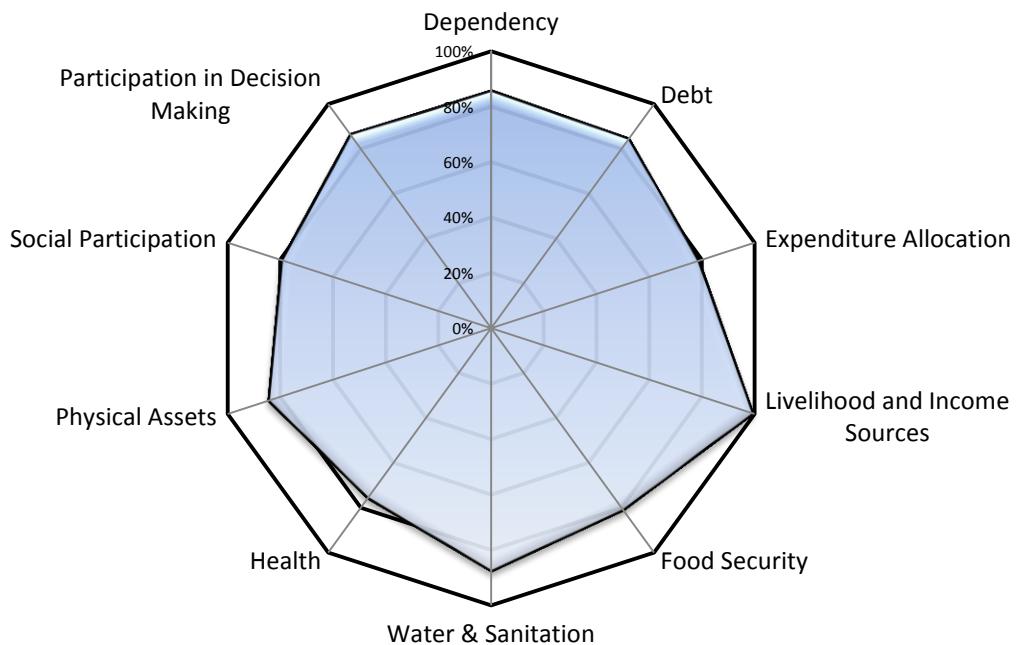
Having established what the mean and standard deviation was for each of these attributes, it was possible to put a number on the amount of households that were vulnerable and resilient in each. The distributions discussed above are summarized in Table 5.

Table 5: Distribution of Vulnerability and Resilience

	# Vulnerable	% Vulnerable	# Resilient	% Resilient
Dependency	256	14%	458	26%
Debt	278	16%	296	17%
Expenditure Allocation	381	21%	193	11%
Livelihood and Income Sources	14	1%	182	10%
Food Security	342	19%	540	30%
Water & Sanitation	225	13%	501	28%
Health	435	24%	1070	60%
Assets	276	15%	249	14%
Social Participation	365	20%	437	24%
Participation in Decision-Making	243	14%	245	14%

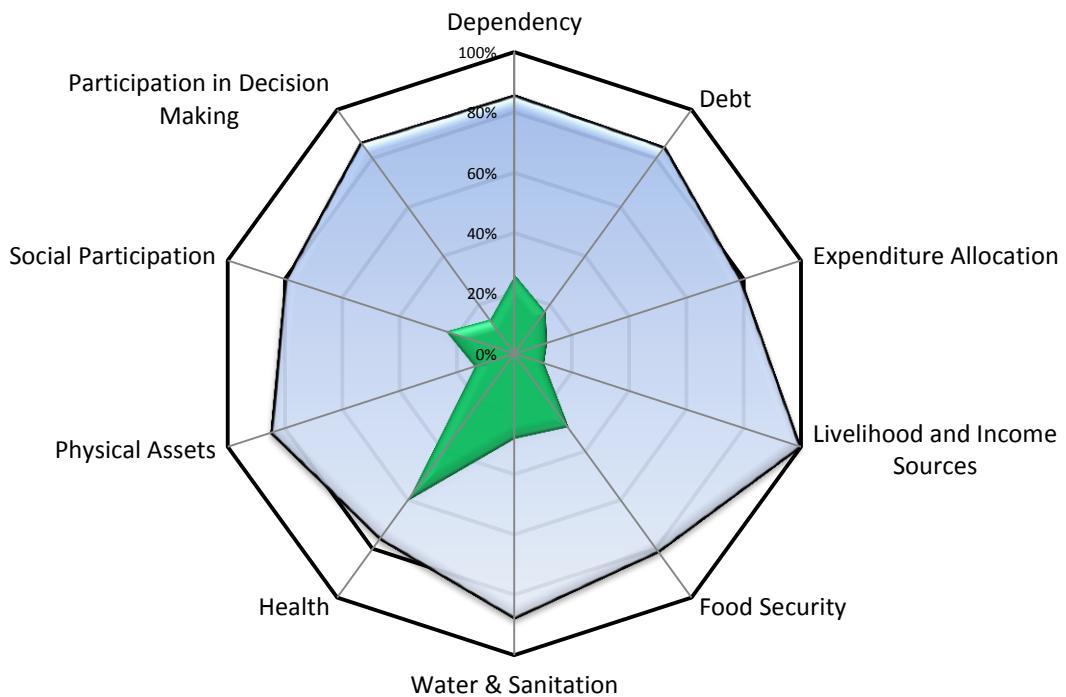
The data can also be represented by an Umbrella Model. Figure 13 shows the percentage of households, represented in blue, which were in the ‘safe’ zone, i.e. not more vulnerable than the norm, in each of the 10 attributes.

Figure 13: Total Sample Umbrella Model



As can be seen, the point where the Umbrella Model sinks inward the most is at **Health**, and points out the most is at **Livelihood and Income Sources**, as one would expect upon examining Table 5. Figure 14 below incorporates the percentage of households which were classified as more resilient in each attribute.

Figure 14: Total Sample 'Umbrella Model' Including Resilience



When resilience (represented in green) is added to the Umbrella Model, it becomes easier to see in what areas that households in the population sample are generally more resilient. In this particular sample, the most significant area is in health, which can be expected, given that the qualifier for being more resilient in this regard is having had no health issues in the last year. In other words, good health appears to be a core facet of the more resilient and non-vulnerable households, while health issues are, by a small margin, the most common vulnerability in this sample.

While Figures 13 and 14 are useful in providing a broad overview of the major issues faced by the sample population and their severity, it says little about whether vulnerability and resilience are scattered or concentrated phenomena. Using this data, it was possible to examine if vulnerability and resilience was clustered within small numbers of households or scattered throughout the 1785 in the sample. For instance, was there a segment of households with three or more vulnerabilities, or were nearly all households simply vulnerable in one or two attributes, and likewise for resilience? If the case was the former, then that would be the first step towards isolating particular groups or types of households that were particularly vulnerable or resilient. The latter scenario, on the other hand, would have indicated that there were no sub-groups within the population which could be regarded as distinctly worse or better off than the rest.

4.3.1 Vulnerable and Resilient Households: Sample Total

Figures 15 and 16, found below, provide a tentative first step towards shedding light on whether vulnerability and resilience are concentrated or scattered phenomena.

Figure 15: Number of Households and Number of Vulnerable Attributes

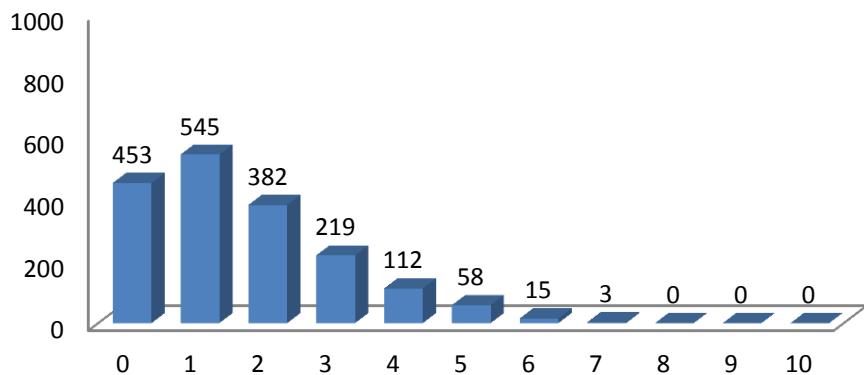
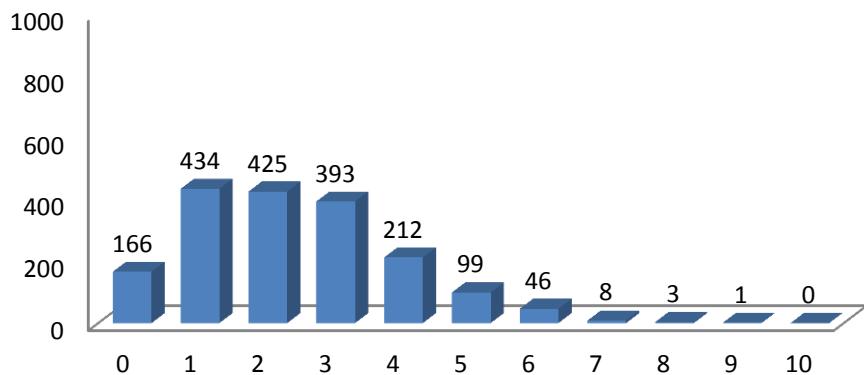


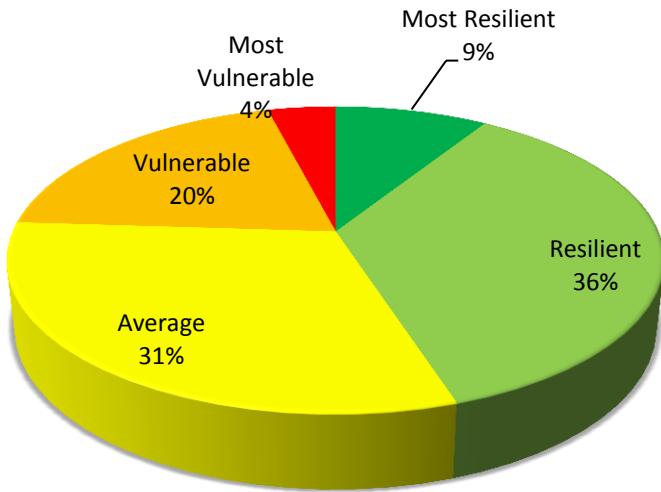
Figure 16: Number of Households and Number of Resilient Attributes



At first glance, it would appear that vulnerability and resilience are quite scattered; the majority of households in the sample (76%) had less than three vulnerable attributes, while a smaller yet still sizeable percentage of households (55%) had less than three resilient attributes, yet it is naturally a bit more complicated than that. The total number of vulnerable *attributes* found in the sample, found by simply multiplying the number of households by the number of vulnerabilities, was 2815. This crudely translates into meaning every household, on average, was vulnerable in 1.58 attributes. However, the 76% of households with less than three vulnerabilities only accounted for 46% of all flagged cases (2815), while the remaining 24%, with three or more, collectively accounted 54% of all vulnerabilities. Similarly, the 55% of households with less than three *resilient* attributes only accounted for 30% of the total number of flagged resilient attributes (4147), while the remaining 45% accordingly accounted for 70%.

