Conservation Farming Unit

CONSERVATION FARMING & CLIMATE SMART AGRICULTURE

HOUSEHOLD ECONOMY ANALYIS BASELINE

FOR IMPACT ASSESSMENT OF THE

CLIMATE SMART AGRICULUTURE – ZAMBIA (CSAZ)

THIS REPORT IS PRESENTED TO THE CFU BY
THE NIXON CHISONGA CONSORTIUM AND
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Acronyms

CA	Conservation Agriculture
CF MT	Conservation Farming Minimum Tillage
CFU	Conservation Farming Unit
COMACO	Community Markets for Conservation
CSA	Climate Smart Agriculture
CSAZ	Climate Smart Agriculture Zambia project
CSO	Central Statistical Office
DFID	Department for International Development
FGDs	Focus Group Discussions
FOs	Field Officers
GDP	Gross Domestic Product
HEA	Household Economy Analysis
IGA	Income Generating Activities
LIME	Longitudinal Impact Monitoring and Evaluation
LCMS	Living Conditions Monitoring Survey
LPT	Livelihood Protection Threshold
LZ	Livelihood Zone
SFO	Senior Field Officers
RT	Resilience Threshold
ZMW	Zambian Kwacha

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Executive Summary

Overview of the Baseline Study

This baseline study used an HEA approach involving both qualitative and quantitative methods to profile livelihood strategies across four different livelihood zones the CFU operates in. These livelihood zones are 1) ZM08 - The Commercial Rail Line Maize, Livestock, and Cotton; 2) ZM09 - The Southern Plateau Cattle, Maize and Tobacco; 3) ZM16 - Eastern Plateau Maize, Cotton and Groundnut; and, 4) Eastern Plateau Maize, Groundnut, Tobacco and Trade. These zones are under Central, Eastern, Western and Southern areas the CFU Climate Smart Agriculture Zambia project is being implemented. The CSAZ project targets small-scale farmers in the rural and peri-urban areas. These farmers are in turn expected to practice, and therefore adopt one form or another of Conservation Farming Minimum Tillage (CF MT) practice. As part of the methodology to examine the impact of the CSAZ project, the baseline study collected information from two groups of small-scale farmers: those that had adopted CSA CF MT and those that were using conventional farming systems.

Objectives of the Study

The study objective was to provide evidence on the functioning of local livelihoods as a way of guiding appropriate decision making that incorporates context specific needs, particularly the distinction between Conservation Agriculture (CA) adopters and conventional farmers. The primary purpose of the study is to provide evidence of needs for timely and appropriate decision making on response to needs for livelihoods and food security programming acknowledging the difference between Conservation Agriculture adopters and conventional farmers (non-adopters).

Methodology

The Household Economy Approach (HEA) was used for collecting and analysing field-based livelihood information on the wealth breakdown, seasonal calendar for main events and activities, and the profiling of livelihood strategies, which include sources of food and cash income, expenditure patterns, and household coping strategies. This methodology allows for a holistic approach to understanding the way people live. It provides a good starting point for objectively demonstrating change in people's access to food and cash due to multiple changes by allowing analysis of the impact of changes in individual livelihood strategies as well as its contribution to total livelihood access. To understand the evolving livelihood situation the assessment identified **2017** consumption year as the year of focus in comparison to reference year collected for **May 2016 to April 2017**[1] as reference period – a year used to describe and quantify occurring livelihood patterns for households and is used as a benchmark against which changes in future access are measured.

[1] The year was a normal year with good harvest, pastures and adequate surface water for both livestock and domestic use characterised by improved livestock conditions

Results

The clearest and undisputable narrative coming from this study is that of adopters tending to be more food secure as a function of their reliance on consumption of food that they produce and also more inclined to be more capable of maintaining their livelihoods when compared to conventional farmers. What, at baseline level is not yet clear is exactly why this is so, is this because CA attracts people that are more enterprising and hence already more likely to be food secure and more conscious of the need to invest towards own livelihoods or it is in fact CA that ushers people into food security and livelihood investments? Answering these pertinent questions demands more exploratory studies beyond this baseline study. From this study, three main but interrelated findings form the conclusion of this baseline study.

1. Climate Smart Agriculture CA adopters, compared to conventional farmers across the four livelihood zones got more of annual food requirements from own crop production and less from casual labour. However, it should be pointed out that this baseline study cannot be conclusive as to why CSA adopters got own crop production as the main food source in the reference period, May 2016 to April 2017. It might become necessary to further investigate this over time in order to strengthen the explanatory power if indeed the adoption of CSA practices is the cause for provision of food through own crop production.
2. It is concluded that the main source food is explained very much by farmers' own crop production in all the zones though, as explained before, the contribution is more in adopters than conventional farmers. However, it is interesting and important to note that there appeared to be additional sources of food in ZM08 and ZM09 and these are livestock and livestock products. Crop sales particularly from adopters, the sale of livestock and livestock products were sources of cash. The attribution of more crop sales from adopters can only be confirmed after tracking the trend for at least two seasons.
3. The comparative profile of livelihood strategies across the four livelihood zones were explained by wealth determinants: land area cultivated, livestock holdings cash leading to differences in access to food, access to cash, and expenditure patterns. The wealth profiles of zones show that the size of land owned and cultivated was a significant expression of wealth in three zones (ZM09, ZM16 and ZM17). The size of cattle herd also explained wealth in three zones (ZM08, ZM09, and ZM16) though there was no significant difference between adopters and non-adopters which is expected as the project has just started. It will be interesting to keep track of these wealth determinants between program participants (adopters) and non-participants (conventional farmers). Although all households across the four zones managed to achieve the survival threshold in the reference year, at least 65% of them were below the livelihood protection threshold, particularly the conventional farmers. Livelihood Protection threshold (as a measure used to show capacity of households to invest in livelihoods and usually the more they invest reflects the potential production they can earn at the end) shows that adopters are heavier investors towards own livelihoods than conventional farmers. This means potentially the adopters are building more resilience to shocks and hazards as they are well above the livelihood protection thresholds. Follow up studies through outcome analysis in a longitudinal manner will help to quantify the magnitude of the resilience built and also check if there are significant differences between adopters and conventional farmers particularly on livelihood threshold attainment.

Recommendations

1. To get a more solid understanding of the differences between program participants (adopters) and conventional farmers, it is highly recommended to track livelihood outcomes longitudinally using the

Longitudinal Impact Monitoring and Evaluation (LIME) concept by carrying out an annual outcome analysis using the identified key parameters at livelihood zone level.

2. There is also need to bring a human face to the methodology (evidence from program participants) by employing other methodologies so as to clearly bring out explanations and attributions to the programme. It is hereby therefore recommended that in subsequent studies, case studies or the use of the Most Significant Change (MSC) stories be also added to compliment the HEA framework. This qualitative dimension of documenting stories of change will help to explain CSA impacts/ or lack of impacts on the livelihood of the farmers.

3. The TOR required that a value be computed for the Resilience threshold (RT). This study recommends that in fact the indicator should be that of Livelihoods Protection Threshold (LPT) since a realistic and observed (contrasted with a theoretical) RT is never unearthed through a baseline but rather at another HEA stage called Outcome Analysis.

1. BACKGROUND

This baseline study reports present findings that would help to inform the development (refining) of the Climate Smart Agriculture Zambia (CSAZ) project interventions and specific livelihood strategies in Zambia. The study seeks to benchmark indicators and facilitating tracking the indicators at seasonal level and the assess impact at the end of the project. The field work was undertaken between the 1st and 15th October 2017 in Kafue, Mazabuka, Choma, Chongwe, Katete and Chipata Districts in Zambia. The report is divided into four sections. The background section provides background information to the baseline study including the importance of the Household Economy Analysis (HEA) and how it fits into this baseline study. Thereafter, the study methods describe the approach used, followed by an analysis of the findings. Finally, the conclusion and recommendations are outlined in the final section.

The Climate Smart Agriculture Project

The Conservation Farming Unit (CFU), a not-for-profit organization being sponsored by the British Government through the Department for International Development (DFID), under its Climate Smart Agriculture Zambia Programme (CSAZ), provides trainings to an outreach of over 150,000 farmers annually across four (4) regions namely Central, Eastern, Western and Southern. The CSAZ project has 81 Field Officers (FOs) and 11 Senior Field Officers (SFOs) across the four regions. Each FO trains and/or oversees training of about 2,700 farmers three times annually. The majority of trainees of the CFU are small-scale farmers in the rural and peri-urban areas of Zambia. These trained farmers are in turn expected to practice one form or another of minimum tillage (which is one basic components of conservation agriculture) as they have been trained.

The Household Economy Approach

The Household Economy Analysis (HEA) was used for collecting and analysing field-based livelihood information on the wealth breakdown, seasonal calendar for main events and activities, and the profiling of livelihood strategies, which include sources of food and cash income, expenditure patterns, and household coping strategies. Livelihood strategies are a range or a combination of activities that people or households engage in to achieve their livelihood goals. They also cover how people manage and preserve assets and how they respond to shocks (i.e. coping strategies employed). This methodology allows for a holistic approach to understanding the way people live. It provides a good starting point for objectively demonstrating change in people's livelihoods as well as access to food and cash due to multiple changes by allowing analysis of the impact of changes in individual livelihood strategies as well as its contribution to total livelihood access.

To understand the evolving livelihood situation, the assessment identified **2017** consumption year as the year of focus in comparison to reference year collected for **May 2016 to April 017** as reference period – a year used to describe and quantify occurring livelihood patterns for households and is used as a benchmark against which changes in future access are measured. Assessment of CFU capacity was done through review of structural arrangements for implementation and achievement of outputs and outcomes as intended through self-administered performance indicator review by the monitoring and evaluation unit.

All livelihood information in the report therefore refers to how households' ways of obtaining resources to sustain their survival have changed from reference year to current with a projection for the current consumption year. The primary purpose of the study is to provide evidence of the difference between Conservation Agriculture (CA)

adopters and conventional farmers (non-adopters) so as to make informed decision on whether Climate smart agriculture really works for farmers in Zambia.

Context

Zambia's Gross Domestic Product has over the past 15 years averaged 5-6%. In 2014 the economy grew at 6% and was projected to grow 7.3% in 2015. GDP capita has risen leading to Zambia being classified as a middle income country. Though the outlook looks favourable, Zambia, like most exporters of primary commodities, is currently going through a difficult patch following the fall in copper prices due to the reduced demand for the commodity in world markets, particularly in China. Whilst inflation and interest rate have more or less remained stable Zambia's currency has plummeted by about 25% against the US dollar since January 2015. This trend which has affected most developing countries' economies is likely to ease with a rebound in the major economies. However, the positive economic growth has not translated into employment creation or poverty reduction for the majority of the population.

The most recent Labour Force Study (LFS) for 2012 puts Zambia's labour force at 5,966,199, with slightly more than half (51.6%) female. The majority of the labour force (84.6%) is engaged in the informal sector. The formal sector, which is responsible for most of the economic growth, foreign exchange and tax revenues, employs only 15% of the employed labour force. The key sector driving economic growth has been the mining sector, which has remained capital intensive, and the construction industry. The mining sector which contributes 12% of GDP employs only 1.7% of the labour force or 8.3 per cent of total formal sector jobs and around 25 per cent of total private sector formal jobs in 2012.

According to Zambia's CSO data, the mining sector increased its share of GDP from 6% in 2000 to 8% by 2006. The sector that has grown rapidly is the construction sector which is ancillary to the mining industry; construction has grown from 4.9% of GDP in 2000 to 23% in 2012. There is even lesser diversification in the export sector, where the mining and quarrying sector account for 80% of total exports.

Poverty remains high at 60.5% (2010 LMCS) and is more prevalent in rural Zambia. Rural poverty stands at 77.9% compared to 27.5% in urban areas. Income inequality, as measured by the Gini coefficient, has increased from 2004 after a declining trend from 1998. The Gini index fell to 0.57 by 2004 but has since worsened to the present level of 0.65, indicating that Zambia remains among the most unequal countries in the world.

Baseline Study Objectives

The baseline study objectives were aimed at providing evidence on the functioning of local livelihoods as a way of guiding appropriate decision making that incorporates context specific needs, particularly the distinction between conservation agriculture adopters and conventional farmers. These decisions are focused on current and future programming and evidence based policy engagement on food security, livelihoods, nutrition and social protection in CFU operational areas. In short, this study would inform CFU to get an understanding of the socio-economic benefits derived from the CSAZ project at household economy level and track both household and community level resilience and shocks related to the climate's effects on agriculture. This is to be achieved by seeking to benchmark and create an understanding of any differences between adopting farmers and conventional farmers.

The CFU engaged technical expertise in the establishment of an HEA baseline which will enable the Unit to monitor and evaluate the performance of conservation agriculture under Climate Smart Agriculture (CSA)

initiative in Zambia in a longitudinal manner. The Household Economy Approach (HEA) provides an analytical framework for understanding strategies employed by households to derive food and income. Three thresholds, the Survival Threshold, the Livelihoods Protection Threshold and Livelihood Promotion (Resilience) Threshold, are then used to measure the performance of households. For the purposes of this baseline, two relevant impact indicators were to be benchmarked and these are;

- ✓ **Impact Indicator 1:** Proportion of Households above the Survival Threshold (disaggregated by Socio-Economic status and adoption status)
- ✓ **Impact Indicator 2:** Proportion of Households above the Resilience/Protection Threshold (disaggregated by Socio-Economic status and adoption status)

The baseline study clearly establishes existing food deficits/surpluses, based on the 2100 kilocalories required by an individual per day for a normal life. The baseline also establishes the proportions of households that are not able to meet their daily energy requirements. The Survival Threshold is a performance threshold against which the adequacy of household access to food and income can be measured. Households falling below this threshold are classified as facing acute food insecurity (at least IPC Phase 3) and require emergency assistance in addition to any other intervention such as the CSAZ. The CSAZ seeks to build the resilience of participating households and this will be measured using the Livelihoods Resilience Threshold. Through this baseline, the Resilience threshold will be estimated and household at or above this threshold will be computed in the next round of the assessment. The project also sought to have project staff capacity built during the conducting of the baseline by participating in the design, conduct and analysis of the baseline data. To that end two CFU staff were trained and mentored on how to conduct a HEA baseline.

Baseline Study Methodology

The Study Design

The study was carried out using the Household Economy Approach[2] (HEA) for collecting and analysing field-based livelihood information on the **livelihood zones** -defining geographic areas within which people share broadly the same patterns of access to food and cash income, and have the same access to markets; **wealth breakdown** – grouping households into socio-economic groups using local definitions of wealth and quantification of their assets; **historical timeline**- Analysis of seasonal performance and events that influenced livelihood access; **seasonal calendar**- graphical representation of the months in which food and cash crop production and key food and income acquisition strategies take place and **profiling of livelihood strategies** for CSA adopters and conventional farmers to allow for comparisons between the two groups - Quantification of each wealth group's sources of food and cash income, expenditure patterns, and coping strategies and assess the difference in performance.

In HEA, the household is the unit of analysis of livelihood strategies used by households to maintain access to basic food and non-food needs. Livelihood strategies include a range or combination of activities that people or households engage in to achieve their livelihood goals, primarily how people access food and cash income to cover their survival needs at all times. These also include how people manage and preserve assets and how they respond to shocks (i.e. coping strategies employed). The HEA allows for a holistic approach to understanding the

[2] For detailed description refer to http://www.savethechildren.org.uk/resources/online-library/household-economy-approach-resource-manual-practitioners

way people live and it provides a good starting point for objectively demonstrating change in people's access to food and cash due to multiple changes by allowing analysis of the impact of both positive and negative changes in individual livelihood strategies and their contribution to total livelihood access. A standard HEA follows a semi-structured approach. Key informants and focus groups are the main source of field data, and rigor is achieved through a system of cross-checking at multiple stages of the assessment. The compilation of this baseline provides a good starting point for outcome analysis and subsequent CSA impact analysis.

Additional assessment and review of CFU capacity was done through one on one discussions with field staff and self-administered indicator performance review. The information was then assessed against institutional implementation structures/arrangements to provide a judgement on organisational capacity and ability to implement current and future programmes.

Baseline Study Implementation Strategy

The assessment was done in four purposively selected livelihood zones: Commercial Rail Line Maize, Livestock, and Cotton (Chongwe – Mazabuka); Southern Plateau Cattle, Maize and Tobacco (Choma) Eastern Plateau Maize, Cotton and Groundnut (Katete); Eastern Plateau Maize, Groundnut, Tobacco and Trade (Chipata) where CFU climate smart initiative is operational in. These zones were purposively selected on the basis of the CFU coverage of districts in the zones and their accessibility to the assessment teams. The study made use of rapid rural appraisal techniques through holding focus group interviews with community leaders to define wealth groups using local determinants and wealth group representatives of identified wealth groups – **Very Poor, Poor, Middle and Better Off**, to quantify their livelihood strategies. A total of 56 key informant and 223 wealth group representative interviews were conducted.

