INGO OPERATIONAL RESEARCH REPORT

March 2018

Breaking the Cycle of Humanitarian Assistance In Malawi

ASSESSING EFFECTIVENESS OF RESILIENCE BUILDING ACTIVITIES IN THE MVAC RESPONSE

Food and Agriculture Organization of the United Nations

GOAL

cepa Centre for Environmental Policy and Advocacy

OXFAM

Save the Children

COOPI COOPERAZIONE INTERNAZIONALE

United Purpose

CONCERN worldwide

Acknowledgements

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List of acronyms

CSA	Climate Smart Agriculture
FAO	Food and Agriculture Organisation
FCS	Food Consumption Score
FGD	Focus Group Discussions
FSI	Food Security Index
GVH	Group Village Headman
GoM	Government of Malawi
HEA	Household Economy Approach
HDDS	Household Dietary Diversity Score
HHS	Household Hunger Scale
INGO	International Non-Governmental Organizations
KAS	Kasungu Lilongwe Plains livelihood zone
KII	Key Informant Interview
LSH	Lower Shire livelihood zone
MVAC	Malawi Vulnerability Assessment Committee
MSH	Middle Shire Valley Livelihood zone
MWK	Malawian Kwacha
NSO	National Statistics Office
OECD	Organisation for Economic Co-operation and Development
OR	Operational Research
PHA	Lake Chilwa - Phalombe Plain livelihood zone
rCSI	Reduced Coping Strategy Index
RESET	Resilience Building in Ethiopia
TA	Traditional Authority
UKAID	United Kingdom Department for International Development
USGS	United States Geological Survey
VSL	Village Savings and Loans
VSLA	Village Savings and Loans Association
VfM	Value for Money
WFP	World Food Programme

Executive Summary

Objectives of the Study

In response to the food insecurity challenge in Malawi, a consortium of International NGOs (INGOs) involving Save the Children International, Concern World Wide, Oxfam UK, and United Purpose implemented an Emergency Cash Transfer Programme since the El Niño induced drought in the consumption period of April 2016 to March 2017. The response was implemented in selected Traditional Authorities (TAs) identified as most at risk of food insecurity by the Malawi Vulnerability Assessment Committee[1] (MVAC). The intervention package also included additional asset and resilience building activities for a sub-set of the beneficiaries. The aim of the resilience activities was to improve household ***productive capacity***, ***reduce negative coping strategies*** and ***increase the household asset base***. The INGO consortium commissioned this Operational Research (OR) study to assess and determine the effectiveness and benefits of providing resilience building activities alongside the regular MVAC response. The study was designed to answer the following specific objectives;

I. Assess extent to which beneficiaries of resilience-building support, as part of the emergency response, achieved positive gains in terms of ***sustained food production***, ***reduced negative coping strategies***, ***increased assets***, and ***adaptive/recovery capacity*** in comparison to those who received just the emergency support.

II. Identify best practice and appropriate additional support package that beneficiaries need to improve resilience capacity through the bridging of humanitarian and development processes.

III. Provide value for money (VfM) analysis for the integrated resilience activities by evaluating if the additional support can, over the long run, reduce the need for such high spending on humanitarian response.

IV. Assess beneficiary satisfaction and acceptance of resilience building activities linked to emergency response.

This report provides results of a follow-up study of the OR, providing an assessment of resilience measurement outcomes to build upon an earlier study done in April of 2017. This report is aimed at providing judgement on whether the additional complementary resilience activities have resulted in the ‘‘MVAC plus Resilience’’ beneficiaries achieving better outcomes than ‘‘MVAC Only’’ beneficiaries. It will also provide key lessons and recommendations for application in the design of similar projects through replication and/or scaling-up.

Methodology

This follow-up operational research adopted the definition of resilience as ***“the ability of households to keep with a certain level of well-being (i.e. being food and livelihood secure) by withstanding and recovering in the short term from a shock that they are expected to deal with normally.”*** The design of the study adopted a comparative analysis of beneficiaries on ‘MVAC Only’ and those on ‘MVAC plus Resilience’ activities. The comparison is to test if there are differences in the capacity of households with additional resilience activities to maintain a state of wellbeing to their counterparts.

[1] MVAC is a Government led consortium comprising of Government departments, NGOs and UN agencies working on humanitarian services, poverty and hunger related programs that is mandated to carry out vulnerability assessments used to inform decision making on emergency and development programs. The committee does assessments in May and October of every year.

A combination of quantitative and qualitative data collection was carried out. For the analysis of quantitative data, two approaches were taken:

(1.) Comparison between 'MVAC only' and 'MVAC plus Resilience' households over time through proxy indicators for resilience using panel data collected soon after harvest in April 2017 and February 2018 at the peak of the lean season[2]; and

(2.) Household Economy Analysis (HEA) to measure resilience against the 'Livelihood Protection Threshold' using existing MVAC HEA baselines[3] and data from the first-round and second-round study to model changes in resilience over time, accounting for moderate drought-related shocks. The HEA analysis estimates resilience scores at three points: **(i)** Baseline (the 2016/17 consumption year), **(ii)** First year (the 2017/18 consumption year, and **(iii)** Projected (for the upcoming 2018/19 consumption year).

In addition, to better understand the key explanatory factors that are significantly associated with food security (a measure of resilience) among the target population, regression analysis was used drawing on the panel data collected in March 2018.

Quantitative data were collected from a total of 675 households from five districts of Dedza, Mangochi, Machinga, Mulanje and Nsanje. This follow-up data collection was contacted among households who participated in the first-round study contacted in April 2017 with exception of 'MVAC plus Resilience' beneficiaries for Nsanje. Of this total, 48% of the sample were receiving only MVAC cash assistance while the remaining 52% were receiving MVAC cash assistance and additional resilience building activities.

The qualitative data was gathered through 10 key informant interviews and 7 focus group discussions across the seven TAs included in this study. In each TA one FGD was held to follow-up perceptions and opinions on resilience activities and choices. In each district, two key informants with Ministry of Agriculture were interviewed to follow-up on key challenges and opportunities for strengthening resilience. The questions were designed to add value to the qualitative findings of the first-round study.

Summary of Key Findings

The sampled districts are in Central Region (Dedza) and Southern Region (Nsanje, Mulanje, Mangochi and Machinga) where the risk of climate change and food insecurity is among the highest in the country. In recent years the districts have experienced an increase in the frequency of drought, flooding and fall army worm which have seen many households experiencing food insecurity. In addition to shocks the districts are also burdened with chronic poverty, high incidence of HIV, increasing decline of agricultural land sizes due to growth in population, as well as decline in soil fertility which compounds the vulnerability of citizens. These underlying structural challenges are exacerbated by the frequent shocks which are becoming less predictable for local farmers resulting in severe impacts on existing livelihoods. The following points summarises the key findings for each of the study objectives drawn from the three components of analysis used in the study;

[2] Note that this difference in seasonality has important implications for the values of indicators at both points in time, though comparison between 'MVAC only' and 'MVAC Plus Resilience' households is still informative.

[3] Quantified information on typical livelihood strategies normally employed by different wealth groups to access their food, generate income and allocate expenditures over a 12-month period. The baselines last for up to 10 years provided no fundamental changes occur. For Malawi the baselines were done for periods April 2013/14 to March 2014/15. The baselines are used to measure changes in access (negative or positive) and whether households can meet their needs. It is the basis for MVAC vulnerability assessments.

Intervention resilience gains: The comparison of resilience proxy indicators between 'MVAC plus Resilience' and 'MVAC Only' between April 2017 and March 2018 data collection cycles show that 'MVAC plus Resilience' beneficiaries have better resilience gains compared to 'MVAC Only'. The comparison was done on through 10 proxy indicators analysing; ***sustained food production, reduced negative coping strategies, increased assets, and adaptive/recovery capacity.*** The summary of findings in these areas is presented below:

Sustained food production: Comparison of maize yield indicate that 'MVAC plus Resilience' households are expecting to harvest 646kg/ha in the 2017/18 season compared to 605kg/ha for 'MVAC Only'. This production is lower than the 1001kg/ha and 798kg/ha harvested in the 2016/17 season respectively. The difference in average yields between 'MVAC Only' and 'MVAC plus Resilience' beneficiaries is statistically significant at both comparison periods although the level of significance declined to 10% in the 2017/18 season compared to 5% in 2016/17 season. The decline in production is attributed to the difference in seasonal performance particularly the occurrence of early season dry spells and fall army worm which affected crops in the 2017/18 season. The average months from own production show that 'MVAC plus Resilience' are expecting own production in 2018 to cover 5 months compared to 4 months for 'MVAC Only' although this a decline from 6 months and 4.5 months in 2017 harvest.

Asset ownership: Asset index a proxy indicator to evaluate asset build-up or loss over time was used to assess the wealth differentiation between the 'MVAC Only' and 'MVAC plus Resilience' beneficiaries. The 'MVAC plus Resilience' beneficiaries have maintained a higher value of asset ownership between April 2017 (12.2) and March 2018 (10.7) compared to 9.8 and 8.3 in the same period for 'MVAC Only'. The results are statistically significant at 5% significance level, which shows that asset holding higher among 'MVAC plus Resilience households'. A comparison of the index over time shows a slight decline in the value between April 2017 and March 2018. The possible losses are mostly in livestock which is used as a coping measure during lean periods to smoothen consumption.

Household food security: Food security was measured using the Food Security Index[4]. The analysis shows that 'MVAC plus Resilience' are more food secure (41%) compared to their 'MVAC Only' (38%). While there is no statistical significance in the differences of this overall measure, one of the indicators used in the computation Food expenditure share shows that 'MVAC plus Resilience' households are less economically vulnerable with 76% of households spending less than 50% household budget on food compared to the 'MVAC Only' with 65%. There is a 5% statistical significance in the differences. This analysis shows that 'MVAC plus Resilience' though marginal, they can cope better compared to 'MVAC Only'.

Adaptive/recovery capacity: Modelling of Resilience Scores using Household Economy Approach was used to estimated recovery capacity of 'Very Poor' households comparing 'MVAC plus Resilience' and 'MVAC Only' beneficiaries. The results show that, none of the groups has achieved full recovery and require additional support. However, 'MVAC plus Resilience' have an overall resilience score of 0.94 compared to 0.86 for 'MVAC Only' which shows better recovery capacity, which is attributed to the additional resilience activities.

[4] Averaging of current ***food consumption status score*** and ***coping capacity score***. Each household's FSI classification is put into either of the four categories; Food secure, Marginally food secure and Moderately Food Insecure and Severely Food Insecure.

Value for Money of Resilience Investments: The financial cost analysis indicates a possible MWK 22,058.07 saving per household due to investment in additional resilience activities which can reduce the financial cost of humanitarian response per household by 60% from initial investment, which is 8% less than the cost of 'cash only' MVAC response in future action. This agrees with the monetary valuation of resilience interventions which show a contribution of between MWK 21,200 and MWK 63,400 per household in the presence of shocks, which reduces the average food gap by between 14% to 42% (*average 28%*), which demonstrates that the resilience activities do reduce the need and cost of humanitarian support at household level overtime.

Beneficiary satisfaction and preference: There is general satisfaction with resilience packages among beneficiaries. Among the reasons for dissatisfaction was the limited quantities of support provided. The 'MVAC plus Resilience' highlighted the need to have more inputs that will enable them to plant the land they have available. In addition, communities indicated the need of expanding intervention package to include the following;

- ⇒ *Business capital and training*: due to the failing of agriculture communities highlighted a greater need of diversity by venturing into appropriate and feasible small businesses which include selling of clothes, cooked food and basic groceries.
- ⇒ *Livestock support*: Livestock was mentioned as one of the key strategies that enable households to cope with shocks. The preference of livestock support was goats, chicken and pigs. These were mentioned as easy to keep and quick to multiply but should be linked to marketing.
- ⇒ *Additional farm inputs:* 'MVAC plus Resilience' beneficiaries mentioned the need to include fertilisers, pesticides, and cash crops in the current input package and for the support to also extend to the winter cropping opportunities in areas where it's feasible.
- ⇒ *Irrigation support:* In addition to extending input support to winter cropping the farmers highlighted a need for investing in irrigation and water harvesting technologies that can reduce the impact of prolonged dry spells.

Key factors that influence Resilience: The multivariate analysis done to explore factors that influence food security as a proxy for resilience, revealed that livestock ownership, higher household income, household size and use of improved seed are the factors which significantly influence food security outcomes. Nonetheless, it is worth acknowledging that use of fertilisers, savings from VSLA have some influence in the presence of the four factors though their influence is not statistically significant.

The findings to this study show that the current resilience package has positive resilience and can reduce the cost of humanitarian response due to the savings made through the resilience gains. The analysis also indicates the need to expand the components of the resilience package in line with community preferences, and inclusion of the factors identified as to have a strong influence on food security outcomes. The projected resilience score indicate that the 2018/19 resilience capacity is likely to decline from what was observed in the 2016/17 and 2017/18 consumption and indication that additional support is required in 2018/19 to support the ability of households to build-up assets, savings and sustain production which will further improve resilience gains.

Key Recommendations

The following bullet points summarize recommendations for consideration by the INGO consortium:

- ⇒ Based on the analysis of the sample households in this study, there appears to be only a small marginal difference between the 'MVAC Only' and 'MVAC plus Resilience' approaches. The slight differences may be because some of the core resilience activities (e.g. seed provision) are themselves susceptible to the key shocks and that it is too early for other components of the package (e.g. training) to translate into significant impacts as they require consistency in practice and time for the effect of technologies to take effect. In this regard the gains of resilience projects require more time to be sustained. Donors must consider multi-year funding for sustaining support to households.
- ⇒ Livestock ownership is important in determining coping capacity of households. The analysis of predictors of food security outcomes shows that households with livestock were 1.6 times more likely to be food secure than those without. The INGO must consider inclusion of livestock support particularly goats and chickens which are easier to maintain for poor households.
- ⇒ Input support is important and the provision of improved seed quantities commensurate to available cultivated land will enhance the production of crops. The analysis showed that improved inputs influence food security situation through improving yields. Provision of seeds together with appropriate fertilizers will likely have desired effect of increasing yields. Fertilizer use showed a strong link to food security in the analysis.
- ⇒ The analysis also shows that there are some structural challenges with the resilience agenda. A high and growing population exists in a context where agricultural land is increasingly getting smaller and less productive, which encumbers the capacity of households to adequately produce and earn incomes sufficient to sustain families. The regression analysis showed that higher household sizes (*greater than 6 people*) are 1.8 times less likely to be food secure compared to those with smaller sizes (*6 people and below*) in the same wealth category.[5] Considerations should therefore be given for mainstreaming family planning and linking to social protection, both of which can have a long term impact on addressing population growth and supporting resilience.
- ⇒ The projected analysis of resilience scores show that households will need a follow up project to maintain or strengthen their capacities to make adequate savings and asset growth, which will be a source of coping during the once in two years moderate drought event. The window of opportunity for recovery and growth has reduced over time and so the level of support must be intensified during non-shock years.
- ⇒ The nature of support provided to communities and households should be an integrated package that addresses water conservation, non- agriculture income generation, promoting savings and investment culture. This is crucial in building diversity and maximise benefits of interventions. Social insurance-based strategies are likely to enhance resilience of households given susceptibility to shocks and increasing frequency which reduces recovery time.

[5] Using the Food security index. Food secure means households with index in ***food secure and marginal food insecure*** category and food insecure households in ***moderate and severe*** food insecure range according to CARI classification.

1.Introduction

1.1 Program background

Malawi is a low-income country with one of the lowest per-capita incomes in the world for its population of 18,091,571 people. A majority of the population estimated at 83.55% reside in rural areas and depend on rainfed agriculture and related labour activities to sustain their livelihoods. However, given the high population density, land holdings are small and with the increasing variability of climate the rural population is highly vulnerable to annual weather volatility often resulting in higher risk to food insecurity and increasing poverty (World Bank, 2016). According to the World Bank (2016), poverty remains a major developmental challenge with an estimated 50.7% of Malawians considered to be poor (*using national poverty line*) and 71% of were considered extremely poor living on less than $1.90 per day as of 2010. According to the National Statistics Office (NSO) (2011), about 80% of households living under the poverty line reside in rural areas.

The poverty situation is aggravated by the increasing failure of subsistence farming to provide reliable and adequate income because of climate hazards such as drought and floods; access to very small landholdings with poor soils; limited economic opportunities; rising cost of agricultural inputs and the high cost of food. This has resulted in recurring food insecurity outcomes and dependence on humanitarian assistance, especially among poor households. Since 2012, at least 10% of Malawi's rural population was estimated to be food insecure,[6] and this number has been increasing with a peak of 37% (6,491,848 people) estimated to be food insecure in 2016, following the El Nino-induced drought (Malawi Vulnerability Assessment Committee , 2017). In the Integrated Household Survey 2016-2017, about 73% of households felt they did not have enough food over the year. In the past three years since 2014, total maize production has been declining with drop in long-term averages from 523,376 MT(10-year) to 497,218 MT (5-year) following the occurrence of droughts, prolonged dry spells, flooding and fall armyworm in 2014 and 2015 production years.

Malawi can be classified as having a double burden of poverty and persisting food insecurity which requires concerted efforts to break the poverty cycle, meet short-term food needs during disaster periods and build household resilience capacity to local climate shocks and stressors. In acknowledging this need, the government of Malawi is developing a **National Resilience Strategy** that seeks to link emergency response and resilience building efforts to strengthen household capacity to anticipate, adapt and recover from the impact of climate hazards and local stressors (Department of Disaster Management Affairs, 2016 -DRAFT). The strategy focuses on four pillars aimed at accelerating the transition to a food and nutrition secure future by: (i) promoting resilient agriculture growth, (ii) reducing disaster risk in the context of a changing climate, (iii) protecting households from shocks, and (iv) protecting and managing the environment.

In line to the national resilience agenda, a consortium of International NGOs (INGOs) involving Save the Children, Concern World Wide, GOAL, Oxfam UK, and United Purpose have been implementing an Emergency Cash Transfer Programme in selected Traditional Authorities (TAs) including but not limited to the districts of Dedza, Machinga, Mangochi, Mulanje and Nsanje as a response to the food insecurity needs identified by the Malawi Vulnerability Assessment Committee (MVAC) in the 2016 consumption

[6] Unable to meet their minimum annual food and non-food needs based on the HEA Survival (*meeting minimum 2100Kcal/person/day plus cost of basic items for food preparation and preservation*) and Livelihood Protection (*Survival plus cost to maintain existing livelihood assets*) Thresholds used by MVAC

year. As part of the response, some of the beneficiaries received additional asset and resilience building support. This Operational Research was commissioned to determine the benefits and the effectiveness of the resilience building activities within the INGO MVAC 2016/17 and 2017/18 responses.

1.2 Assessment background and objectives

The purpose of this Operational Research was follow-up to assess the effectiveness of providing complementary resilience building activities alongside the regular humanitarian response in ***improving household productive capacity***, ***reducing negative coping strategies*** and ***increasing the household asset base***. Additionally, the operational research was aimed at obtaining beneficiary feedback regarding satisfaction and appropriateness of the resilience building activities included in the MVAC Response. Lessons drawn from this research are supposed to inform future program design and approaches that strengthens the humanitarian and development nexus.

The specific objectives of this study were to:

I. Assess the extent to which beneficiaries of resilience-building support, as part of the emergency response, achieved positive gains in terms of ***sustained food production***, ***reduced negative coping strategies***, ***increased assets***, and ***adaptive/recovery capacity*** in comparison to those who received just the emergency support.

II. Identify best practice and any appropriate additional support package that beneficiaries need to improve resilience capacity through the bridging of humanitarian and development processes.

III. Provide value for money (VfM) analysis for the integrated resilience activities by evaluating if the additional support can, over the long run, reduce the need for such high spending on humanitarian response.

IV. Assess beneficiary satisfaction and acceptance of resilience building activities linked to emergency response.

Specifically, the operational research aimed at answering the following **research questions**:

⇒ Does the short/midterm livelihood support programme significantly increase the ability of beneficiaries to cope with future shocks? Why and due to which underlying factors?

⇒ What are the net differences in livelihood and resilience outcomes for the 'MVAC response group' (Group A) versus 'MVAC plus Livelihoods' group (Group B) with similar socio-economic status?

⇒ Is the investment in complementary resilience activities worth it in the sense of reducing the cost of humanitarian operations over time?

⇒ What resilience building interventions are preferred and perceived by beneficiaries as most effective?