As outlined in the Methods and Study Design section, any household in this sample would eventually be put into one of five categories; Most Resilient, More Resilient, Average, More Vulnerable, and Most Vulnerable. **Average** households were only vulnerable/resilient in one or two regards relative to the total sample, or simply had no deviating scores at all across the board. More **Vulnerable** and **Resilient** households were those which had three or four attributes which deviated from what was normal. The **Most Vulnerable** and **Most Resilient** households were any with five or more deviating attribute scores.

Figure 17: Distribution of Vulnerable/Resilient by Total Population



At first glance, the results were - mildly put - rather surprising. Figure 17 suggests the existence of a highly clustered distribution, where 45% are significantly better off than the other 55%, and 24% are significantly worse off than the other 76%. 1 in 25 households were more vulnerable in five or more attributes, and nearly 1 in 10 more resilient in five or more attributes.

Interestingly however, the divisions are not as clear-cut as they may appear. Closer scrutiny revealed that 75 households - a little over 4% of the sample - were in fact ambiguously classified as being *both* vulnerable and resilient.

To get a better overview of how common it was the same household to have both resilient and vulnerable attributes, a simple exercise was conducted: the number of resilient attributes every household had was subtracted from its number of vulnerable attributes, so that a household with two resilient attributes and one vulnerable would get a score of 1 for example, and -1 if it had one resilient attribute against two vulnerable ones. A score of 0 would mean that the household either had no deviating attributes or that it had an equal number of resilient and vulnerable attributes that had 'canceled each other out'.

The households were then ranked according to the difference (from the highest number of resilient attributes to highest number of vulnerable attributes), and finally transferred onto a scatterplot (Figure 18).

Figure 18: Household Vulnerability/Resilience Score

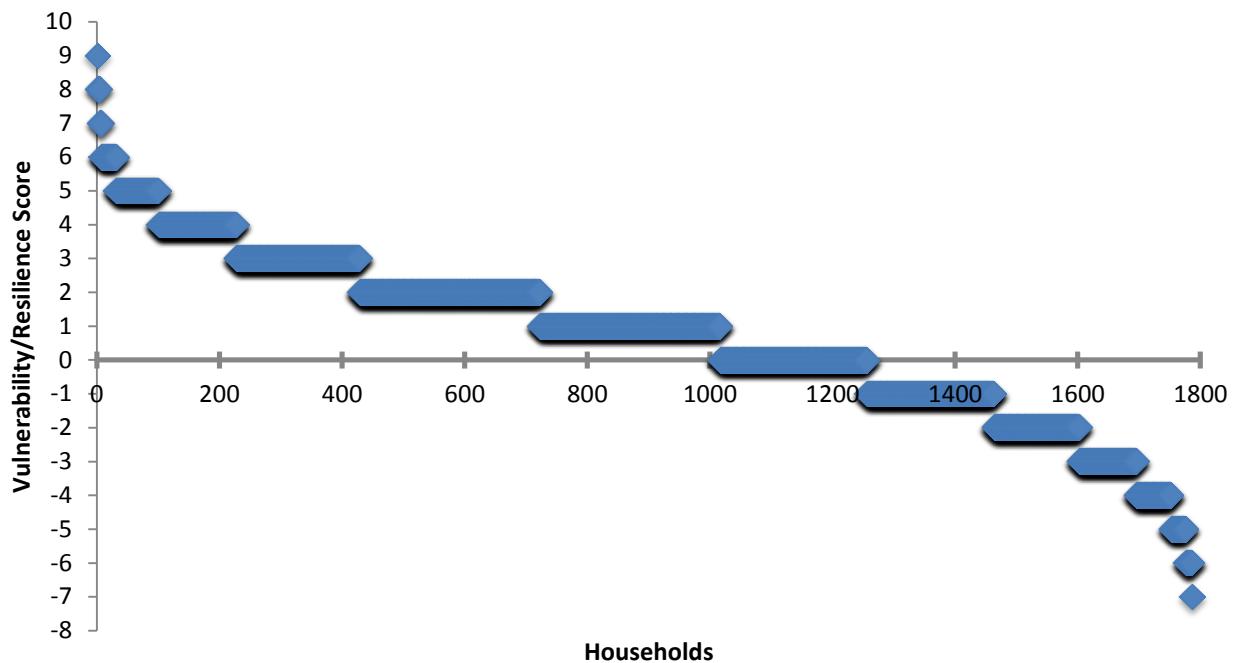


Figure 18 shows that while only 4% of households could be classified as being *both* more vulnerable and resilient due to three or more deviating attribute scores on both sides of the spectrum, a far higher proportion of households did in fact have a number of attributes deviating towards both sides of the spectrum. Put differently, there was a high likelihood that a household with three or more vulnerable/resilient attributes had one or two attributes on the other side of the spectrum. However, further analysis revealed – as one would expect – that this observation becomes less true the further one wanders from the ‘middle’. With only a few exceptions, the *most* vulnerable and resilient households only had attributes that were in the normal range or congruous to their classification, strongly suggesting positive/negative feedback cycles; the further a household drifts from the middle, the more cemented it becomes in its classification as negative coping increasingly becomes the only option.

Consequently, this shows that the situation of every household is truly unique; a generally vulnerable household can be resilient in a smaller number of areas and vice-versa. That said, it also demonstrates that while the clustering is not as clear-cut as Figure 17 would indicate, there is every reason to believe that more vulnerable households are more likely to gravitate further into paucity, just as more resilient households are more likely to be on a path out of it, though this can naturally not be confirmed without carrying out another study in the future and examining how these households have fared since then.

The next question, then, is what causes this clustering? Is it the demographic characteristics of a household, its location, or is it relationships between the attributes - that deviating in some makes a household more likely to deviate in others? If it is the demographic characteristics of a household that act as important determinants, then certain groups – such as female-headed households, smaller households, or households with lower/higher education levels – should be overrepresented in the vulnerable/resilient categories and moreso in the most vulnerable/resilient categories. To what extent location matters can be ascertained by checking for

overrepresentation of vulnerable/resilient households in certain villages. Finally, if there are certain attributes that are closely related to one another and a household's overall socioeconomic score, then we should expect to see a significant percentage of the most vulnerable/resilient households sharing one or more common deviating attributes.

5. ANALYSIS

5.1 Introduction

This section explores the questions underpinning this research through more in-depth investigation of the findings presented in section 4.

We begin by examining the relationship between location and relative vulnerability/resilience – in short, to what extent does the village a given household belongs to determine the likelihood of it falling into a certain category? Breaking down the percentage of households in each of the five categories by village produced interesting results that strongly suggest that it may be appropriate in *some* instances to look at villages as the leading explanation. Two villages in particular stood out, one where there were almost no vulnerable households and one where there were almost no resilient ones. However, the total number of households in these villages only accounted for a small percentage of the total sample.

The investigation then proceeded to examining the relationship between fundamental demographic characteristics of households and vulnerability/resilience. As one would expect, there were some very significant differences, particularly in terms of health and income-generating activities, between the more vulnerable and resilient households. Interestingly, female-headed households were actually *over-represented* in the more resilient categories. All-in-all however, the demographic characteristics (including levels of economic poverty) of households were not able to definitively explain the difference in fortunes between the vulnerable and resilient.

The analysis ends with looking at the attribute composition of households in different categories, and their potentially causal influence on one another. It was ultimately concluded that social participation appeared to be the attribute that mattered most in terms of causality; while a household's food security score was by far – and predictably – the most telling indicator of a household's overall vulnerability/resilience, social participation was not far behind.

5.2 Location

One of the most fundamental assumptions to make about what constitutes vulnerability and resilience is that it is very dependent on where you live; a household in the Swedish countryside, for instance, is probably more likely to be better off than one in rural Myanmar in almost every comparable socioeconomic regard. Even if one narrows the frame of analysis to rural Myanmar, and even further, the parts of Magway province which are in the Dry Zone, one would probably also expect to see differences – albeit not as significant – between communities.

Noting down the percentage of households in each village that had been classified as non-average (in respect of the total sample mean), and then comparing how each village fared, was a simple way to test this hypothesis. The results are found in Table 6.

Table 6: Distribution of Vulnerable and Resilient Households by Village

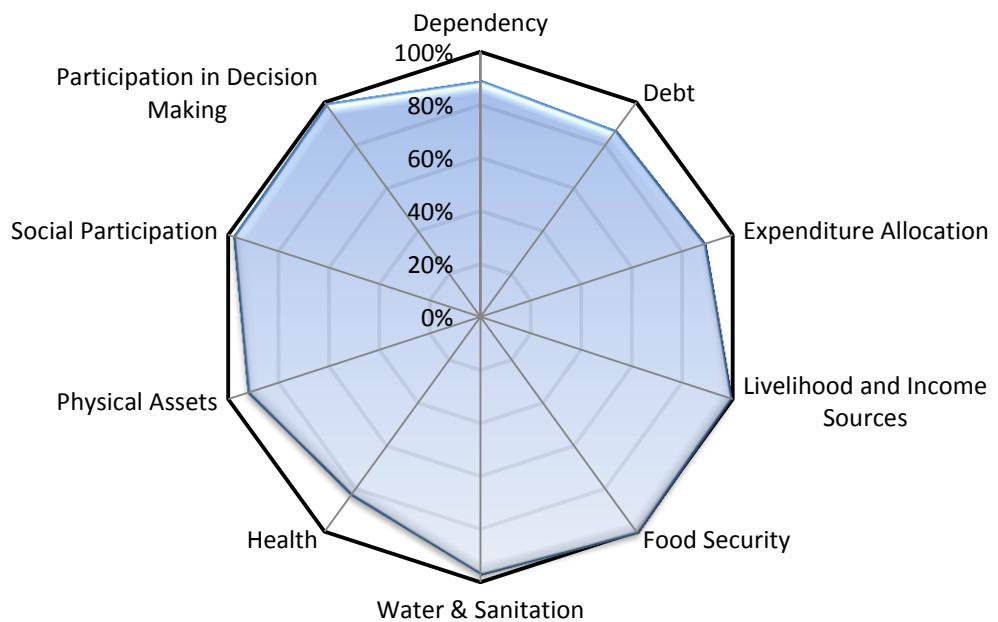
	(% Most Resilient)	% Resilient	% Vulnerable	(% Most Vulnerable)
Le Ku Bin	(8%)	52%	17%	(1%)
Son Gone	(11%)	24%	29%	(7%)
Chaung U Toe	(6%)	33%	6%	(1%)
Myin Ko Thit	(24%)	53%	8%	(2%)
Zee Taw Tite	(34%)	50%	1%	(0%)
Chaung Sone	(0%)	29%	36%	(0%)
Ong Daw	(4%)	31%	25%	(5%)
A Nauk Daw	(1%)	7%	40%	(20%)
Let Pan Kyun	(11%)	54%	6%	(1%)
So Pyin	(6%)	19%	25%	(6%)
Ywa Dong She	(4%)	23%	34%	(7%)
Kan Ka Lay	(6%)	29%	20%	(4%)
Sabai (M)	(11%)	52%	6%	(1%)
Kyo Tan	(7%)	42%	7%	(0%)
San Pya	(3%)	29%	3%	(0%)
Say Kyine	(11%)	28%	14%	(3%)
Myay Gyan Taw	(10%)	31%	10%	(0%)
TOTAL POPULATION	(9%)	45%	24%	(4%)

The color-coded cells demonstrate that, as a whole, 6 villages had a higher percentage of vulnerable households than average, and 5 villages had a higher percentage of resilient households than average. Zee Taw Tite, located in Myaing Township, had the highest proportion of resilient households relative to its size, while A Nauk Daw, located only some 40-45 kilometers away in Pakokku Township, was in a truly dire situation relative to the other 16 villages. Generally however, the distribution of vulnerable and resilient households in villages appears close to the trends found in the total population. Nearly every village has a socioeconomic ‘upper’, ‘middle’ and ‘lower’ class to one extent or another.