The consulting teams undertook the following steps during this study:

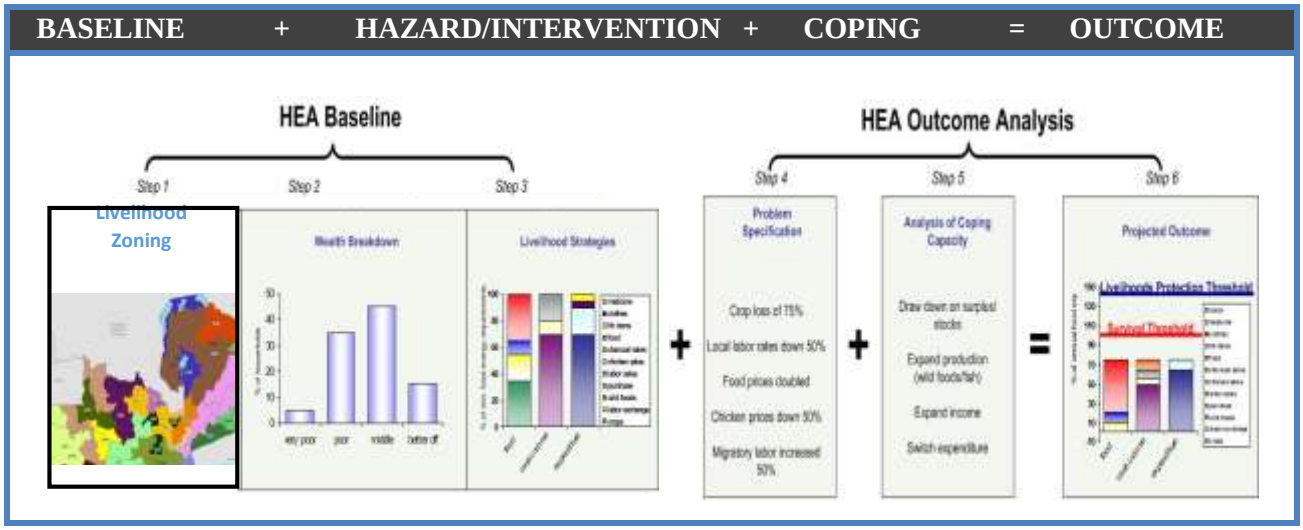
- **Training:** The assessment was combined with capacity building of recruited field research assistants and two CFU Planning officers. A training workshop was held from 25th – 29th September with a total of 12 participants. The topics covered included: HEA framework overview, livelihood zoning, reference year, wealth breakdown, livelihood strategies (food, income, expenditure), kilocalorie calculations, coping strategies, seasonality, ensuring high quality field information, reviewing and practicing community leader and household focus group interviews, storing baseline data in spreadsheets and data analysis. The training had field practice embedded in it to allow better appreciation of the data collection instruments before the actual field work and also expose participants to the actual field work conditions.
- **Livelihood Zoning:** During the training the staff where informed of the purposively selected livelihood zones of interest which were to be used as the geographic analysis unit. The study focused on **4 selected livelihood** zones where CFU operates.
- **Field Work Timing:** The field work was undertaken from 2nd – 15th October 2018. Trained participants were deployed to carry out the assessment with guidance and mentoring from experienced HEA practitioners who led the data collection process providing quality control.
- **Interviews with Household Representatives**. Wealth group interviews were held with 2 groups (CSA adopters and conventional farmers. Each group had between 8 to 12 members). There were 8 communities per zone and 8 FGDs per community (consisting of 4 groups of CSA adopters and 4 conventional farmers). Household representatives provided information on access to food, cash income and

expenditure patterns, hazards and coping strategies. The reference year for this study was ***May 2016 to April 2017***.The start of the reference year was determined by the typical start consumption month of the main harvest period for all these agricultural zones.

- **Market Assessment:** The team visited 28 markets in the zone to collect price data and understand market hazards in reference year and current year for triangulation and running of price increase hazard analysis.
- **Data analysis and livelihood baseline report compilation**. Data analysis was carried by HEA expert with remote support of research assistants giving guidance on specific field experiences. The process involved developing a typical picture of household livelihood strategies for respective wealth groups.

In summary, below is the conceptual framework used in the baseline compilation and the envisaged subsequent processes for monitoring and assessing the impact of CSA as CFU climate smart initiative.

Figure 1: Conceptual Framework



A Note on Thresholds.

The **Household Economy Analysis** framework uses two thresholds to measure ability of households to meet their food and non-food needs. The **Survival Threshold (ST)** is the cost required to meet 100% of minimum food needs based on 2100 Kilocalories per person per day and includes costs required for food preparation – energy for cooking, salt and water for human consumption. The **Livelihood Protection Threshold (LPT)** – includes the survival threshold and costs to maintain existing livelihood assets and locally accepted standard of living which include following examples; education, health, inputs, basic clothing. These thresholds are used to guide intervention decisions; a survival deficit (being below the ST) indicate a need for external support to save lives and protect existing livelihoods while the livelihood deficit (being below the LPT) indicate livelihood related support. In this study, where data was collected separately from adopters and conventional farmers, the two thresholds were computed differently from the traditional methods. This was because by default, if adopters have their own baseline spreadsheet, then separate thresholds would be computed for them and would obviously be different from those of conventional farmers. Yet being in the same zone implies having the same thresholds against which all households would be judged. To overcome this anomaly, the average for each threshold was computed from all wealth groups (from adopters and conventional farmers) and used for all groups.

The Livelihood Protection threshold can be used to show capacity of households to invest in livelihoods, and usually the more they invest reflects the potential production they can earn at the end. So in this case, the LP basket for adopters is significantly higher than that of non-adopters - which shows that adopters are making a bigger investment in livelihoods than the other group - which is positive and needs to be tracked in the coming season to check sustenance and evidence for impact. This also provides an indication that they are more likely to have higher production than non-adopters. A higher LP also means spending on things such as inputs is higher, it also means spending on basic social services such as education and health is high - which is a proxy for good improved quality of life.

The proportion of livelihoods protection to total income is the basis for household resilience, where if households have total income above the LPT in the presence of a shock, it is said to be resilient to that shock. Although this depends with the shock and its severity, chances are that households that have a higher investment on livelihoods will likely be able to realise a bigger return on investment thereafter; generate more income and build a greater, broader asset base and surplus that can be easily transformed into cash and cushion them in times of shocks thereby improving their resilience to shocks.

The **Resilience Threshold (RT)** also termed the Livelihood Promotion Threshold is the total food and cash income necessary for CSAZ beneficiaries to withstand observed, measured, and typical set of zonal hazards without falling below the LPT; to remain above the LPT in the face of typical zonal shocks. It is the sum total of all components of the Livelihood Protection Basket plus productive expenditure -IGA / Agricultural related expenditures. The RT is fundamentally computed after observing zonal households' responses during an experience of typical shocks. It therefore is a result from the Outcome Analysis stage of the HEA framework. It is for this reason that a recommendation will actually be made to use the LPT as a proxy in this baseline (or even replace the RT with the LPT altogether in the event that there is no typical quantifiable shock during the life of a project). Any other attempt to fix the RT in the absence of real life experiences will remain just theoretical exercises whose values may become dubious. The good thing is with guaranteed livelihood protection threshold communities are assured of safety in the livelihoods though might require a buffer (resilience) in the event excessive shocks.

2. BASELINE STUDY FINDINGS AT LIVELIHOOD ZONE LEVEL

The findings are presented at livelihood zone level so as to be able to articulate context specific issues. As already noted, there were four zones under the study.

Zone 1: The Commercial Rail Line Maize, Livestock, and Cotton (ZM08)

The Commercial Railway Line Maize, Livestock, and Cotton(ZM08) livelihood zone is located in the central plateau with an altitude ranging between 900-1200 meters above sea level and stretching across the districts of Kazungula, Monze, Mazabuka, Namwala, and eastern parts of Lusaka, Kafue, Chongwe, Chibombo, and Kapiri Mposhi along the main rail line and the well-developed road linking Livingstone through Lusaka to the Copperbelt. The zone falls within agro-ecological Region II, which receives an annual rainfall of 700–1000 mm per annum and is characterized by good soils and climate for agriculture. The soils are moderately to highly fertile sandy loam and clay that are well drained and suitable for a wide range of crops. The temperatures are high towards the start of rains between September and November, with highs ranging from 30-35 degrees Celsius. The dry months of May to July are coolest, with average low temperatures of 16-17 degrees Celsius. Open savanna grasslands and Mopane, Munga, and Miombo woodlands cover the zone. Forest reserves and rivers in the zone provide opportunities for charcoal production and fishing.

This densely-populated zone contains about 55 inhabitants per square kilometer. Land cultivated for food and cash crops averages from 1-3 hectares per household. The Lenje and Tonga are the main ethnic groups. Rain fed and irrigated agriculture using manual labor or animal traction are the primary livelihood activities, though a number of commercial, mechanized farms dot the zone. The main crops grown include maize, cotton, groundnuts, sweet potatoes, and beans, with minor production of millet and sorghum, primarily for household consumption. The growing season is medium to long, ranging from 100-140 days, which is suitable for maize. Cattle are mostly kept for sale and used as draft power. Other livestock in the zone include goats, pigs, and poultry, and are kept for sale or household consumption.

The zone has generally good physical infrastructure, facilitating market access and trade particularly along the road and railway line linking Lusaka and Livingstone and they cut across the zone. Access to markets is fairly good and mostly focused on the big towns of Lusaka, Kafue, Livingstone, and Kabwe. These markets are located within the zone and provide outlets for most commodities produced in the zone, as well as a steady supply of non-food items. Good infrastructure and proximity to urban areas generate a strong demand for labor; local laborers work primarily on local farms or as casual labor in urban areas within the zone.

Seasonality (ZM08)

The seasonal calendar breaks down households' activities over a **consumption year** - defined as the 12-month period from the beginning of the main harvest period until the next harvest period. This is useful because once the harvest is known, households can begin to budget resources and income until the next harvest.

Figure 2: The Commercial Rail Line Maize, Livestock, and Cotton((ZM08) livelihood zone seasonal calendar

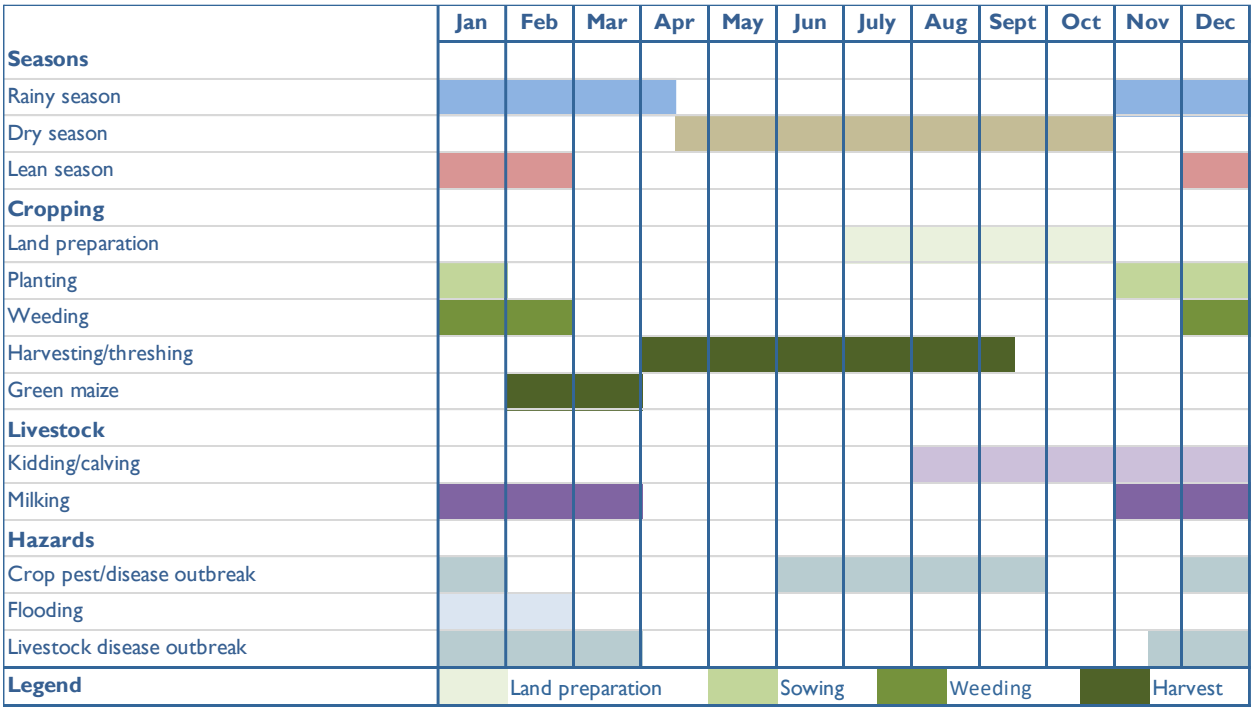
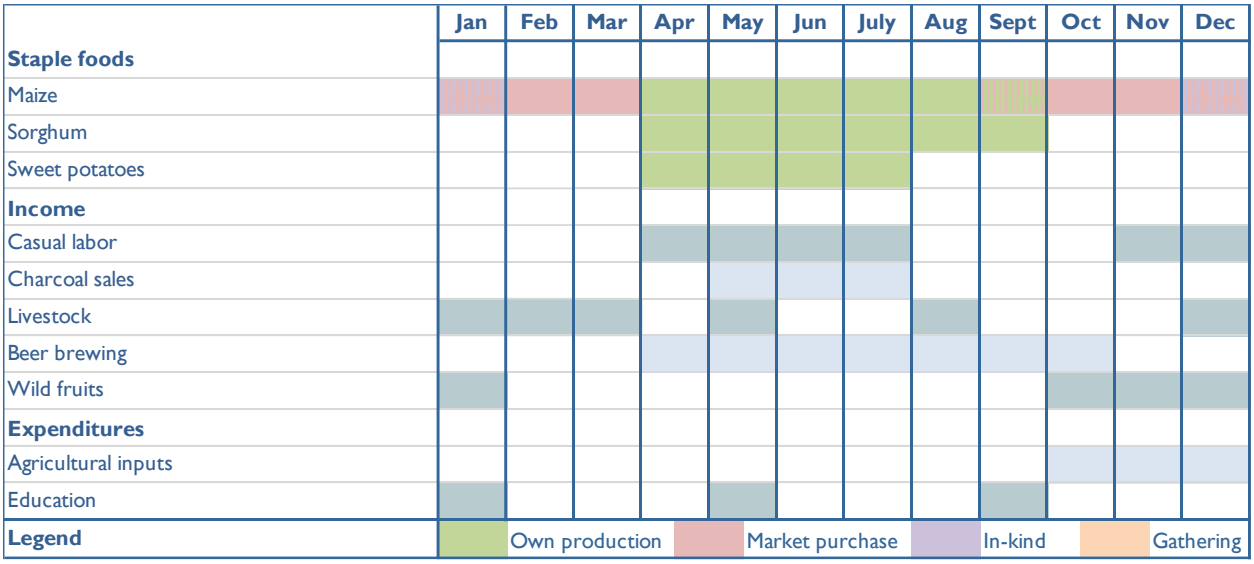


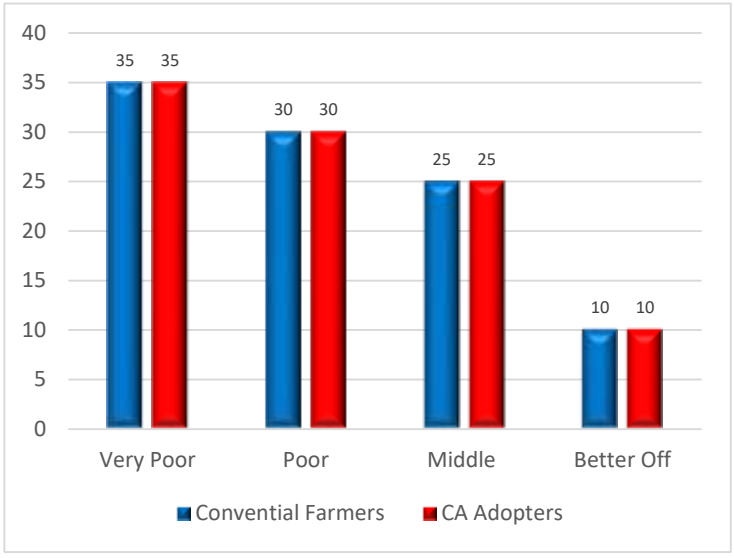
Figure 3: The Food access calendar for the zone



Wealth profiles (ZM08)

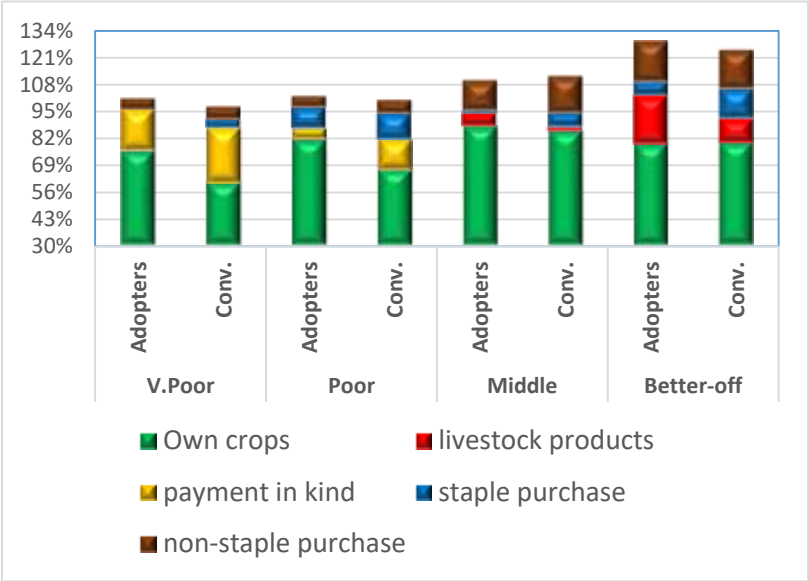
There is no difference in the proportion of households in specific wealth groups of adopters and conventional farmers as shown in Figure 4. The primary determinants of wealth in this area include; number of livestock owned primarily cattle and goats. Land area cultivated is a secondary determinant followed by the type of crops grown. Household size tend to be bigger for lower wealth group households who have 7-8 people on average while households of highest wealth groups, the Better off have smaller household sizes of 6 to 7 people. This minor disproportionate size of household members compared to asset base further strain the capacity of poorer households to meet their households needs. Cattle and goats are mainly sold by wealthier households for cash and production of milk which is also sold and consumed mainly in summer, between November and March as shown on the seasonal calendar. Goats and chicken are kept in small numbers and mainly utilised through selling and consumption

Figure 4: Percentage Comparison of Wealth distribution ZM08



Access to Food (ZM08)

Figure 5: Household food Sources ~ZMO8

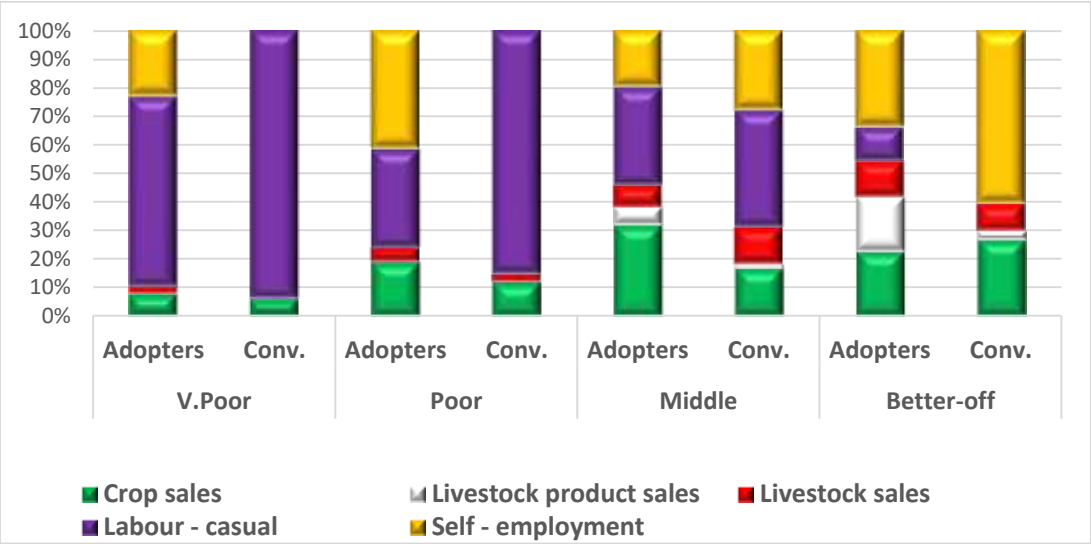


Own crop production is the main source of food for both CA adopters and conventional farmers. However, the percentages are slightly different since adopters access more of their food energy needs from **own crop production** compared to conventional farmers. This is an interesting scenario to follow up in the coming seasons, when attempting to assess the impact of CA as a climate smart initiative. For the very poor and poor households, the other source of food in the reference year is payment in kind, with the conventional farmers engaging in more casual labour and being paid in kind for food. Again, it is important to keep track of this difference over years (seasons) in order to assess if CSA adoption is in any way related to the intensity of casual labour households perform for food. For conventional farmers, the average contribution for the very poor and poor households is around 21% while CSA adopters are

getting around 8% from casual labour. This implies that a baseline level conventional farmers are performing more casual labour for food than adopters and the sustenance of the trend need to be checked.