⇒ What additional support needs to be provided to beneficiaries to help them to achieve resilience in context of locally defined shocks[7] (e.g. a drought every 3 years)?

⇒ What are community level structures and enabling factors which strengthen the household level capacity to build resilience to deal with flooding and drought?

1.2.1 Rationale for the Operational Research

Since 2011, the INGO consortium has been supporting food insecure population through provision of cash transfers to enable households to purchase food from the market. To date the emergency food

[7] The definition of shocks was based on time series data analysis to identify the cyclical periods of local shocks.

security response programs have evolved with the inclusion of additional interventions that boost household productive capacity, enhance quick recovery and support longer term resilience building, thereby contributing to breaking the cycle of hunger in Malawi. The range of resilience activities have gone through various modifications informed by operational lessons. The current resilience interventions being implemented include: village savings and loan associations (VSLAs); provision of agricultural inputs; irrigation farming; promoting intercropping and climate smart agriculture; malnutrition screening and referrals; and disaster risk reduction programs among others.

In the first round of this operational research (for which data were collected in April 2017), it was observed that many households continue to depend on food/cash from the MVAC response every year, suggesting that households in the MVAC response had not developed sufficient capacity to withstand food shortages without external support from the development partners. However, the resilience building components of the MVAC response by the INGO consortium are viewed as bridging the humanitarian and development work and therefore contribute to resilience building (Makoka, 2017). This follow-up operational research is therefore key in providing key lessons on how households can cover emergency needs and invest in recovery and resilience capacity to deal with future shocks. This knowledge base is essential in improving intervention approaches and design features that maximize the benefits of linking humanitarian, development and resilience interventions to reduce cost and or need of emergency programs in future.

2. The Inquiry Process

2.1 Research approach

The analytical approach used in this research follow-up is informed by pragmatic measurement of key aspects of the resilience definition. While there are many variations in how different organizations define resilience (as shown in **Table 1)** there exists a common theme across these definitions, that is, **the ability to sustainably withstand, and recover from hazard impact in the short term.** There is also the element of adaptation in the long run, and the idea of resilience at different levels, from an individual, household, community to society.

The OECD definition adds an essential qualification of the nature of the shock, that is, a magnitude expected of households to deal with in 'normal' circumstances. This study acknowledges the multi-dimensional nature of resilience and does not attempt to deal with addressing the measurement of all these aspects.

In the scope of this study resilience is defined as:

"the ability of households to keep with a certain level of well-being (i.e. being food and livelihood secure) by withstanding and recovering in the short term from a shock that they are expected to deal with normally."

More specifically, the analysis would determine whether the beneficiary households **can meet their basic food and non-food needs as measured by the Livelihood Protection Threshold**[8] in the context of moderate shocks and stressors **through normal livelihood strategies and sustainable coping mechanisms** in a way that does not slow recovery **in the context of moderate locally-relevant hazards and stressors.**

Table 1: Resilience Definitions

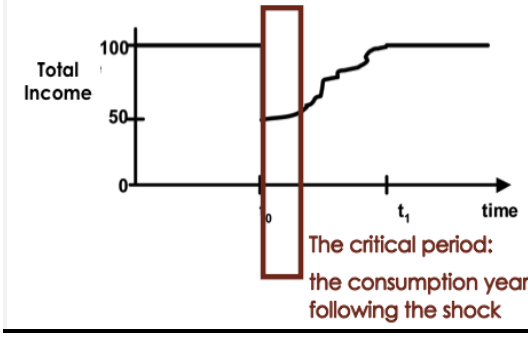
Malawi Department of Disaster Management Affairs: The ability of urban and rural communities, households, and individuals, to withstand, recover from, and reorganize in response to crises, so that all members of Malawian society can develop and maintain their ability to benefit from opportunities to thrive[i].

UKAID: The ability of countries, communities and households to manage change, by maintaining or transforming living standards in the face of shocks or stresses [ii].

OECD: Enhancing the capacity of individuals, communities, and states to absorb, adapt and transform to the shocks and risks that they are expected to deal with normally[iii].

FAO: In a food security context, resilience is defined as "the ability of a household to keep with a certain level of well-being (*i.e. being food secure*) by withstanding shocks and stresses."[iv]

Figure 1: Resilience Triangle



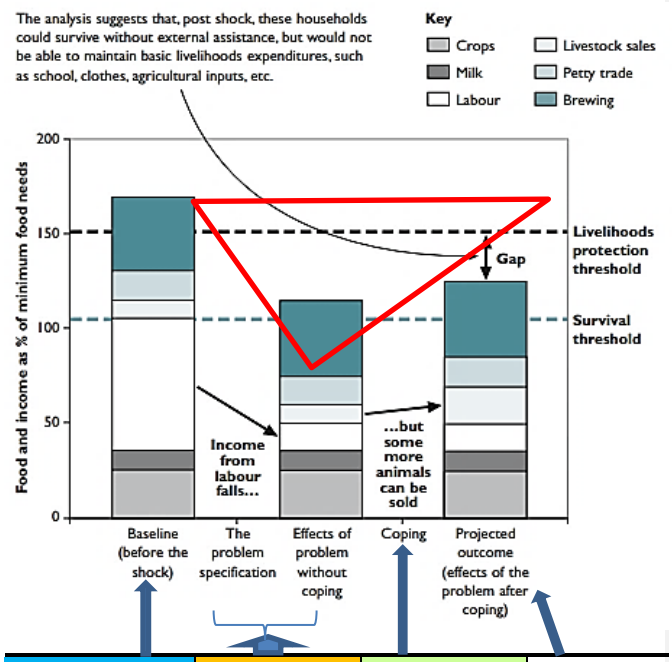
2.2 Analytical Model used in Resilience Measurement

The "Resilience Triangle" in **Figure 1** shows how resilience is conceptualized in this follow-up research. The triangle measures the state of well-being post shock/damage and the recovery pattern over time (Tierney & Bruneau, 2007).

[8] This is a term used in the Household Economy Analysis approach which refers to the amount of resources required to maintain access to minimum energy requirements, costs associated with food preparation and preservation, as well as the expenditure required to maintain existing livelihood assets (includes investment in agriculture inputs, livestock drugs, education and health costs).

The analytical approach chosen for this study is based on the Household Economy Approach (HEA). The HEA offers a best fit on operationalizing the four elements of the DFID resilience framework Approach (i.e. **Context**, **Disturbance**, **Capacity to deal with disturbance** and **Reaction to disturbance**) (DFID, 2011) and the concepts of 'Resilience Triangle' in estimating resilience measure. ***Figure 2*** below provides a simplified graphic of the HEA framework and where the four elements of the resilience framework are considered as well as how the resilience triangle is operationalized.

Figure 2: Simplified HEA Framework (Save the Children, 2008)



HEA analysis has been used to determine household resilience to drought as the most common shock in Malawi by measuring; (i) whether households **meet the costs of attaining the livelihoods protection threshold**[9] (*minimum level of well-being*) after a **typical locally-relevant hazard without using damaging coping strategies over a consumption year**. Like the 'Resilience Triangle' the conceptual framework adopted for this follow-up suggests that timing of measurement is at the time of disaster (t0) and over time (t0 to t1) until the previous (pre-shock) state is achieved. According to Tierney (2007) resilience-building actions are measured by how they improve functionality or status of a system after the disaster and how they decrease the recovery time (t0 to t1), which reduces the size of the triangle (p. 15).

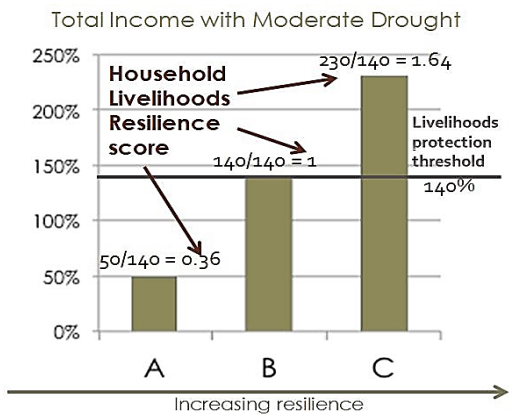
The analysis allows inclusion of the economic contribution of individual and combined interventions to households' ability to meet the livelihood protection threshold. The outcome of this analysis will be used to develop **resilience scores** as a measure of resilience. The resilience score calculation is equal to the ratio of total income after a typical locally relevant shock to the livelihoods protection threshold as shown below:

Household Livelihoods Resilience Score =	Total Income after Shock
(Based upon total income after a shock)	Livelihoods Protection Threshold
This is illustrated in **Figure 3** next page	

In this follow-up research, we are interested in measuring the effect of the project interventions and approaches on resilience. This has been done by assessing whether the project interventions have the effect of increasing the resilience score to 1 or above.

[9] The resources required for a household to meet minimum food needs and maintain existing livelihood assets that includes expenditure on productive inputs including additional maintenance costs associated with intervention.

Figure 3: The Resilience Score based upon HEA



Source: FEG Consulting

A resilience score of 1 indicates that a household is just able to reach the livelihoods protection threshold following a locally relevant shock (moderate drought for our analysis). This has enabled us to understand which of the beneficiary households have increased resilience scores and hence judge whether project interventions and approaches have been effective in increasing household resilience. By plotting the resilience scores over time, we can visualize the 'Resilience Triangle' as conceptualized in **Figure 1.** To evaluate the effectiveness of resilience activities, the resilience scores of the 'MVAC Only' and 'MVAC plus Resilience' beneficiaries were compared and the impact of each intervention or combinations was examined to show interventions that are more effective in building household resilience.

2.2.1 Complementary Proxy Analysis

Additionally, the first round of this research (April 2017) collected data on several proxy indicators. Data these same indicators was collected in this follow-up study to complement the HEA analysis based on the Resilience Score. Specifically, comparisons were made to show how the proxy indicators have changed between April 2017 and March 2018. The proxy indicators used are indicated in the following **Table 2:**

Table 2: Additional Proxy indicators to measure impact of intervention

Coping Strategy measures	Food consumption measures	Asset growth measures
Coping Strategy Index (livelihood based) **	Months of food adequacy	Household Asset Index
Reduced Coping Strategy Index (food based) **	Food Consumption Score**	Percentage of households owing productive assets.
Proportion of households reporting stress sales of assets	Household Dietary Diversity Score	Diversity of household income sources
Food expenditure share**	Estimated yield for 2017-18 season for maize and legumes	
Food security Index *** Indicators combined in calculating index*		

The above indicators do not directly measure resilience but provide a snapshot of a household's food security situation as determined by use of negative coping strategies, food consumption patterns and asset holdings/ livelihood strategies. By comparing the outputs for April 2017 and March 2018, we can see how the indicators changed and why, which adds understanding of changes in food security situation of households and therefore indication of resilience. In this follow-up, while the individual indicators are discussed the main proxy indicator used as an indication of a household's food security situation is the Food Security Index[10].

In summary, the **Resilience Score** and the **Food Security Index** are therefore the indicators that were compared for the two different beneficiary groups over time. A comparison for all indicators was carried out for the two data points (i) first round study (April 2017 soon after harvest) and (ii) Second round study (February 2018 peak lean season). For the Resilience Score a third comparison was also made, based on the projections for the 2018/2019 consumption year.

[10] **Food Security Index**: Averaging of current ***food consumption status score*** and ***coping capacity score***. Each household's FSI classification is put into either of the 4 categories; Food secure, Marginally food secure and Moderately Food Insecure and Severely Food Insecure.

2.3 Research Design

The follow-up operational research design used a mixed methods approach to collect both quantitative and qualitative information from beneficiary households across different project sites; *Tambala TA* in Dedza, *Ngabu TA* in Nsanje, *Mkanda and Ndanga TAs* in Mulanje, *Nkula and Sitola TAs* in Machinga, and *Katuli TA* in Mangochi. The research applied comparative analysis of the two groups of beneficiaries: (i) Households receiving just the MVAC humanitarian response (**Group A**), and (ii) Households receiving the MVAC response *plus* resilience activities (**Group B**) belonging to the same wealth category. The beneficiary profiling information shows that households in very poor (and some in the poor) wealth groups were included in the project. The comparison was done using the very poor wealth group who constituted over 80% of the beneficiaries.

To assess net effectiveness of the implementation approach of complementary resilience activities to the regular MVAC humanitarian response, the comparative analysis was carried out at three points in time: (a) First round comparison test (2016/17 consumption year), (b) second-round comparison test (2017/18 consumption year), and (c) projected comparison test (2018/19 consumption year). The differences and significance of the tests provides information on the value of additional resilience projects to complement a humanitarian response. The design of the comparative test is summarized in **Table 3** below.

Table 3: Survey design Theory

Study group	First Round Test	Implementation Time (T)	Follow-up test	Projected Future intervention benefits (S)	Projected test	Impact over 3 years	Net effectiveness**
Intervention Group (A) P	*A1*	*X - Interventions*	*A2*	*X1 Future intervention benefits*	*A3*	*A3-A2-A1*	**(B3-B2-B1) – (A3-A2-A3)**
Intervention Group (B) P	*B1*	*Y- Interventions*	*B2*	*Y- Future intervention benefits*	*B3*	*B3-B2-B1*	
*** Effectiveness of implementation approach (represented by Intervention Group B) being tested will be assumed to be the difference in outcomes at the different comparison points and the projected year post intervention period*							

Where;

⇒ A is the Intervention Group which only received MVAC response

⇒ B in the Intervention Group which received MVAC response plus resilience building interventions

⇒ P refers to use of purposive re-visiting of panel sampling unit from first round in April 2017.

⇒ T is the implementation time during which the Intervention Group received project support, while the 'Comparison' Group does not receive any benefit.

⇒ X denotes the interventions.

⇒ S denotes the sustained benefits of interventions

⇒ A1, B1, indicator value of the Intervention Group in first round of study in April 2017

⇒ A2, B2, indicator value of the Intervention Group in follow-up study March 2018

⇒ A3, B3, indicator value of the Intervention Group in projected post intervention scenario (April 1018 to March 2019) only done for Resilience score.

⇒ A3-A2-A1 is the Gross Change (Impact) in the measured indicators for **Group A** households that has taken place during the project implementation time T and expected to sustain through time S.

⇒ B3-B2-B1 is the Gross Change (Impact) in the measured indicators for **Group B** households that has taken place during the project implementation time T and expected to sustain through time S.

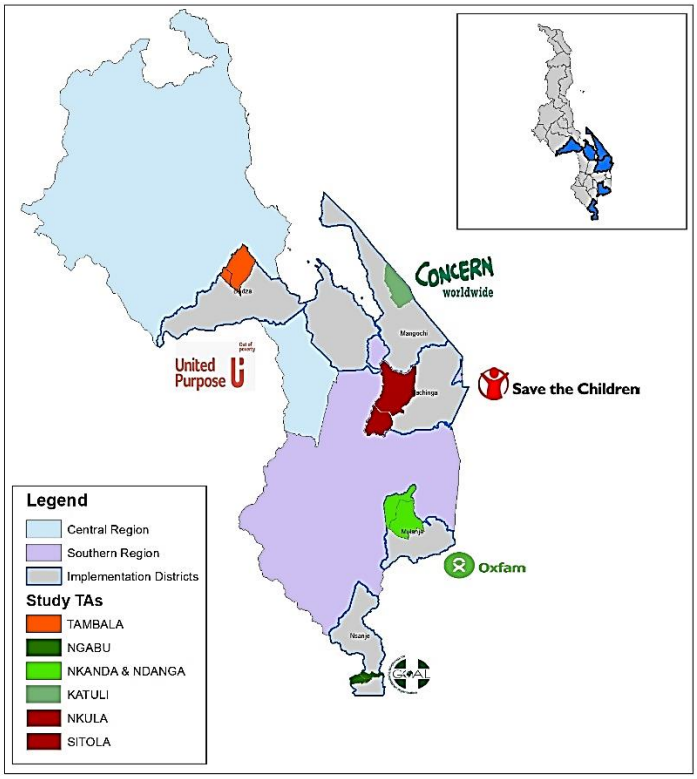
⇒ (B3-B2-B1) – (A3-A2-A3) is the net impact that has accrued to the measured indicators (*Resilience score and the Food Security Index*) which can be attributed to the absence and or variation in intervention packages provided by INGO consortium.

In addition to the comparative analysis, qualitative analysis of intervention options was carried out drawing on key informant interviews, listing of intervention options in the household quantitative tool

and existing secondary information. This was used to answer questions around beneficiary satisfaction and identify some best programming practices. The analysis of the intervention feedback section of the study was done through generating frequency tables to compare satisfaction of interventions over time and reasons for dissatisfaction. Overall satisfaction was further disaggregated by gender and district to understand any location specific differences.

2.3.1 Study Areas and Sample size

Figure 4: Study Districts and Traditional Authorities



Map produced by consultant with program information provided by SCI Malawi

The follow-up operational research was undertaken in five districts where the INGO Consortium members implemented the MVAC Response. **Error! Reference source not found.** shows the location of the seven Traditional Authorities where data for this study were collected. The TAs are found in five livelihood zones[11]: **Lower Shire** – *Ngabu TA*, **Lake Chilwa and Phalombe Plains** – *Mkanda, Ndanga and Nkula TAs*, **Middle Shire** - *Sitola TA,* **Shire Highlands** – *Katuli TA,* and **Kasungu Lilongwe Plains** – *Tambala TA*. While all areas are rural the underlying livelihood patterns which determine options that households can pursue within their locations vary. The program design considered this aspect by requesting households who participated in the conditional cash transfer to choose intervention options suitable to support local production patterns.

A total of 675 households participated in this study. **Table 4** provides a breakdown of the sample by district, TAs and beneficiary group. The sampling was informed by the first-round study which applied probability proportion to size representative at district level and by beneficiary group. In this follow-up the same households included in the first-round study were included in the study except the ‘‘MVAC plus Resilience’’ sample for Nsanje district.

Table 4: Sample size distribution

District	Traditional Authority	Beneficiary Type		District Total	Percentage of total Sample
		‘MVAC Only’	‘MVAC plus Resilience’		
Dedza	Tambala	83	104	**187**	28%
Machinga	Nkuna	44	29	**121**	18%
	Sitola	14	34		
Mangochi	Katuli	46	84	**130**	19%
Mulanje	Mkanda	58	27	**111**	16%
	Ndanga	9	17		
Nsanje	Ngabu	68	58	**126**	19%

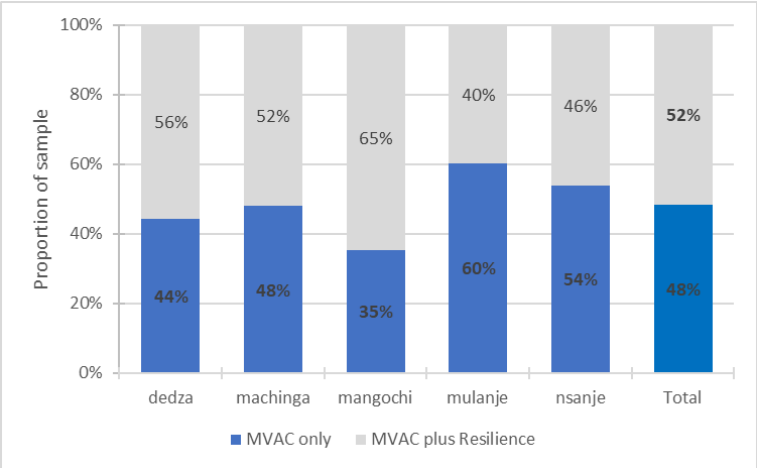
[11] A distinct geographic area within which people broadly share similar livelihood patterns as defined by production systems, agro-ecology potential, and access to markets.

Total	**322**	**353**	**675**	**100%**

2.3.2 Data Collection and its timing

Data collection was carried out in March 2018. A total of 322 households (48%) who participated in the study received cash transfers only in the MVAC response while 353 (52%) of households received resilience interventions in addition to the MVAC cash transfer response.

Figure 5: Proportion of sample by district and type of intervention



Primary sources of data

Quantitative information was collected as primary data from 675 households using tablets through KOBO online data collection platform which enabled ongoing data quality control. The tool collected information from both 'MVAC Only' and 'MVAC plus Resilience' beneficiaries on key assessment indicators highlighted in **Table 2** and additional intervention costs and income used in the resilience score measurement. The households that participated in the quantitative study were the same households included in the first-round study, with exception of 'MVAC plus Resilience' households in Nsanje who were only added in this follow-up to allow for a comparison at district level.