Zee Taw Tite and A Nauk Daw are nevertheless interesting outliers to examine; can the socioeconomic scores tell us anything about *why* two villages, only a bus ride from one another, can have such radically different

levels of well-being when they are located in the same region? The Umbrella Models for the two villages presented below provide some clues.

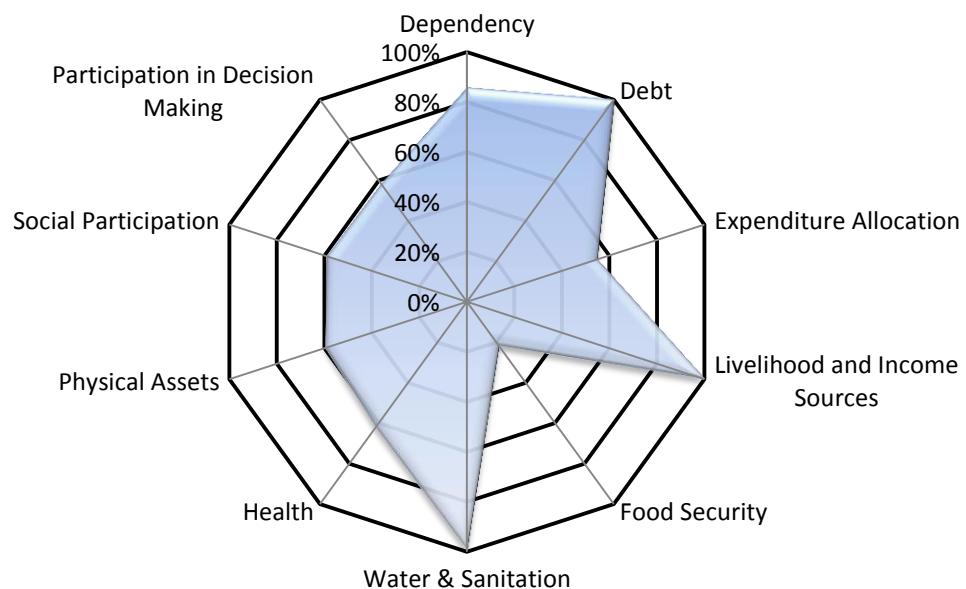
Figure 19: Zee Taw Tite



Zee Taw Tite is clearly a pretty great place to settle down, if one had to choose from among these 17 communities. A few households have some issues in one or two socioeconomic aspects, but generally, almost everyone living there is either on par with or better off than what has been ascertained to be a normal standard of living in this region. Notably, they appear to live in a tightly-knit community where no one is completely excluded from social events or village planning.

The inhabitants of A Nauk Daw, seen below, are nowhere near as fortunate.

Figure 20: A Nauk Daw



A stunning 78% of A Nauk Daw's households had major issues with food security in the 3 months preceding this survey. Some 40% of the households were classified as vulnerable in terms of health, and an equal proportion could be regarded as the 'poorest of the poor' in the sample judging by assets owned. A little under half of all households also spent their limited incomes 'worse' than the sample average. A closer look revealed that this was due to A Nauk Taw being unique in the sense that nearly every household was spending between one third and half of its money on "official/social" expenses, which is likely to be land-leasing (in fact almost certain, as nearly every household also listed an employer as their primary source of debt). An equally significant percentage of households also appear to be excluded from social events and village planning, suggesting that A Nauk Daw is socially fragmented.

Judging from the data, then, the major differences between the two villages are levels of poverty, land ownership, health and functioning social institutions. A satellite snapshot view of the respective villages helps explain why these differences exist.

Satellite Picture 1: Zee Taw Tite



(Google 2013a)

Satellite Picture 2: A Nauk Taw



(Google 2013b)

As can be seen, Zee Taw Tite and A Nauk Taw are two completely different types of communities. Zee Taw Tite is a typical Dry Zone village in the sense that its households are clustered in a single area with surrounding fields. The households in A Nauk Taw, on the other hand, appear to be much more spread out and distributed along the land leased by the households.

This provides a likely explanation to why the inhabitants of A Nauk Taw are disproportionately vulnerable relative to the rest of the population sample; it is not so much a village as a loose conglomeration of 161 landless households working in what can best be described as a variety of debt-slavery. That the inhabitants of A Nauk Taw are generally not considered vulnerable relative to the rest of the sample in terms of *debt* could therefore be an argument for a future readjustment of formulas pertaining to debt calculations in Umbrella Modeling.

Location can matter a great deal then, as one would expect. Yet while it explains ‘cases of overrepresentation’ in instances such as A Nauk Daw, where the households are generally worse off than the sample norm, location alone does not adequately explain why a typically structured village such as Zee Taw Tite is relatively *better off* than others with a similar composition. Additionally, it does not sufficiently explain why the distribution was not concentrated in a select few villages, and why it varies so much even *within* most villages; even in the extreme case of A Nauk Daw for instance, it is important to note that 60% of households were *not* classified as vulnerable. In short, the divisions of relative vulnerability and resilience are not so much along the lines of villages as they are between groups within the population.

For a more detailed explanation, we will have to delve into the demographic characteristics of the more vulnerable and resilient households.

5.3 Demographics

This section investigates quantifiable statistics of the sample population, to uncover differences between resilient and vulnerable households. The focus here was on identifying any demographic groups that were more likely than others to be overrepresented on either side of the resilience/vulnerability spectrum.

The average household size in this sample was 5,07. This value decreased in proportion to the qualifier in which a household belonged in *both* directions, though not all of these differences were found to be statistically significant (see Appendix C).

Table 7: Average Household Size

Category	Average Household Size
Most Resilient	4,24
Resilient	4,74
Sample Average	5,07
Vulnerable	4,69
Most Vulnerable	4,46

One possible explanation for why both the more vulnerable and resilient households generally appeared smaller than average would naturally be differing dependency ratios. As one may recall from earlier, the average score of members contributing to the income of a household (i.e. economic dependency ratio) in this

sample was 0,69, which can be directly translated into 69%. The average dependency ratios for resilient and vulnerable households differed significantly however, as seen below:

Table 8: Average Percent Working Household Members

Category	Average % Working Household Members
Most Resilient	81%
Resilient	75%
Sample Average	69%
Vulnerable	66%
Most Vulnerable	62%

Important to recall is that even children are included in this dependency ratio, as the survey results showed that it was very common for children to contribute to the household income. It is therefore more likely to conclude that the most disadvantaged households in the sample have more elderly and/or disabled family members requiring care and fewer family members who are able to provide it. There was a statistically significant difference between all values except the one between the Vulnerable and Most Vulnerable categories.

On average, a working member of a household in the sample lost 19 days in the last year to either not being able to work or having to take care of another household member. However, there were major differences between the more vulnerable and resilient households.

Table 9: Workdays Lost Per Year

Category	Average # Workdays Lost in the Past Year per Working Household Member
Most Resilient	4
More Resilient	5
Sample Average	19
More Vulnerable	37
Most Vulnerable	40

On average, every working member of the most vulnerable households lost significantly more days in the last year to bad health or caring for a sick family member compared to those of the most resilient households. All in all, health appears to be a major differentiator between vulnerability and resilience; less people are working in the more vulnerable households, and on top of that they have far more days than the sample average where they are not *able* to work. Additionally, the main livelihoods of these households also differ. Not only are the more vulnerable households those which have worse health and lower productivity, but also less reliable and diverse income sources.

Table 10: Livelihood/Income Source Distribution

Category	Agriculture	Livestock	Selling	Day Wages	Remittances	Other
Most Resilient	26%	9%	9%	15%	17%	24%
More Resilient	21%	13%	7%	22%	20%	17%
Sample Average	18%	14%	6%	29%	19%	14%
More Vulnerable	10%	14%	7%	39%	16%	14%
Most Vulnerable	12%	15%	6%	45%	19%	3%

The collective distribution of livelihood sources indicates that generally, households which list day wages as their primary income source are overrepresented in the more vulnerable categories, while the more resilient have far more varied income sources. The differences are exacerbated further by how these incomes are spent.

Table 11: Expenditure Allocation Distribution

Category	Food	Debt	Health	Education	Livelihood	Official/Social	Savings	Other
Most Resilient	31%	8%	14%	9%	15%	14%	5%	4%
More Resilient	33%	13%	14%	7%	10%	12%	2%	9%
Sample Average	33%	14%	14%	8%	8%	13%	1%	9%
More Vulnerable	35%	17%	16%	5%	5%	15%	1%	6%
Most Vulnerable	37%	16%	15%	5%	2%	19%	0%	6%

As can be seen, the most vulnerable households generally use more of their money on food and debt repayments, and invest far less in their livelihoods and education. They do not have the means to save money. The most resilient households, on the other hand, are able to accumulate savings while a significant portion of the money they make from their livelihoods go straight back into improving them. A partial explanation for this may be that the more resilient households are more likely to be landed farmers, who have to spend money on agricultural inputs, and of course that they are likely to generate enough income to do so. The difference in the proportions of income devoted to debt repayments can also be explained upon closer investigation.