Sources of Cash Income (ZM08)

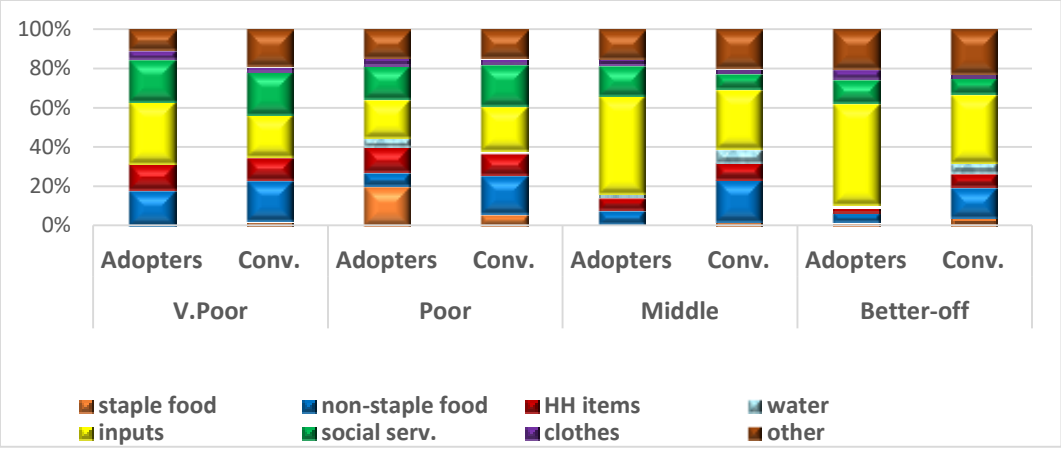
Figure 6: Sources of Income



Generally, income from crop sales increases with wealth for both CSA adopters and conventional famers but the rate of increase is higher among adopters if the groups were to be compared. On average the amount of money coming from crop sales for conventional farmers is around 3,800 Zambian Kwacha while for adopters it is around 52.6% times more (5,800 Zambian Kwacha) per year. It will be interesting to keep track and see if CSA adopters could sustain this lead in subsequent studies and establish what exactly it is about CSA that puts adopters on the lead. Conventional farmers, particularly the middle households and below, are getting significant amounts of money from casual labour, at least 40% of the annual income while adopters are getting less. Subsequent studies should seek to verify whether this is because adopters do not have much time to dedicate to the pursuit of such extra livelihood options since they (according to the CFU Outcomes report of 2017) in fact tend to invest more and more of their time towards own on-farm activities. As already noted above, it will also be important to seek to find out whether adopters are the ones employing those households that are predominantly categorised as “conventional farmers”.

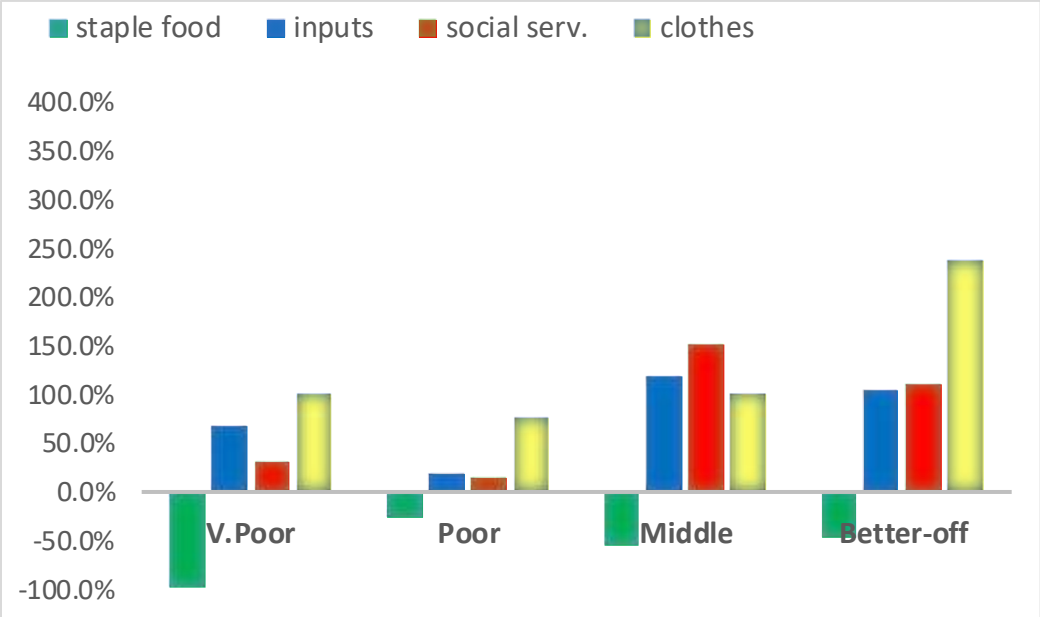
Expenditure Patterns (ZM08)

Figure 7: Household Expenditure patterns ~ZM08



The expenditure graph above is better understood if focus is placed on the margin of differences between adopters and conventional farmers in each respective wealth group. This is illustrated in Figure 8 below.

Figure 8: Margins of differences in expenditure (adopters versus conventional)

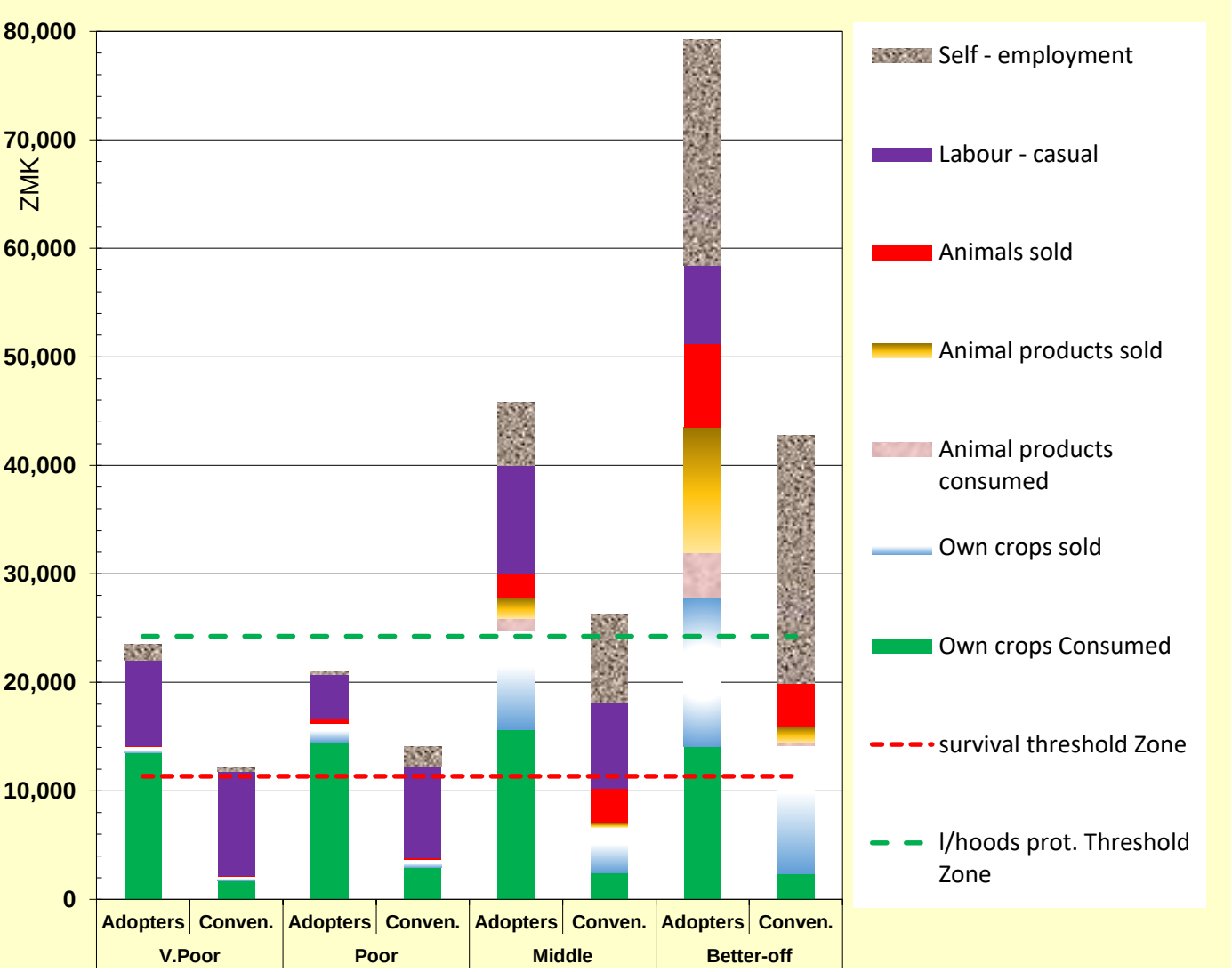


Expenditure on staple food was found to be consistently lower among adopters when compared to conventional farmers by an average as high as 58.7% lower among adopters. This supports the fact already noted above that adopters tend to rely more on own food production and hence no need to purchase staple food. Expenditure for inputs (very relevant to all farmers) is consistently on the higher side for adopters, with an average of 77.0% in favour of adopters. It appears that adopting CSAZ leads to a greater consciousness of the need to invest in agricultural inputs and this consciousness is less prevalent among conventional farmers. On indicators of well-being, adopters tend to invest more in social services and personal clothing than does conventional farmers. These

findings need to be further unveiled in subsequent studies to find out exactly what it is about being an adopter than inclines them to produce the observed results.

Total income and Thresholds (ZM08)

Figure 9: Household total income and thresholds ~Adopters and Conventional farmers



As seen in Figure 9 above, all households (100%) among adopting farmers' wealth groups managed to achieve the survival thresholds. For conventional farmers the story is the same as the very poor and poor households (65% of conventional farmers) also manage to achieve survival threshold during the baseline year. The achievement of the ST by adopters is largely due to the already mentioned reliance on consumption of own production as it can be clearly seen in Figure 9 own crop consumption ALONE will suffice to bring adopters above the ST while conventional Middle and Better off households end up having to rely on other sources (casual labour and trading off livestock) to achieve the same.

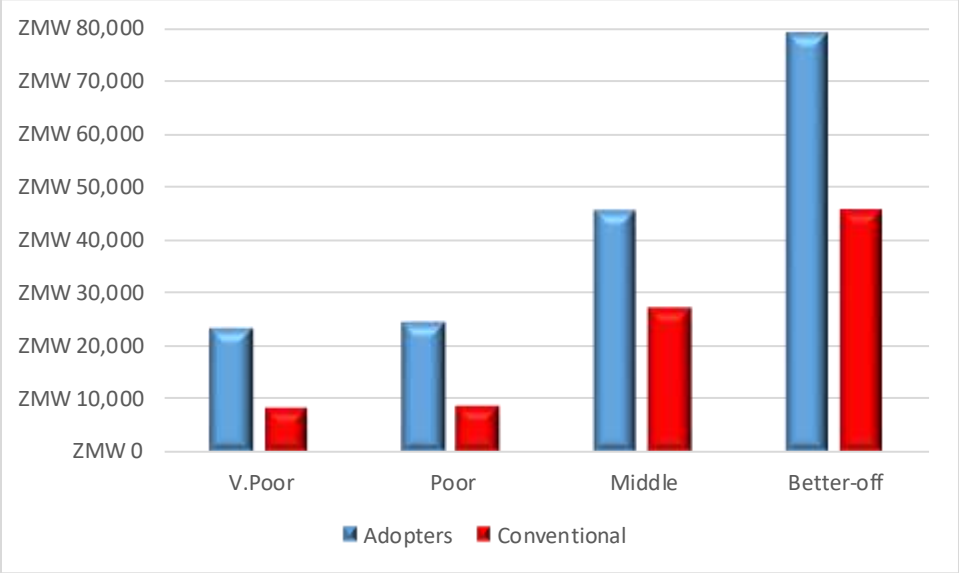
The Livelihood Protection Threshold (LPT) as a measure to show capacity of households to invest in livelihoods, and usually the more they invest reflects the potential production they can earn at the end. Achievement of the

households that reach and surpass the LPT are those whose spending on things such as inputs and investments towards any livelihood option being pursued is high, in addition such households' spending on basic social services such as education and health is also significantly high and this is a proxy for good improved quality of life. In this zone, the Livelihood protection threshold is however a different issue. Both CA adopters and conventional very poor and poor households (65% of the zone) are below the LPT even though the adopting Poor households (30%) narrowly miss the LPT. Only the Middle and Better off households are above the LPT and this translates to only 35% of the Zone from the two wealth groups (both adopters and conventional). This means that households in this zone are finding it difficult to sustain the very livelihoods that they are pursuing. Perhaps this explains why the Government's FISIP programme is still relevant.

Total Income between CSA Adopters and Conventional Farmers (ZM08)

Total income can be used in poverty analysis, through comparing different areas. Total income can be used to indicate the total production for a household, in both food and income and hence can be used to compare poverty levels. Figure 10 below shows a comparison of adopters and conventional farmers' total income in this Livelihood zone.

Figure 10: Total Income between CSA Adopters and Conventional Farmers(ZM08)



In this case, there is a huge difference in total income in favour of adopters, which shows that adopters are able to generate more food and cash income than non-adopters. For instance, a middle household for non-adopters is almost the same as a poor household for adopters in terms of total income which shows that adopters are better than non-adopters. Very Poor farming households of adopters are earning around 188.4% higher incomes than Very Poor conventional farming households, the Poor adopters' households also earn 178.0% better than Poor conventional farming households. Perhaps most importantly is the fact that total income from crops is higher for adopters than non-adopters - which reflects differences in crop production.

Livelihood Promotion/ Resilience threshold (RT)

Establishing the RT requires more data than can be collected from a HEA baseline study. This is usually calculated during Outcome analysis and not at baseline stage. This has already been noted in a section above and a

recommendation will be put in place to substitute this indicator in all zones, substituting it with the LPT. For this reason, the sections below will no longer bring back this sub-topic.

Zone 2: The Southern Plateau Cattle, Maize and Tobacco~ ZM09

The zone is located in the districts of Kalomo and Choma. The zone lies on a highland over 1000 meters above sea level bordered by low-lying areas moving towards Gwembe to the east and plains of the Kafue basin in the north. The zone is located within agro-ecological Region II, and receives an annual rainfall of 600–800 mm per annum falling between November and April. The average high temperatures are highest towards the start of rains between September and November, ranging from 30-35 degrees Celsius. Temperatures are lowest during the dry months between May and July with an average low ranging from 16-17 degrees Celsius. The soils are moderately to highly fertile, sandy loam that are well drained to moderately leached, which is good for tobacco production. The main vegetation consists of Miombo woodland forests and open-grasslands that are good for pasture.

The zone is moderately populated with 26 people per square kilometer, and land cultivated averages 8 hectares per household. Most land is used for growing of food and cash crops on a commercial scale. The main ethnic group in the zone is Tonga.

The high prevalence of large landholdings for commercial production cultivated using draft power or by tractor, as well as the production of tobacco instead of cotton, distinguish this zone from the surrounding Commercial Rail Line Maize, Livestock, and Cotton Zone (Zone 8). Rain fed and irrigated, commercial cropping using draft power or mechanization drives the economy of the zone. The main crops grown include maize, tobacco, groundnuts, and beans. The growing season ranges from 100-140 days during the rainy season from November-April. Households keep some livestock in the zone for sale or for draft power. The amount of land cultivated, livestock owned, and productive assets are key factors that differentiate the wealth groups. The poor households rely on own crop production and market purchase while the better-off, who have better production capacity, rely on own production throughout the year. The poor obtain their income primarily from the sale of small livestock, selling their labor, charcoal production, and, to a lesser extent, brewing and wild foods sales. The better-off mainly rely on crop, livestock, and livestock product sales.