Additional primary data was gathered using qualitative data collection methods involving key informant interviews (KII) and focus group discussions (FGDs) which were undertaken in each sampled TA. A total of 7 FGDs and 10 KIIs were completed in this follow-up study. The KIIs were undertaken with government extension workers and lead farmers to gain more insights based on recommendations of the previous studies. Each district had 2 KIIs completed and each TA had 1 FGD completed. These were very informative discussions based on effectiveness of resilience activities and explore options to further enhance resilience capacity in different locations.

Sources of Information

An in-depth desk study was conducted to gain a deeper understanding of the context and triangulate study results. The available first-round secondary data was re-analysed to compare study indicators collected in both rounds. Additionally, time series data on production, rainfall, vegetation condition and commodity prices and the MVAC livelihood knowledge base was used in the resilience score analysis.

2.4 Study Limitations

The data collection of the research study started in April 2017 with the first-round data collection with the follow-up being conducted in March 2018. There are a few limitations that need highlighting as they affect the research. The following factors must be taken into consideration in interpretation of the results discussed in this report;

- **Timing of data collection and influence of seasonality:** The timing of data collection for the quantitative data and proxy food-security indicators was done at different seasonal periods. The first-round data collection was done soon after harvest when access to food is generally at its best while the follow-up study was done at peak lean season when access to food is at its lowest.

The proxy indicators are sensitive to seasonality and the temporal comparison should not be interpreted as showing changes of project impact between periods. The indicators are best compared when they are for same seasonal period.

- **Limitations of self-reporting and estimates:** The harvest of the 2017/18 production year is based on self-reported estimates while the 2016/17 production was based on actual harvest realised. The estimation of production after experience of shocks (army worm and prolonged dry spell) are at best indicative of expected harvests which might be biased with an incentive for some beneficiaries to show a picture in anticipation of continued external support.
- **Study sample contamination:** The indirect adoption of some activities targeted at 'MVAC plus Resilience' beneficiaries by 'MVAC Only' have an influence in the differences observed in the results. VSLAs were practised by 61% of 'MVAC Only' beneficiaries and access to seeds from seed fairs was not restricted to 'MVAC plus Resilience'. The adoption of observed farming techniques in CSA by those not directly in the training also influence results. The differences in the beneficiary types must not be viewed as completely showing absence of intervention impact given observed contamination.
- **Lack of baseline values for proxy indicators:** No information on proxy indicators was available prior to the 2016/17 intervention for the comparison groups. However, the triangulation with HEA analysis supports the idea that intervention has had positive influence on interventions which is consistent with the proxy comparison.
- **Change of study approach:** In the first-round study the analysis was done in absence of a shock. In improving the analysis, the follow-up included the Household Economy Analysis Resilience Score measurement and refined the use of proxy measures. The reanalysis of the first round for Food Security Index could not be completed as some necessary variables were not included in the first-round. The comparison of data was only possible for individual food security indicators and could not tell food security status.
- **Time and consistency of programming approach:** The time of study was done in two years and the impact of some interventions related to training are too early as this require time for adoption and consistent application which cannot be fully realised in two growing seasons. Additionally, the change in level of support for 'MVAC plus Resilience' beneficiaries in 2017/18 resulted in the absence of cash transfers in lieu of food which reduces use of received transfers for production. The results must be understood in the context of limited time and changes in level of support in addition to recurrent shocks to allow for recovery and asset growth.

3. Background

3.1 Program Context

Malawi's economy is predominantly agro-based with most of the population directly and indirectly depending on agriculture and related employment for their livelihoods. In recent years, the agricultural seasons have increasingly become unpredictable characterised by late onset of rains, prolonged dry spells, frequent droughts and flood occurrence across the country (Department of Disaster Management Affairs, 2016 -DRAFT). The successive shocks have affected large numbers of vulnerable populations resulting in cycles of food insecurity which have now become a common feature among the very poor and poor household in many districts. The drought and flood risk analysis completed by World Food Programme show that Southern region rural populations are among the most vulnerable to climate-related shocks in Malawi (WFP, 2014)

The increasing climatic shocks and resultant failure of agriculture exacerbates the underlying poverty for the rural population where poverty is higher with 55.9% of the population regarded poor compared to 25% in urban areas. Geographically, rural areas of the Southern Region have high poverty prevalence estimated at 63.3%, with some districts having higher poverty prevalence than the rural average. Mangochi has an estimated prevalence of 73.2%, Machinga 75% and Nsanje 81.2% (WFP, 2017). The reports of food insecurity by the Malawi Vulnerability Assessment Committee (MVAC) indicate that food insecurity is driven by the following key factors: (i) **climatic shocks** which is mainly driven by rainfall variability causing droughts, dry spells and floods; and (ii) **economic shocks** in the form of high inflation, and fluctuations in exchange rates. These factors undermine households' ability to purchase food and non-food items and consequently effect on meeting basic needs. As a result, breaking the cycle of food insecurity and structural vulnerability remains a challenge.

3.1.1 Extent of the food insecurity problem

The information from MVAC shows that the trend of food insecurity is increasing though there are fluctuations yearly. The 10-year and 5-year averages show that the prevalence of food insecure populations has increased from 12% to 15% respectively. This change represents a 32% increase in the actual number of people at risk of food insecurity. The peak food insecurity was experienced in the 2016/17 consumption year following the failure of the 2015/16 agricultural season due to the El Nino induced drought. In the five districts that the INGO consortium is working in the food insecurity situation is worse than the national average; with an increase to 22% from 18% prevalence in the 5-year and 10-year averages, which represents a 33% growth in the population at risk. Over the years these districts accounted for about 23% to 24% of the national food insecure population.

In addition to the economic and climatic shocks the growing food insecurity challenge is also attributed to rapid population growth which reduces the capacity of already small farm lands to sustain increasingly large populations.

Figure 6: National Food Insecurity Trends

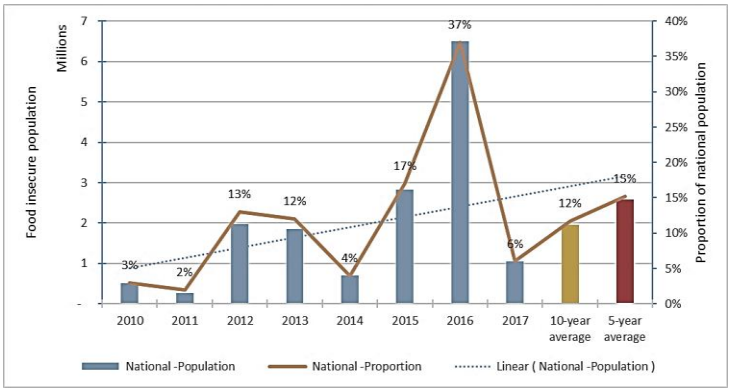
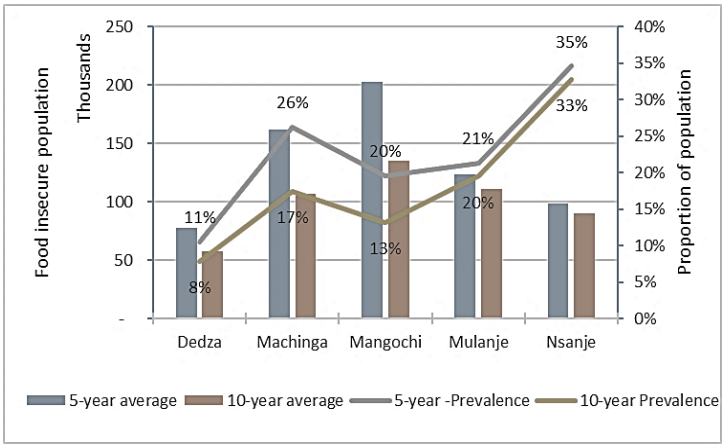


Figure 7: Long-Term Food Insecurity Trends in INGO District



*** Analysis of MVAC data from 2007*

Figure 6 and **Figure 7** reveal the increasing food insecurity burden at national and district levels. The year 2016 was distinct with over a third (37%/ about 6.49 million) of the national population being at risk of food insecurity. This was a first in many years, otherwise the trend in the past 10 years has been below 20% to as low as 2% in good years. This indicates that the shock of 2016 was severe and hence the declaration of disaster by the Government of Malawi (GoM).

The district picture shows a worse situation for southern districts compared to the central district, which confirms the effect of the climate risk and poverty which is higher in the southern region in comparison to other regions. Nsanje district has the highest proportion of people who remain food insecure although the increase between the two-long term averages is a mere 9%, possibly indicating a chronic food insecurity trap. Machinga and Mangochi districts have the highest increase in population at risk, followed by Dedza with a 52%, 50% and 35% increase in proportion of food insecure population in the 10-year and 5-year averages. Increase in food insecurity is influenced by the El nino induced drought of 2016.

In the 2016 humanitarian response a total of 6,491,848 people (37% of Malawi's population) received assistance in cash and kind following the declaration of disaster. This was the biggest humanitarian response in the country's history. In the same year the INGO consortium supported 52,610 households (315,660 people) across 5 districts. In the TAs under this study a total of 11,811 households (70,866 people) received assistance during the 2016 MVAC response. A total of 43,842 households received 'MVAC Only' assistance while 8,768 households received additional resilience support to the MVAC response. In 2017, a total of 70,475 households also received MVAC support (47,692 'MVAC Only' and 22783 MVAC plus) across 10 districts[12]. Since the 2017 response, the INGO consortium introduced a non-binding conditionality to the MWK14,400 monthly cash transfers, for beneficiaries to engage in resilience building activities in their own fields for at least 18 days/month for 8 months from September 2016 to April 2017[13]. Seed fairs and training in climate-smart agricultural technologies were also included in the additional package.

[12] The number of consortium members increased to 8 from 5 in 2017.

[13] This was the sub-set of the MVAC beneficiaries selected to participate in the resilience building activities, aimed at boosting production.

4.Study Findings

The findings of the Resilience Operational Research have been organised into six sub-themes answering specific objectives and the key research questions as set out in section 1.2. The sub-themes include (i) **demographic data**, (ii) **effect of intervention on resilience proxy indicators**, (iii) the **resilience measurement,** (iv) **assessment of effectiveness of resilience programs;** (v)**, beneficiary feedback on programs,** and (vi) the **lessons learnt drawn from study and best practices**.

4.1 Demographic Statistics

This section provides a description of key characteristics of household demographics 'MVAC Only' and 'MVAC plus Resilience' beneficiaries drawn from the quantitative data. These characteristics include: gender and marital status, household composition age of household head and dependency ratios, education level of household head and presence of chronic illness. **Table 5** provides and overview of the key demographic statistics for the two comparison groups. This summary provides an understanding of key differences and similarities in the characteristics of beneficiaries that could have a bearing on the results.

Table 5: Comparison of demographic status by beneficiary type

Demographics Information		MVAC only	MVAC plus Resilience
Gender of Household head **	Male	45%	55%
	Female	51%	49%
Marital status of household head**	single	2%	2%
	married (monogamy)	52%	66%
	married (polygamy)	6%	5%
	widowed	21%	10%
	separated	6%	7%
	divorced	12%	10%
Age of Household Head**	less than 35 (young)	29%	33%
	36-60 (middle age)	47%	54%
	61 and above (elderly)	24%	13%
Education level of Household head	none	28%	27%
	Primary	64%	65%
	secondary	8%	9%
Household size categories**	4 members and less	25%	21%
	5-8 members	64%	60%
	9 and above	11%	19%
Dependence Ratios		2.28	2.29
Presence of chronic illness		28.6%	26.1%

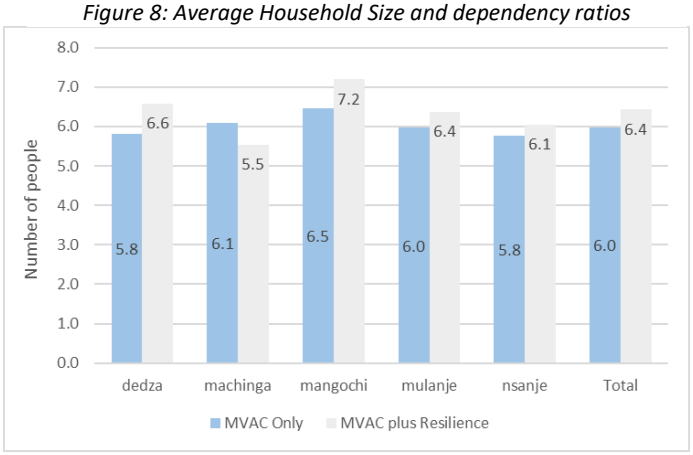
** Key difference in the variable between groups

4.1.1 Gender and marital status

Data was collected from 675 beneficiary households where 46% were female-headed and 54% were male-headed. 'MVAC Only' households had more female headed households who constituted 51% while 'MVAC plus Resilience' had more male headed households at 55%. When viewed together with marital status, the 'MVAC Only' households had more households headed by single parents widowed, separated and divorced about 39% compared to 27% for 'MVAC plus Resilience' households. The above distribution indicates possibility of a higher vulnerability among 'MVAC Only' with indication of more female and single parent households when compared to 'MVAC plus Resilience households which has more households with both parents at 71%. The distribution of beneficiary households shows that there are generally more male beneficiaries with exception of Mulanje where 54% are female and 46% males. In terms of respondents, most households were represented by females who constituted 75% of respondents while males were 25%. This difference might be driven by the additional selection criteria which used labour endowment in selecting 20% of already targeted vulnerable households to be engaged in resilience activities.

4.1.2 Household Size and Structure

Figure 8: Average Household Size and dependency ratios



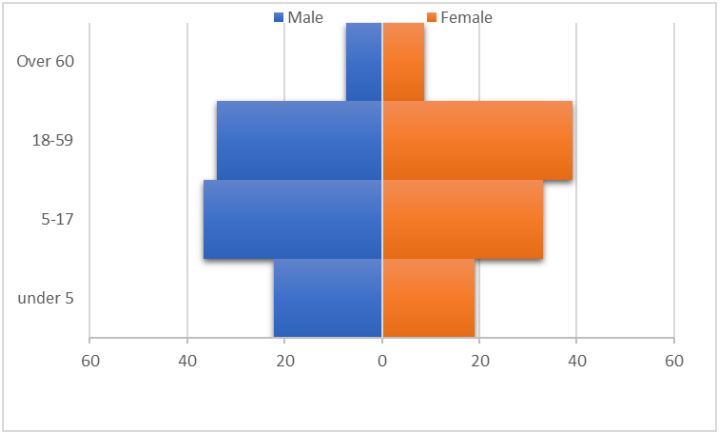
Districts	'MVAC Only'	'MVAC plus Resilience'
ALL	**2.3**	**2.3**
Dedza	2.4	2.4
Machinga	2.5	2.1
Mangochi	2.2	2.5
Mulanje	2.0	2.3
Nsanje	2.2	2.0

There is not much difference in the average household size between the two groups or dependency ratios across the districts and between beneficiary groups. The overall average household size is 6.2. 'MVAC plus Resilience' beneficiaries have slightly bigger household sizes with an average of 6.4 compared to 6 for 'MVAC Only'. Most of the households in both beneficiary groups are in the 5-8 range of household members – 64% for 'MVAC Only' and 60% for 'MVAC plus Resilience'. However, the 'MVAC plus Resilience' have more households with large family sizes after this range compared to 'MVAC Only' who have smaller household sizes. Analysed by district Mangochi and Mulanje have big family sizes, which are attributed to the religion and matriarchal culture predominant in the districts. There is no statistically significant difference between the dependency ratios of the different beneficiary groups, with an average of 2.3 dependents per working adult. However, the difference in household size is statistically significant at the 10% confidence level.

Chronic illness presence was used as proxy measure of HIV and AIDS. This indicator estimates that 27.8% of the households had a chronically ill member. The disaggregation by gender shows that female headed households had higher proportion of chronically ill members with 28.8% compared to 25% in males. This suggests a possible slightly higher burden of illness among female headed households. Mulanje and Mangochi districts have the highest proportions of chronic illness at 38.7% and 29.2% respectively which is above the average in the five districts. There is more chronic illness among 'MVAC Only' 28.6% compared to 21.1% for 'MVAC plus Resilience' beneficiaries, possibly driven by the targeting criteria of 'MVAC plus Resilience' which required more able-bodied people.

4.1.2.1 Population structure

Figure 9: Distribution of sample population by gender and age groups

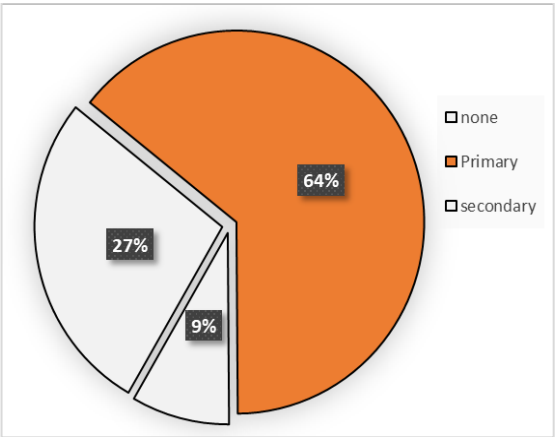


The distribution of households by gender and age groups show that the majority of the sample population are children under the age of 17 years who constitute 55% of household members compared to 37% for the productive age group (18-59 years) and the elderly who constitute 8% of the sample population. This population structure suggests a youth bulge; a challenge for the young and growing population. This overall distribution is the same for 'MVAC Only' and 'MVAC plus Resilience' beneficiary members. Although there are variations with the age groups female population is bigger with 53% compared to 47% for males in

sample population. In the female population a majority (39%) are in the 18-59 age group which covers most of the reproductive age group (typically 18-49). The main difference observed among beneficiary groups is in the age ranges of household head, where the 'MVAC plus Resilience' have less households headed by over 60-year olds 13% compared to 'MVAC Only' who have about 24% of the households headed by over 60-year olds. This variation may influence the labour units in these households which may influence ability to engage in activities that bring resources to the household to meet food and non-food needs.

4.1.2.2 Education levels of household head

Figure 10: Level of education attained by household head



Education levels in Malawi remain low and the study confirms this challenge for the rural population. In the study sample no household head had attained education beyond secondary school, with a majority (64%) ending at primary level. A significant (27%) of the household heads had not even been to primary school. The low education levels have the likely impact of limiting pursuance of livelihood options beyond agriculture and related casual labour (ganyu). The components of climate smart technologies in the programme seem to have tailor made the training to suit this contextual reality, using local adapted teaching methods and local lead farmer facilitation. There is no significant difference in educational attainment among different beneficiary groups and across different districts.

The demographic statistics indicate a slight difference in the characteristics of 'MVAC Only' and 'MVAC plus Resilience' beneficiaries with an indication of relatively higher vulnerability among 'MVAC Only' households. This is indicated by, higher burden of chronic illness, high female and single-parent households and higher proportion of elderly-headed households when compared to the 'MVAC plus Resilience' households. This difference is not surprising as the project decided to add a criterion of labour endowment in the 20% of households who were selected to participate in the resilience activities[14]. However, these difference in characteristics provides a context to better understand the differences that maybe observed in the results.

[14] This is does not mean that 'MVAC Only' beneficiaries were labour poor as they include both labour poor and labour endowed. This is so because the 20% was based on resources that were available for supporting resilience activities.

4.2 Comparison using resilience proxy indicators

The operation research was designed to test the INGO Consortium programming hypothesis which postulates that providing complementary livelihoods support to build resilience in combination with emergency cash transfer programs enables households to increase productivity, build better coping capacity and asset holding which will enable them to deal better with future shocks and therefore reduce the likelihood of requiring the same level of external assistance in subsequent years. This section provides comparison of proxy indicators focusing on following areas: (i) sustained food production; (ii) reduced negative coping strategies; (iii) increased assets ownership, (iv) food security and resilience estimation. Comparisons, of the beneficiary groups **Group A** ('MVAC Only') and **Group B** ('MVAC plus Resilience') will be made for each impact area to estimate the gains in terms of resilience capacity.