Table 12: Debt Source Distribution

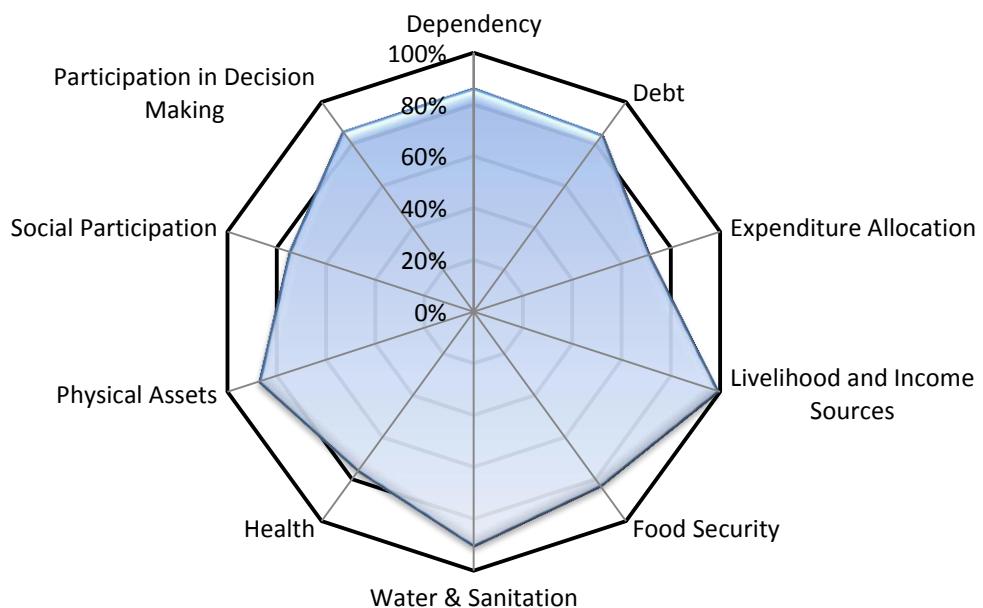
Category	Relatives/Friends	Moneylender	Bank	Employer/Boss/Broker	INGO/NGO
Most Resilient	19%	23%	6%	10%	40%
More Resilient	19%	27%	6%	11%	36%
Sample Average	25%	28%	5%	15%	27%
More Vulnerable	27%	32%	3%	21%	16%
Most Vulnerable	32%	29%	0%	22%	16%

Just over 51% of the total debt of the most vulnerable households was owed to moneylenders and their employers/brokers, versus only 33% for the most resilient households. The more resilient households were also those which have better access to formal microcredit through NGO's and banks, while the more vulnerable households were more reliant on informal lending practices.

However, the divisions are even more pronounced along the respective levels of education. Generally, and as one would expect, the average level of education decreases and increases along with the level of vulnerability and resilience of a household. Survey respondents were able to rate each household member's level of education on a scale of 1-7, from the lowest value of 1 being 'Never Attended' and up to a value of 7, which was 'University'. The average household education level for the total sample was 3,5 , which equates to an educational level between monastic schools and primary school. The most resilient households, however, had an average level of 4 (primary school), while the most vulnerable had an average level of 2,6, which lies between a basic ability to read/write and monastic school.

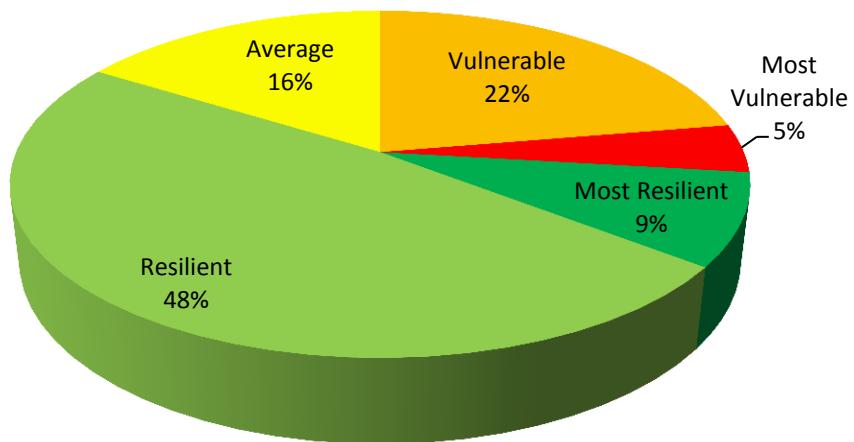
The final – and arguably most important – factor to consider in this section is gender. There were a total of 443 female-headed households, amounting to 25% of the population sample. This percentage is slightly higher than what has been found in other surveys, indicating that labor migration may be even more pronounced in this sample than what is typical for the Dry Zone, where 19-20% of households are female-headed (WFP 2011:9, IHLCAb 2011: 49). The female-headed households were quite evenly distributed across the 17 villages. How this group of households fared relative to the others is shown in Figures 21 and 22.

Figure 21: Female-Headed Households Umbrella Model



In relation to the total population sample, female-headed households are slightly weaker in terms of expenditure (71% versus 79%) and social participation (75% versus 80%), and marginally stronger or simply average in all other respects. Surprisingly however, the distribution of their vulnerability/resilience classifications is quite different from the total population sample, as shown in Figure 22.

Figure 22: Distribution of Female-Headed Households



Interestingly, female-headed households are actually highly overrepresented in the more resilient category. 57% of all female-headed households range between being more resilient or among the most resilient relative to other households, where the sample average is 45%. This correlates with what has been found in the 2011 Poverty Dynamics study, where the authors noted that female-headed households in the Dry Zone had been more likely to experience improvements in their standard of living compared to male-headed households in recent years (IHLCA 2011a: 15). This is despite the fact that it is unclear what the exact cause is; in terms of the demographic variables discussed in this section, they do not differ from male-headed households in any particular way. The simplest possibility could certainly also be the most plausible one; that women are just better at managing household resources, as has been outlined in microfinance literature for instance (Brau & Woller 2004: 20).

In the absence of any contradictory findings which may otherwise have instilled caution to leap to such judgment, it may be natural at this point for the reader to conclude that the more vulnerable households overlap directly with the poorer ones, yet this is not necessarily the case.

If we define a poor household in this sample as one spending 50% or more of their total expenses on food and health, then 54% of the all households fall under this classification. One would then expect the more vulnerable households to be found within these 54% and the more resilient ones to be found in the remaining 46%. However, this was only true to a limited extent. 67% of the more vulnerable households and 78% of the most vulnerable can be classified as poor. However, 51% of the more resilient households, and 50% of the most resilient households, *also* fall under this classification.

In other words, while it is true that more vulnerable households are often the likely to be among the poorer as well, *it cannot be categorically stated that the poorer households are by default the more vulnerable ones*. This is once again because transient poverty is such a wide-spread phenomenon in the Dry Zone. Most households in this sample are likely to be dancing precariously on the poverty line and will find themselves on either side of it at one point or another in the coming years. However, the dynamics of this – that is, which households are likely to ‘bounce back’ and which are likely to descend further into poverty – are determined by the socioeconomic capital (entitlements) they can draw upon, which in this paper, for better or worse, has been translated into measureable attributes. In other words, it is those households which are *both* poorer and more

vulnerable that are most at risk because they are likely to *remain* so due to the negative self-perpetuating feedback cycles of poverty, while the more resilient households will be able to draw upon a wider array of entitlements to increase their standard of living or mitigate the likelihood of falling into poverty in the first place.

This section has established that the more resilient households are those that are more productive, have better access to credit, and more varied means of income, which would seem to suggest that the distribution of more vulnerable and resilient households appears to be primarily contingent on the their given economic characteristics. As a whole, the more vulnerable households fared worse in every single facet examined here, which should not be surprising, yet the intent of this section was to investigate more closely how and to what extent their circumstances and behavior differ from the more resilient households. The findings strongly suggest that while their economic behaviors (or choices) differ widely, this may be due to more fundamental circumstances; less household members who are able to work due to old age or disability, and being forced into a livelihood (day laborer) due to no other options – and, apparently, being a male-headed household.

There was not a black-and-white relationship between poverty and vulnerability however, indicating that while there is a definite relationship between the two in the sample, they are not synonymous, as half of all the households identified as being more resilient *also* spent more than 50% of their expenses on food and health. In other words, a household's income level is not a particularly good indicator of how able it is to cope with hazard – or at the very least, not the most important one.

To summarize the analysis thus far: where you are seems to matter less than where you are headed. Yet this phase of analysis only serves to draw the distinctions between the two groups insofar as demonstrating which differences exist, while only providing limited clues as to *why* they exist. Why is resilience concentrated in one half of the population while vulnerability is even more concentrated within a quarter of it? Put differently, what remains to be examined is how relative resilience and vulnerability are concentrated *within* the more vulnerable and resilient household categories, thereby highlighting which of the ten attributes appear to be the most significant determinants of drawing a household to either side of the spectrum. This would then in turn highlight the most important issues (and potentially, determinants) of socioeconomic vulnerability and resilience in the sample.

5.4 Attribute Score Composition

This section seeks to outline what the most and least common types of vulnerability and resilience are in the sample, and examines the potential for uncovering relationships between the attributes themselves as well as the effect of attributes on a household's overall level of vulnerability/resilience. In doing so, the hope was to discover commonalities which could shed light on what factors help determine a household's gravitation towards either side of the spectrum.

There are several ways to do this. Simply highlighting the differences in the total composition of vulnerable/resilient attributes in the different categories sets the foundation for this section. This is then followed by disseminating what percentage of households in every category scored one standard deviation above or below in each of the 10 attributes. Finally, Umbrella Models are employed to identify if there are any attributes that, quite simply, matter more than others. Combined, this gives us a relatively clear picture of what the major issues appear to be, which, in turn, could be interpreted as the most important determinants of vulnerability/resilience in the Dry Zone.

5.4.1 Attribute Distribution of Vulnerability and Resilience

As mentioned, the first step is to consider most and least common types of vulnerability and resilience in the population sample. Table 13 below is a product of adding up the total number of each vulnerability in the sample total and each category and then presenting the data in percentage format. Naturally, this data should be interpreted with caution; the highest and thereby most useful distribution of vulnerability is found in the sample total, as this has the total number of vulnerabilities. The Most Vulnerable category consists of a much smaller number of households and the Most Resilient category consists of a much smaller number of vulnerabilities. Hence Table 13 (and Table 14, which provides an overview of the distribution of resilience, where the same restrictions apply), should be considered more indicative than significant.

Important to bear in mind when viewing this table is that the ‘ideal’ distribution would be each of the 10 attributes having a 10% representation; any attribute which is over- or under-represented could therefore signify its importance in the given category. A higher representation in the resilient categories could suggest that the attribute is not a particularly important determinant of resilience, while a lower representation in the vulnerable categories could suggest that it is not a particularly important determinant of vulnerability. By extension, a lower representation in the resilient categories could signify the attribute being an important determinant of resilience, while a higher representation in the vulnerable categories could signify the attribute being an important determinant of vulnerability.