The zone has generally good infrastructure for markets and trade. Access to markets is good and mostly localized with the big towns located within the zone providing markets for most commodities produced in the zone and as supply markets for nonfood items. The largely localized labor market is either on farm or in urban areas within the zone.

The main hazards are climate-related with at least one year in every three years being a bad year. Because coping strategies of poor households are relatively successful at mitigating any production or income losses, the risk of food insecurity in the zone is relatively low.

Seasonality (ZM09)

Figure 11: The Southern Plateau Cattle, Maize and Tobacco (ZM09) seasonal calendar

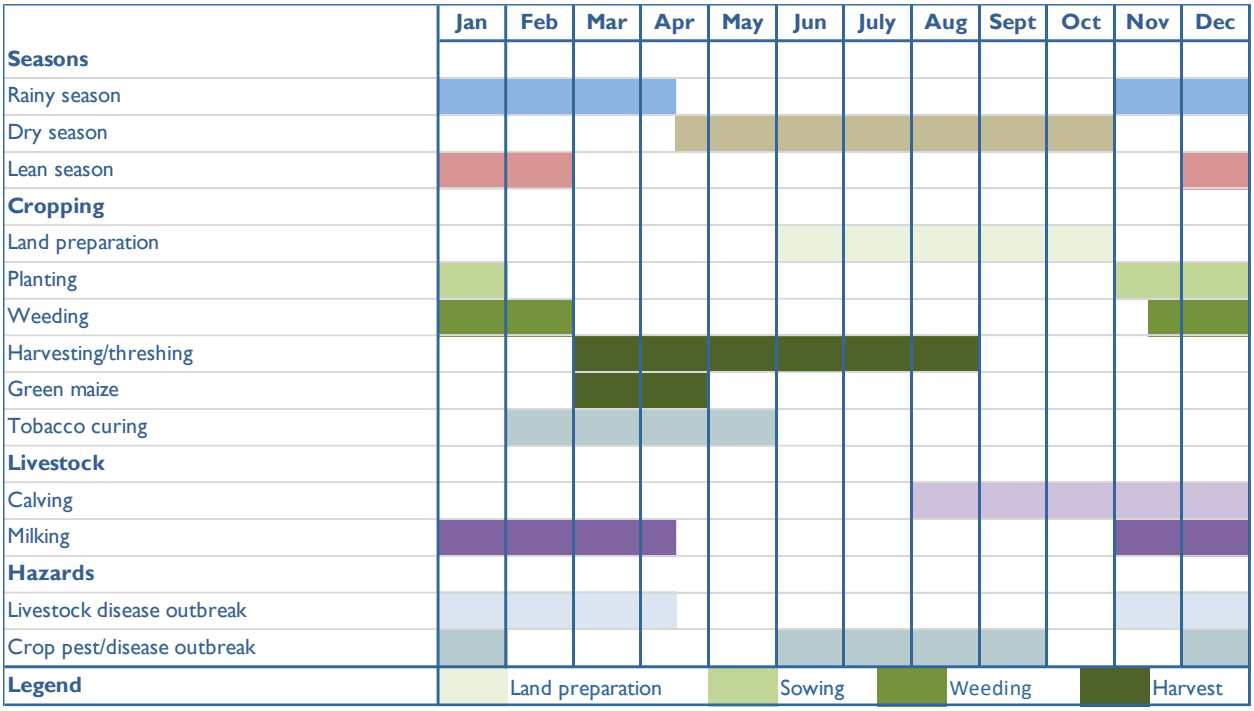
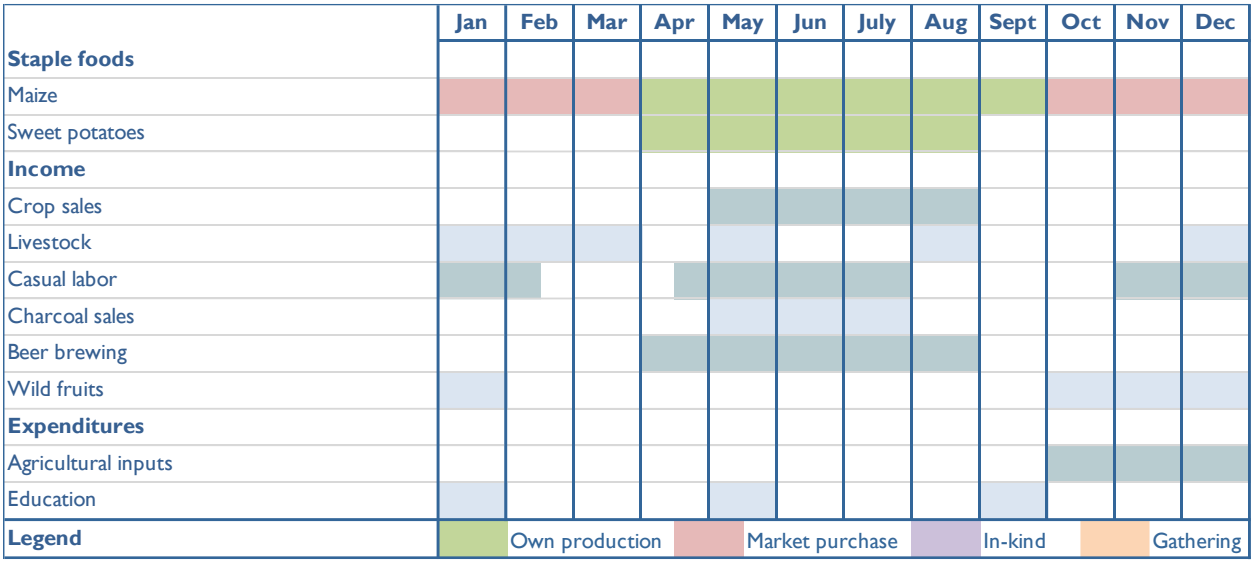


Figure 12: The Food access calendar for the zone



The two figures above are showing how different activities are happening at different time across the zones. Some activities are wealth group specific, for example, milking of livestock is not typical among Very poor and Poor households since they do not typically own the livestock. Seasonal calendars capture variations in access that occur throughout a typical year. Therefore, seasonal calendars give graphic representations of key production, market-related and other activities as they occur throughout the year. They help analysts draw correlations between different activities and highlight potential areas of competition for labor, resources etc. Rainfall in Zone

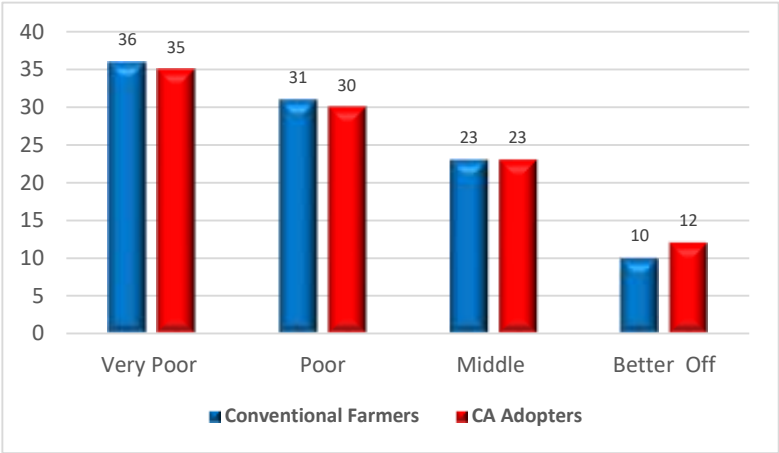
09, as with the other parts of the country is a unimodal, where rains start in December and last through March, with peak precipitation occurring in January and February. Households are engaged in a range of activities throughout the year, mostly linked to the agriculture.

Land preparation for the coming season involves both women and takes place in October and November. As soon as the rains start, women and children are heavily engaged in planting; first in line for planting are maize and groundnuts, these are then followed by sunflower and then beans, sweet potatoes and cowpeas. Weeding is a task mostly by women and extends from January through March. This is a time of increased labour demand, and households in the Better-off wealth group typically hire those in the bottom two wealth groups to help with land preparation and weeding. Vegetable gardening starts in May, with the consumption of such vegetables starting any time after June through to end of October or the onset of the rainy season. Households water these small vegetable plots by hand mostly drawing water from shallow wells and nearby streams/ pools.

Wealth profiles (ZM09)

Household wealth in this livelihood zone is determined by the area of land owned and cultivated, how many plough oxen and ploughs it has, and how much labour is at its disposal (both within and outside the household). Better-off households own up to 20 hectares, whereas very poor households own only about 3 hectares. On average, very poor households cultivate 1 hectare using either its own oxen, or oxen taken on loan in exchange for labour. Better-off households cultivate 10 hectares using their own oxen and ploughs and hired labour. Middle households cultivate about 3.5 hectares, the poor cultivate about 1.5 hectares while the very poor cultivate just one hectare of land. All households use inputs, such as fertilizers and improved seeds, but better off households are able to buy optimal amounts and to time their inputs and their labour most effectively, enabling them to get higher yields. Another determining factor of wealth is ownership of livestock. People own considerable numbers of livestock in this area and the wealthier the household, the more animals it owns. Cattle are an especially valuable category of livestock; better-off households typically own 10 - 25 cattle, whereas very poor households may not own any. Cattle are used for milk, which is both consumed and sold. But just as important are the oxen used for ploughing. These oxen function as a critical labour force that enables households to prepare large areas of land for planting and fundamentally determines how much area households can cultivate. One of the critical distinctions between poor and middle households is ownership of oxen; middle households own at least one pair of oxen, whereas poor and very poor households generally do not. Most households also own goats, chickens and pigs, which – in addition to their meat and eggs – are used as a bank account, cashed in for small amounts of income when needed. Thus, the more animals a household owns, the more money it has in reserve. Very poor households may possibly have goats and/or pigs, but they typically all have chickens. All other wealth groups have goats and chickens. Better-off and some middle households are also engaged in petty trade, where they sell a range of items, such as salt, soap, cigarettes, matches, sugar and oil in make-shift Tuck-Shops or sometimes small brick shops.

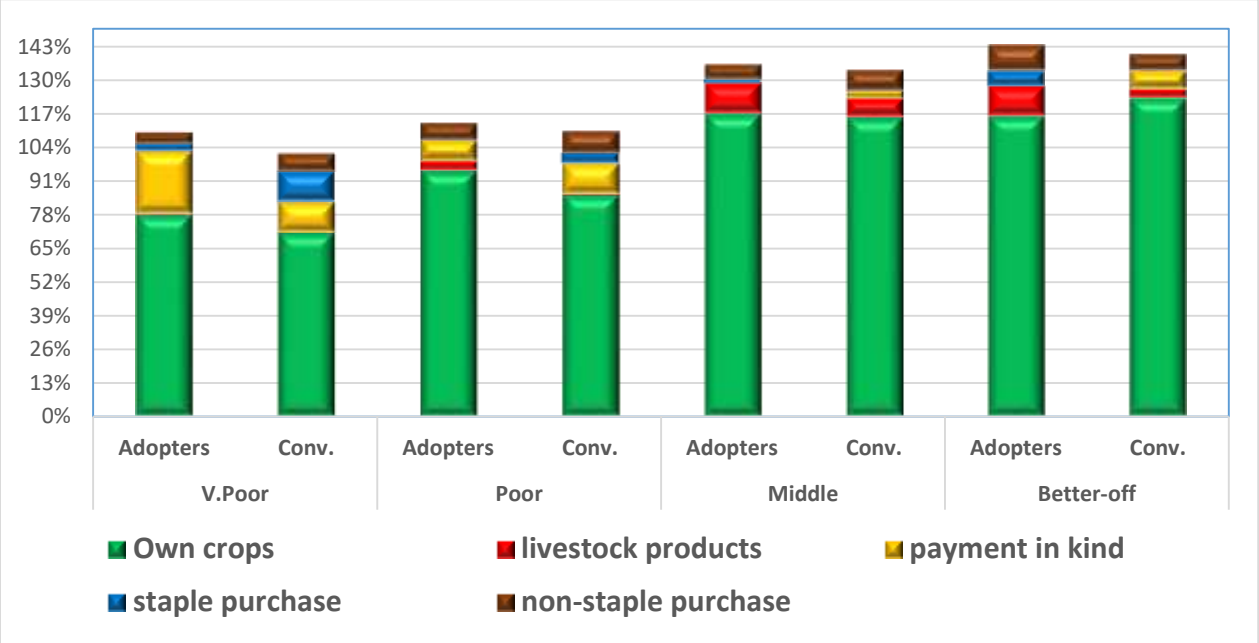
Figure 13: Percentage Comparison of Wealth distribution – ZM09



Access to Food (ZM09)

Sources of energy

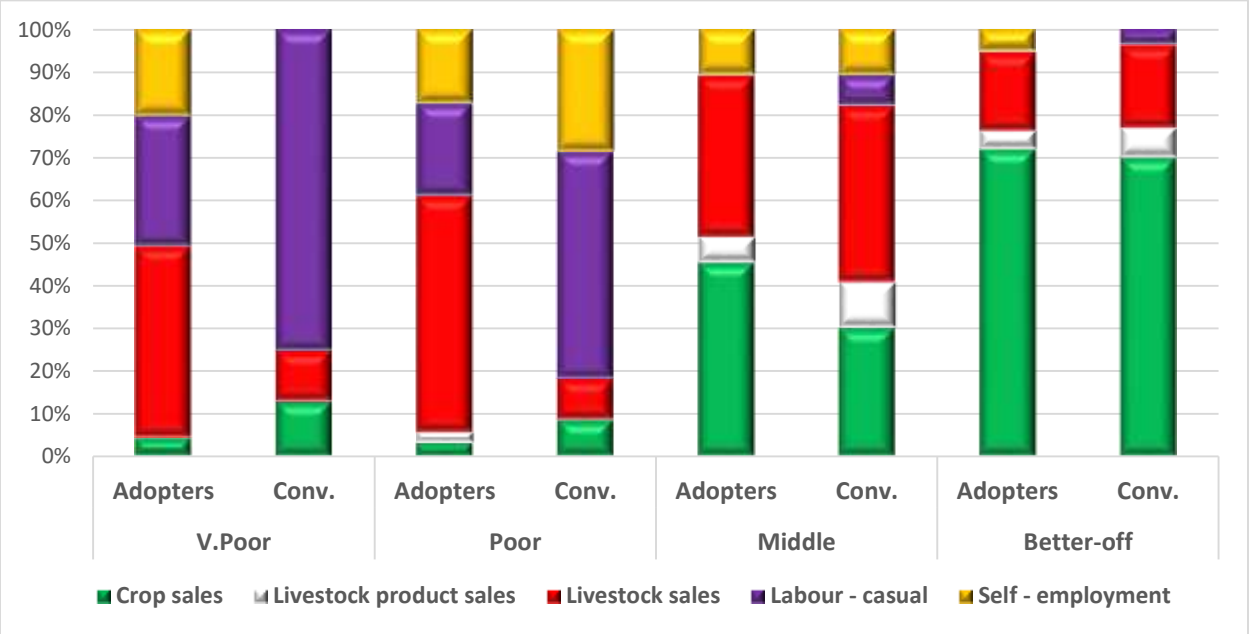
Figure 14: Household food Sources ~ZMO9



Own crop production is the main source of food for both adopters and conventional farmers, but the percentages are slightly different with adopters obtaining slightly more food energy needs from own crop farming compared to conventional farmers (particularly among households in lower wealth groups). This is an interesting scenario to follow up in the coming seasons, when attempting to assess the impact of CA as climate smart initiative under the CSAZ programme. Very poor conventional farmers engage payment in kind and purchase of staples so as to meet their annual food energy needs as own crop production typically contributes only up to 71% of such needs.

Sources of Cash Income (ZM09)

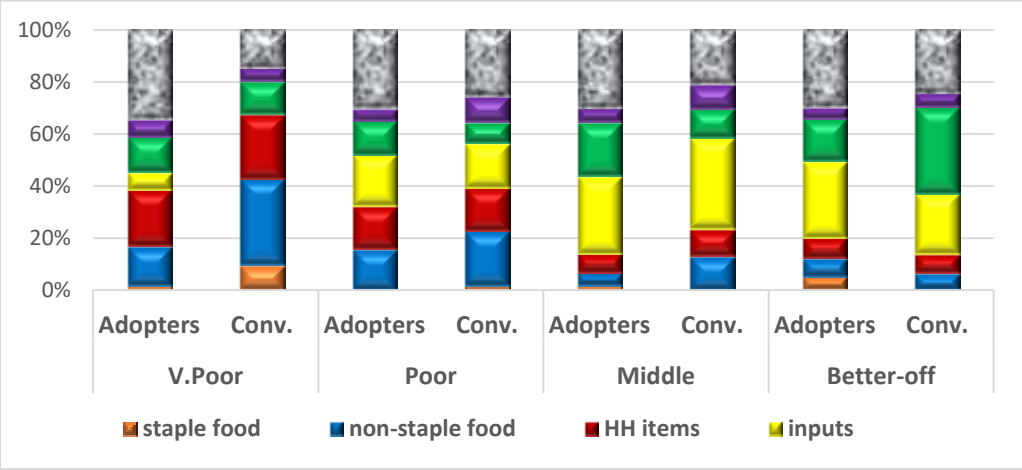
Figure 15: Sources of Income ~ZM09



Generally, income from crop sales increases with wealth for both CSA adopters and conventional farmers but the rate of increase is higher among adopters if these groups are to be compared. Casual labour for cash is more pronounced in conventional farmers. For the lower wealth groups (Very Poor and Poor households) the highest income earner for adopters is livestock sales while among the same groups for conventional farmers, it is in fact casual labour. More needs to be established in the next studies why conventional farmers do not equally rely on livestock sales. The cash income for middle and better off households is understandably higher because of the cash crop (tobacco) which is grown in the zone. Overall, as noted in the previous zone, CSA CSA adopters are performing better that the conventional farmers.