4.2.1 Crop Production

The success of crop production particularly cereals has significant implications for the ability of beneficiary households to access adequate food for each consumption year which runs from April with the start of harvest to March with the end of the peak lean season. A comparison of the 2016/17 season and (estimated[15]) 2017/18 season maize yield was carried out for beneficiaries on 'MVAC Only' and those on 'MVAC plus Resilience'. It appears that the average yields will see a decline from 889kg/ha to 626kg/Ha between the 2016/17 and 2017/18 seasons. These yields are significantly lower than the potential 6000kg/Ha indicated by the Ministry of Agriculture. In the 2017/18 season 'MVAC plus Resilience' still have higher yields of 646kg/Ha compared to 605kg/Ha for 'MVAC Only'. It is important to note that the statistical significance in the difference in average yields between 'MVAC Only' and 'MVAC plus Resilience' beneficiaries has declined to 10% significance from a significance of 5% in the first round.[16]

Table 6: Average Maize Yield (Kg/Ha) in 2016/17 and 2017/18 season, by Beneficiary Type

District	2016-17 Season			t- Test (P Value)	2017-18 Season			t- Test (P Value)
	'MVAC Only'	'MVAC plus Resilience'	All		'MVAC Only'	'MVAC plus Resilience'	All	
Dedza	928	1055	991	0.302	665	637	650	0.64
Machinga	746	1035	909	0.023**	763	758	761	0.64
Mangochi	1,265	1,037	1,142	1	596	982	795	0.055*
Mulanje	711	818	753	0.352	569	405	484	0.20
Nsanje	353	-	353	-	294	352	322	0.63
ALL	**798**	**1001**	**889**	**0.036****	605	646	626	**0.055***

The district disaggregation of yield data shown in **Table 6** shows a mixed picture in average maize yields between 'MVAC Only' and 'MVAC plus Resilience' building activities. Mangochi and Nsanje are the only districts showing higher yield among 'MVAC plus Resilience' beneficiaries while Mulanje and Machinga and Dedza show the 'MVAC Only' as having better yields. Large difference between groups are in Mangochi and Mulanje which have a 24% and 20% difference in yield whereas Machinga and Dedza are less than 5% difference. However only Mangochi has a statistical significant difference at 10% level (*P-value of 0.055*). The main reasons highlighted by households for this mixed performance is the occurrence

[15] Farmer estimates on standing crops in March which had matured.

[16] The presence of fall army worm and the prolonged dry spell in the first half of season are the main reasons for the change in the yields.

of fall army worm and the erratic rainfall and dry spells experienced in the first half of the season. Machinga, Mangochi, Mulanje, Nsanje, and Dedza districts were among the worst affected districts with the prolonged dry spells and fall army worm (Joseph Mwanamvekha, 2018).

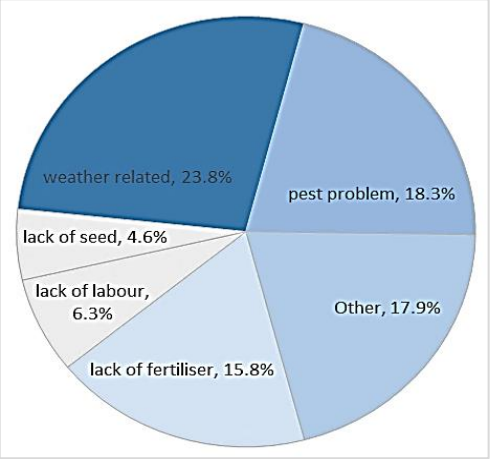


Figure 11: Reasons for change in production between 2016/17 and 2017/18

Figure 11 shows the reasons highlighted by households as reasons for change in production in the 2017/18 season. The poor weather performance and pest problem are indicated as the main reasons affecting production and thereby eroding the benefits of the resilience building activities on sustained food production. The impact of the prolonged spell and fall army worm was acknowledged by the government as having far reaching impacts in the production of the 2017/18 season with an estimated 1, 022, 735 farming households being affected nationally (Joseph Mwanamvekha, 2018).

3.3.1.1 Average Number of Months in consumption year own production lasts

Due to the anticipated low production the average number of months that the staple food will last in the 2018/19 consumption year has declined compared to the 2017/18 consumption year. This indicator was calculated based on self-reporting beneficiaries as well as calculated based on per-capita maize requirement and what is estimated to be available from production. In both instances while 'MVAC plus Resilience' households have slightly more months from own production this has declined compared to the previous harvest period (see **Table 7**). The calculated months show, that the average number of months that the food will last is higher for 'MVAC plus Resilience' (4.59 months) than for 'MVAC Only' (4.11). Unlike in the first round where there was statistical significance of the difference in this follow-up there is no significance in the difference. What is important to note though is that while in 2016/17 there was some army worm reported, the current season has seen a much higher pest infestation and there is a prolonged dry spell which have both affected yields. This season is a season with shocks of greater magnitude compared to the previous year.

Table 7: Consumption year average months from own production by beneficiary type

District	Self-Reported				Estimated from Data			
	'MVAC Only'	'MVAC plus Resilience'	'MVAC Only'	'MVAC plus Resilience'	'MVAC Only'	'MVAC plus Resilience'	'MVAC Only'	'MVAC plus Resilience'
Dedza	6.5	7.3	3.0	3.0	8.7	9.4	7.57	7.32
Machinga	4.3	7.1	2.7	3.6	4	7.4	5.63	6.48
Mangochi	4.4	5	3.3	3.1	6.5	4.9	2.57	4.35
Mulanje	3.8	4.3	1.8	1.5	3.5	3.6	3.02	2.52
Nsanje	2.6	N.A.	1.9	2.0	1.9	N.A.	1.78	2.25
ALL	**4.4**	**6.1**	**2.6**	**2.7**	**5**	**6.7**	4.11	4.59
Data period	*April 2017*		*March 2018*		*April 2017*		*March 2018*	

There is no significant difference in the consumption months between beneficiary groups except for Mangochi where 'MVAC plus Resilience' beneficiaries have close to 2 additional consumption months compared to 'MVAC Only'. In the rest of the districts the difference in consumption between groups is less than 1 month. The expectation of significant positive differences for 'MVAC plus Resilience' beneficiaries is therefore unlikely to be achieved based on 2018 yield estimates.

There are several reasons from the data that can explain these marginal differences:

- The impact of resilience technologies, particularly climate-smart agriculture, cannot be realized in a short period of time as farmers need to fully adopt and practice the technologies. Over several years if adoption and practice take effect, we are more likely to observe incremental differences between groups. Track of adoption rates and application of technologies will provide guidance when impact of training takes effect.
- There are no significant differences in access and utilization of land between groups with 'MVAC Only' (averaging 1.26 acres of land used for production) compared to 1.29 for 'MVAC plus Resilience'. Given the small pieces of land the yield variation without significant input variation is difficult to achieve through training.
- There is variation in the sources of inputs between groups, with 'MVAC plus Resilience' households relying more on NGO support (56.3%) compared to purchasing on the market (51%) for 'MVAC Only' households. In both cases the seed accessed through these sources was improved variety. It has been mentioned that the NGO inputs are small quantities and do not include fertilizers that can enhance yields.

In the absence of actions that directly deal with improving yields through providing adequate seeds and fertilizers along with training on appropriate agronomic practices it is difficult to see how the production activities will result in significant variations between groups.

4.2.2 Assets ownership

An asset index was used to assess the wealth differentiation between the 'MVAC Only' and 'MVAC plus Resilience' beneficiaries. This is a proxy indicator to evaluate asset build-up or loss over time. A comparison of the index over time shows a slight decline in the value between April 2017 and March 2018. The possible losses are mostly in livestock due to sales to meet food needs in the consumption year. The 'MVAC plus Resilience' beneficiaries have maintained a higher value of asset ownership (10.7) compared to (8.3) for 'MVAC Only' (see **Table 8**). The results are statistically significant at 5% significance level. Livestock ownership is higher in 'MVAC plus Resilience' (56.8%) compared to 'MVAC Only' (43.2%). In the range of assets owned, livestock is commonly used as a coping measure to smooth consumption, which suggests that 'MVAC plus Resilience' beneficiaries have more capacity to respond to shocks than those in 'MVAC Only'.

Table 8: Value of Asset Index by beneficiary type

District	April 2017		March 2018	
	'MVAC Only'	'MVAC plus Resilience'	'MVAC Only'	'MVAC plus Resilience'
Dedza	8.2	14.9	6.7	13.4
Machinga	8.7	6.6	7.2	5.1
Mangochi	13	6.4	11.5	4.9
Mulanje	15.1	18	13.6	16.5
Nsanje	7.1	N/A	5.6	4.9
All	**9.8**	**12.2**	**8.3**	**10.7**

4.2.3 Household Food Security Situation

To estimate the food security situation of households, the study made use of the Consolidated Approach to Reporting Indicators of food security (CARI) to classify households into different food security index groups. CARI uses proxy food security indicators to measure the food consumption status and household coping capacity. The food security status is measured using **food consumption score** (FCS)[17], which looks at the adequacy of household current food consumption, while the coping capacity is measured based

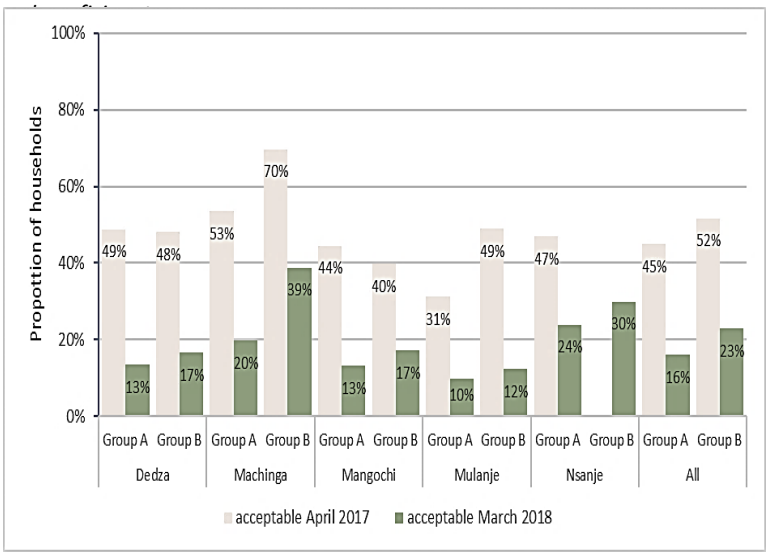
[17] Food Consumption Score: '***Poor***' food consumption is generally regarded as a sign of extreme household food insecurity. It refers to a diet composed mainly of maize daily and vegetables for a maximum of four days per week. '***Borderline***' food consumption is classified as a diet made up of cereals and vegetables daily plus oils/fats for five days and sugar/sugar products for three days per week. '**Acceptable**' food consumption is classified as daily intake of cereals, vegetables, oil and sugar, and at least one day consumption of foods rich in protein.

on a combination of **livelihood coping strategies** and **food expenditure share**. Based on these three indicators, each household was assigned to a food security index group; 1) food secure, 2) marginally food insecure, 3) moderately food insecure and 4) severely food insecure. The following sub sections will provide a comparison to the findings of the first-round study and between beneficiary groups. It must however be noted that some of the observed results could be influenced by the difference in seasonality; the first round was carried out soon after harvest while this follow-up was collected at peak lean season. Given this, the differences between groups is more telling than the comparison over time.

4.2.3.1 Food consumption score

The Food consumption score (FCS) was calculated using the frequency of consumption of period, categorizing households into 'poor', 'borderline' and 'acceptable' food consumption groups. Overall, the findings indicate that food consumption between the two study periods has declined, which is not surprising as the follow-up was done during the peak lean season. However, the results show that more 'MVAC plus Resilience' beneficiary households are in the acceptable consumption group (23%) compared to 'MVAC Only' (16%). There is no statistical significance in the differences between Group A and Group B in the follow-up although in the first round the differences were significant at 5% level (P-value of 0.039).

Figure 12: 'Acceptable' food consumption score comparison by



These results suggest that in the face of shocks, the gains of resilience activities are not statistically significant and were not sustained, though Group B households tended to have marginally improved outcomes to those on 'MVAC Only' in all districts. The trend is the same across all districts except for Machinga where the difference of 'MVAC plus Resilience' and 'MVAC Only' beneficiaries is statistically significant at 10% level (*P-value of 0.055*). This is attributed to the low impact of fall army worm and the prolonged dry spell compared to other districts.

4.2.3.2 Household Dietary diversity

The Household Dietary Diversity Score (HDDS) is proxy indicator of intake of nutrients measured by the number of different food groups consumed by households over 7-day period. Households were assigned into low dietary diversity, moderate dietary diversity and high dietary diversity[18]. The findings indicated that 'MVAC plus Resilience' beneficiaries have marginally higher diversity (3.19) than the 'MVAC Only' (3.08). However, there is no statistical significance in the differences unlike in the first round where there was a strong significant difference at the 1% significance level (*P-value of 0.003*). It must be noted that, even during harvest time the diversity was low and its possible with the lean period availability of some foods from production such as pulses would have exhausted, and households do not typically purchase when production runs out.

[18] HDDS Categories: Less than average 4.4 food groups is regarded as low, between average 4.5 and 6 food groups is regarded as moderate and above average of 6 food groups is regarded as high diversity. This indicator is best used in combination with food consumption.

Table 9: Average dietary diversity by beneficiary type

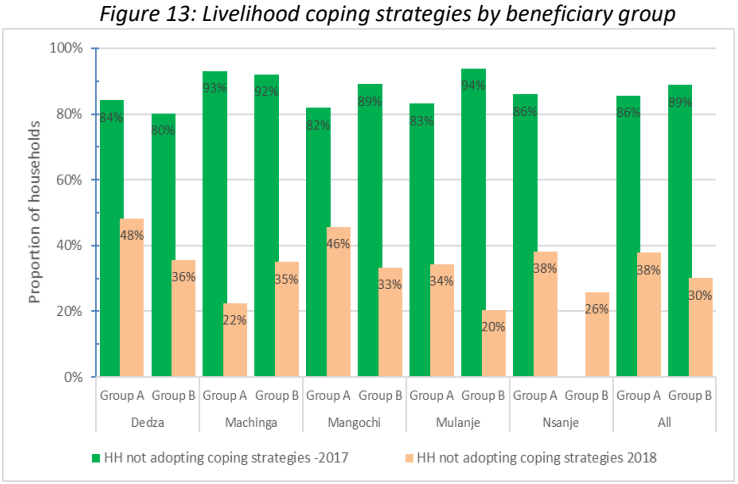
District	April 2017		March 2018	
	'MVAC Only'	'MVAC plus Resilience'	'MVAC Only'	'MVAC plus Resilience'
Dedza	4.80	5.00	3.04	3.17
Machinga	4.50	5.10	3.25	3.37
Mangochi	4.80	4.78	2.86	3.14
Mulanje	4.30	4.70	3.05	2.88
Nsanje	4.60	N/A	3.21	3.40
All	**4.60**	**4.90**	**3.08**	**3.19**

Dietary diversity seemed to be the main challenge for all households including those that had acceptable food consumption score. Only 7.8% of households with acceptable food consumption for 'MVAC plus Resilience' had acceptable diversity, while a mere 2% for MVAC had high diversity. In both cases at least 90% of the households had low dietary diversity respectively. This analysis confirms the general challenge of dietary adequacy and nutrition intake highlighted by previous MVAC reports which indicate that most households rely on diets that lack diversity even though they may still attain minimum energy requirements.

4.2.3.3 Livelihood Coping strategies

Livelihood coping strategies are classified into three categories[19] which are ***stress***, ***crisis*** and ***emergency*** strategies. Households that did not employ any of these strategies are considered food secure on this indicator. The rationale of the INGO consortium programming approach, was to build coping capacity and we would expect that the adoption of worse coping strategies would decline over time and that 'MVAC plus Resilience' beneficiaries would be better than the 'MVAC Only' beneficiaries.

Figure 13: Livelihood coping strategies by beneficiary group



The results indicate that the proportion of households adopting undesirable coping strategies has increased between the April 2017 and March 2018. **Figure 13** reveals that the proportion of households not employing coping strategies has declined for all groups with 'MVAC plus Resilience' only having 30% of households not engaged compared to 38% for 'MVAC Only'. There is no statistical significance in the differences between groups, however the differences between groups are larger in March 2018 than April 2017. The results must be understood to be influenced by seasonality as the April 2017 study was done just after harvest when coping is expected to be low while in February most households will be using coping during the peak lean season[20].

[19] **Stress strategies**, such as borrowing money, selling more animals than usual, purchasing food on credit or borrowing food are those that indicate a reduced ability to deal with future shocks due to a current reduction in resources or increase in debts. **Crisis strategies**, such as consuming seed s that were saved for the next season, cutting down on the expenses on fertilisers, animal feeds etc. directly reduce future productivity. **Emergency strategie s**, such as selling land or last female animals affect future productivity but are more difficult to reverse or more dramatic in nature.

[20] For better temporal comparison of the indicator this must be carried out within the same period of lean season where coping is expected to be important.

4.2.3.4 *Reduced Coping strategy index*[21]

Reduced coping strategies index (rCSI) is an indicator that is used to measure the frequency and severity of food consumption behaviours or strategies that households engage in when they are faced with shortages. A high rCSI value is associated with frequent use of consumption-based coping strategies which is indicative of higher risk to food insecurity. Like livelihood coping reducing the rCSI value is indicative of a reduction in use of consumption-based coping strategies, which may indicate increased capacity in use of acceptable coping mechanisms during times of shock or stressors. This is one of the key outcomes of resilience building actions. **Table 10** shows the results of the comparison between groups.

Table 10: Average reduced Coping Strategy Index by beneficiary type

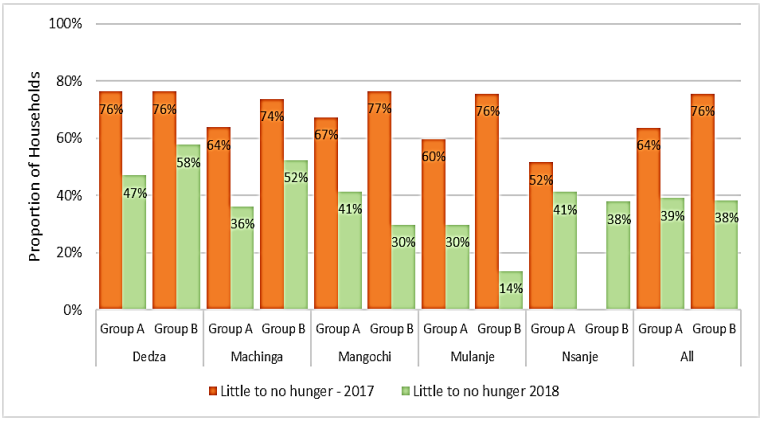
	April 2017		March 2018	
District	**'MVAC Only'**	**'MVAC plus Resilience'**	**'MVAC Only'**	**'MVAC plus Resilience'**
Dedza	22.9	24.1	32.6	37.7
Machinga	18.3	16.8	34.3	31.7
Mangochi	17.6	22.0	35.0	35.3
Mulanje	21.8	16.6	35.1	37.3
Nsanje	19.8	N/A	32.3	29.1
All	**20.1**	**19.9**	**33.9**	**34.2**

Overall, the results show marginal differences for 'MVAC plus Resilience' beneficiaries (34.2) compared to those on 'MVAC Only' (33.9). The difference was found not to be statistically significant. Analysis of district results for the rCSI shows a mixed trend with Nsanje and Machinga showing 'MVAC plus Resilience' with lower coping index while Dedza, Mangochi and Mulanje show higher indices when compared to their 'MVAC Only' counterparts. This mixed pattern was also noted in the first round. Generally, the first round has lower index as the data was collected in April 2017 a period when food availability is at peak following start of harvest season. Coping indices are high but comparable to data from MVAC during lean periods.

4.2.3.5 *Household hunger scale*

The HHS is a household food deprivation scale, based on the reaction of households when they experience food deprivation[22]. The indicator combines frequency[23] of behaviours in past 30 days when households, *did not have food, slept without eating, or went whole day or night without food.*

Figure 14: Household hunger scale by beneficiary type



There is no significant difference in the hunger scales between beneficiary groups. 'MVAC Only' have 39% households who experience little to no hunger compared to 38% for 'MVAC plus Resilience beneficiaries. The April results showed more households who were experiencing little to no hunger as this was during the harvest time. The differences

[21] The reduced CSI is calculated based on five weighted individual consumption-based coping behaviours which include; **eating less-preferred foods**, **borrowing food/money from friends and relatives, limiting portions at mealtime**, **limiting adult intake** and **reducing the number of meals per day**. According to WFP guidance on indicators 'Extensive research has demonstrated that the "reduced" CSI reflects food insecurity nearly as well as the "full" or context-specific CSI.