Table 13: Attribute Distribution of Vulnerability

Attribute	Most Resilient	More Resilient	Sample Total	More Vulnerable	Most Vulnerable
Dependency	7%	8%	9%	7%	8%
Debt	8%	9%	10%	9%	6%
Expenditure Allocation	32%	19%	14%	12%	10%
Livelihood and Income Sources	0%	1%	0%	0%	1%
Food Security	0%	5%	12%	16%	17%
Water & Sanitation	12%	13%	8%	5%	4%
Health	13%	13%	15%	15%	10%
Assets	7%	8%	10%	11%	15%
Social Participation	15%	15%	13%	15%	15%
Participation in Decision-Making	7%	9%	9%	10%	15%

Despite its constraints, Table 13 does give rise to some potentially useful observations. 9% of all vulnerabilities in the total sample were in the form of dependency, which did not change much as we check to either side of the spectrum. Debt vulnerability, if anything, seemed to be a marginally more prevalent characteristic for households in the middle of the spectrum. Surprisingly though, a significantly higher percentage of vulnerabilities in the resilient categories came in the form of expenditure allocation. When viewed in combination with livelihood and income source vulnerability however, this could suggest that it is acceptable to be spending money in a non-optimal way as long as a household’s livelihood(s) provides enough income to compensate for it (this is further supported by looking at the attribute distribution of resilience, which we will examine next). Food security was (as one would expect) a more prevalent vulnerability among the more vulnerable households than both the sample average and resilient households. Access to drinking water, on the other hand, was a far more common vulnerability among the more resilient households, suggesting that a household’s proximity to a water source is one of the less important determinants of resilience, and given that only 4% of the total vulnerabilities of the most vulnerable households came in this form, it can also be regarded as an unimportant determinant of vulnerability. Health issues were more or less evenly spread across the

categories. Coupled with the findings outlined in the previous section, where it was established that on average the more vulnerable households were less productive due in no small part to health issues, this indicates that resilient households have the means to compensate for family members falling ill. Somewhat unsurprisingly, asset vulnerability was less common among the resilient households.

The results truly worth noting however, particularly when viewed in combination with the attribute distribution of resilience, is in the more social aspects. Social participation accounted for 13% of the total vulnerabilities in the sample, slightly increasing to 15% in the outlying groups on either side of the spectrum. Hence, this could be considered an important determinant of vulnerability and an unimportant factor for resilience. In terms of decision-making, the relationship is even more clear; only 7% of the total vulnerabilities of resilient households came in the form of the decision-making attribute while this came in as 15% for the most vulnerable. A household's level of inclusion in the community, in terms of social capital and proximity to power, appears to be just as important as the more fundamental factors of food security and assets.

Examining the attribute distribution of resilience appears to support most of the trends found in Table 13. The same '10% ideal rule' applies here, only in reverse; higher representation of an attribute in the resilient categories signifies that the attribute is potentially an important determinant, while lower representations signify it is not. Lower representation of an attribute in the vulnerable categories signifies that the attribute could be an determinant of vulnerability, whilst higher representations suggest otherwise.

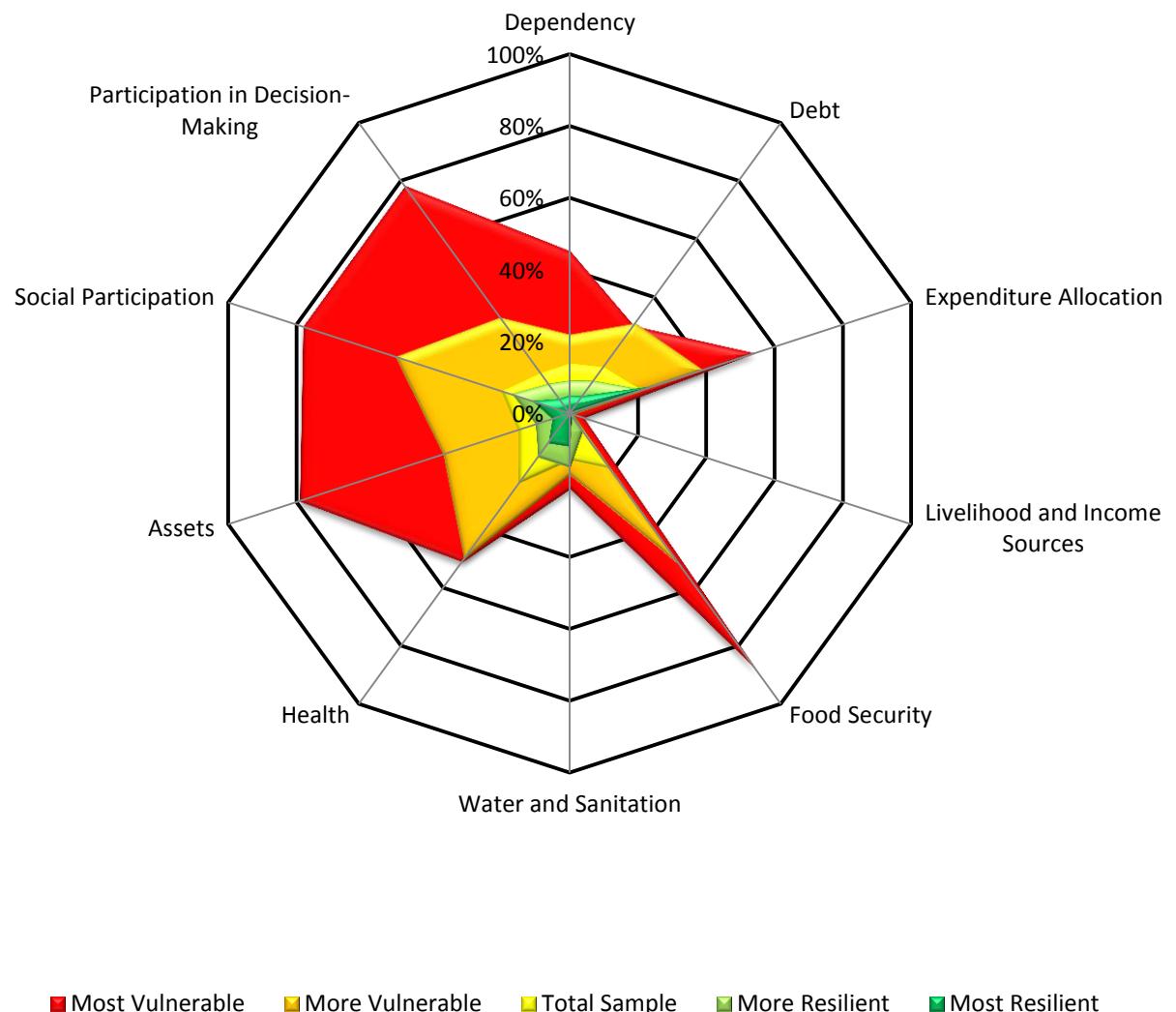
Table 14: Attribute Distribution of Resilience

Attribute	Most Resilient	More Resilient	Sample Total	More Vulnerable	Most Vulnerable
Dependency	10%	12%	11%	17%	22%
Debt	11%	7%	7%	9%	6%
Expenditure Allocation	7%	5%	5%	2%	0%
Livelihood and Income Sources	4%	6%	4%	9%	18%
Food Security	16%	14%	13%	8%	4%
Water & Sanitation	7%	9%	12%	19%	27%
Health	16%	22%	26%	22%	21%
Assets	9%	6%	6%	4%	1%
Social Participation	12%	11%	10%	5%	0%
Participation in Decision-Making	9%	6%	6%	4%	0%

Once again, the vulnerable households are those which had weak scores in terms of expenditure allocation (presumably due to negative coping responses), assets, food security, social participation and decision-making. For the more resilient households, it was most common to be resilient in terms of health and food security, but in both the more and most resilient categories, social participation and decision-making were either equal to or higher than the sample average (though possibly not as much as one would expect in light of how the vulnerable households fared in this regard).

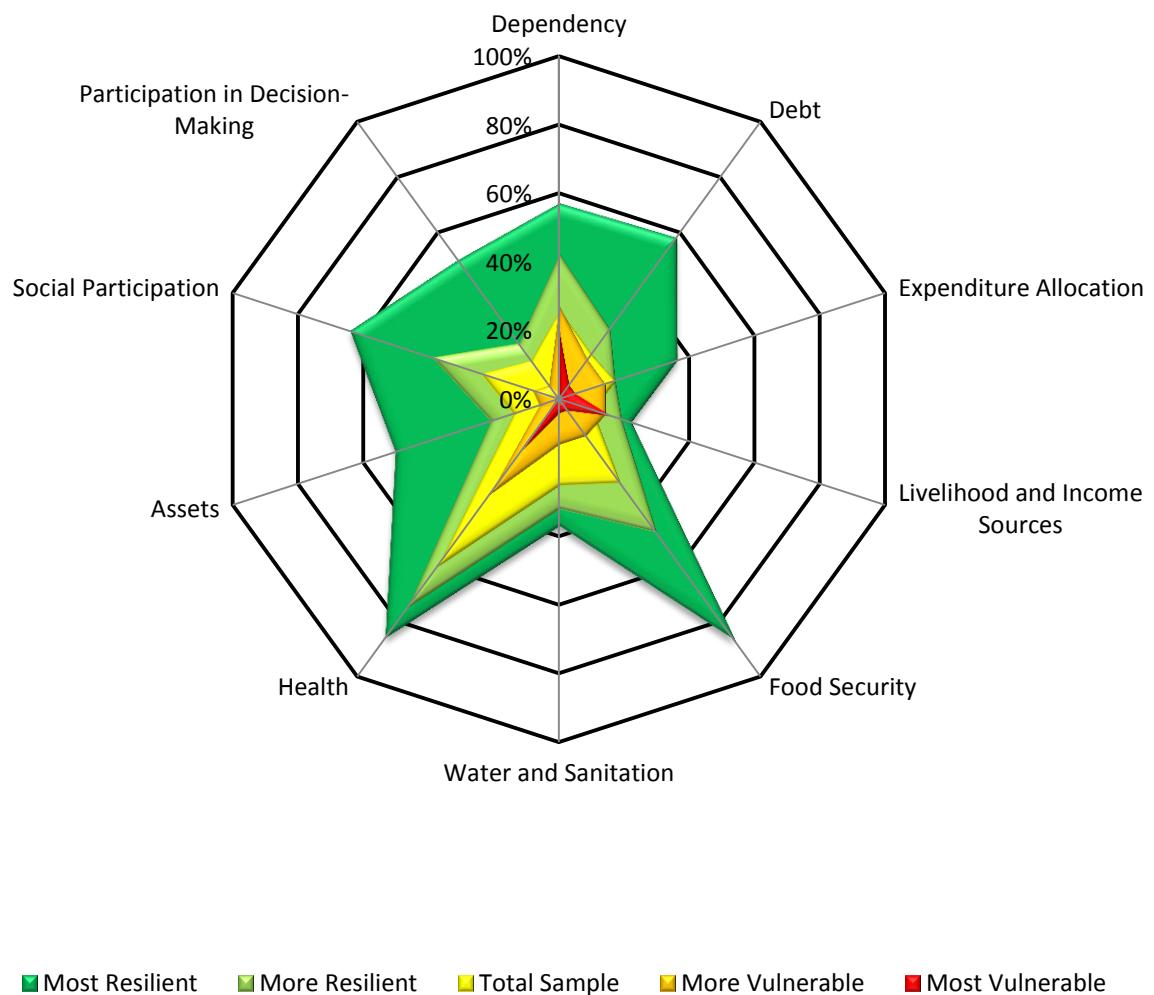
Equally useful is to examine the percentage of households in each category that scored one standard deviation above or below the mean value in each of the attributes, to further help isolate the ones that seem to matter the most.