Expenditure patterns ZM09

Figure 16: Household Expenditure patterns ~ZM09



The more noticeable difference in expenditure patterns in this zone is investments in agriculture related inputs and social services. For agriculture inputs, adopters are consistently on the higher percentage as the conventional

Very poor households typically invest little or insignificant amounts while the adopters among the Poor, Middle, and Better off households' investments are 19.4%, 36.4%, 103.8% (respectively) higher when compared with their respective conventional farming households. The better off households have such a high percentage expenditure on inputs as they are growing capital intensive crop (tobacco).

Total income and Thresholds (ZM09)

Figure 17: Household total income and thresholds ~ ZM 09 Conventional farmers

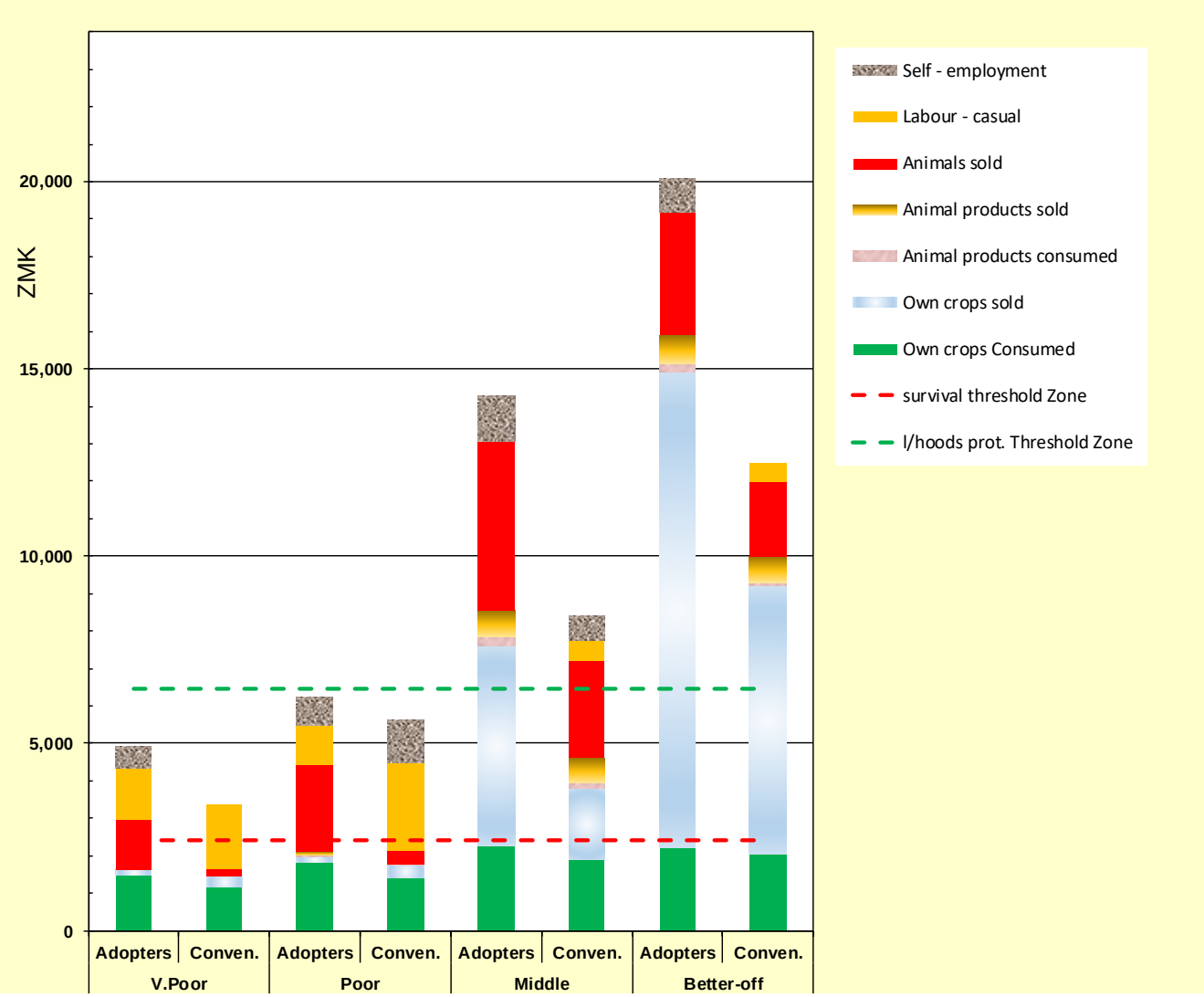


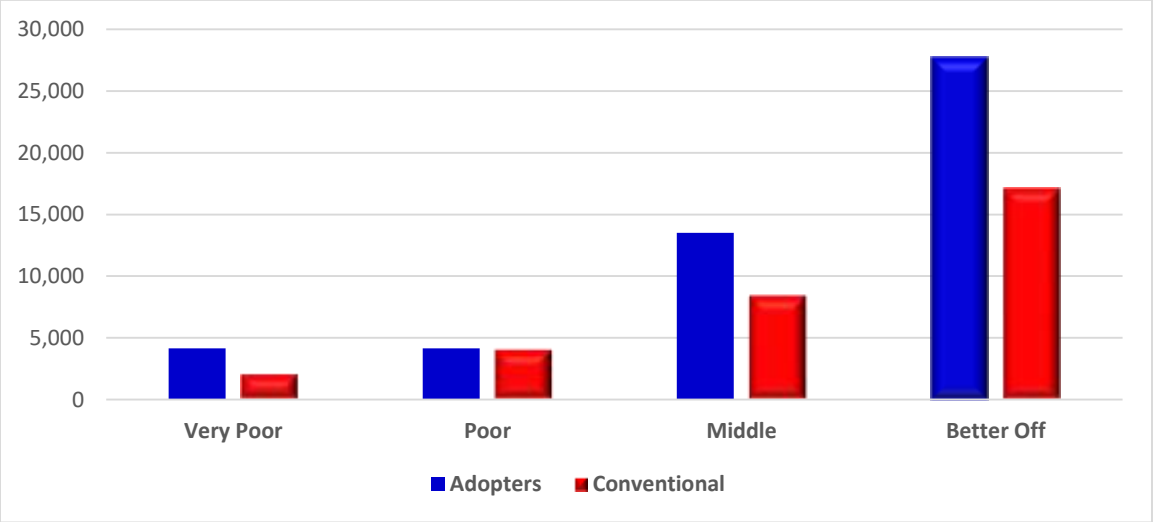
Figure 17 compares adopters and non-adopters (conventional famers) against the survival threshold and livelihood protection thresholds. Both groups (100%) managed to achieve the survival threshold which is consistent with the norm since HEA looks at survival in retrospect, the reference year, May 2016 to April 2017. However, the Very poor (35% of adopters, and 36% of conventional farmers) and Poor households (both adopters 30% and conventional farmers, 31%) could not reach the livelihood protection threshold. Only 33% of adopters and 35% of conventional farming households (the Middle and Better off) surpassed the LPT. Note that the LPT surplus for adopters is in each wealth group (Middle and Better-off) is way higher than the surplus realised by conventional farmers. This makes CSA a critical intervention which should sustain the livelihoods of the all the Very poor and

the Poor and also we anticipate CSA to assist the poorer groups to boost own crop productions so that they achieve the LPT. Keeping track of the trend over the years will assist in quantifying the contribution of CSA to these two threshold particularly on the very poor and poor. The reliance on casual labour might not be sustainable in terms of both availability and the prices.

Total Income between CSA Adopters and Conventional Farmers (ZM09)

Figure 18 below shows a comparison of adopters and conventional farmers' total income in this Livelihood zone.

Figure 18: Total Income between CSA adopters and conventional farmers



The baseline study shows the total income, without specifying the source is higher for adopters across wealth groups. It is important to keep track of this trend to see if it can sustain itself over seasons.

Zone 3: Eastern Plateau Maize, Cotton and Groundnut (ZM16)

The zone covers Northern parts of Nyimba, Petauke, Katete, and parts of Chadiza Districts along the eastern plateau on the border with Mozambique. It is a highland zone with an altitude measuring 1000-1200 meters above sea level. The zone is located within agro ecological Region II and receives an annual rainfall of 800-1000 mm falling between November and March. Temperature extremes range from an average minimum of 15 degrees Celsius during the winter months of May to July, to an average maximum of 35-40 degrees Celsius during the hot, summer months of September and October. The generally sandy, loamy, strong clay soils are fertile and suitable for crops and growth of pasture for livestock grazing. Miombo woodlands, bush shrubs, and savannah grassland make up the vegetation in the zone. Important natural resources include forest reserves, seasonal and perennial rivers, and thatching grass. The zone also contains green tourmaline and emeralds.

Population density is high in the zone with 37 people per square kilometre and average landholding of 3-5 ha per household used for cropping. The main ethnic groups include Chewa, Ngoni, Nsenga, and Kunda. Livelihoods in this zone are based on rain fed agriculture using manual labour and draft power, supplemented by livestock rearing and petty trade.

Land ownership and capacity utilization, livestock ownership, and access to productive equipment are the basis for differences in how households obtain their food and cash in a year. Maize and groundnuts are the most common crops, and contract-farming arrangements with cotton companies supports cotton production. Goats are the main livestock reared, though pigs are also common. Cattle are typically owned by Poor, Middle and Better-off households. All livestock are typically kept on free range. Other sources of livelihoods include limited activities in timber, handicrafts, and fish trade with Mozambique.

Own-produced maize is the primary source of food for all households, lasting between seven and nine months out of the year depending on wealth group. Typically, all households purchase staple food from the market for the remainder of the year. Market purchases of rice also play an important role for better-off households throughout the year, with both groups supplementing their diets with products from goats, pigs, and chickens – most of which comes from own production.

The most important source of cash for all households is the sale of crops. Better-off households also engage in formal employment, trading, and/or services (transport hire, etc.). Poor households earn additional income from vegetable sales, selling wild food and handicrafts, and brewing beer.

Road and communication infrastructure in this zone are good. For example, the Great East Road linking Lusaka and Chipata passes through the zone, linking markets and providing opportunities for roadside marketing. The proximity to Mozambique border offers a variety of opportunities for cross-border trade and labour exchange. A significant share of agricultural production in this zone is destined for large-scale or commercial trade. Most households sell maize to FRA, which then re-supplies the households during the lean season. COMACO is the main buyer for groundnuts. NWK Agri-Services, Cargill, and Olam buy cotton.

Seasonality (ZM16)

Figure 19: Seasonal Calendar for ZM 16

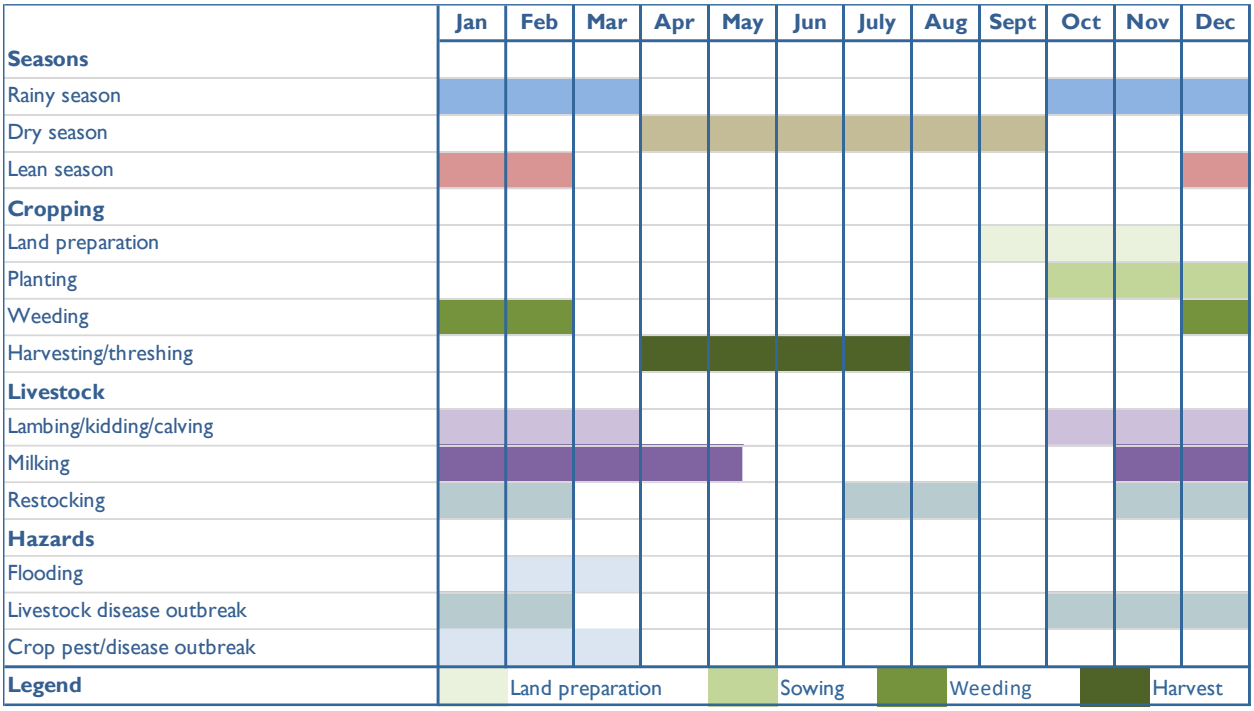
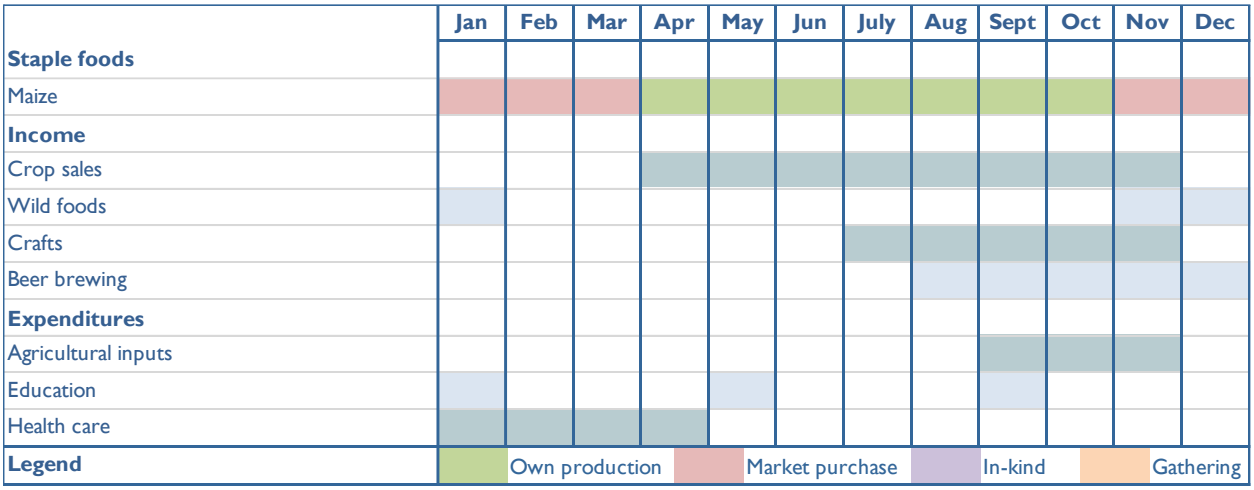
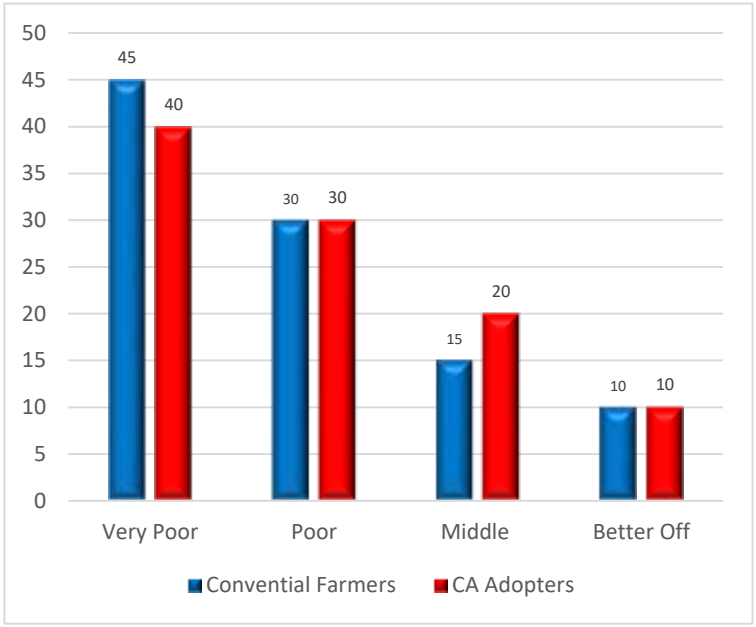


Figure 20: Food access calendar for ZM16



Wealth profiles (ZM16)

Figure 21: Percentage Comparison of Wealth distribution – ZM16

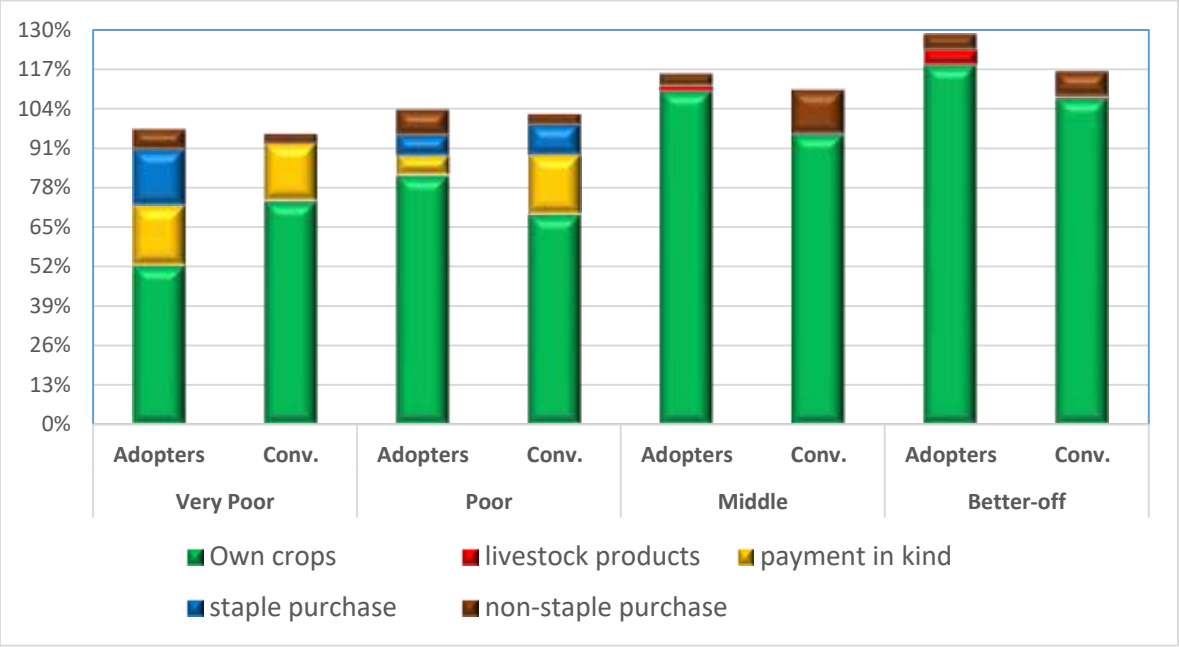


Household size is not very different across wealth groups. A comparison of the proportional piling of CSA adopters against those still practising conventional farming shows that proportion of households still practising conventional farming are a skewed towards the very poor and poor. Though it is still too early to attribute the difference to CSA adoption. Since this exercise uses a longitudinal approach, it will be very interesting to track the proportions of the two groups in the next coming season and see if the difference becomes significant and interrogate on the issue of attribution. Land area owned and cultivated is larger for better off and middle wealth groups. Households in the Better Off wealth category have around 8 hectares for both adopters and non-adopters while the middle wealth group have around 6 hectares. Regarding the land area cultivated, 50 percent of land owned is cultivated by the very poor and the poor for both CSA adopters and non-adopters while 100 percent by the middle and the better off wealth groups. The very poor and poor households in the zone do not own any cattle other than the better off and middle wealth groups that own around five and twelve (12) respectively which potentially explains why the middle and the better of cultivate more land because of the availability of draught power. The same trend is observed in the ownership of goats where the very poor do not own any with the ownership of goats increasing with wealth.