[22] https://www.fsnnetwork.org/household-hunger-scale-indicator-definition-and-measurement-guide

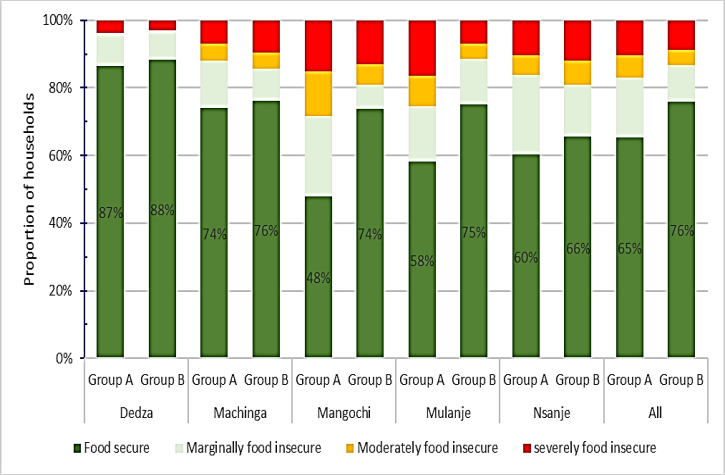
[23] Frequency which measure severity is classified into three categories: Rarely/**Little to no hunger** – (1-2times); Sometimes/**moderate hunger** (3-10 times) and Often/**severe hunger** (more than 10times)

in the first round were statistically significant at 1% level (P-value of 0.001). Like Food Consumption Score the results here could be suggesting that the benefits of resilience activities are not significant and sustained throughout the consumption year as observed during the lean seasons.

4.2.3.6 Food expenditure share

The food expenditure share was calculated to measure the household economic vulnerability by estimating share of food expenditure (*including non-purchased but consumed food*) in household budget in a month (30 days prior to the assessment. This indicator was not collected in the first round as it makes sense to collect during peak seasons when households typically rely on food purchases. The indicator suggests that the more the share of food expenditure on household budget the more economically vulnerable and likely food insure.

Figure 15: Food expenditure share by beneficiary type



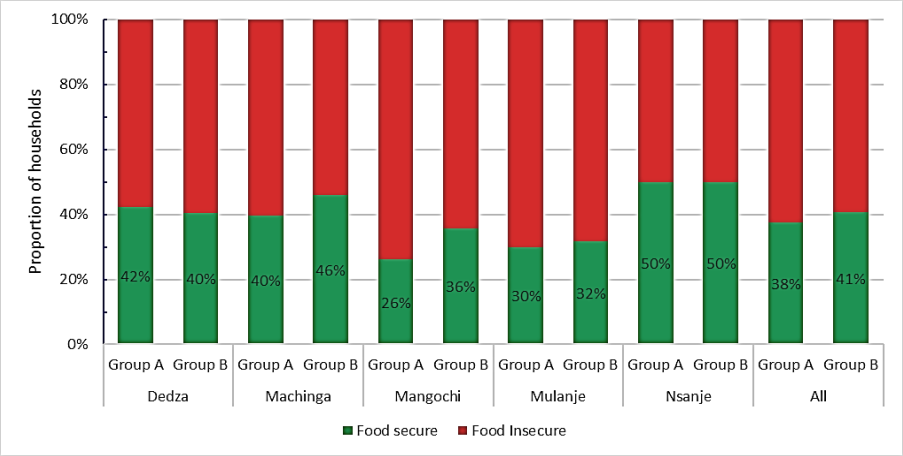
The results, show that the 'MVAC plus Resilience' beneficiaries have a better food expenditure share with 76% spending less than 50% household budget on food compared to the 'MVAC Only' with 65%. Across all the districts, the 'MVAC plus Resilience' have better food expenditure shares compared to 'MVAC Only' beneficiaries. These results suggest that the 'MVAC plus Resilience' households are less vulnerable against this measurement compared to 'MVAC Only' beneficiaries. There is 5% statistical significance (*P-value of 0.43*) in the differences observed between the results of 'MVAC plus Resilience' and 'MVAC Only'. The district results show that the differences between beneficiary groups for Mulanje and Mangochi to be statistically significant at 5% (*P-value of 0.050*) and 10% (*P-value of 0.068*) levels respectively.

4.2.3.7 Food insecurity Index

In this study, resilience has been narrowed to refer to the ability of households to maintain a food secure state in the presence of shocks and stressors. The timing of the study at peak lean season which has many stressors that include, rise in food prices, decline in food stocks, and limited income sources makes it appropriate to use the food insecurity index to measure status of food security among households. However, this indicator is a situation analysis and is great for tracking evolution of resilience over the consumption year if repeated periodically. The food security index (FSI) combines the results of the food security indicators; ***food consumption group***, ***food expenditure share*** and ***livelihood coping strategy*** categories that have been discussed in the previous sections. The percentage of food insecure population is derived by summing up the two most severe categories[24] (severely and moderately food insecure). This indicator was only calculated for the follow-up study as the first round did not include variables for food expenditure, so reanalysis could not be implemented.

[24] **Food Security Index categories:** ***Food secure*** - Able to meet essential food and non-food needs without engaging in atypical coping strategies; ***Marginally food secure***- has minimally adequate food consumption without engaging in irreversible coping strategies; unable to afford some essential non-food expenditures; ***Moderately food insecure*** - Has significant food consumption gaps, OR marginally able to meet minimum food needs only with irreversible coping strategies; and ***Severely food insecure*** - Has extreme food consumption gaps OR has extreme loss of livelihood assets will lead to food consumption gaps, or worse.

Figure 16: Food Security Index comparison by type of beneficiary



The results shown in **Figure 16** indicate that 'MVAC plus Resilience' are more food secure (41%) compared to their 'MVAC Only' (38%). This trend is observed in all districts except Dedza where 'MVAC Only' are more food secure (42%) than the 'MVAC plus Resilience' (40%). There is no statistical significance of the differences although the trend shows marginal positive gains in food security for 'MVAC plus Resilience' compared to 'MVAC Only' beneficiaries.

The analysis in this section compared the outputs of ten resilience proxy indicators between 'MVAC plus Resilience' and 'MVAC Only'. The results show that 'MVAC plus Resilience' households fair better in 7 of the 10 indicators with statistical significance in 3 indicators when compared to 'MVAC Only' households. The better outcomes on rCSI, livelihoods coping and HHS by 'MVAC Only' can be explained by the fact that in the 2017/18 they received an average of three months food transfers while the 'MVAC plus Resilience' only received transfers meant for resilience activities and did not receive the cash for the MVAC response. The FSI, which combines indicators does show that the MVAC plus resilience have are more food secure than the MVAC Only which suggests that the addition of resilience activities builds greater resilience.

4.3 Modelling resilience using Household Economy Analysis

The food security indicators described in **Section 4.2.3** have been used as proxy indicators to measure food security status at specific points in time (April 2017 and March 2018) and explain some factors that influence the food security situation and, by inference, resilience capacity. In this follow-up study these indicators have been used to provide snapshots of the household food security situation but they do not allow us to understand how the indicators have evolved over the consumption year. In the absence of corresponding seasonal comparison of the indicators it therefore leaves us with a partial understanding of the effectiveness of resilience activities and why variations between time and among groups are the way we observe.

To further provide another dimension to the research questions the follow-up study used the Resilience Score based on modelling of Household Economy Analysis (HEA) datasets for Malawi. The HEA baselines for Malawi were developed by MVAC for all the livelihood zones in Malawi. **Table 11** show the livelihood zones included in the Resilience score measurement for this study.

Table 11: Livelihood Zones of the study areas

Livelihood Zone	Reference year	Study Areas	
		District	TA
Lake Chilwa - Phalombe Plain (PHA)	Apr13-Mar14	Machinga	Nkuna
		Mulanje	Mukanda and Ndanga
Lower Shire (LSH)	Apr13-Mar14	Nsange	Ngabu
Middle Shire Valley (MSH)	Apr14-Mar15	Machinga	Sitola
Kasungu Lilongwe Plains (KAS)	Apr14-Mar15	Dedza	Tambala
Shire Highlands (SHI)	Apr13-Mar14	Mangochi	Katuli

4.3.1 Linking project beneficiaries with wealth categories of MVAC HEA baselines.

To start the modelling process, the analysis started by identifying the wealth categories of the beneficiary households. This was done through wealth profiling of beneficiary households using the same asset holdings as were used in the wealth categories in the HEA baselines. The MVAC HEA information is the one that is used to determine populations at risk and identify the wealth categories where these vulnerable households belong based on a set of characteristics. These set of characteristics are the ones used for targeting of MVAC response.

In the INGO districts the MVAC analysis indicated that the 'Very poor' and 'Poor' households are most at risk of food insecurity. An analysis of the March 2018 data on wealth characteristics linking the project participants to the HEA characteristics indicates that 84% of sampled households are in 'Very poor' wealth category consisting of 53.5% 'MVAC plus Resilience' and 46.5% 'MVAC Only' beneficiaries. The modelling of the Resilience score was done for the very poor as the most vulnerable wealth group across the five livelihood zones and districts. The exclusion of the poor in modelling who constitute 16% of was judged not to impact finding conclusions.

4.3.2 Analysis of Shocks and problem specifications

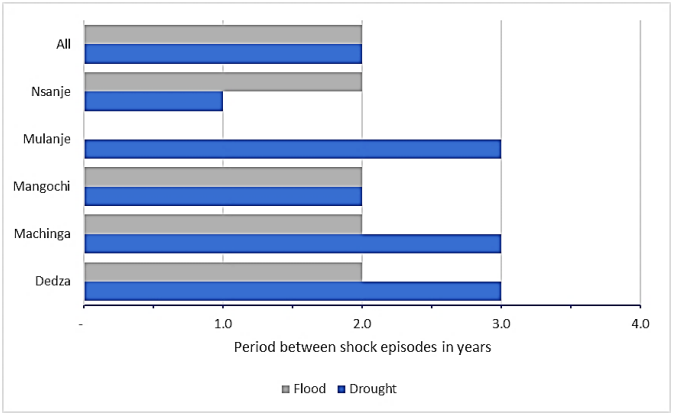
The first step in this analysis was to identify the most important sources of food, cash income and expenditure in the respective reference years for each livelihood zone. These are known as *key parameters*, which have the greatest effect on livelihoods when there are changes in quantity and or prices from one year to the next. **Table 12** below provides a list of the key parameters used to develop problem specification in relation to changes in quantity and price compared to the reference years for the five zones covered in this analysis. The problem specification was based on moderate drought

conditions defined through analysis of time series data for rainfall and vegetation cover as these were the available data series[25].

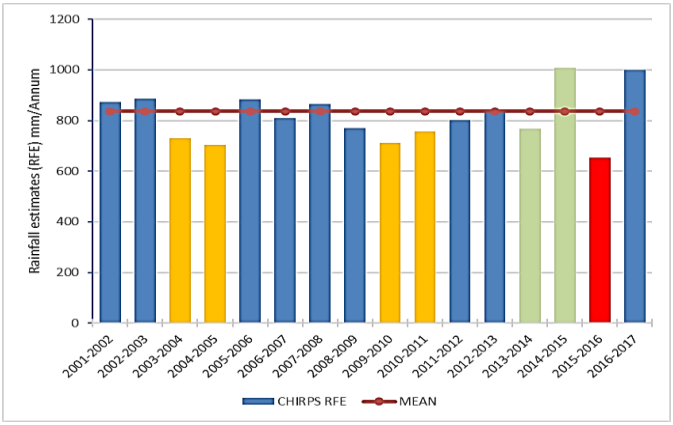
Table 12: Key Parameters for the KAS, LSH, MSH, SHI and PHA Livelihood zones	
Key Parameter Quantity	Key Parameter Price
Crops: **Maize, Sorghum, Rice, Beans, tobacco, Cotton** Livestock: **Cattle sales, goat sales,** Other income: **Agric. labour cultivation, migration labour Firewood sales, petty trade.**	Sales prices: **maize, Rice, Beans, cotton, tobacco. Cattle, Agric. labour, migration labour cultivation and firewood sales.** Purchase prices: **maize, pulses, seeds, fertilizers, pesticides, school fees, medicines, transport livestock drugs, and land rental.**

Figure 17: Parameters used to pick a moderate drought year

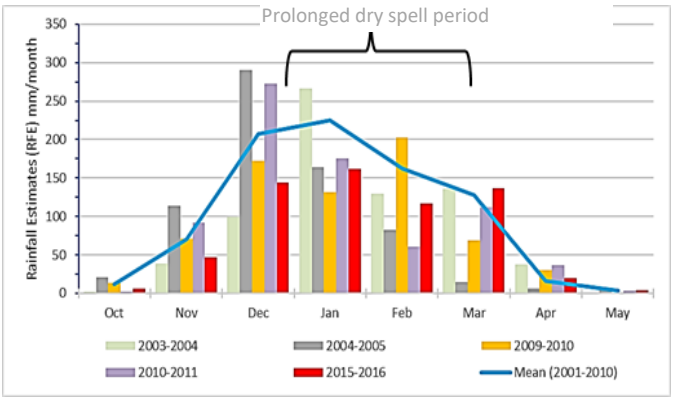
Frequency of Major Shocks



Annual rainfall trends: Average for INGO districts



Rainfall distribution in the years of below normal rainfall



4.3.2.1 *Defining a moderate drought*

Slow-onset drought and rapid-onset floods are the main climate-related shocks in Malawi that trigger risk to food insecurity, due to impacts on harvests as well as a sequence of knock-on shocks to the national economy (Department of Disaster Management Affairs, 2016 - DRAFT). **Figure 17** shows results of the risk analysis in the districts where the INGO consortium operates. The analysis show that drought and floods are some of the shocks with far reaching impacts which variably occurs once after every two to three years across all districts. Malawi has a unimodal rain season which starts in October and ends in March, which has a critical bearing on production and wellbeing for the following consumption year (from April). To identify years where rainfall was below average cumulatively and in distribution, rainfall estimates from satellite remote sensing data for the last 16 years was analysed for the study districts (Source: USGS website). The time series analysis shows that in seven of these years the districts received significantly below average rains that were poorly distributed. The pattern of these below normal years indicates that they occurred in two consecutive years for every four or three years.

[25] Price data obtained from FEWS NET, Remote sensing data obtained from USGS database

The same analysis was done for vegetation cover using the Normalized Difference Vegetation Index (NDVI) to estimate vegetation cover and therefore pasture and crop conditions in these years. This analysis resulted in the identification of **2003/4 & 2004/05**; and **2009/10 & 2010/11** as the 4-year cycle consecutive years where rainfall was moderately below average **(-10 to 16 percent).** From 2011 the occurrence of moderate below normal rains was after a two-year period (see ***Figure 17*****)**. A rare severe drought was also observed for the 2015/16 season.

The combined analysis resulted in the selection of the years **April to March 2009/10 and 2010/11** as recent years which represent conditions of moderate drought with a one in two-year frequency (*frequency reduced based on recent frequency*). The analysis suggests that once every two years the communities could go through a drought of moderate magnitude whose effect we expect them to cope with and should be the focus of resilience efforts. The drought of 2016 was exceptional (***worst in 35 years***) last experienced and is a rare occurrence, the magnitude of which was difficult for households and the country to cope with.

4.3.2.2 Impact of moderate drought on livelihood strategies

The next step in the analysis was to define the impact of moderate drought using the using average data from the identified years to develop problem specifications for key parameters (**Table 13**) that can be considered representative of the likely magnitude of changes to key livelihood strategies during moderate drought year - defined as the type and level of shock that is likely to occur once every two years. The procedure used to do the problem involved the following: (i) Comparing livestock and crop production trends and computing an average for the shock years, (ii) Comparing market price trends and computing averages, and (iii) Using these data to develop problem specifications for the outcome analysis by comparing to reference year values.

The problem specification estimates developed were then used to run outcome analysis to measure the effect of drought and stressors on existing livelihoods for KAS, LSH, MSH, SHI and PHA livelihood zones. In general, all ***production related strategies*** are worse in moderate drought situation in March 2018 compared to the respective reference years, with prices of livestock deteriorating due to a general decline in body condition. ***Petty trade*** has been estimated to increase in quantity as households try to maximize other sources of income to cope with situation. ***Food aid and cash transfers*** are set to zero since the objective of the analysis is to measure the ability of households to cope with or recover from drought without emergency food/cash assistance.

4.3.2.3 Coping strategies analysis

The objective of resilience analysis is to determine whether the different wealth groups can meet the costs of their livelihoods protection threshold after a locally relevant drought, **without using damaging coping strategies**. For the analysis of resilience, some coping strategies are excluded to avoid negative effects on recovery. This review resulted in the following decision on coping settings in the analysis:

Sale of firewood: no increase as this compromises future coping ability and damages the environment; and ***Increase in casual labour:*** a maximum 10% increase in a bad year presumed not to influence time spent own production. High-cost coping strategies such as excessive sale of livestock and illegal activities are always excluded from outcome analysis.

The following **Table 13** summarizes the problem specifications used in this analysis by livelihood zone.

Table 13: Problem Specification for a Moderate Drought

Quantity problem specification	KAS	LSH	MSH	SHI	PHA	Price Problem Specification	KAS	LSH	MSH	SHI	PHA
Crops						**Sales price**					
maize	80%	50%	64%	70%	68%	Maize	190%	176%	178%	181%	220%
sorghum	N/A	60%	71%	92%	80%	Rice	110%	180%	189%	115%	195%
Rice	50%	40%	46%	50%	54%	Beans	154%	152%	159%	142%	180%
Beans	86%	75%	80%	63%	85%	Cotton	114%	193%	199%	181%	N/A
Cassava	90%	N/A	75%	80%	95%	Tobacco	101%	N/A	N/A	102%	N/A
Cotton	48%	30%	45%	52%	N/A	Cattle	115%	102%	110%	127%	110%
Tobacco	72%	N/A	N/A	54%	N/A	Goat	128%	106%	123%	106%	101%
Livestock						Agriculture labour	100%	100%	100%	100%	100%
Cattle	110%	103%	101%	100%	114%	Firewood	110%	120%	120%	120%	110%
Goats	115%	115%	102%	125%	118%	Migration labour	100%	100%	100%	100%	100%
Other						**Purchase price**					
Agriculture labour	60%	65%	67%	67%	67%	Maize	280%	245%	287%	320%	307%
Migration labour	100%	75%	100%	93%	100%	Beans/pulses	130%	218%	182%	176%	188%
firewood/charcoal	100%	100%	100%	100%	100%	Seeds	130%	204%	204%	204%	204%
petty trade	80%	100%	100%	100%	100%	Fertilizers	150%	170%	160%	152%	156%
						Livestock drugs	137%	150%	150%	150%	150%
						Inflation	137%	204%	204%	204%	204%

Assumptions when estimating problems specification:

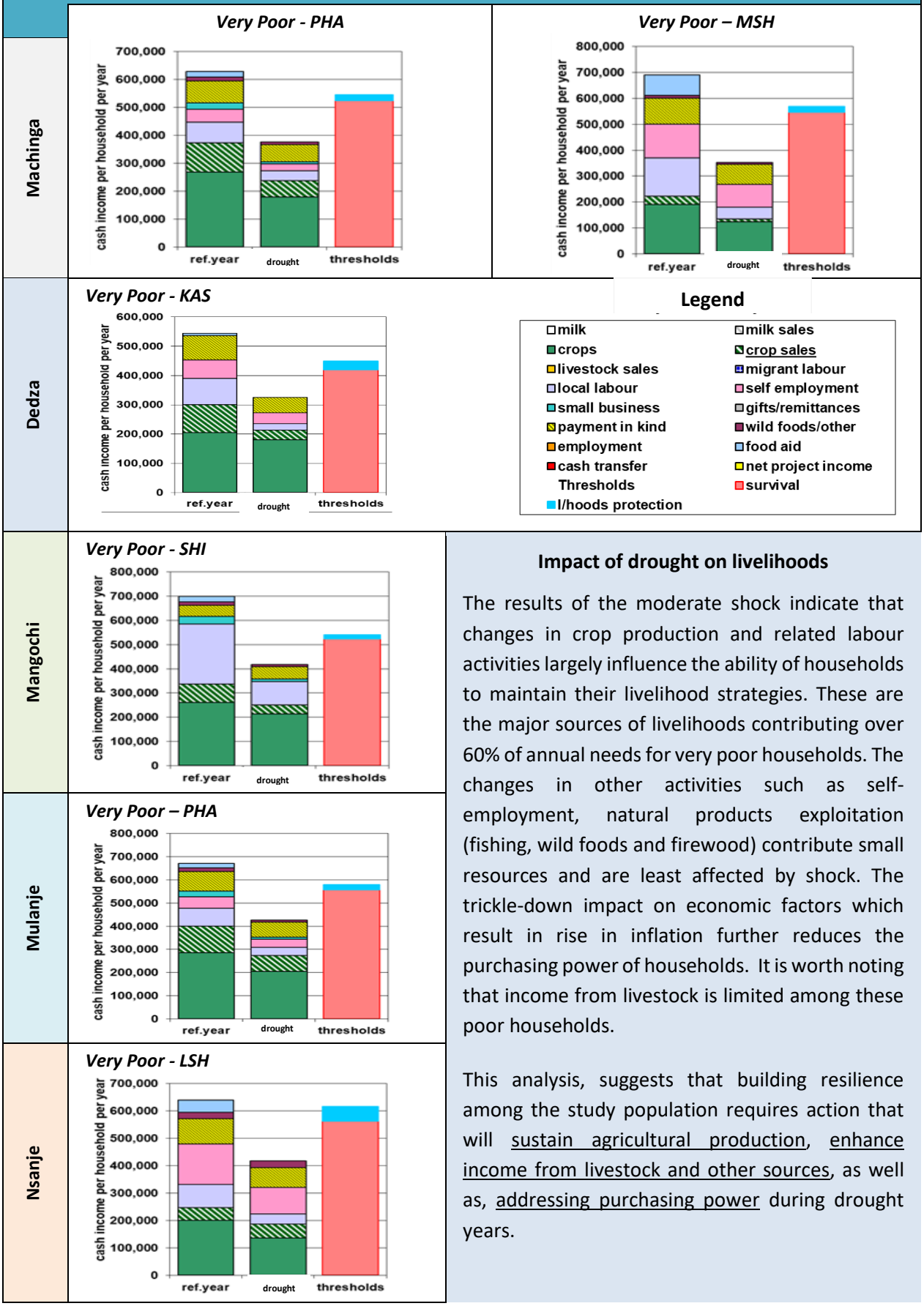
1) Production quantity data was based on comparing average production data for **2009/10** and **2010/11** years as representing moderate drought with respective reference years assuming similar production changes are anticipated in such years
2) Natural resource exploitation- set to 100% as there was no information on how these would respond in drought year
3) Casual labour reduced as better-off cannot afford to pay for as much labour in a bad year as wells as increased supply of labour which limits obtaining opportunities
4) Food assistance and cash transfers switched to zero

4.3.3 Outcome of Moderate drought outcomes at baseline (*2016/17 consumption year*)

The effect of the moderate drought scenario on total income[26] before intervention is shown in **Figure 18**. The outcome analysis shows that very poor households across all livelihood zones would be unable to meet their livelihood protection (*minimum well-being*) in the absence of humanitarian assistance. The exclusion of any form of external assistance is because the analysis of resilience relates to exploring the ability of households to withstand and recover from a shock on their own and when they cannot it help us understand the level of support required to restore or support their recovery. In this analysis the deficits provide guidance of the amount of resources resilience interventions must help households generate to be able to withstand impact of moderate shocks. The deficits are shown in relation to the livelihoods protection threshold which is the level we are measuring the ability of households to maintain, recover or bounce back in the event of a moderate drought. Resilience building measures must build household production, incomes and assets that generates adequate resources to cover the shortfalls caused by the impact of the moderate drought conditions applied in this analysis. Investments in non-shock years must strengthen build-up of savings and assets that can be used in recovery process with less or no need for external assistance after shock.

[26] Total income is the sum of income from food plus income from cash. Here it is expressed in food terms - as a percentage of minimum food needs (2100 kcals per person per day).

Figure 18: Effect of the Moderate Drought Scenario on Total Income by Wealth Group



Impact of drought on livelihoods

The results of the moderate shock indicate that changes in crop production and related labour activities largely influence the ability of households to maintain their livelihood strategies. These are the major sources of livelihoods contributing over 60% of annual needs for very poor households. The changes in other activities such as self-employment, natural products exploitation (fishing, wild foods and firewood) contribute small resources and are least affected by shock. The trickle-down impact on economic factors which result in rise in inflation further reduces the purchasing power of households. It is worth noting that income from livestock is limited among these poor households.

This analysis, suggests that building resilience among the study population requires action that will sustain agricultural production, enhance income from livestock and other sources, as well as, addressing purchasing power during drought years.

4.3.3.1 *Resilience scores for a moderate drought at baseline*

Table 14: Resilience score Moderate Shock at Baseline						
Study Area	**Machinga (PHA)**	**Machinga (MSH)**	**Dedza (KAS)**	**Mangochi (SHI)**	**Mulanje (PHA)**	**Nsanje (LSH)**
Total income after shock	81%	74%	86%	91%	81%	80%
Livelihoods protection threshold	111%	114%	116%	112%	110%	119%
Deficit (% of minimum food needs)	30%	39%	30%	21%	29%	39%
Deficit (MWK-equivalent	*148,948*	*197,626*	*116,622*	*100,933*	*131,444*	*198,242*
Resilience score	***0.73***	***0.65***	***0.74***	***0.81***	***0.74***	***0.67***

Reminder: Where total income is below the livelihoods protection threshold (resilience score less than 1), households are unable to sustain their well-being over a consumption year after the moderate drought without turning to damaging coping strategies that are likely to slow recovery. Where total income is above livelihood protection (Resilience score of 1 and above), households can sustain their well-being following a moderate drought thus are resilient.

The results of the Resilience score calculations, shown in **Table 14** show the estimation of resilience of the very poor households across all zones in a situation without support, which indicate that none of the households are resilient to moderate drought conditions. This means that with use of their existing livelihood strategies and sustainable coping strategies they cannot cover their livelihood requirements in the absence of external support. The deficits shown here indicate the amount of resource that are required to enable household to achieve the livelihood protection threshold thus **bounce back!** While the role of MVAC Response is to provide resources to meet the food needs of households the addition of resilience activities must be understood as providing an opportunity for households to work on building their production, savings and assets to better deal with similar shocks in future and or cope with effects of shock in short-term. Nsanje and Machinga are the worst affected districts whilst Mangochi and Dedza are among the least affected.

In this analysis the deficits should be viewed as the target of how much resources interventions must generate to make households resilient. If households are to be resilient to moderate drought (which occurs approximately once every two years), this analysis reveals that assets building, savings and production must be able to generate between MWK 100,933 (£99) and MWK 198,242 (£194) to maintain a resilience score of at least 1 across different districts. The results suggest that resilience packages need to consider the level of vulnerability (deficits) and use that as a target for resilience activities to achieve and exceed, making households more capable of even dealing with higher magnitude shocks such as the 2016/17 drought. The differences observed across different districts must be understood as an action of the varying impact of shocks on existing livelihood structure and their knock-on effects. The impact of interventions has not been included at this stage.

4.3.3.2 *Impact of interventions on resilience scores ~ 2017/18 and 2018/19 consumption years*

While the previous section estimated the level of support needed for Very Poor households to remain above the 'Survival' and 'Livelihood Protection' thresholds (in the absence of any support). This section now models the impact on resilience of the MVAC support provided to the same households. The Resilience score analysis was done at the three points in time (2016/17, 2017/18 and the 2018/19 forecast) and was based on project impact information collected from 675 beneficiary households

collected in April 2017 and March 2018 by asking production and income obtained from interventions as well as expenses and opportunity costs incurred for their participation

The interventions implemented as part of the MVAC Response in 2016/17 included; unconditional and conditional cash transfers, agricultural seeds (*cereals and pulses*), Village Savings and Loans (VSL) and training in climate smart agriculture technologies. The cash was provided to primarily meet the food needs while the complementary activities were to help households rebuild lost assets, savings and improve production so that they will be in a better situation in the following year if a shock occurs. During the first-round study in 2017, information on the impact of seed provision*, training and cash transfers* was collected while VSL data was obtained from INGO monitoring data. This set of information was used to calculate the food and cash income generated by these interventions over a year. An analysis of the impact of moderate shocks on interventions was also done before the information was included in the analysis to see the impact of interventions in the 2017/18 consumption year.

In this present follow-up study, information on the expected impact of the same interventions was gathered and the same impact analysis of the effect of drought shocks was done. The information was then included in the model to forecast the impact of interventions on resilience in the 2018/19 consumption year. In both cases the cost of interventions was considered. These costs were calculated based on the required expenditure to maintain benefits of interventions (e.g. able to purchase seed, able to contribute to VSLs, purchase livestock drugs to maintain growing animal herd, and pay for costs associated with practising the climate smart agricultural technologies). In addition, the analysis considered any opportunity arising from households participating in the interventions (i.e. such as reducing existing number of labour days for casual employment because more time is being spent on own production). The two sets of costs were calculated in relation to income generated by each intervention to find out the net income generated for households. The following summaries give a description of the project activities covering both 2016/17 and 2017/18 response used in this analysis:

***Cash Transfers:* -** Households were provided with a monthly cash transfer between MWK14,400 (unconditional) per month to meet food needs and for two months. 'MVAC plus Resilience' received a conditional transfer of MWK 18,000 (an additional MWK 3,600 compared to unconditional transfers) to purchase inputs in 2016/17. In 2017/18 the 'MVAC plus Resilience' received two months transfers of MWK19,000 (total of MWK 38,000) while some of the 'MVAC Only' received MWK 15,000 for three months (total of MWK 45,000). The MVAC response coverage was low in 2017/18 with only 34% of households in both groups receiving cash transfers in lieu of food.

Seed provision through seed fairs: - Households on 'MVAC plus Resilience' used a proportion of the cash received to buy seed during seed fairs. The seeds purchased most frequently were maize and groundnuts, used to produce crops for home consumption and sale. The seed fairs were organised to bring agro-dealers closer to farmers to improve access to seeds at affordable prices.

Village Savings and Loans Associations: Provision of training in saving and loaning to savings groups. About 83% of 'MVAC plus Resilience' beneficiaries were members of a VSLA while the 'MVAC Only' had about 61% being a member of VSLAs. The promotion of savings and loans was done in previous projects prior to the 2016/17 response. This created a platform of using savings to invest in income generating ventures, to diversify income portfolios.

Climate Smart Agriculture training: - Training on climate smart technologies provided to households on resilience building activities. This was aimed at promoting adaptation to climate change and reduce its impact on production.

Note: The programming hypothesis being tested in this study is that providing additional resilience activities to the 'cash only' MVAC response builds better resilience outcomes which reduces the need and amount of future response. In the 2017/18 response the 'MVAC plus Resilience' only received 2 months of cash transfers compared to 3 months for 'MVAC Only' as there was a deliberate move to exclude them from MVAC response. This change may explain some of the marginal differences between groups observed in this analysis.

Table 15 indicates the net average income (*expressed as percentage of minimum food needs and Malawian kwacha*) for the activities implemented as part of the MVAC Response since the 2016/17 response. It's important to note that in the 2016/17 consumption year the only interventions having an impact were the cash transfers provided in the response and VSLs which had started in previous years. In 2017/18 the impact of the resilience activities take effect following the first production season in 2017. In the forecast 2018/19 consumption year expected production and incomes based on experiences of the current agricultural season are included in the analysis.

Table 15: Intervention average net income following moderate drought

Resilience Intervention	Baseline 2016/17	Follow-Up 2017/18	Forecast 2018/19	Average
Seed distribution - Cereal production	**0%** *(MWK 0)*	**21%** *(MWK 90,565)*	**19%** *(MWK 90,618)*	**13%** *(MWK 63,394)*
Seed distribution - pulse production	**0%** *(MWK 0)*	**15%** *(MWK 71,449)*	**14%** *(MWK 65,655)*	**9%** *(MWK 45,701)*
Conditional cash transfer	**32%** *(MWK 152,851)*	**8%** *(MWK 38,415)*	**0%** *(MWK 0)*	**13%** *(MWK 63,755)*
Unconditional Cash transfers**[27]	**30%** *(MWK 145,572)*	**8%** *(MWK 40,942)*	**0%** *(MWK 0)*	**13%** *(MWK 62,171)*
Village Savings and Loans'	**3%** *(MWK 15,116)*	**5%** *(MWK 24,186)*	**5%** *(MWK 24,186)*	**4%** *(MWK 21,163)*
Crop Production plus conditional Cash Transfer	**32%** *(MWK 152,851)*	**43%** *(MWK 209,428)*	**32%** *(MWK 156,273)*	**36%** *(MWK172,850)*
Crop Production + conditional Cash Transfer + VSLA (~83%)*[28]	**35%** *(MWK 167,967)*	**48%** *(MWK 233,614)*	**37%** *(MWK 180,459)*	**40%** *(MWK 194,013*
Unconditional Cash transfers + VSLA (~61%)	**33%** *(MWK 160,688)*	**13%** *(MWK 65,204)*	**5%** *(MWK 24,262)*	**17%** *(MWK 83,385)*

The interventions generated 3% (MWK 15,116) to 32% (MWK 152,851) of minimum annual food needs in 2016/17 consumption year. In the 2017/18 consumption year interventions generated 5% (MWK 24,186) to 21% (MWK 90,565) of minimum annual food needs. Cash transfers were provided for a total of 10 months in 2016/17 while they were given for 2 to 3 months in 2017/18, which explains the decline in the amounts received by households and their contribution to food and non-food needs.

Individually, **Table 15** show that on average resilience activities generate less than MWK 90,565 but in combination generate a minimum of MWK156,278. This confirms the rationale of additional activities to the MVAC response. However, it must be noted that VSLs were also being practised by the 'MVAC Only' beneficiaries with at least 61% reporting to be members of a VSLA. In this analysis this was taken as contamination and the contribution of VSLs was excluded in the resilience score calculation of 'MVAC Only' beneficiaries so as to highlight the marginal impact of this intervention for 'MVAC plus Resilience' beneficiaries. The village savings and loans were initiated in other programs prior to the 2016/17 MVAC Response targeting the poor who would volunteer to form savings groups. This explains why in both beneficiary groups there are members of VSLAs.

[27] ** Intervention category taken to represent 'MVAC Only' beneficiaries
[28] * Intervention combination taken to represent 'MVAC plus Resilience' Beneficiaries

4.3.3.3 Resilience score results for different interventions

Table 16: Average impact of interventions on Resilience Scores by district for periods 2017/18							
Study areas	Machinga (PHA)	Machinga (MSH)	Dedza (KAS)	Mangochi (SHI)	Mulanje (PHA)	Nsanje (LSH)	ALL
Baseline Resilience scores	***0.73***	***0.65***	***0.74***	***0.81***	***0.74***	***0.67***	**0.72**
Seed distribution - Cereal production	0.84	0.77	0.85	0.95	0.89	0.85	**0.86**
Seed distribution - pulse production	0.81	0.74	0.82	0.91	0.86	0.82	**0.83**
Conditional cash transfer	0.83	0.76	0.87	0.92	0.87	0.84	**0.85**
Unconditional Cash transfers	0.84	0.76	0.88	0.93	0.87	0.85	**0.86**
Village Savings and Loans'	0.76	0.68	0.78	0.85	0.80	0.78	**0.78**
Crop Production plus conditional Cash Transfer	0.83	0.76	0.87	0.92	0.87	0.84	**0.85**
Crop Production + conditional Cash Transfer + VSLA (~83%)	0.86	0.79	0.91	0.95	0.90	0.87	**0.88**
Unconditional Cash transfers + VSLA (~61%)	0.87	0.79	0.92	0.96	0.91	0.88	**0.89**

The results in **Table 16 above** indicate that the interventions have a positive contribution to resilience of households, but the incomes generated are not enough to make very poor households meet their livelihood protection gaps coming from the impact of the moderate drought.

An analysis of the impact of intervention incomes on the resilience scores indicates that all interventions increase resilience although none would enable households to attain the desirable score of 1. Across districts, Mangochi shows greater impact of activities while Machinga shows least impact on the resilience scores. Interventions have increased resilience scores by between 7% to 19% in 2017/18 from baseline scores in 2016. 'MVAC plus Resilience' beneficiaries resilience score improved by 22% compared to 18% for 'MVAC Only' beneficiaries which suggests that the additional resilience activities have slightly improved resilience capacity of households. These results correspond to the marginal differences in Food Security Index: an indication that while the resilience activities show slightly better outcomes their differences are not yet significant.

4.3.4 Trends in Resilience scores and comparison between beneficiary groups.

Table 17: Overall Resilience Scores comparisons							
'MVAC ONLY'							
	Machinga (PHA)	**Machinga (MSH)**	**Dedza (KAS)**	**Mangochi (SHI)**	**Mulanje (PHA)**	**Nsanje (LSH)**	**All**
Baseline (2016 pre-implementation)	***0.73***	***0.65***	***0.74***	***0.81***	***0.74***	***0.67***	0.72
Year 1 (2016-17)	0.99	0.91	1.06	1.08	1.02	0.98	1.01
Year 2 (2017-2018)	0.80	0.72	0.83	0.89	0.82	0.82	0.81
Overall Y1-Y2	***0.90***	***0.82***	***0.95***	***0.98***	***0.92***	***0.90***	***0.91***
Projected (2018/19)	0.73	0.65	0.74	0.81	0.77	0.75	0.74
'MVAC PLUS RESILIENCE'							
Baseline (2016 pre-implementation)	***0.73***	***0.65***	***0.74***	***0.81***	***0.74***	***0.67***	***0.72***
Year 1 (2016-17)	1.01	0.93	1.09	1.10	1.04	1.00	1.04
Year 2 (2017-2018)	0.82	0.74	0.85	0.90	0.86	0.83	0.84
Overall Y1-Y2	***0.91***	***0.83***	***0.97***	***1.00***	***0.95***	***0.92***	***0.94***
Projected (2018/19)	0.76	0.69	0.78	0.85	0.81	0.78	0.79

Table 17, show the trends in average estimated resilience scores for '***Very poor'*** wealth groups at different stages of the programme across the five study districts. The forecast shows the projected situation if project benefits are maintained.

There is a general increasing trend in the scores of all beneficiary groups from baseline, with overall resilience scores higher than the baseline year. In the 2016/17 response, interventions were able to meet the desired resilince score of at least 1 except for 'MVAC Only' beneficiaries in Machinga and Nsanje and for 'MVAC plus Resilience' beneficiaries in Machinga Middle shire livelihood zone. The 2017/18 and the forecasted 2018/19 resilience scores are still above baseline levels but declining from the 2016/17 response due to the drop in period of cash transfers provided to both beneficiary groups in 2017/18 as well as the anticipated drop in production following Fall Army Worm and dry spells experienced in the current production year. This general trend indicates that though the interventions have an incremental benefit on household resilience, the rate of increase has not been adequate to maintain the desired resilience score in the absence of significant cash transfers. Additionally, some of the interventions such as climate smart agriculture training require more time for the impacts of adoption and practice to be observed on production. The other reasons for low impact are to do with the low level of input support provided**,** which impedes the maximisation of production potential. Furthermore, the provision of interventions as primarily crop production activities without diversifying with livestock and other non-agricultural income activities which must target same households limits the effectiveness of resilience actions which layered complementarity can have greater impact.

Figure 19: Comparison of Resilience Score by Beneficiary type

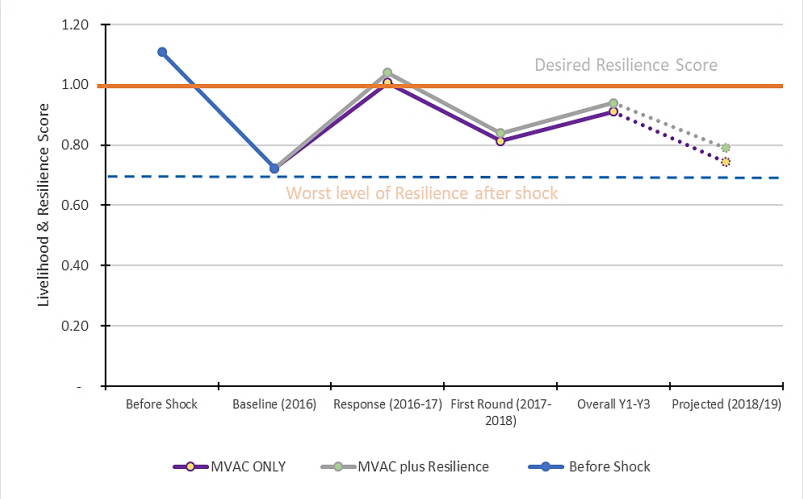


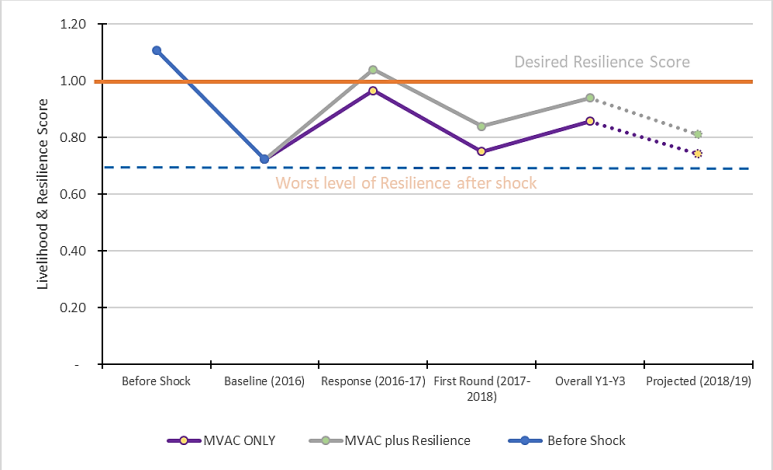
Figure 19 reveals the trends of overall resilience scores for 'MVAC plus Resilience' and 'MVAC Only' beneficiaries. The graph highlights the need for more investment in resources and time to sustain resilience gains among very poor households to maintain the desirable resilience score. The main aspect that is changing between the periods is level of transfer provided to households and production which suggests that households have not been able to build adequate assets and savings that could be used to adequately recover from impact of drough or prolonged dry spells.