Figure 23: Percent of Households Scoring 1StDev Below Mean



The three most significant attributes for the vulnerable households in the sample can now essentially be confirmed to be food security, social participation and participation in decision-making (closely followed by assets and expenditure allocation). These are both the most commonly occurring vulnerabilities among the vulnerable households, as seen in Table 13, and ones that the highest percentage of vulnerable households are suffering from, as seen in Figure 23 above.

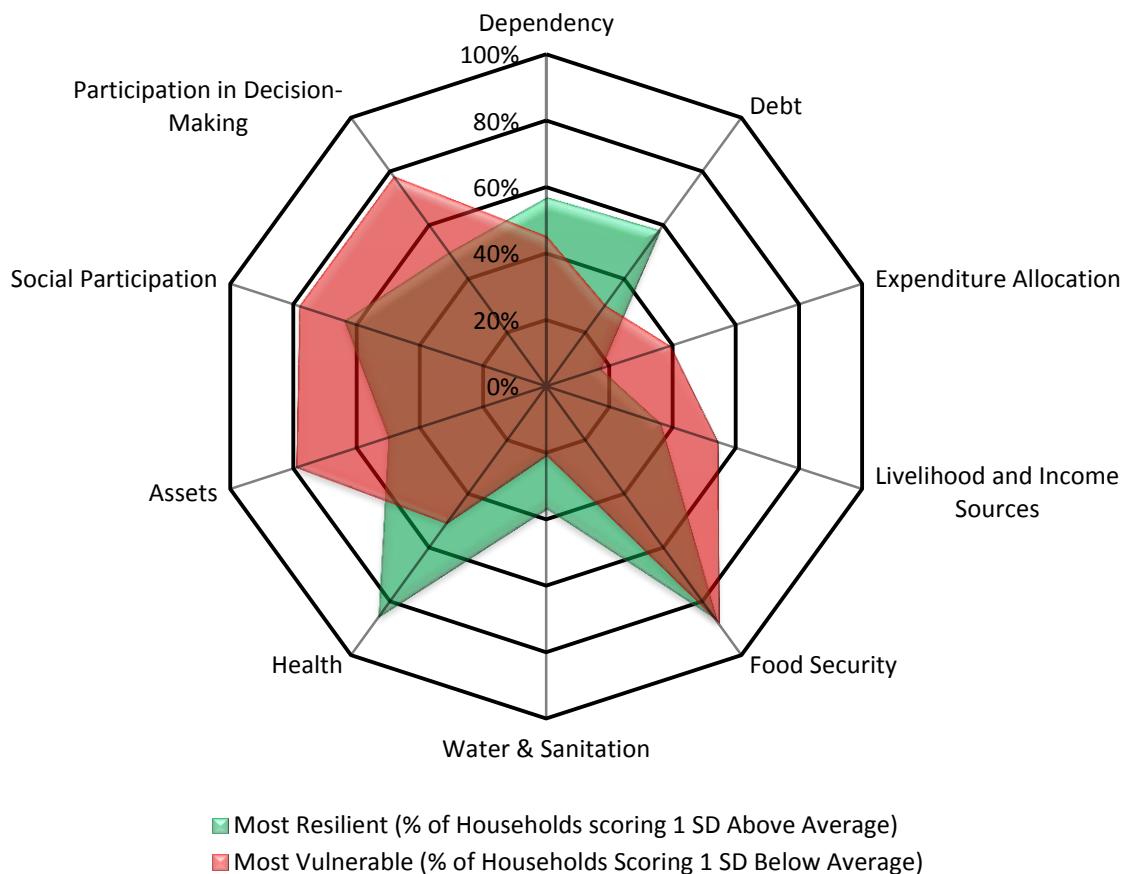
Figure 24: Percent of Households Scoring 1 StDev Above Mean



As can be seen in Figure 24, the three resilient attributes that the highest percentage of resilient households has are food security, health, and social participation (closely followed by debt and dependency), which suggests that once again, social participation (and decision-making as well, albeit not as significantly) appears to be a very influential factor.

If we attempt to crystallize the differences between the most vulnerable and most resilient by creating a final model where the most resilient and vulnerable households are directly compared in terms of the former's resilient attribute composition versus the latter's vulnerable attribute composition, we get something like Figure 25.

Figure 25: Resilience/Vulnerability Attribute Overlaps (Most Resilient and Most Vulnerable)



As can be seen, the most significant overlap is in terms of food security, an attribute where nearly 90% of the most vulnerable are vulnerable in, and a correspondingly high percentage of the most resilient are resilient in. Once again, this is to be expected – in fact one could argue that there would be something wrong with the methodology if these percentages were any lower. What may have been less expected from the onset of this study is that social participation would follow so closely behind.

Closer examination of this attribute also revealed that of the 365 households in the sample which had a vulnerable social participation score, 78% of them belonged to one of the vulnerable categories. Similarly, of the 437 households in the sample which had a resilient social participation score, 334 of them (76%) fell into one of the resilient categories.

Piecing together every aspect of the analysis, the picture that presents itself is one where participation in community institutions appears to be, by far, the most prevalent characteristics of extreme vulnerability, while the reverse holds true for extreme resilience. We saw this with A Nauk Taw, a community only in name, and Zee Taw Tite, a very tightly knit community compared to not just A Nauk Taw, but the rest of the sample as well. Zee Taw Tite had the highest social participation scores of any of the other villages, while it had just one household classified as vulnerable. This could also help explain why the differences that emerged from comparing the demographic characteristics of vulnerable and resilient households were not always very distinct if the main separator between vulnerability and resilience was rooted in social causes.

6. CONCLUSION

This paper has revolved around a set of numbers on a spreadsheet, 1785 rows long and 371 columns wide. Contained in those numbers are 9065 men, women and children, whose lives were coded, sorted, and calculated until they and their family came out the other end classified as one of five options. From the reams of data in this spreadsheet and the dozens of formulas used to compute scores, means, standard deviations, sums, percentages and models, nevertheless emerged the rather simple conclusion that while living outside the circle of humanity is a lonely experience in the developed world, it can be a fatal one in places like the Dry Zone. It emphasizes the importance of the role of community, speaking to the notion that resilience is something that is attained as a group while vulnerability is a consequence of having no one left to turn to for help.

One of the unspoken aims of this paper was to avoid placing those 9065 individuals into a theory-laden narrative and instead let each step of the analysis guide the direction of the next, until a conclusion emerged upon which a hypothesis could be based on. The danger of research based solely on numbers and percentages is that they are even more open to interpretation than words; “There are lies, damned lies, and statistics”, as Benjamin Disraeli said. There is an infinite number of ways that this massive amount of data could have been interpreted, but this interpretation was based on the paradoxically rigid yet flexible analytical framework that is Umbrella Modeling.

The primary reason why Umbrella Modeling was adopted as an analytical framework in this paper was to help encourage a view of social vulnerability (and by extension, transient poverty) as something that is immensely complex, with a multitude of interconnected factors and circumstances. It is both ironic and interesting that despite the exclusive reliance on coding, sorting, and calculating, the conclusion of this paper produced a hypothesis that can only be effectively investigated through qualitative research.

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Appendix A: SPPRG Household Vulnerability Questionnaire

1) Household Member Characteristics / ၁။ အိမ်ထောင်စုဝင်မှား၏အခြေခံနှစ်လက္ခဏာများ

အိမ်ထောင်စုဝင် အရေအတွက် - _____ ယောက် | ____ |

အိမ် ထောင် စုဝင် အမှတ် House- hold member ID	အမည် Name	အိမ်ထောင် ဦးစီး household head	ကျော်/မ Gender	အသက် (ပြည့်ပါး အသက်) Age (at last birthda y)	အိမ်ထောင်၏ အခြေခံအနေ Marital Status (Only ask people over 12 yrs old) (အသက်၏ နှစ်နှင့်အထက် မှားကိုပေးရန်)	[အမည်] [အမည်] က လျှို့သောင်ငွေ /လုပ်အေး ဖူ ဒီသားစုအသုံး မြတ်ဆတ်ကို ထင်း ဝင်ငွေ မြှု/မြှို့ အတန် What highest education level has [NAME] completed OR is <u>currently</u> <u>attending</u>	[အမည်] က သာနှစ်များသူ မြတ်ဆတ်ကို ထင်း ဝင်ငွေ မြှု/မြှို့ အတန် Does member have a disability ?	[အမည်] က လျှို့သောင်ငွေ /လုပ်အေး ဖူ ဒီသားစုအသုံး မြတ်ဆတ်ကို ထင်း ဝင်ငွေ မြှု/မြှို့ အတန် How does member contributes to household income?	မန္တိက တအမည် 'များနာတဲ့သူ ကိုပြုစေပေးရ ^၅ တဲ့ အတွက် တ အမည် 'အလုပ် ဘယ်နှစ်ရက် ပျက်စွဲတိပါ ဘယ်	မန္တိက များနာတဲ့သူ ကိုပြုစေပေးရ ^၅ တဲ့ အတွက် တ အမည် 'အလုပ် ဘယ်နှစ်ရက် ပျက်စွဲတဲ့သူ
01		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
02		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
03		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
04		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
05		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
06		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
07		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
08		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
09		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
12		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
13		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
14		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
15		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

2. Household Expenditure အိမ်ထောင်စု အသုံးစရိတ် Please evaluate the percentage of your various household expenditures using the 10 stones method (last year) ကျောက်ခဲ ၁၀ လုံးနည်းကို အသုံးပြု၍ အိမ်ထောင်စု အသုံးစရိတ်ကိုရာခိုင်နှင့်တကွေဖော်ပြပါ။(မနှစ်က)