Access to Food (ZM16)

Sources of energy

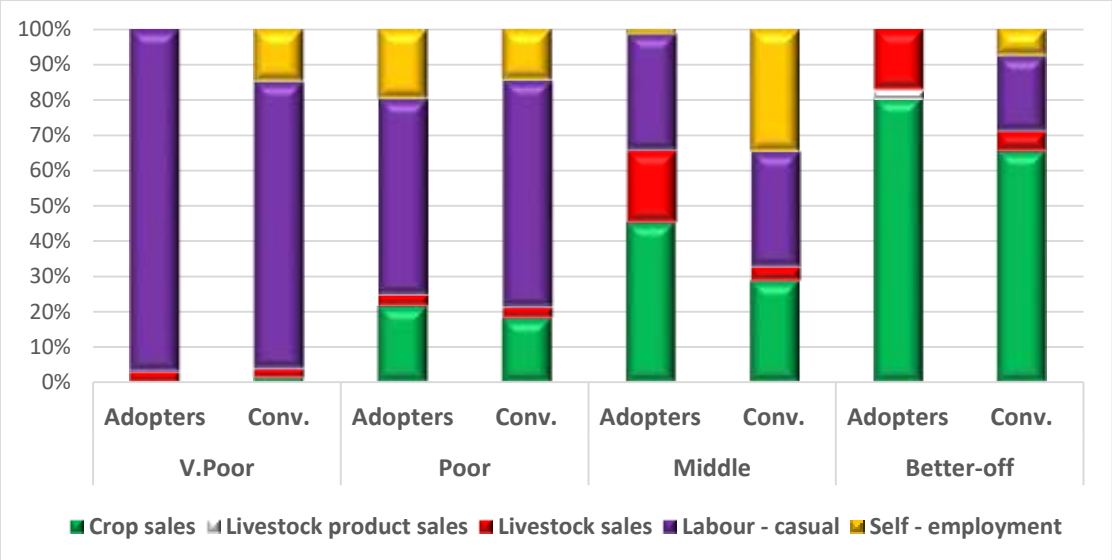
Figure 22: Household food Sources ~ZM16



Own crop production is the main source of food for both adopters and conventional farmers, but the percentages are slightly different with adopters contributing more from own crop farming compared to conventional farmers, except among the Very Poor households were conventional farmers' contribution from own crops is typically higher. For this same wealth group (Very Poor), adopters apparently have to resort to purchase of staple food to meet their food energy needs. This is an interesting scenario to follow up in subsequent studies, when attempting to assess the impact of CA as a climate smart in the CFU initiative.

Sources of Cash Income (ZM16)

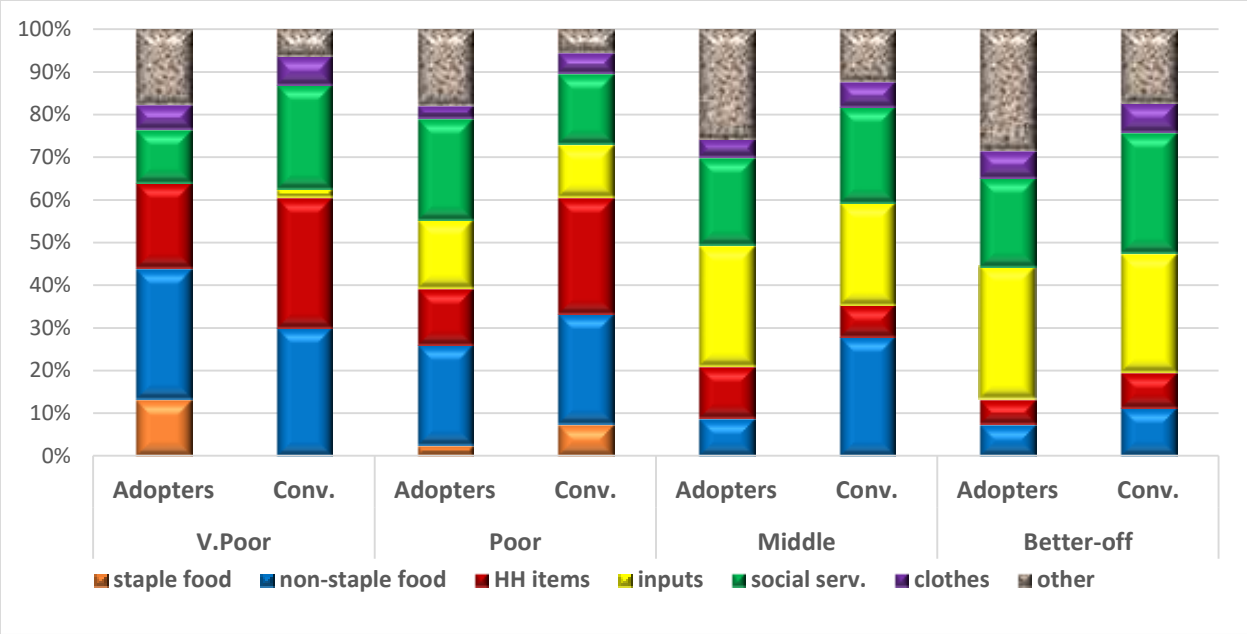
Figure 23: Sources of Income ~ ZM16



A comparison with households in other zones discussed above shows that wealthier households in this zone appear to depend ***very much*** on agriculture for income while Very poor and Poor households largely depend on casual labour. Among conventional farmers, the main income sources for the Middle and Better-off households is crop sales, casual labour, and self-employment. For adopters, Better-off and Middle wealth groups largely depend on crop sales and livestock sales.

Expenditure patterns (ZM16)

Figure 24: Household Expenditure patterns ~ZM16



At this (baseline) point of the study, there is not much to tell in terms of differences in expenditure patterns in this zone between adopters and conventional farmers as no expenditure pattern emerge as dominant among adopters or conventional farmers. Patterns shift from one wealth group to another and the result is there is not much of an emerging story worth noting. For example, while non-staple food is more among adopting Very poor households than among conventional Very poor households, the story shifts and is the opposite among Poor households. It will be interesting to keep over seasons and see if there is a consistent and sustained story at livelihood zone level and assess the implications. Since the zone has higher reliance on own crop production, the percentage contribution on staple is relatively lower than non-staple food.

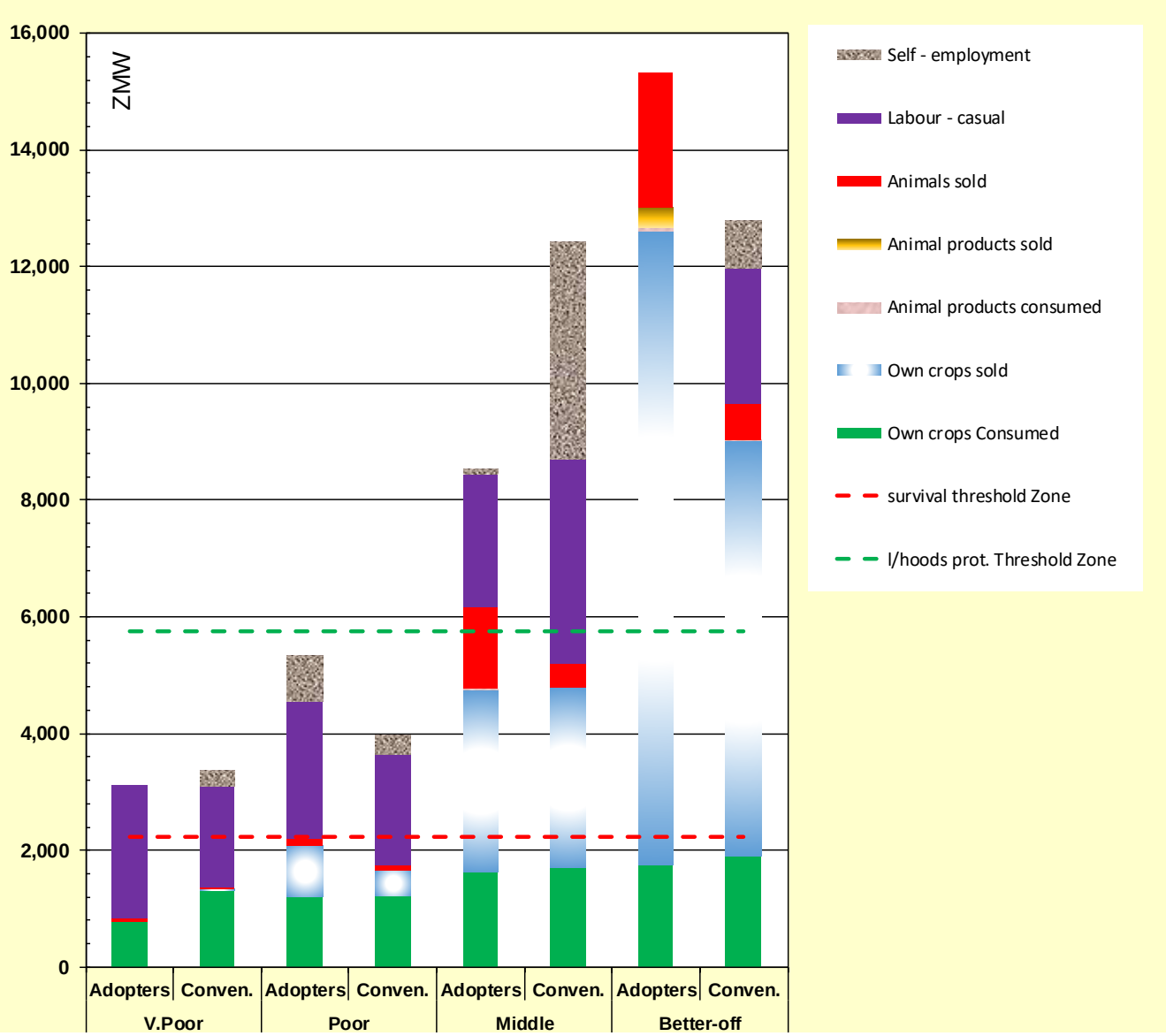
Total income and Thresholds (ZM16)

Figure 25 below tells a story slightly different from all the other zones studied under this baseline. While 100% (all adopters and conventional farmers) succeeded in surpassing the Survival threshold, the story of adopters managing to do this through the consumption of own produce has vanished. Adopters, just like their conventional counterparts, now have to depend on **other** livelihood options in order to meet household food energy requirements. In fact, among less wealthy households (the Very Poor) conventional farmers tend to even marginally surpass adopters in deriving food energy needs from own production and there is not much observable difference between households in other wealth groups. Thus agriculture alone does not seem to lead to food security in this zone, even though wealthier (middle and better off) households will need to do a little bit less to complement consumption of own produce in order to meet household food energy needs. Households in this zone have to sell crops produced (mainly cotton and groundnuts) as well as trade off some livestock and engage in casual labour in order to meet food energy needs.

A focus on the Livelihood Protection Threshold shows that all the very poor adopters (40%) and conventional farmers (45%), as well as all the Poor adopters (30%) and conventional farmers (30%) are below the LPT.

Considering what has been noted above, it is not surprising then that the LPT deficit of the Very Poor and Poor adopters is larger than in other zones, or that the Middle adopters (even though above the LPT) face a comparatively lesser LPT surplus than their conventional farming counterparts. What needs to be further investigated is whether or not CSAZ adopters are also largely growing cotton and groundnuts using CSAZ technologies since possibly the technologies are expected to give them a lead and keep them ahead of their conventional counterparts.

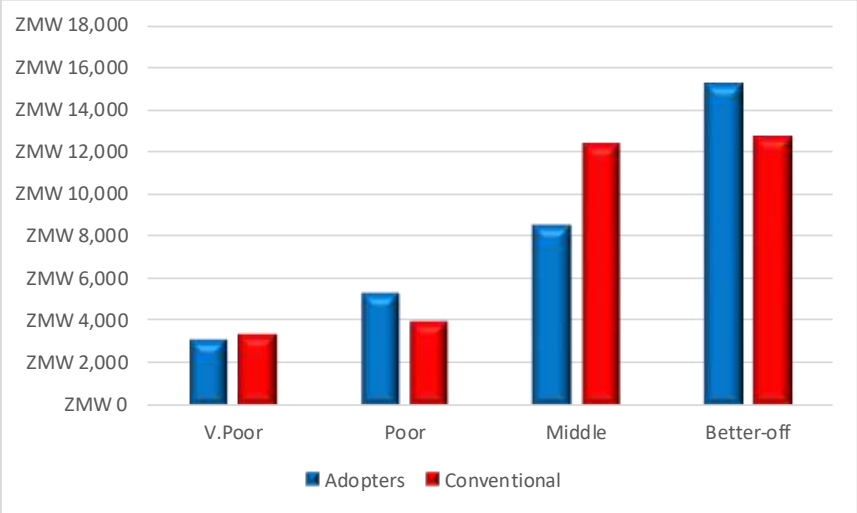
Figure 25: Household total income and thresholds ~Adopters Vs Conventional farmers.



The other two wealth groups, the Middle; (20% adopters and 15% conventional) and the Better-off (10% adopters and 10% conventional) were above the LPT. Keeping track of the threshold in the successive seasons will assist in quantifying the issues of CSA attribution. This zone, as already noted, is quite unique and it is the one with the greatest potential of proving whether or not CSA works far better than conventional technologies

Total Income between CSA Adopters and Conventional Farmers (ZM16)

Figure 26: Total Income between CA adopters and conventional farmers (ZM16)



As already hinted above, total income among households in both adopters and conventional farmers is comparatively lower than it is in the zones discussed above. This will naturally have a strong bearing in the computations for the livelihoods protection and resilience thresholds. Figure 26 shows that same non-consistent pattern when comparisons are made between adopters and conventional farmers. It is apparent that being an adopter does not really seem to pre-dispose a household to have higher incomes. Comparisons of total incomes between adopters and wholly conventional farmers in this zone presents a very unstable picture. Very Poor and Middle conventional farmers are apparently realising higher total incomes compared to their adopting counterparts and the opposite is true for Poor and Better-off households where adopters are in fact the ones doing better. This becomes therefore a zone where, if anything the real impact of adoption on incomes can be typically examined and attribution can be fully explored. If over the years, Very Poor adopting households could earn higher incomes, the possibility of attributing this to adoption may become most understood.

Zone 4: Eastern Plateau Maize, Groundnut, Tobacco and Trade (Chipata) ~ ZM 17

This highland (1000-1500 meters above sea level) zone on the eastern plateau covers Chipata, Lundazi, southern parts of Chama, and parts of Vubwi Districts along the border with Malawi. The zone lies in agro-ecological region II, with average annual rainfall ranging from 800-1,000 mm per year, falling from November-April, the main growing season. Temperatures range from an average minimum of 11-19 degrees Celsius in June to an average maximum of 25-30 degrees Celsius in October. The sandy loam and clay loam soils are good for crop production and support open Miombo woodland vegetation. The zone also has aquamarine and emerald deposits.

The population is more concentrated along the main roads than in the interior parts of the zone. The average population density for the zone is about 26 people per square kilometre with relatively moderate landholding averaging 2 ha per household. The main ethnic groups include Chewa, Tumbuka, Ngoni, Senga and Kunda.

Livelihoods in the zone are predominantly based on crop and livestock production. Agriculture is mainly rain-fed, with animals used for draught power. Mechanized agriculture is insignificant in this zone. The high rainfall, long growing season (100-150 days), and the fertile soils are favourable for production of maize, tobacco, cotton, and groundnuts. Beans are grown at a small scale. Dams and rivers provide the main source of water for communal livestock that includes goats and cattle. Trade with Malawi is important as it provides opportunities for exchange of agriculture products and labour.