This analysis points to a need for multiyear programming that builds on lessons drawn from the MVAC plus Resilience building approach. The design will need to provide a clear link between Long-term resilience with, contingency/ early action and emergency response to ensure that in drought years or other shocks the benefits of long term investments are not eroded as observed in the results between 2017 and 2018. Project design must consider the desired/appropriate level of investment, asset buidling, income and savings levels to be achieved in non-shock years to build resilience capacity of households (see **Table 14**).

The forecasting of resilience scores for very poor households suggests the need for continued support focussed on resilience building, social protection, and/or increased input investment to increase production, income generation, savings and asset building during non-drought years to speed up the time required to reach a resilience score of 1 or more.

Discounting for contamination

Figure 20: Comparison of Resilience scores after discounting for contamination



An exploration of the reasons for marginal differences in the results of 'MVAC plus Resilience' and 'MVAC Only' revealed that there is contamination of the 'MVAC Only sample'. This contamination is mainly on VSLA and access to improved seeds through seed fairs. A total of 61% of 'MVAC Only' beneficiaries reported participation in VSLA. **Figure 20** shows the resilience score comparison after removing income from VSLAs for 'MVAC Only' beneficiaries. The results, indicate that the difference of the 'MVAC Only' beneficiaries and 'MVAC plus Resilience' households widens with an overall resilience of 0.86 compared to 0.94.

4.4 Effectiveness of resilience building

The investment in complementary resilience activities to provide alongside the regular MVAC response in Malawi was intended to help households increase productive capacity, coping ability and asset holding. In turn these 'MVAC plus Resilience' beneficiaries would be expected to have greater resilience capacity that will reduce the need for, and cost of, humanitarian response in the future. This section provides value for money (VfM) analysis by evaluating if the additional resilience activities can, over the long run, reduce the need for high spending on humanitarian response. The assessment of value for money was done in through a combination of a **financial cost analysis**[29] and **monetary valuation of resilience gains**[30]**.**

4.4.1 Financial Analysis

The financial analysis of the value for money analysis in this report focused on comparison of financial expenditure of delivering 'cash only' MVAC response and that of additional resilience activities to the cash only response. **Table 18** below present the financial cost of the project in 2016/17 response which was basis used in doing the financial calculations[31]:

Table 18: Basis and assumptions of financial cost analysis

Description	Received (GBP)	Received (MWK)	Beneficiaries
Value of Cash Transfers Distributed 'MVAC Only'	1,773,188.40	1,782,647,548.31	**52,872.00**
Total Admin Cost 'MVAC Only'	91,359.28	91,846,639.64	'MVAC Only'
Total Cash program costs	1,864,547.68	1,874,494,187.95	
Value of Cash transfers distributed 'MVAC plus Resilience'	1,185,105.72	1,191,427,713.84	**22,783.00**
Total Admin Cost 'MVAC plus Resilience'	54,828.36	55,120,844.37	'MVAC plus Resilience'
Total Cash program costs	1,239,934.08	1,246,548,558.21	

Assumptions

§ The *cost of targeting is assumed to be the same for reaching the same number of beneficiaries*

Notes

§ Administration *cost include Service fees for cash transfers and logistics handling of seed*

The purpose of this analysis is to draw judgements over whether resilience activities can reduce the cost of humanitarian operations over time. Given the difference in the beneficiary numbers between the expenditures used in the delivery of each type of assistance, this analysis worked at cost per beneficiary. **Table 19** shows the results of the financial analysis done based on the project financial information.

Table 19: Comparison of financial cost analysis between beneficiary types

Description	Total Cost per Beneficiary (GBP)	Total Cost per Beneficiary (MWK)	Share of total cost
Value of Cash Transfers Distributed 'MVAC Only'	33.54	33,716.29	95%
Total Admin Cost 'MVAC Only'	1.73	1,737.15	5%
Total Cash program costs	35.27	35,453.44	
Value of Cash transfers distribute ' MVACplus Resilience'	52.02	52,294.59	96%
Total Admin Cost 'MVAC plus Resilience'	2.41	2,419.38	4%
Total Cash program costs (a)	54.42	54,713.98	
Impact of Resilience on 'MVAC plus Resilience' (b)	76.36	76,772.04	
Net Saving in next Response (b) minus (a)= (c)	21.94	22,058.07	
Projected cost of next Response (a) minus (c)	32.48	32,655.91	

[29] Based on program financial cost information including administrative costs
[30] Based on the outputs of the resilience analysis
[31] Costs associated with targeting assumed to similar and not of significance to affect analysis conclusions

The analysis shows that to deliver the additional resilience activities the cost of response increased by a total of 35% considering the value of resilience activities and related administrative cost. The administrative cost is 28% higher compared to 'cash only' part of the response at MWK 2,419.38 (£ 2.41) compared to MWK 1,737.15 (£1.73) per beneficiary. In both types of support at least 95% of the intervention cost is received by households. In this analysis the cost of 'cash only' MVAC response is expected to remain the same only changing nominally due to exchange rate and inflation.

The impact of resilience activities including the cash transfer was valued at an average of MWK 76,772.04 which indicates an additional MWK 22,058.07 per household based on the 2017/2018 project information obtained from the resilience modelling. Assuming, a similar 2016/17 humanitarian response was required in 2017/18 the cost of response would have reduced by 40% from MWK 54,713.98 to MWK 32,655.91/ beneficiary. The cost of this 'projected response' is 8% less than the cost of 'cash only' MVAC response and assuming the same share of administrative cost are maintained the administrative cost of the 'projected response' would be 25% less than the case where investments in resilience are absent.

In conclusion the financial analysis, reveal that over time the investment in additional resilience activities can reduce the cost of future responses to below costs of just continuously implementing humanitarian actions separately. It must be noted that the initial investment would be higher than in typical humanitarian responses but the long-term benefits of strengthened resilience and reduction in humanitarian cost justifies the investment.

4.4.2 Monetary valuation of resilience gains

In the resilience analysis the impact of shocks on the resilience activities was included to assess the extent to which interventions can increase incomes in the shock period. The analysis of impact of drought on livelihoods for the 'Very poor' **Table 14** revealed that on average households face a 28% gap in meeting the minimum acceptable livelihood wellbeing as defined by the livelihood protection threshold in periods of moderate drought conditions. This gap is equivalent to 31% of minimum food needs or MWK, 149,000 per household, which is the humanitarian cost at household level. In assessing the resilience activities, we are looking at their ability to reduce this cost over time.

The project effect analysis in **Table 15** shows that the interventions contribute between MWK 21,200 and MWK 63,400 in the presence of shocks. When analysed together with the gap in livelihood needs the interventions can reduce the MWK 149,000 gap to between MWK 127,800 and MWK 85,600 per household. This shows that although the resilience activities do not cover the gap of the moderate drought it reduces the gap by average of 28% ranging 14% to 43%, which indicates the magnitude of resilience gains. The final resilience score analysis shown in **Figure 20** indicates that the 'MVAC plus Resilience' beneficiaries have an aggregate of 0.94 Resilience Score compared to 0.86 for 'MVAC Only' after discounting for income of VSLA.

The financial cost analysis and the monetary valuation of resilience gains show that future cost and needs of humanitarian action can reduce to lower levels in comparison to not investing in additional resilience activities. Although, the initial investment is higher the results of resilience score analysis and the proxy indicators show that the 'MVAC plus Resilience' fared better on resilience outcomes compared with 'MVAC only' households, which indicate that it is worth investing in additional activities and over time it will further reduce cost of humanitarian response if gains are sustained and intervention effectiveness is enhanced. In conclusion resilience activities do improve resilience capacity and therefore would reduce the future cost of humanitarian action.

4.5 Beneficiaries' Perceptions of the Resilience Building Activities

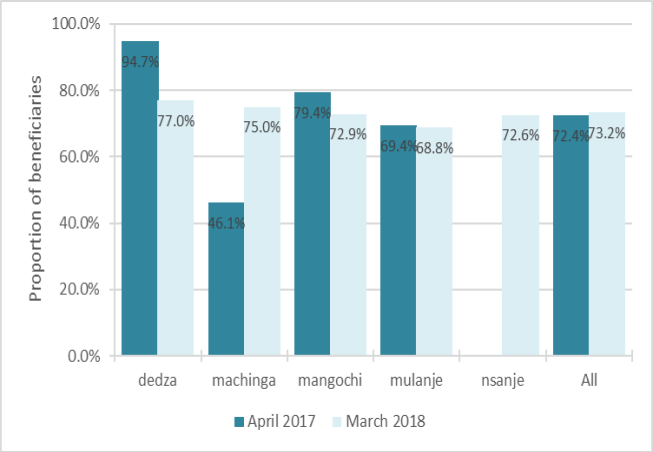
Beneficiary feedback is a process that ensures that their views and perceptions are included in decisions that will improve the quality and effectiveness of programs. This provides opportunity of design and implementation modifications based on the experiences of people who are the end beneficiaries of project activities.

Qualitative and Quantitative data was used to obtain beneficiary feedback on various aspects of the resilience activities. In the quantitative data, beneficiaries were asked to provide feedback on; ***intervention timeliness, effectiveness in building resilience***, ***appropriateness*** and ***satisfaction***. The qualitative data of the was collected through FGDs and Key informant interviews and were looking at perception of communities on activities and factors that will build resilience within their locality. The analysis of the information was organized into themes: ***Perception on resilience, the challenges in building resilience, and Improving project effectiveness.*** The design of FGDs was intended to complement information gathered during the first round of this study.

4.5.1 Timeliness of the Interventions

Satisfaction with timeliness of activities remains high with 73% of beneficiaries indicating that interventions were delivered within appropriate times to enable use of support for production. Across all the districts the level of satisfaction is above two thirds of the beneficiaries. The main reasons highlighted for the dissatisfaction is around the delays and poor organisation of seed fairs. In training and support of lead farmers some concerns were raised with limited support due to led farmers being busy in own fields.

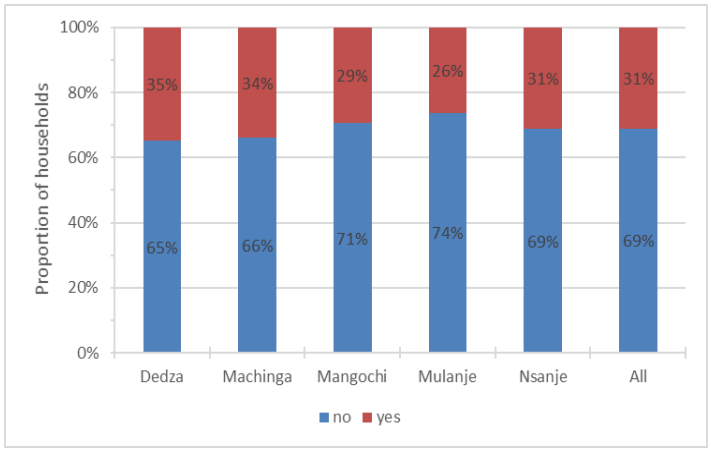
Figure 21: Proportion of beneficiaries Satisfied with timeliness of interventions



4.5.2 Effectiveness of the Resilience Building Interventions

'MVAC plus Resilience' beneficiaries were asked to provide their opinion on whether the resilience interventions were effective to make them food secure throughout a 12-month period.

Figure 22: Perception on effectiveness of resilience building activities



In general, the opinion of the beneficiaries is that the interventions are not on their own effective to ensure food security throughout a consumption year (69%). This opinion is supported by the Food security index which indicated that the food security status has deteriorated when compared to April 2017 suggesting that, though production was higher, it was not adequate to cover food needs. The regression analysis in section 3.4 also showed that income is critical in explaining food security and yet there is no package other than VSL which generates cash income.

4.5.3 Beneficiary Satisfaction with the Resilience Package

4.5.3.1 Intervention Appropriateness and Satisfaction

Across the districts, all beneficiaries indicated that resilience building activities were appropriate in supporting their production capacity and contribute to food security. The INGO MVAC response was largely regarded as designed to meet needs, particularly the immediate food needs through cash transfers. Beneficiary satisfaction was analysed using a rubric of level of satisfaction in three categories: ***Very satisfied***, ***Satisfied*** and ***Not satisfied.***

Figure 23: Proportion of households Satisfied with resilience Interventions

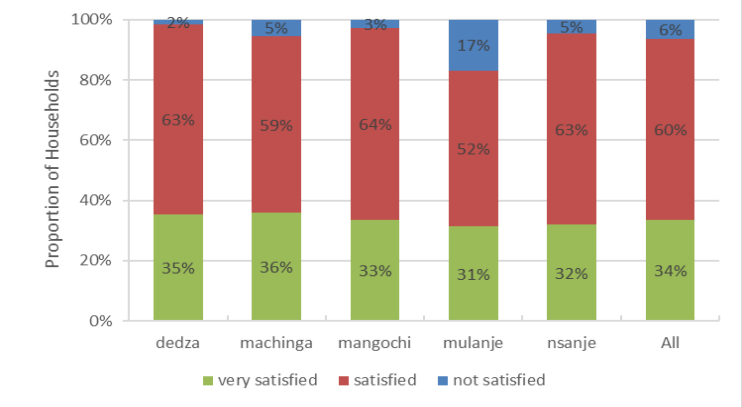


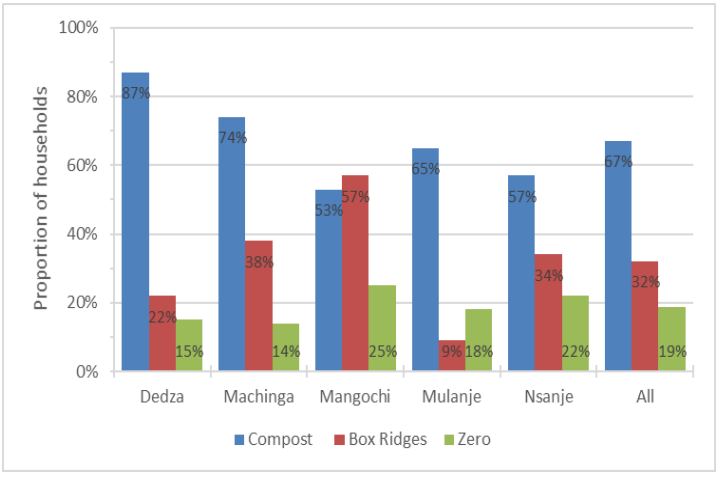
Figure 23 provides the overall level of satisfaction across all resilience building activities (*seed, Training and marketing*). There is general satisfaction with interventions provided across all the districts with over 90% of beneficiaries indicating they either were satisfied or very satisfied with the resilience interventions.

When juxtaposed with the indicated lack of effectiveness of intervention to meet annual food security needs on **section 4.5.2**, this indicates that while there is satisfaction with intervention types there is need to enhance activity effectiveness. The need for increasing effectiveness is also raised in the regression analysis which indicates the key predictors of food security to include, livestock ownership, income in addition to access to improved seed. When analysed by intervention the level of dissatisfaction is less than 5% for all the activities which confirms that the provided support is appreciated by beneficiaries.

4.5.4 Beneficiaries' Preference of Climate Smart Agriculture (CSA) Technologies

The main CSA activities that were ranked high in the 'MVAC plus Resilience' activities are composting (67%), box ridges (32%) and zero/minimum tillage (19%). These results are similar the first-round study where the three activities were also ranked top three.

Figure 24: Ranking of Climate Smart Technologies



The district results also show the same preference. Composting seems preferred as it helps improve soil fertility and in turn plant nutrients that enhance yields. In the absence of livestock manure and given the high prices of fertilizers, it makes sense that farmers see composting as an important strategy that can be used for improving yields. At least 28.5% of beneficiaries relied on manure as a fertilizer. Within 'MVAC plus Resilience' beneficiaries 33.2% used manure as fertilizer compared to 20.7% for 'MVAC Only' beneficiaries. While this is not compost manure, it indicates possibility of promotion or innovation of manure production from current local strategies.

4.5.5 Community opinion on factors and activities that build resilience

4.5.5.1 Perception on what it means to be resilient

Communities were asked to provide a description of what it means to be resilient and what it takes to be resilient. The communities focused on three aspects which included being able to provide food and non-food items for the families, owning productive assets and having good houses with bricks and iron roofing;

⇒ On being able to feed family through the year without external support one participant had this to say;

> "W*e are feeling ashamed when time and again we get relief support. It is as if we are not hardworking people. As we are saying we don't have food most of us."* **FGD Participant in Mkanda**

⇒ Across all the districts communities highlighted that owning livestock particularly goats and cattle makes them more resilient. Additionally, they can use the animals to earn income to by household provisions and build nice houses.

4.5.5.2 The challenge in building Resilience

The communities highlighted several reasons that they view as impeding resilience building. The main reason according to communities is that the shocks are increasing in frequency and intensity which does not allow enough time to recover between shocks. The example given is that of fall army worm and prolonged dry spells which have happened in successive seasons in 2016/17 and 2017/18 season for fall army worm with increasing infestation. The dry spells are becoming more frequent, less predictable, and intensity is increasing. Dry spells now seem to occur every season, though timing varies between start and mid-season which are both critical periods in crop growth. Other reasons highlighted are limited non-agricultural opportunities and the reduced viability of traditional farming methods. One FGD participant had this to say on farming techniques;

> "*We are used to our old ways of farming and it's difficult to adopt new ways of farming. We are thankful to OXFAM for introducing new methods and we are just trying to see if it works, however due to the fall army worm and dry spells our efforts are not materializing*." **FGD participants in Kuselema GVH in Mulanje**

And on predictability of shocks;

> *"We have been having floods since 2014 which affected our crops. On the other hand, we rely on river bank farming and if there is no flooding the banks become dry. The flooding sequence is now disturbed we do know what come along in a particular year"* **FGD participant in Kaudzu GVH in Nsanje**

4.5.5.3 How can we Improve project effectiveness?

The need for consultation and participation in decision making on aspects of resilience packages was raised in all FGDs by communities. In a general sense the communities highlighted that increased communication will help in addressing implementation challenges. The communities highlighted that INGOs must strengthen monitoring of programs to see if the support provided is working as intended. A participant had this to say;

"The project should do what people want, we have been saying this to many NGOs, but they bring things that we do not normally do here, for example, they bring crops that do not germinate yet they call them improved." **FGD participant in Mulanje.**

Another way of enhancing resilience was improving the comprehensiveness of the package by providing enough quantities of support provided. This was mention in respect to inputs, that inputs provided must be aligned to the amount of land used for crops. The communities highlighted the need for seeds to be provided together with fertilizers, pesticides to improve yields and control pests such as army worm. In Dedza a participant in one of the FGDs had this to say;

> "*If we get inputs without adequate fertilizers and ways of controlling pests is not very helpful as the production will be affected as is happening in this current season*.**" FGD participant in Dedza**

To address the prolonged dry spells during rainy season, communities suggested the development of appropriate irrigation and water harvesting techniques as one way of providing relief to crops. Additionally, in areas that have access to offseason winter cropping opportunities using residual moisture, beneficiaries highlighted that because of these resources they do not get support for production which could enhance the use of the winter season. Additionally, support for cash crops and improving pricing of agriculture inputs and produce was also raised as a way of improving the resilience package.

4.6 What are the factors that influence food security outcomes?

To explore whether resilience activities influence food security outcomes and therefore resilience a regression analysis was completed including resilience activities and other factors known to influence food security. The following section will explore the key contributors to food security outcomes.