No. စဉ်	List အမျိုးအစား	Number of stones
1	Food expenses အစားအသောက်အတွက် ကုန်ကျစရိတ်	
2	Debt repayment ခေါ်ငွေအတွက်ပေးရငွေ	
3	Health expenses ကျွန်းမာရေးအတွက် ကုန်ကျစရိတ်	
4	Education expenses ပညာပေါ်အတွက် ကုန်ကျစရိတ်	
5	Livelihood expenses အသက်မွေးဝမ်းကျောင်းဆိုင်ရာလုပ်ငန်းများအတွက် ကုန်ကျစရိတ်	
6	Official/social expenses အခွန်အခဲ / အလျေငွေ(သာရေးနာရေး) ပေးဆောင်ရသည့် ကုန်ကျစရိတ်	
7	Travel expenses ခန့်သွားလာရေး ကုန်ကျစရိတ်	
8	Others (Specify) အခြား(ဖော်ပြပါ)	
9	Savings လက်ကျွန်း ငွေ	
2.1	Is anyone from your household indebted (money/assets)? ယခုသင်တို့အိမ်ထောင်စုဝင် တစ်ဦးဦးဟာ ငွေကြေး/ပစ်ပြည်း အမြှေးတင် ထားတာ ရှိပါသလား။	Yes ရှိသည်။ ၁ No မရှိပါ။ ၂

		Number of stones ကျောက်ခဲ အလုံးခေါ်
2	For this household, who are the main creditors?(MA) သင်တို့အိမ်ထောင်စု ဘယ်သူတွေဆိုကန် ငွေကြေးတို့ခေါ်ပြုသူများမှာတာဝါလဲ။ (MA)	
1	Relatives/friends ဆွဲမျိုး၊ သူငယ်ချင်း	
2	Money lender ငွေခေါ်သူ / အတိုးပေးသူ	
3	Bank (Public/Private) ဘဏ် (အစိုးရ/ပုဂ္ဂလိက)	
4	Employer/boss/broker အထုပ်ရှင်/သူငွေး/ခွဲစား	
5	INGO/NGO	
6	Others (Specify) အခြား (ဖော်ပြပါ)	

3. Sources of Household Income and Diversity ၃. မီသားစုဝင်ငွေနှင့် ဝင်ငွေရရှိနိုင်သောအခြားနည်းလမ်းများ

	ကျောက်ခဲ ၁၀ လုံးနည်းကို အသုံးပြု၍ ဝင်ငွေနှင့်ဝင်ငွေရရှိနိုင်သောနည်းလမ်းများတို့နှင့်တကွေဖော်ပြပါ။(မနှစ်က)	ကျောက်ခဲ အလုံးခေါ်	ပုံမှန် Regular	ရာသီလိုက် Seasonal
1	Agriculture စိုက်ပို့ဆေး			
2	Livestock rearing ငွေဗြိုင်း			
3	Selling other goods through a shop or stall ငွေဆိုင် / အရောင်းအဝယ်			
4	Irregular day-wages တွေ့သန်း / နှေ့စားလုပ်သား			
5	Regular part-time employment (employee) ပုံ့ဖို့အဖို့နိုင်းလုပ်သား			
6	Regular full-time employment (employee) အမြဲတမ်း ဝန်ထမ်း / လုပ်သား			
7	Remittances/contributions from family/friends မိဘ / မီသားစုဝင် / သူငယ်ချင်း မှ ထောက်ပုံပေးခြင်း			
8	Other services provision/ Small technical work အခြားဝန်ဆောင်မှုများမှုပိုင်းခိုင်း / အသေးစားစက်မှုလက်မှု			
9	Rental of assets အိမ်ထောင်စုမှုပိုင်းဆိုင်မှုအားလုံးရမ်းထားခြင်း			
10	Donation အလျော့အတန်းမှုပိုင်းခိုင်း			
11	Debt interest repayments အတိုးငွေရရှိခြင်း			
12	Others အခြား(ဖော်ပြပါ)			

3.2	Did your household grow any crop in the past one year? သင်တို့မိဘအစူ မနှစ်ကသီးနှံတစ်မျိုးမျိုးစိတ် ခဲ့ပါသလား။	Yes/ခိုက်သည် No/မခိုက်ပါ	1 2
3.3	If yes, how many acres did your household grow? နိုက်ရင်ကယ်နှင့်က နိုက်ခဲ့ပါသလဲ။	perennial crop/နှစ်ရှည်သီးနှံ	seasonal crop/ရာသီအလိုက်သီးနှံ
		_____ ဧက _____ ပ်	_____ ဧက _____ ပ်
3.4	Type of land(SA) နိုက်ဖြူမြေ အမျိုးအစား (SA) Own land/ တို့ထိုင်မြေ-----1 Rent in cash နိုက်လေး၍ ငှားရမ်းမြင်း -----2 Rent in kind သီးနှံလေး၍ ငှားရမ်းမြင်း -----3 Use the land for freeအမှားလုပ်စဉ်မြောင်းမြှင့်းမြှင့်းမြှင့်းမြှင့်း-----4		

4. Household assets ၁၄ အိမ်ထောင်စုပိုင်ဆိုင်သည့်ပစ္စည်းများ

No.	List	Quantity
Home assets အိမ်အသုံးအဆောင်		
01	Generator ဖီးစက်	
02	Television ၅/၇ပိုင်သံကြေား	
03	Telephone/Mobile တယ်လိုဖန်(ကြေးဖန်/လက်တိုင်ဖန်)	
04	Other(Specify) အခြား(ဖော်ပြပါ)	
Livelihood assets (agriculture) အသက်မျှေးဝင်းမြောင်းမှုဆိုင်ရာ ပိုင်ဆိုင်ပစ္စည်းများ		
01	Draught animal မိုင်းကျွဲ့ မိုင်းကျွဲ့	
02	Buffalo/cow မိုင်းသောကျွဲ့/မိုင်းသောကျွဲ့	
03	Pig ဝက်	
04	Chicken ကြိုင်	
05	Sheep ဆီး	
06	Goat ဆီတ်	
07	Duck ဆဲ	
08	Horse မြင်း	
09	Quail ငါး	
10	Hand tools လက်ဖြင့်အသုံးပြုခြင်သာ နိုက်ဖျိုးရောသုံးကိုရိုယာများ	
11	Machine နှိပ်ပျိုးဆေးသုံး စက်ပစ္စည်းကိုရိုယာများ	
12	Small home business Assets အသေးစားအိမ်တွင်းမှုလုပ်ငန်းသုံးပစ္စည်းကိုရိုယာများ	
13	Sewing machine အပ်ချုပ်စက်	
14	Loom machine လက်ယတ်ကန်းစင်	
15	Other(Specify) အခြား(ဖော်ပြပါ)	
Transportation Assets သယ်ယပ်အဆောင်ရေး		
01	Bicycle စက်ဘီး	
02	Motorcycle မော်တော်ဆိုင်ကယ်	
03	Car မော်တော်ကား	
04	Trawler-G ထော်လာရှို	
05	Tricycle ဆုံးဘေး/သုံးဘေးဆိုင်ကယ်(တတ်တတ်)	
06	Animal drawn cart...etc နှားလည်း၊ မြင်းလည်း . . . စသည်	
07	Other(Specify) အခြား(ဖော်ပြပါ)	
Other household assets အိမ်ထောင်စုပိုင် အခြားပစ္စည်းများ		
01	Valuable assets to be sold if needed (Gold/Jewels)	

5. Type of house နေထိပ်အမြဲးအစား (circle one number for each section)

5.2	What source of walling materials does your household primarily use? နေတိပ်(အပြင်)နှင့်အတွက် အဓိကသုံးသော ပစ္စည်း (Observation)	No protection အထားမရှိ	0
		Thatch/big leaves/palm leaves/polytarp/ plastic tarp သက်တယ်/သစ်ချွေကြီး/ထန်း/ပန့်/တာပေါ်လင်	1
		Bamboo/bamboo sheets ဝါး/ဝါးထပ်	2
		Raw wood သစ်အကြောင်းထည်	3
		Brick (concrete/mud) / Finished wall နေလှ့ပါးတို့ ဖွံ့ဖြိုး အခြားတိုင်နှင့် (သစ်ချွေအပါးအဝါး) အခြား (ဖော်ပြုပါ)	4
		အခြား (ဖော်ပြုပါ)	5
5.3	What source of roofing materials does your household primarily use? နေတိပ် အမိုးအတွက် အဓိကသုံးသော ပစ္စည်း (Observation)	None	0
		Thatch/big leaves/palm leaves/ polytarp/ Bamboo/bamboo sheets/plastic tarp သက်တယ်/သစ်ချွေကြီး/ထန်း/ပန့်/ဝါး/ဝါးထပ်/တာပေါ်လင်	1
		Zinc sheet ဘွဲ့	2
		Others finished roof (shingles and tiles) အခြား အဆာတည်အစိုး (အုတ်ကြိုပ်)	3
		အခြား (ဖော်ပြုပါ)	4
5.4	What source of lighting does your household primarily use? နေတိပ်မီးအလင်းနေတိပ် အများဆုံး ဘာကိုအသုံးပြုပါသလဲ	No electric power (only kerosene, battery, candle, LED ,etc.) လျှော်စစ်ခိုက်အားမဟုတ်သော ဘက်ထပ် ရော်ဆီ ဖလောင်းတိုင်၊ LED မီး စသည်	0
		Someone else's private generator အခေါ်အငွေပေးရသောကျေးမှု့လျှော်စစ်ပိုး	1
		Public electricity (or) hydro -power အများဆုံးလျှော်စစ်ခိုက်အား(သို့)ကျေးမှု့ရေအားလျှော်စစ်	2
		Household's own private generator အိမ်အတင်စုပိုင်မီးခိုး	3

6. Food Security ၆. အစားအစားဖူးမှု

	During the past 3 months (ပြီးဂုဏ်သော(၃)လအနှင့်ကာလအတွင်း	Frequently မကြာခဲ့	Some times တခါတင့်	Never လုံးဝ
6.1	Has anyone in your household had to borrow food from relatives/neighbors? (ရု)လအတွင်း သင်တို့အိမ်ခိုက်တောင်စု အစားအစားအတွက် ဆွဲမျိုးများ သူငယ်ချင်မီးပိတ်ဆွဲများထံမှအေးလွှာသောက်ရတာများရှိပါသလား။			
6.2	Has anyone in your household had to reduce food consumption due to lack of food? (ရု)လအတွင်း အိမ်ခိုက်တောင်စုအတွက်အစားအစားပုဂ္ဂိုလ်မှုံးကြောင်းလျော့စားရတာ ရှိလား။			
6.3	Has anyone in your household had to eat cheaper food instead of rice? (ရု)လအတွင်း သင်တို့အိမ်ခိုက်တောင်စုတစ်ဦးပို့သာ အစား အစာရှားလို့ (သို့) မတတ်နိုင်လို့ ထမင်းအစား ရေးသက်သာတဲ့ အခြားအစားအစာကို ပြောင်းလဲ စားသောက်ခဲ့ပါသလား။			
6.4	Has adults in your household had to skip more than one meal a day during? (ရု)လအတွင်း အစားအစာရှားလို့ (သို့) မတတ်နိုင်လို့ သင်တို့ အိမ်က အရွယ်ရောက်သူတစ်ဦးပို့သာ ထမင်း ၁ နှင့်မစားဘဲ နေခဲ့တာမျိုးရှိပါ သလား။			
6.5	Has children/dependents in your household had to skip more than one meal a day ? (ရု)လအတွင်း အစားအစာရှားလို့ (သို့) မတတ်နိုင်လို့ သင်တို့ အိမ်က ကတေး/မြို့မြို့သူတစ်ဦးပို့သာ ထမင်း ၁ နှင့်မစားဘဲ နေခဲ့တာမျိုးရှိပါ သလား။			