Land and livestock are the main wealth determinants. Better-off households own a wide range of livestock, including cattle, goats, pigs, chickens, and domesticated doves. Poor households' livestock ownership is limited to some goats and chickens. In addition to crop and livestock sales, the better-off also obtain income through trade. The poor rely primarily on the sale of their labour, some livestock sales, and beer sales for cash. The better-off households rely on their own production of maize throughout the year, as well as groundnuts and sweet potatoes seasonally. Poor households rely on own-produced maize from March-August and purchases or in-kind payments for the rest of the consumption period. In return, Zambians get chitenge, groceries like sobo orange juice and tea.

Market access is good due to a good road network linking Chipata and Chama with a number of secondary roads connecting to the main road and Malawi border, facilitating an easy movement of goods. Households sell tobacco to private companies, maize to FRA, and groundnuts mainly to COMACO and some private traders. Trade with Malawi mainly concerns tobacco, maize, fish, and livestock.

In bad years, poor households usually intensify the search for casual labour opportunities, providing labour to richer households within the zone or migrating to towns. In bad years, poor households may prioritize working to earn cash or food in kind, over working in their own fields, thus potentially reducing area planted or yields compared to average.

Seasonality (ZM17)

Figure 27: Seasonal calendar for ZM 17

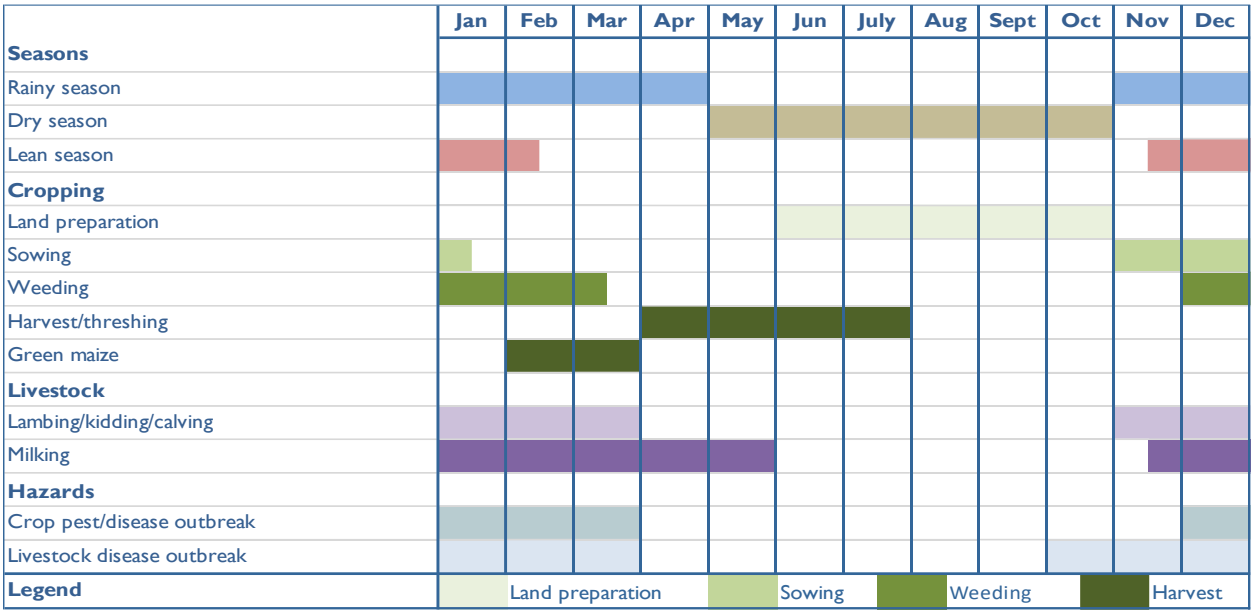
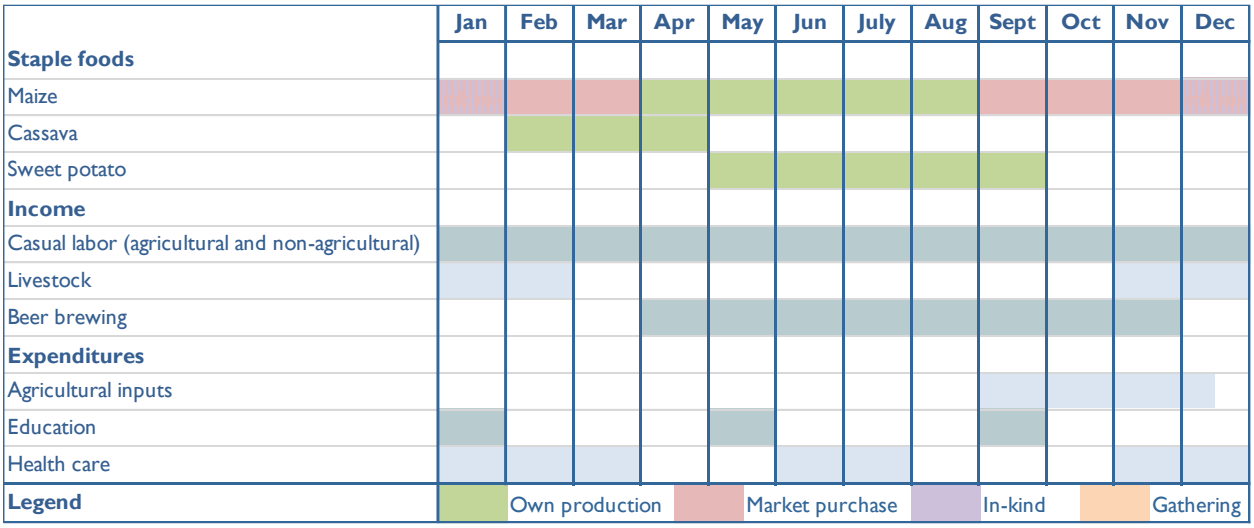


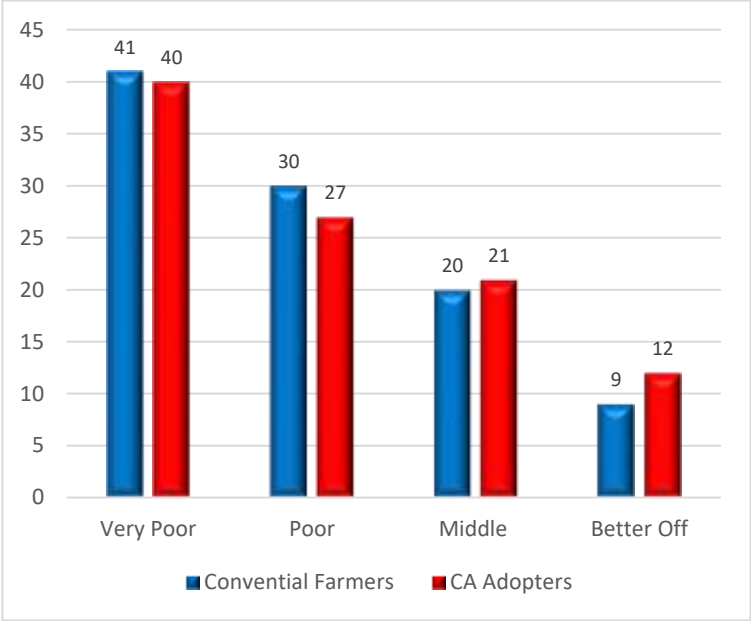
Figure 28: Food access calendar (ZM17)



Wealth profiles (ZM17)

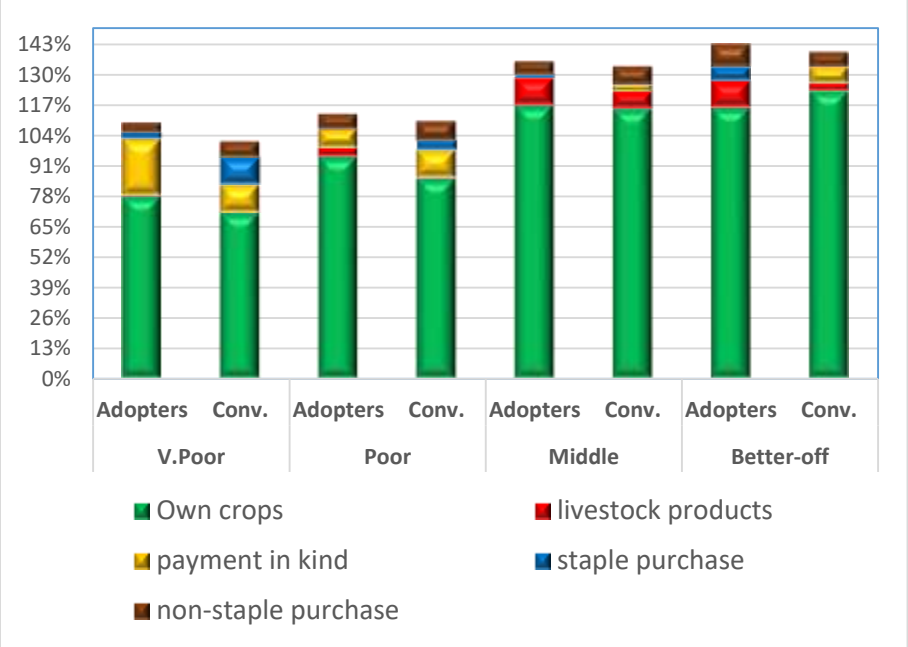
There are observable similarities between CSA adopters and conventional farmers like the link between household size and wealth group. Household size increases generally with wealth especially when comparing the very poor and poor versus the middle and better off. A comparison of the proportional piling of CSA adopters against those still practising conventional farming shows that proportion of households still practising conventional farming are a skewed towards the very poor and poor. Though it is still too early to attribute the difference to CSA adoption. Since this exercise uses a longitudinal approach, it will be very interesting to track the proportions of the two groups in the next coming season and see if the difference becomes significant and interrogate on the issue of attribution. Land area owned and cultivated is larger for better off and middle wealth groups.

Figure 29: Percentage Comparison of Wealth distribution – ZM17



Access to Food (ZM17)

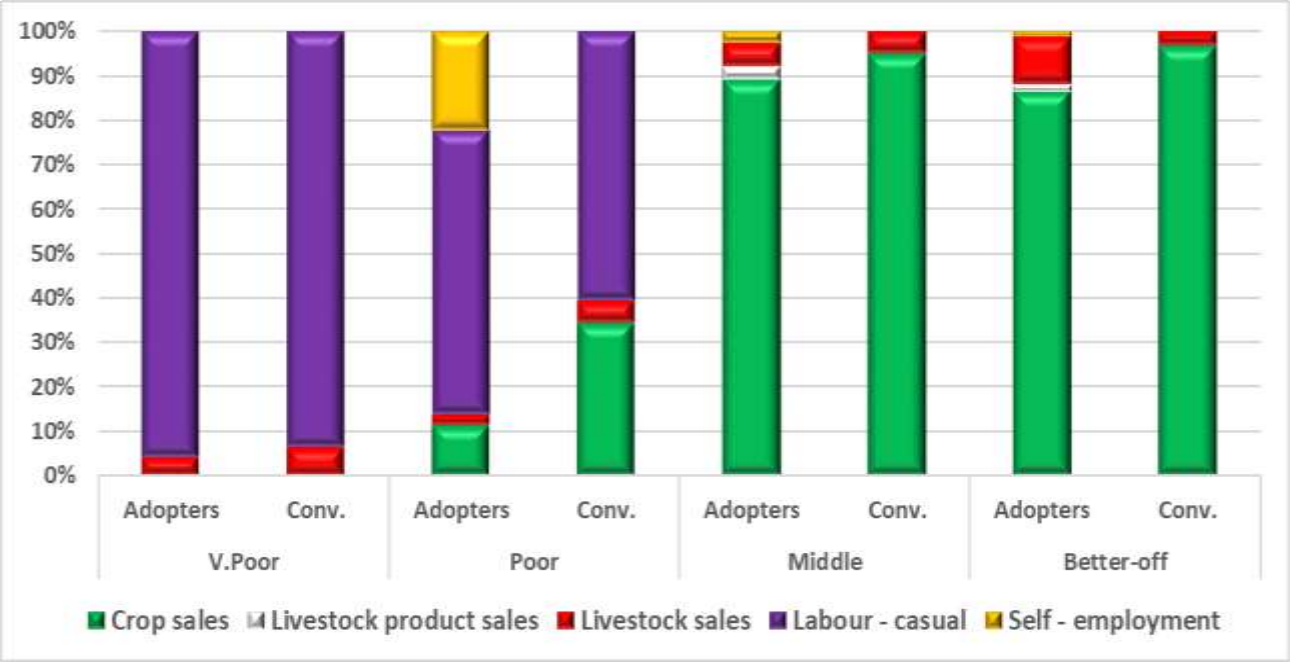
Figure 30: Household food Sources ~ZM17



Own crop production is the main source of food for both adopters and conventional farmers, but the percentages are slightly different with adopters contributing more from own crop farming compared to conventional farmers. Across all wealth groups for both adopters and non-adopters, own crop production is contributing at least 65% of the households' annual food needs. This is an interesting scenario to follow up in the coming seasons, when attempting to assess the impact of CA as climate smart.

Sources of Cash Income (ZM17)

Figure 31: Sources of Income ~ ZM17

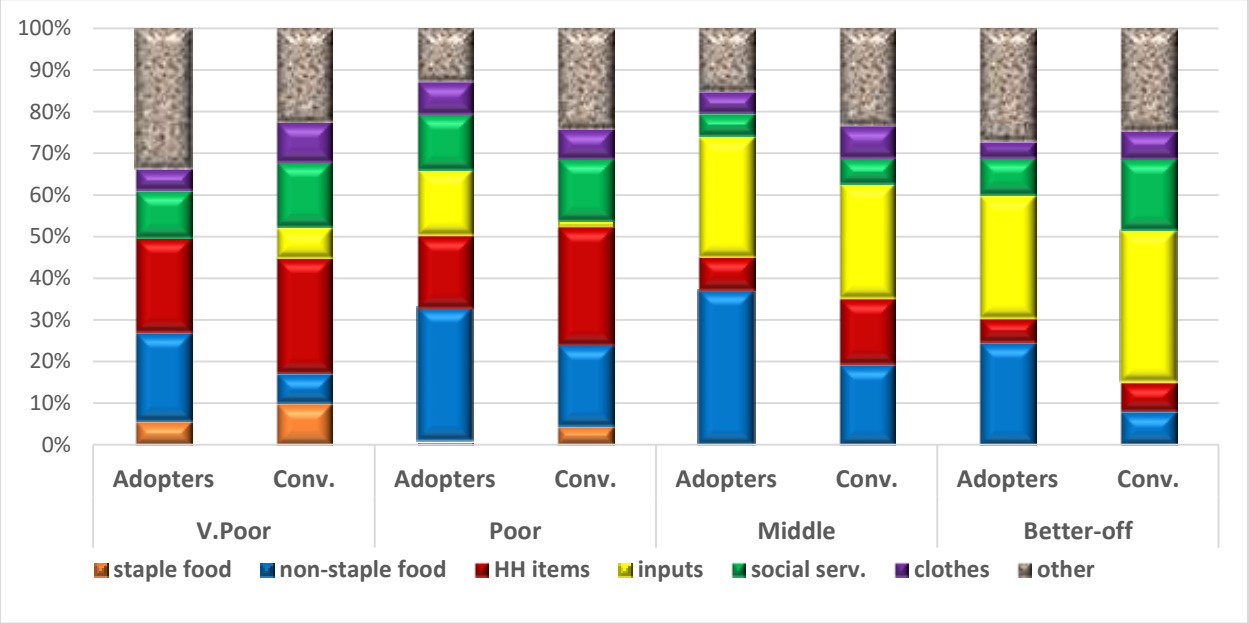


As shown in Figure 31 above, dependence on income from crop sales increases with wealth. It is clear that wealthier households are the ones relying more on sales of cash crops (tobacco and groundnuts) than on other livelihoods in the zone. Labour (casual) is provided by the Very poor and Poor households to the middle and Better off households, this explains why the Very Poor and Poor households also have casual labour as their main source of cash income. The challenge would be for CSAZ to attract lower wealth groups to use CSAZ CA technologies in the production of cash crops. Cross boarder trading with Malawi is also another source income under self-employment particularly from the poor, middle and better off households. The main items which were sold across Malawi are maize, tobacco and sunflower.