4.6.1 Multivariate analysis – Binary Logistic Regression Model

To investigate the factors mostly contributing to food security, a multivariate analysis approach was taken in the quantitative March 2018 survey data. The model used was a Binary Logistic Regression model, run in SPSS. The model uses two sets of variables, the first is the response variable or dependent – which in this case was, "Food Security Status", which were coded as binary*; 0=food insecure, 1=food secure* based on the measured Food Security Index classification. In this case, "1=food secure" was the desired outcome which was therefore taken as the reference category.

The second set of variables was a group of explanatory variables otherwise known as predictors or independent variables. In this case, thirteen explanatory variables[32] were being tested as predictors of household food security status. These variables were chosen based on past knowledge of factors that influence food security and areas of project intervention. The hypothesis tested was that the explanatory variables influence food security status of the households in study. In a multivariate analysis, the effects of each explanatory variable were being tested in the presence of the others, that is accounting for the interactive effects of different variables.

A stepwise (forward conditional) process was used to fit the final model. This involved including all the thirteen predictors of food security into the model on the first step, then the model removed one variable at a time (starting with the weakest predictor) through a 10-step iterative process until the significant predictors were retained on the last step, which are regarded as the true predictors of food security. In other words, these are the most influential variables to intervene on in addressing food security.

Table 20: Regression analysis Steps for food security predictor

Step	Predictor	p-value	Significant
Step 1	HH experienced shock in 2016/17	.588	
	Livestock ownership	.029	**
	Beneficiary type	.279	
	HH income	.001	***
	Land cultivated	.815	
	Maize production	.897	
	HH size	.067	*
	Income from casual labor	.949	
	Access to humanitarian transfers	.698	
	Type of seed (improved or unimproved)	.011	**
	Use of fertilizer	.293	
	VSL_member	.449	
	Social grant	.787	
Step 2	HH experienced shock in 2016/17	.589	
	Livestock ownership	.029	**
	Beneficiary type	.278	
	HH income	.001	
	Land cultivated	.811	
	Maize production	.899	
	HH size	.067	*
	Access to humanitarian transfers	.700	
	Type of seed (improved or unimproved)	.011	**
	Use of fertilizer	.293	
	VSL_member	.445	
	Social grant	.788	
Step 3	HH experienced shock in 2016/17	.580	
	Livestock ownership	.026	**
	Beneficiary type	.276	
	HH income	.001	***
	Land cultivated	.829	
	HH size	.067	*
	Access to humanitarian transfers	.688	
	Type of seed (improved or unimproved)	.011	**
	Use of fertilizer	.248	
	VSL_member	.435	
	Social grant	.781	
Step 4	HH experienced shock in 2016/17	.583	
	Livestock ownership	.027	**
	Beneficiary type	.275	
	HH income	.001	***
	HH size	.066	*
	Access to humanitarian transfers	.702	
	Type of seed (improved or unimproved)	.011	**
	Use of fertilizer	.257	
	VSL_member	.433	
	Social grant	.778	
Step 5	HH experienced shock in 2016/17	.630	
	Livestock ownership	.026	**
	Beneficiary type	.282	
	HH income	.001	***
	HH size	.068	*
	Access to humanitarian transfers	.748	
	Type of seed (improved or unimproved)	.011	**
	Use of fertilizer	.266	
	VSL_member	.446	
Step 6	HH experienced shock in 2016/17	.577	
	Livestock ownership	.024	**
	Beneficiary type	.284	
	HH income	.001	***
	HH size	.067	*
	Type of seed (improved or unimproved)	.012	**
	Use of fertilizer	.261	
	VSL_member	.449	
Step 7	Livestock ownership	.022	**
	Beneficiary type	.273	
	HH income	.000	***
	HH size	.062	
	Type of seed (improved or unimproved)	.012	**
	Use of fertilizer	.260	
	VSL_member	.467	
Step 8	Livestock ownership	.019	**
	Beneficiary type	.325	
	HH income	.000	***
	HH size	.066	*
	Type of seed (improved or unimproved)	.009	**
	Use of fertilizer	.258	
Step 9	Livestock ownership	.021	**
	HH income	.000	***
	HH size	.058	*
	Type of seed (improved or unimproved)	.015	**
	Use of fertilizer	.308	
Step 10	Livestock ownership	.015	**
	HH income	.000	***
	HH size	.060	*
	Type of seed (improved or unimproved)	.007	**

**significant at 10% level, **significant at 5% level, ***significant at 1% level of significance*

[32] List of variables is provided in Annex 1 at end of report

4.6.1.1 Results of the multivariate analysis

Table 20 shows the 10-step iterative process of model fitting. In the first step, all variables are included in the model. In step 2 the model removes "income from casual labour" as the weakest predictor of food security, and 12 variables are retained in step 2. In step 3, "land cultivated" is removed as the third weakest predictor of food security and 10 variables are retained. This process is repeated, and one variable is taken out at a time, in order of importance of their influence in presence of other variables as shown in the table.

The final model fitted included only 4 explanatory variables which proved to be statistically significant predictors of food security. As shown in step 10, these variables are; livestock ownership, household income, household size and type of seed used. Nonetheless, it is worth acknowledging that there are other predictors which can be deemed to be have some strong influence though not statistically significant. These are the variables dropped at later stages of the iteration, which indicate that in the presence of other factors they have influence. These are "beneficiary type", "participation in VSLA" and "use of fertilizer", which were still part of the model until steps 7, 8 and 9. **Table 21** shows the final model fitted after a stepwise process of removing all explanatory variables which are not significant.

Table 21: Final Model fitted after the stepwise process of removing variables from the model

Variable predictor	**Multivariate effect**	**p-value**	**95% Confidence interval**	
	Odds ratio		**Lower**	**Upper**
Livestock ownership	1.599	0.007**	1.135	2.253
HH income	2.358	0.000***	1.535	3.622
HH size	1.395	0.056*	0.991	1.964
Type of seed (improved or unimproved)	1.865	0.008**	1.176	2.956

**** Statistically significant at the 1% level of significance ** Statistically significant at the 5% level of significance *significant at the 10% level of significance*

The strongest variable as shown in the table is **household income**. The results show that there is strong statistical evidence (p=0.000) at 1% level of significance to conclude that household income is the strongest important factor influencing food security at the household level. An odds ratio of 2.358 means that households that earned income which was above 25th percentile of the sample were 2.3 times more likely to be food secure than an extreme group which earned income below 25th percentile of the sample. The given corresponding 95% confidence interval shows the range through which the odds ratio falls. It is worth noting that while casual labour is one of the income sources pursued by a majority it was dropped in first stage of the analysis the same with humanitarian transfers.

This analysis seems to point to a need for increasing diversity and intensity of various income sources. Analysis of income shows the top 7 income sources excluding humanitarian transfers as; casual labour, crop sales, small business, petty trade, savings, fishing/wild foods, and remittances.

Further details on the three other statistically significant variables are given below:

Livestock ownership, had an odds ratio of 1.599 which means that households that own some livestock are 1.6 times likely to be food secure than those who do not own livestock at all. This was statistically significant (p=0.007) at 5% level of significance. In the sample, ownership of livestock was primarily in goats and chickens and these are typically used to earn income to meet food and other needs. These small stocks can be kept on small pieces of land enhancing market access and production will improve the contribution of livestock to food security.

Type of seed used was also a significant predictor of food security. An odds ratio of 1.865 shows that households that used improved seeds were 1.9 times likely to be food secure than those who used unimproved seeds, and this was statistically significant (p=0.008) at 5% level of significance.

Household size also emerged as a significant predictor of food security at 10% level of significance with p-value of 0.056. An odds ratio of 1.395 means that households with a normal to low household size (i.e. 6 and below) were 1.4 times likely to be food secure than those with larger household sizes (i.e. above 6). The issue of household size can be related to the relationship between high calorie demand at the household versus low production or income which increases the burden at the household level. Long term family planning and social protection for large families will enhance future resilience of households.

While earning cash from VSLA, beneficiary type and the use of fertilizer do not fit in the final model they remain in the model until step 7, 8 and 9 respectively which shows that they are still influential in the presence of other variables in those late stages of analysis. In case of fertilizer, the INGO did not provide any fertilizer and households reported lack of fertilizer due to cost as they buy on own as one of reasons for change in production. Though not statistically significant, if provided in right quantities there is possibility for fertilizer becoming an important predictor of food security as it relates to increase in yields.

It is important to note that these factors do not work in isolation and must be provided as a key package which need to be accompanied with; right size of support that maximizes benefits of each intervention; complementarity of actions with other existing programs such as social protection[33], appropriate vocational skills for income diversification for the growing youth population; and nutrition mainstreaming to improve nutrient intake.

[33] In this data set only 7% of households reported receiving social protection grants. The reason why Social grants and VSLA are not showing as significant is related to the amounts of transfers and savings reported. If earnings from these amounts increase as shown with total income they will likely become significant.

4.7 Best practices and lessons learnt

In addition to the best practices and lessons learnt identified in the first round (see **Table 22**) this follow-up study highlights a few best practices identified based on the findings of the regression analysis and literature review of similar programming in other countries. The INGO consortium will need to consider these best practices in future program designs:

Table 22: Best practices identified in first-round of study

Best Practices identified in first- study	
1.	Training on compost manure making
2.	Provision of cash to the beneficiaries (MVAC + resilience), prior to the full MVAC response
3.	Use of seed fairs
4.	Use of lead farmers
Lessons identified in first- study	
5.	Timely distribution of agricultural inputs improves timing of planting.
6.	Quantity and quality of seed distributed influence long-term resilience.
7.	The success of the resilience building activities in the 2016/17 season was largely due to a good agricultural season that was characterized by good rains experienced

⇒ **Layering of resilience action actions:** The inclusion of additional activities to support production have shown incremental benefit to household's resilience scores and food security situation. The regression model shows that addition of other interventions to production activities will increase effectiveness of resilience activities. These include, access to improved seed varieties, livestock ownership and income diversity and intensity which are major in influencing food security outcomes. Furthermore, feedback from communities highlighted that livestock ownership and improving the comprehensiveness of package will enhance impact. INGO consortium must consider including of small stock (goats and chickens) as part of the package that enhances resilience among the households who have lost stock in previous droughts. Additionally, organic fertilizers and manure must be included to improve yields.

⇒ **Additional activities suggested by beneficiaries:** Despite satisfaction in the current resilience package the beneficiaries highlighted that the current packages will benefit from expansion and inclusion of the following;

- In addition to crop production the beneficiaries highlighted that ownership of livestock improves their income earning opportunities during periods when crop production fail. Communities highlighted the inclusion of cash to purchase livestock particularly goats, chickens and pigs
- In addition to the seed, beneficiaries highlighted that improved access to fertilisers will enhance production. There was an observation that richer households who can afford fertilisers have better production.
- Timely access to pesticides and herbicides during the fall army worm response was observed as helping control of the pesticides in some districts. Beneficiaries highlighted that access to pesticides will reduce the damage of crops by pests.
- The communities highlighted that winter cropping presents an opportunity of recovery but usually following a shock they have limited resources to optimally invest in seed. This was highlighted in communities that use residual moisture for production in wetlands and in flood recession lands.
- The training in moisture conservation in the CSA trainings was appreciated by communities and a suggestion to expand it to irrigation support was indicated as a mitigating factor to be used during dry spells. This point should consider appropriate measures suitable within scope of micro-irrigation and water harvesting techniques

- Money for starting businesses was also mentioned as a way of improving income earning opportunities through engaging in various trade activities. This however should be preceded with market feasibility studies and accompanied with appropriate business skills. Alternatively, VSLA can be an entry point of providing group investment capital as appropriate.

⇒ **Integrated programming providing nexus of humanitarian and development:** The linking of humanitarian and resilience actions show that it can enhance food security and resilience of households although the gains of the benefits can still be lost over a consumption year as production does not cover annual needs and savings are still low to meet the needs at peak lean season. There is need to consider a programming model that has long term Resilience/livelihood promotion which has budget for early action/contingency linked to early warning to ensure that in shock years the level the benefits of resilience action are protected until a time they are more sustainable. (see RESET design). Resilience requires multi-year programming.

5. Main Conclusions and Recommendations

5.1 Conclusions

The INGO Consortium is implementing resilience building initiatives in the context of increasing exposure to multiple shocks for a population with underlying poverty challenges. The districts of operation in the south and central regions are characterized as being at high risk of climate change and are among the districts with worst food insecurity outcomes in the past five years. The occurrence of drought, flood and fall army worm is increasing in frequency and intensity encumbering recovery since the time between shocks is getting shorter. Access to improved seed (*cereals, sweet potatoes and pulses*); CSA training and VSLA were the main activities implemented as resilience activities in the 2016/17 and 2017/18 production periods. With exception of VSLA, the benefits of production related activities are still vulnerable to the existing shocks. In addition, high population and low land holdings continue to be underlying factors that influence food security and production potential in the districts of operation. The following key conclusions are drawn from the analysis to answer the assessment questions;

5.1.1.1 Do the resilience activities increase the ability of beneficiaries to cope with future shocks?

The study has demonstrated that the resilience interventions generally had a positive impact on the resilience scores of households contributing a monetary value of between MWK 21,200 and MWK 63,400 per household in the presence of shocks. This analysis showed that this contribution reduces the average food gap by between 14% to 42%, which demonstrates that interventions increase the ability of households to deal with shocks. In the regression analysis, access to improved seed an activity supported in the response program is among the four influential factors which influence food security outcomes which indicates its ability to increase coping with future shocks. The regression analysis also indicated that households with greater ownership of livestock and higher income earning had nearly double the chance of being food secure compared to those with no livestock or less income. These findings demonstrate that, existing resilience package effectiveness can be further enhanced by enhancing diversity (*crop and non-crop/agriculture*) and intensity of support provided. Effects of CSA training is too early to be observed as this requires more time for adoption and consistent practise.

5.1.1.2 What are the net differences in resilience outcomes between the 'MVAC plus Resilience' and 'MVAC Only' beneficiaries?

The comparison of analysis outputs for resilience proxy indicators and the resilience score between 'MVAC plus Resilience' and 'MVAC Only' beneficiaries show that 'MVAC plus Resilience households have better outcomes compared to their counterparts. In the proxy indicator comparison only 3 indicators of the 10 showed statistical significance between the differences. The FSI, which combines indicators does show that the MVAC plus resilience have are more food secure than the MVAC Only which suggests that the addition of resilience activities builds greater resilience. In the analysis of resilience scores 'MVAC plus Resilience' households have a better resilience score of 0.94 compared to 0.91 for 'MVAC Only'. The resilience analysis observed that 'MVAC Only' households also benefited from the VSLAs and access to improved seed during seed fairs resulting in contamination and possible a reason for marginal differences[34] observed in most of the comparison indicators. However, after discounting for contamination in 'MVAC Only' households their resilience score is 0.86, which indicates that households receiving additional resilience activities have better resilience capacity. The forecast resilience analysis

[34] The change in programming in 2017/18 where 'MVAC plus Resilience' households did not receive the 'cash only' MVAC response also affected their resilience in second year of support.

shows that while there are gains there is still need for support as households are not able to attain the desired resilience score of 1 in the 2018/19 consumption year.

5.1.1.3 Is it worth it investing in additional resilience activities to the MVAC Response?

The financial cost analysis and the monetary valuation of resilience gains show that future cost and needs of humanitarian action can reduce to lower levels in comparison to not investing in additional resilience activities. Financial cost analysis for 2016/17 showed that humanitarian cost per household can be reduced by 60% from initial investment, which represents an overall 8% less than the cost of 'cash only' MVAC response. The value for money analysis indicates a possible MWK 22,058.07 saving per household due to investment in additional resilience activities. It must be noted that the initial investment in additional activities would increase cost of humanitarian responses but the long-term benefits of strengthened resilience and reduction in humanitarian cost justifies the investment.

5.1.1.4 What resilience building interventions are preferred and perceived by beneficiaries as most effective?

Most of the beneficiaries reported that they are satisfied with find the resilience package appropriate. However, they indicated that currently the interventions are not yet enabling them to meet their food needs over a 12-month period following a shock. In addition to the existing package, beneficiaries indicated need to expand the package to include; livestock support, access to fertilisers, pesticides and herbicide, irrigation support, business capital and input support for winter cropping. Livestock ownership, access to fertilisers and business ventures were highlighted as most preferred additional activities. The discussions with communities noted that quantity of seeds need to be increased based on effective land to be planted to achieve significant yield.

5.2 Recommendations:

The following bullet points provide a summary of the key recommendations for INGO Consortium members and other stakeholders involved in resilience work in Malawi.

- ⇒ The vulnerability context in the operation districts requires an integrated approach of resilience building initiatives for crop and livestock-based as well as non-agriculture income generating livelihood strategies. Given the short periods of recovery due the support levels must be intensive by increasing quantity and connectedness to longer term programs. A consideration localised social micro-insurance schemes will allow early action or response. Malawi has taken national insurance through the Africa Risk Capacity and advocacy for timely pay-outs should be considered.
- ⇒ Households still require additional support to achieve the desired resilience scores in the face of moderate drought. This support should focus on (i) enhancing non- agricultural income generation activities such as trade/businesses, vocational skills application and VSLA, to diversify sources of income, (ii) enhancing sustainable increase in livestock holdings to enhance coping[35], and (iii) on crop production to include appropriate fertilizers in sufficient quantities. However, a strong community consultation and market-oriented support should be integral to avoid over production/supply that could hinder feasibility of initiatives.

[35] Goats, chicken and pigs were indicated as the most preferred livestock types by beneficiaries. These livestock types can multiply in short space

⇒ The analysis also shows that there are some structural challenges with the resilience agenda. Key within this is the high and growing population in a context where agricultural land is increasingly getting smaller and less productive, encumbering the capacity of households to adequately produce and earn incomes to sustain families. The regression analysis showed that larger household sizes (6 people or above) are about 1.8 times likely to be food insecure compared to those with smaller sizes in the same wealth ranges thus are associated with lower food insecurity. Considerations for mainstreaming family planning and social protection are therefore critical to have long term impact on population.

⇒ The projected analysis of resilience scores show that households need a follow up project to maintain or strengthen the capacities of households to make adequate savings and asset growth will be a source of coping during the once in two years moderate drought event. This shows that resilience building should be taken as a long-term investment and considerations of multi-year predictable support will enhance current efforts.

These recommendations are in addition to the ones raised during the first round-study outlined in the box below.

⇒ There is need to ensure access to good seed quality for sorghum and millet seed in districts that have the suitable agro-ecology for these droughts resistant varieties such as in Nsanje and Chikwawa.

⇒ The quality of the seed through seed fairs should regularly be checked and that they are suited for the agro-ecological zone.

⇒ The implementing partners should ensure that compost manure making is central to future resilience building package, as it is the most preferred technology, and is highly effective in the context of rising prices of inorganic fertilizers.

⇒ The implementing partners should promote irrigation farming to ensure that the resilience gains are maintained even when the rainfall pattern is problematic.

⇒ The implementing partners should consider increasing the quantity of seeds provided to ensure that they are commensurate with the land that farmers allocate for maize production to maximize yields and promote long-term resilience to food insecurity shocks.

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[i] Refer DRAFT National Resilience Strategy: Breaking the Cycle of Food Insecurity in Malawi

[ii] See UKAID definition source: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/67451/Defining-Disaster-Resilience-summary.pdf

[iii] See OECD definition source: http://www.oecd.org/dac/May%2010%202013%20FINAL%20resilience%20PDF.pdf

[iv] See definition of source: https://www.omicsonline.org/open-access/spatially-explicit-structural-approaches-to-measuring-hazardriskassessment-vulnerability-and-resilience-2167-0587-1000133.php?aid=54717#13

ANNEXES 1

Predictor	Definition
HH experienced shock in 2016/17	Household experience either, prolonged dry spell, floods or pest infestations
Livestock ownership	Whether household owns any livestock
Beneficiary type	Either 'MVAC plus Resilience' Or 'MVAC Only'
HH income	The total income earned by households from diverse income sources
Land cultivated	Quantity of land cultivated by households
Maize production	Quantity of maize produced
HH size	Number of people in the households above and below average
Income from casual labor	Total income received from casual work (ganyu)
Access to humanitarian transfers	Whether household received any humanitarian assistance
Type of seed (improved or unimproved)	Whether household used improved or unimproved seed varieties
Use of fertilizer	Whether household used any fertiliser including manure in crop production
VSL_member	Whether household received income from savings schemes
Social grant	Whether households received social grants income