7. WASH ဥပဒေနှင့် သီတယ်မှု

7.1	Time taken for fetching domestic/drinking water in one day တစ်နာရီမှာ သောက်/သုံးပေါ်ရရှိနိုဘတွင် ရေခံ ချိန်စုပေါင်း ဘယ်လောက်ကြောသလဲ	Normal season (Minute) ပုံမှန်ရာသီ (၆၄၄)	Dry season (Minute) နှဲရာသီ (၆၄၄)

8. Health ကျော်မာရေးဆိုင်ရာလိုအပ်ချက်များ (indicate number of persons with needs; same person can have more than one need)

No.	List အမျိုးအစား	Vaccine ကာကွယ်ဆေး	Nutrition အာဟာရ	Other အခြား
1	Child needs (ကလေးသူငယ်များ)			
No. ၁။	List အမျိုးအစား	Rehab ပြန်လည်ထူးစောင်းရေး	Assistive device အထောက်အကွပ္ဗည်းများ	Surgery ခွဲစိတ်ကုသမှု
2	PwD needs (မသနစွမ်းသူများ)			
No. ၃။	List အမျိုးအစား	Eye care မျက်စိစိုင်ရာကုသမှု	Hypertension သွေးတိုးရောဂါ	Diabetes ဆီးချိုးရောဂါ
3	OP Needs (သက်ကြေးချုပ်အိုးများ)			
No. ၄။	List အမျိုးအစား	Reproductive သားစက်မြား	Gynaecological အမျိုးသမီးဆိုင်ရာ ရောဂါဆေးကုသမှု	Other health အခြား
4	Women needs (အမျိုးသမီးများ)			

9. Social Participation ၏ လုပ္ပန်အစိအစဉ်များတွင်ပါဝင်မှု

	How do household members participate in following events? အောက်တွင်ဖော်ပြုထားသော မည်သည့်လုပ်ငန်းများတွင် အိမ်တောင်စု၏ ပိုသားစုဝင်တစ်ဦးလို့မှု ဘယ်လိုပါဝင်မှုပါ သလဲ။	Always အမြဲတမ်း	Frequently မြောဆက်	Some times တခါတရဲ့	Never လုံးဝ
9.1	Village meetings ကျေးဇူးနှင့်ပတ်သက်သောအစည်းအဝေးများ				
9.2	Weddings, funerals, religious festivals ရုပ်ဆွာအတွင်းသာမေး/နာမေး/ဘာသာမေး တို့များ				
9.3	Household events အိမ်မှာအကြောင်းကြီးထောက်လိုက်တွေ့ရှိရင် အိမ်နှီးနားချင်းတွေ့လာရောက်လေ့ရှိခြင်း (အကြောင်းအရာများလေ့လာခဲ့ရန်) - အချက်အလက်ကောက်လုပ်ရာတွင် တိကျသော အကြောင်းအရာများလေ့လာခဲ့ရန်)				

10. Decision Making

	To what extent does the household participate in village planning?အိမ်တောင်စုသည့်ဆုံးစိစ်စောင်ရွက်မှုများတွင်မည်မျှအတိုင်းအ တာအထိပါဝင်သနည်း	Always အမြဲတမ်း	Frequently မြောဆက်	Some times တခါတရဲ့	Never လုံးဝ
9.1	Influences decisions အုပြစ်ချက်များအပေါ်ယဉ်စီးပို့နိုင်မှု				
9.2	Participates in discussions ဆွေးနွေးများတွင်ပါဝင်ဆွေးနွေးမှု				
9.3	Attends meetings အစည်းအဝေးများတွင်တက်ရောက်မှု				

Appendix B: Correlations Matrix

Correlations

		Dependency	Debt	ProdEx	LDI	FoodSec	WatSan	Health	Assets	Social	Decision
Dependency	Pearson Correlation		1	.035	-.110**	.248**	.108**	.044	.100**	.066**	.053*
	Sig. (2-tailed)			.138	.000	.000	.000	.064	.000	.005	.026
	N	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785
Debt	Pearson Correlation		.035	1	.093**	.095**	.277**	.008	.034	.148**	-.035
	Sig. (2-tailed)			.138		.000	.000	.738	.155	.000	.141
	N	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785
ProdEx	Pearson Correlation		-.110**	.093**	1	-.123**	.209**	-.035	.163**	.160**	.063**
	Sig. (2-tailed)			.000	.000		.000	.139	.000	.000	.007
	N	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785
LDI	Pearson Correlation		.248**	.095**	-.123**	1	.023	.154**	-.061**	-.145**	-.127**
	Sig. (2-tailed)			.000	.000	.000		.332	.000	.009	.000
	N	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785
FoodSec	Pearson Correlation		.108**	.277**	.209**	.023	1	-.134**	.268**	.324**	.236**
	Sig. (2-tailed)			.000	.000	.000		.332	.000	.000	.000
	N	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785
WatSan	Pearson Correlation		.044	.008	-.035	.154**	-.134**	1	-.244**	-.080**	.008
	Sig. (2-tailed)			.064	.738	.139	.000	.000		.001	.720
	N	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785
Health	Pearson Correlation		.100**	.034	.163**	-.061**	.268**	-.244**	1	.042	.110**
											.132**

	Sig. (2-tailed)	.000	.155	.000	.009	.000	.000		.076	.000	.000
	N	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785
Assets	Pearson Correlation	.066**	.148**	.160**	-	.324**	-.080**	.042	1	.131**	.244**
	Sig. (2-tailed)	.005	.000	.000	.000	.000	.001	.076		.000	.000
Social	N	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785
	Pearson Correlation	.053*	-.035	.063**	-	.236**	.008	.110**	.131**	1	.466**
Decision	Sig. (2-tailed)	.026	.141	.007	.000	.000	.720	.000	.000		.000
	N	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix C: ANOVA Significance Tests

1= Most Vulnerable

2= Vulnerable

3 = Sample Total

4 = Resilient

5 = Most Resilient

Household Size

Multiple Comparisons

Dependent Variable: Value

Tamhane

(I) GN	(J) GN	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	-.232	.297	.997	-1.08	.62
	3.00	-.612	.277	.263	-1.41	.19
	4.00	-.413	.290	.820	-1.24	.42
	5.00	.218	.319	.999	-.69	1.13
2.00	1.00	.232	.297	.997	-.62	1.08
	3.00	-.380*	.129	.034	-.74	-.02
	4.00	-.180	.154	.938	-.61	.25
	5.00	.451	.205	.249	-.13	1.03
3.00	1.00	.612	.277	.263	-.19	1.41
	2.00	.380*	.129	.034	.02	.74
	4.00	.199	.112	.538	-.11	.51
	5.00	.831*	.175	.000	.34	1.33
4.00	1.00	.413	.290	.820	-.42	1.24
	2.00	.180	.154	.938	-.25	.61
	3.00	-.199	.112	.538	-.51	.11
	5.00	.631*	.194	.013	.08	1.18
5.00	1.00	-.218	.319	.999	-1.13	.69
	2.00	-.451	.205	.249	-1.03	.13
	3.00	-.831*	.175	.000	-1.33	-.34
	4.00	-.631*	.194	.013	-1.18	-.08

*. The mean difference is significant at the 0.05 level.

Dependency

Multiple Comparisons

Dependent Variable: Value

Tamhane

(I) Group_Num	(J) Group_Num	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	-.06024	.02595	.199	-.1343	.0138
	3.00	-1.21994*	.05703	.000	-1.3799	-1.0600
	4.00	-4.34732*	.10143	.000	-4.6323	-4.0623
	5.00	-3.71594*	.16856	.000	-4.1944	-3.2375
2.00	1.00	.06024	.02595	.199	-.0138	.1343
	3.00	-1.15969*	.05344	.000	-1.3095	-1.0099
	4.00	-4.28708*	.09946	.000	-4.5666	-4.0076
	5.00	-3.65570*	.16738	.000	-4.1310	-3.1804
3.00	1.00	1.21994*	.05703	.000	1.0600	1.3799
	2.00	1.15969*	.05344	.000	1.0099	1.3095
	4.00	-3.12738*	.11167	.000	-3.4408	-2.8140
	5.00	-2.49601*	.17492	.000	-2.9915	-2.0005
4.00	1.00	4.34732*	.10143	.000	4.0623	4.6323
	2.00	4.28708*	.09946	.000	4.0076	4.5666
	3.00	3.12738*	.11167	.000	2.8140	3.4408
	5.00	.63138*	.19399	.013	.0839	1.1789
5.00	1.00	3.71594*	.16856	.000	3.2375	4.1944
	2.00	3.65570*	.16738	.000	3.1804	4.1310
	3.00	2.49601*	.17492	.000	2.0005	2.9915
	4.00	-.63138*	.19399	.013	-1.1789	-.0839

*. The mean difference is significant at the 0.05 level.

Working Days Lost

Multiple Comparisons

Dependent Variable: Value

Tamhane

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	2.6100876	4.9498734	1.000	-11.441760	16.661936
	3	20.7095328*	4.1444900	.000	8.790061	32.629004
	4	34.9665259*	4.0412325	.000	23.310386	46.622666
	5	35.5979054*	4.0434744	.000	23.936078	47.259733
2	1	-2.6100876	4.9498734	1.000	-16.661936	11.441760
	3	18.0994452*	3.0057330	.000	9.637722	26.561168
	4	32.3564383*	2.8616766	.000	24.290639	40.422238
	5	32.9878178*	2.8648419	.000	24.913336	41.062299
3	1	-20.7095328*	4.1444900	.000	-32.629004	-8.790061
	2	-18.0994452*	3.0057330	.000	-26.561168	-9.637722
	4	14.2569931*	.9299158	.000	11.650421	16.863566
	5	14.8883726*	.9396111	.000	12.254718	17.522027
4	1	-34.9665259*	4.0412325	.000	-46.622666	-23.310386
	2	-32.3564383*	2.8616766	.000	-40.422238	-24.290639
	3	-14.2569931*	.9299158	.000	-16.863566	-11.650421
	5	.6313795*	.1939885	.013	.083884	1.178875
5	1	-35.5979054*	4.0434744	.000	-47.259733	-23.936078
	2	-32.9878178*	2.8648419	.000	-41.062299	-24.913336
	3	-14.8883726*	.9396111	.000	-17.522027	-12.254718
	4	-.6313795*	.1939885	.013	-1.178875	-.083884

*. The mean difference is significant at the 0.05 level.