Expenditure patterns (ZM17)

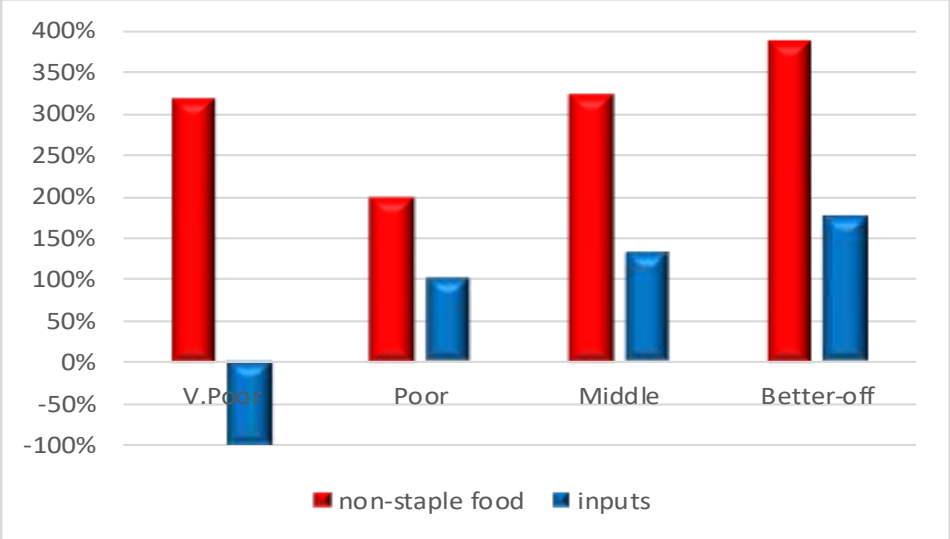
Expenditure pattern differences between adopters and conventional farmers are clearer when data is analysed and filtered to show such differences. While there is not much difference in the purchase of staple food between the Middle and Better-off wealth groups, the Very-poor and Poor adopters typically use (respectively) 20.0% and 66.7% less resources to purchase staple food. This is because the very poor adopters depend more on payment in kind to supplement for food energy needs while the Poor adopters actually already meet (and in fact exceed) 100% of their food energy need through own crop production and so end up purchasing far less than their conventional counterparts

Figure 32: Household Expenditure patterns ~ ZM17



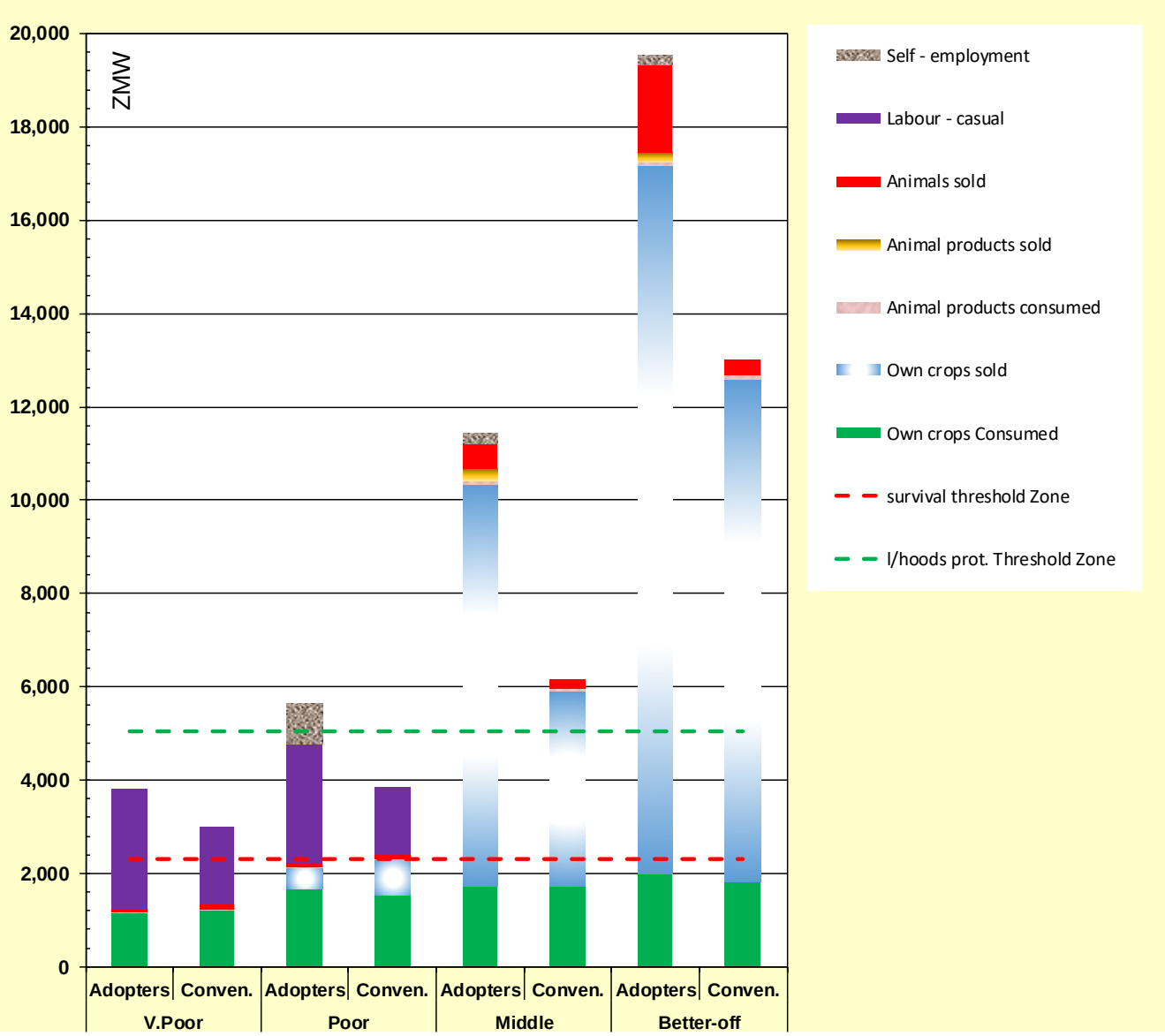
More clear patterns emerge (as seen from Figure 33 below) from a comparison of non-staple food and inputs where adopters typically and consistently use over 200% more resources to purchase non-staple luxury food like sugar, cooking oil and tea compared to conventional farmers. Adopters also consistently use more resources than conventional farmers (except for the Very-poor) to purchase agricultural inputs.

Figure 33: Margins of differences in expenditure (adopters versus conventional)



Total income and Thresholds (ZM17)

Figure 34: Household total income and thresholds ~ Adopters and Conventional farmers

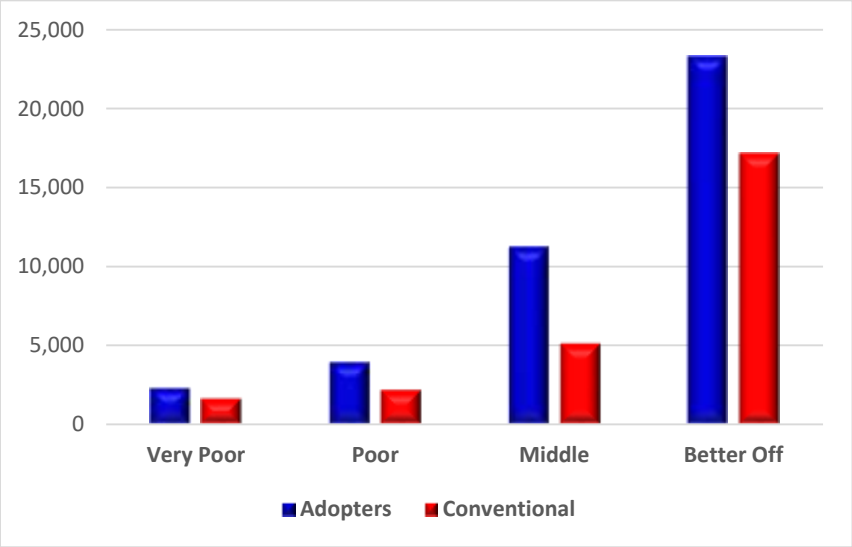


Once more, households in this zone, like those in the zone discussed above, have to supplement households' food energy needs with livestock sales, casual labour, and crop sales in order to bridge any looming survival threshold deficit. Consumption of own crop production does not warrant attainment of the 100% household food energy needs (survival threshold). Thus even though 100% of the households are above the ST, very poor households (both adopters and conventional farmers alike) ended up engaging in casual labour in order to meet the ST. Of great concern and warranting to keep track, is the failure very poor (40% adopters and 41% non-adopters) and 30% of the Poor conventional farming households failed to reach the LPT. On a positive note, Poor adopting households (27% of adopters) managed to go above the Livelihood Protection threshold along with both the Middle (21% adopters and 20% conventional) and Better Off (12% adopters and 9% conventional) households. Outcome analysis in the coming seasons should be able to assist us to see final picture and pull out CA attribution to the beneficiaries.

Total Income between CSA Adopters and Conventional Farmers (ZM17)

Figure 35 below shows a comparison of adopters and conventional farmers' total income in this Livelihood zone. Once more, total income for adopters is higher than that of conventional farmers and this difference is most pronounced among wealthier households. Never the less, this baseline study was not aimed at attributing this difference to the CSAZ intervention but it will be very important to monitor this across time and in fact establish whether or not the differences can be attributed to adoption of Climate Smart CA technologies.

Figure 35: Comparison of adopters and conventional farmers' total income



3. CONCLUSION

This baseline study used an HEA approach involving both qualitative and quantitative methods to profile livelihood strategies across four different livelihood zones the CFU operates in. These livelihood zones are:

1. ZM08 - The Commercial Rail Line Maize, Livestock, and Cotton;
2. ZM09 - The Southern Plateau Cattle, Maize and Tobacco;
3. ZM16 - Eastern Plateau Maize, Cotton and Groundnut; and,
4. ZM17 - Eastern Plateau Maize, Groundnut, Tobacco and Trade.

As part of the methodology to examine the impact of the CSAZ project, the baseline study collected information from two groups of small-scale farmers: those that had adopted CSA and those that were still wholly using conventional farming systems. Seven main but interrelated findings form the conclusion of this baseline study are itemized below.

1. It is concluded that CSA adopters compared to conventional farmers across the four livelihood zones **have benefited more from own crop production as the main source of food energy for farming households.** Never the less, in terms of the first impact level indicator, (Proportion of Households above the Survival Threshold), there is no differentiation between being an adopter and being a wholly conventional farmer. All (100%) households were above the survival threshold. However, it should be pointed out that this baseline study cannot be conclusive as to why CSA adopters are deriving more of their annual food energy needs and cash income from own crop production. Seeking attribution should become the subject for further investigations through longitudinal HEA studies in order to strengthen the explanatory power if indeed the adoption of CSA practices is the causal factor of this scenario.
2. With regards to the second impact indicator (Proportion of Households above the Resilience Threshold), the actual thresholds can only be computed at outcome analysis level after incorporating shocks and hazards and incorporating expandability.
3. The comparative profile of livelihood strategies across the four livelihood zones were explained by wealth determinants: land area cultivated, livestock holdings cash leading to differences in access to food, access to cash, and expenditure patterns. The wealth profiles of zones show that the size of land owned and cultivated was a significant expression of wealth in three zones (ZM09, ZM16 and ZM17). The size of cattle herd also explained wealth in three zones (ZM08, ZM09, and ZM16) though there was no significant difference between CA adopters and non-adopters which is expected as the project has just started. It will be interesting to keep track of these wealth determinants between program participants (adopters) and non-participants (conventional farmers). Although all households across the four zones managed to achieve the survival threshold in the reference year, at least 65% of them were below the livelihood protection threshold, particularly the conventional farmers.

4. It is concluded that the main source food is explained very much by farmers' own crop production in all the zones though, as explained before, the contribution is more in adopters than conventional farmers. However, it is interesting and important to note that there appeared to be additional sources of food in ZM08 and ZM09 and these are livestock and livestock products. Crop sales particularly from adopters, the sale of livestock and livestock products were sources of cash. The attribution of more crop sales from adopters can only be confirmed after tracking the trend for at least two seasons.
5. Interestingly, while expenditure patterns did not really show a significant pattern among wealth groups nor CSA adopters against conventional farmers, there were heavy investments in agriculture inputs and social services among adopters in some Zones. **It is therefore being concluded that expenditure on agriculture related investments could be a differentiating facet between adopters (who seem to invest more in this area) and conventional farmers**. This however will need further investigation over time to form a clear conclusion. Notably, only findings from ZM08 clearly showed this pattern.
6. In a development related to the third issue above, the Livelihood Protection threshold can be used to show capacity of households to invest in livelihoods, and usually the more they invest reflects the potential production they can earn at the end. **This study came to the conclusion that that adopters are making a higher investment in their livelihoods than the conventional farmers**. This is positive and needs to be tracked in the coming season to check sustenance and evidence for impact. This also provide an explanation as to why adopters are more likely to have higher production and resilience than conventional farmers.
7. It can also be noted that even though adopters tend to invest in inputs comparatively better than conventional farmers, **the lower wealth groups (Very poor and Poor) are however generally below the Livelihoods Protection Threshold**. This implies the need to strengthen the capacity of poorer wealth groups to invest in livelihoods related expenditures and thereby build a foundation for resilience.

4. RECOMMENDATIONS

1. It is recommended that the information in this baseline study be used to benchmark livelihood access for the given reference period and used as basis for comparing changes to livelihood patterns due to programme activities by enabling tracking of interventions impact in specific strategies. The added advantage of using the framework for monitoring and evaluation is its potential to allow understanding of specific intervention contributions to overall changes in access.
2. It is essential that monitoring and evaluation systems for the CSAZ be streamlined to track project milestones and impact over time.
3. It is highly recommended to track Livelihood outcomes longitudinally using the Longitudinal Impact Monitoring and Evaluation (LIME) concept,
4. However, there is also need to bring a human face to the methodology by employing other methodologies so as to clearly bring out explanations and attributions to the programme. It is hereby therefore recommended that in subsequent studies, case studies or the use of the Most Significant Change (MSC) stories be also added to the HEA framework to as to breath human testimonies to what exactly caused changes to life as experienced by farmers.
5. The TOR required that a value be computed for the Resilience threshold (RT). This study recommends that in fact the indicator should be that of Livelihoods Protection Threshold (LPT) since a realistic and observed (contrasted with a theoretical) RT is never unearthed through a baseline but rather at another HEA stage called Outcome Analysis.

Key Parameters for Monitoring for the 4 zones

If the Longitudinal approach were to be adopted, then the following key parameters have been identified and are being suggested for such LIME tracking.

Item	Key Parameter – Quantity Produced	Key Parameter – Price
Crops	• Maize • Groundnuts • Tobacco • Cotton	• Maize • Groundnuts • Tobacco • Cotton
Livestock production	• Cattle • Goats • Chicken	• Cattle • Goats • Chicken
Other food and cash income	• Agriculture labour (harvest) • Self-employment	• Agriculture labour (harvest) • Self-employment

ANNEXES

Annex 1 – Impact Indicator Summary Tables by Zone

Indicator Summary Table: Zone ZM08								
	Very Poor		**Poor**		**Middle**		**Better Off**	
	Adopters	Conven.	Adopters	Conven.	Adopters	Conven.	Adopters	Conven.
ü **Impact Indicator 1:** Proportion of Households above the Survival Threshold (disaggregated by Socio-Economic status and adoption status) [Percent of households in Zone]	100%	100%	100%	100%	100%	100%	100%	100%
ü **Impact Indicator 2:** Proportion of Households above the Resilience/Protection Threshold (disaggregated by Socio-Economic status and adoption status)	In all zones, this indicator has been replaced by the one below							
ü **Impact Indicator 2:** Proportion of Households above the Livelihood Protection Threshold (disaggregated by Socio-Economic status and adoption status) [Percent of households in Zone]	0%	0%	0%	0%	25%	25%	10%	10%
Indicator Summary Table: Zone ZM09								
	Very Poor		**Poor**		**Middle**		**Better Off**	
	Adopters	Conven.	Adopters	Conven.	Adopters	Conven.	Adopters	Conven.
ü **Impact Indicator 1:** Proportion of Households above the Survival Threshold (disaggregated by Socio-Economic status and adoption status) [Percent of households in Zone]	100%	100%	100%	100%	100%	100%	100%	100%
ü **Impact Indicator 2:** Proportion of Households above the Livelihood Protection Threshold (disaggregated by Socio-Economic status and adoption status) [Percent of households in Zone]	0%	0%	0%	0%	23%	23%	12%	10%

Indicator Summary Table: Zone ZM16								
	Very Poor		**Poor**		**Middle**		**Better Off**	
	Adopters	Conven.	Adopters	Conven.	Adopters	Conven.	Adopters	Conven.
Impact Indicator 1: Proportion of Households above the Survival Threshold (disaggregated by Socio-Economic status and adoption status) [Percent of households in Zone]	100%	100%	100%	100%	100%	100%	100%	100%
Impact Indicator 2: Proportion of Households above the Livelihood Protection Threshold (disaggregated by Socio-Economic status and adoption status) [Percent of households in Zone]	0%	0%	0%	0%	20%	15%	10%	10%

Indicator Summary Table: Zone ZM17								
	Very Poor		**Poor**		**Middle**		**Better Off**	
	Adopters	Conven.	Adopters	Conven.	Adopters	Conven.	Adopters	Conven.
ü **Impact Indicator 1:** Proportion of Households above the Survival Threshold (disaggregated by Socio-Economic status and adoption status) [Percent of households in Zone]	100%	100%	100%	100%	100%	100%	100%	100%
ü **Impact Indicator 2:** Proportion of Households above the Livelihood Protection Threshold (disaggregated by Socio-Economic status and adoption status) [Percent of households in Zone]	0%	0%	27%	0%	21%	20%	12%	9%

Annex 2 – Field Team and Field Schedule

List of Research team members

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The table below summarises the areas visited in the two zones:

Livelihood zone	Livelihood zone name (actual districts under study)	Areas visited	Dates
ZM 08	Commercial Rail Line Maize, Livestock, and Cotton (Chongwe, Kafue and Mazabuka)	Nkondola (Chongwe) Lukoshi (Chongwe) Nkomesha (Chongwe) Dumba (Mazabuka) Chiyawa (Mazabuka) Shantumbu (Kafue) Lukolongo (Kafue)	9/10/2017 9/10/2017 10/10/2017 11/10/2017 4/10/2017 10/10/2017
ZM 09	Southern Plateau Cattle, Maize and Tobacco (Choma)	Simaubi Chipande Mbabala Batoka Kamwanu Mutepaila (No BO) Njebe	5/10/2017 6/10/2017 7/10/2017 7/10/2017 5/10/2017 6/10/2017
ZM 16	Eastern Plateau Maize, Cotton and Groundnut (Katete)	Mwandafiles Singa Mpamba Mutunga Chinkuni Gwabele Mutoseni Kampambe 1	9/10/2017 9/10/2017 10/10/2017 10/10/2017 10/10/2017 11/10/2017 11/10/2017
ZM 17	Eastern Plateau Maize, Groundnut, Tobacco and Trade (Chipata)	Mafuta Tigwilizane George	11/10/2017 12/10/2017 12/10/2017

		Chiparamba Chitaza Chibale Mshikate	12/10/2017 13/10/2017 13/10/2017 14/10/2017

Annex 3 – Data Collection Tools Used In The Assessment

Annex	Item	Attachment
Annex 3.1	HEA Tool 1 Key informant Tool	Interview form1.doc
Annex 3.2	HEA Tool 2 Market Tool	Interview Form 2.doc
Annex 3.3	HEA Tool 3 Community Leaders FGD	Interview Form 3.doc
Annex 3.4	HEA Tool 4 Wealth Group Representatives Tool	Interview Form 4 - Wealth group interv