



Save the Children®

SAHEL HEA-BASED CHANGE ANALYSIS

ASSESSING CHANGES TO
LIVELIHOODS AND HOUSEHOLD
RESILIENCE CAPACITY

ABSTRACT

Livelihoods study based on ten years of Household Economy Analysis information in the Sahel region. Purpose: to better understand the impact of climatic variability on household economies and livelihoods resilience.

FEG

THE FOOD ECONOMY GROUP

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EXECUTIVE SUMMARY

Study Objectives

The Sahel has experienced recurrent droughts since the 1970s and 1980s that has led to multiple food crisis particularly from the 2000s. This trend led to a rising demand for tools and approaches that could inform decisions and actions to preventing and managing food crises, centered on the capacity to manage impact or respond to major exogenous mostly climate-related shock on food production. Since 2010, Save the Children has led a regional, multi-agency effort aimed at establishing a systems-based food and livelihood security monitoring and analysis system, known as the Household Economic Analysis (HEA) Sahel project, initially funded by ECHO, and co-funded by OFDA since 2013. The analysis generated through the project, has noted the continued impact of climate-related shocks in the Sahel region observed with variation in rainfall and temperature which have now seen an increase in severity and frequency of droughts and occurrence of flash and river floods. Save the Children has commissioned this study to identify changes in livelihoods, with a particular interest to explore the impact of climate variability and generate information to guide long-term programming and policy decisions on effective approaches to improve food and nutrition security, as well as poverty reduction.

The specific evaluation objectives were to;

- Identify and assess the major changes in household livelihoods – by comparing changes in sources of food, and cash income across agricultural, livestock and non-farm livelihood systems.
- Analyse key changes in livelihood assets ownership or access influencing observed changes in livelihoods such as, ownership/access to land, livestock available to different socio-economic groups.
- Analyse relevant contextual and policy changes that have occurred in past ten years that influenced changes in access to livelihoods at household level – such as economic factors, land use, and population change/movement.
- Provide an analysis of historical climate-related data (rainfall and temperature) and explore how variations have influenced changes in livelihoods over the years.
- Assess the resilience capacity of households in the context of climate variability and other exogenous shocks of in the Sahel region.

Study Analytical Approach

The study used a mixed method approach to analyse quantitative and qualitative information to assess the changes in livelihoods and identify impact of climate variability on household resilience capacity across different livelihood zones and countries in the Sahel region. The HEA baseline data will be obtained from available baselines done in the Sahel – focusing on the zones that have at least two HEA baseline data sets that meet a minimum of five-year difference. The climate related data was obtained from the FEWSNET data portal. The study used time series analysis through tracking HEA data through different time periods; (i) Old compared to New Baseline (ii) Climate-related trends compared to outcome analysis trends. Each HEA baseline dataset was organized by livelihood zone, containing a vast amount of information. In this study we analyzed changes over time for 30 livelihood zones in the Sahel.

Summary of Key Findings

The following points summarises the key findings for the study questions;

Change in wealth and assets: There is a general increase ownership in livestock ownership, whilst size of land cultivated has declined. Whilst the changes are less than 10%, the distribution of wealth suggest a narrowing of inequality between the poor and better-off.

Changes in sources of Food: The basic sources of food that households draw on have not changed. The percentage changes observed are not significant, although there is a relative shift in importance of these sources with less contribution of crops and higher contribution of aid and food purchases. These shifts, food occur every year, related to changes in weather-dependent production, and changes in food prices. Thus, the changes observed do not necessarily indicate a longer-term structural change.

Changes in sources of cash income: Across all livelihood zones and all wealth groups cash income levels after adjusting for inflation were either the same or higher. The positive change in cash income is mainly driven by increases in cash from livestock sales due to increased number of sales and prices, labour payments and crop sales.

Changes in Expenditure patterns: In general, the results indicate that poor and very poor households are still spending more of their available cash on just surviving and non-productive activities (staple and non-staple food, household items and other), leaving less for things like school and health, and inputs. There is no significant change in expenditure patterns observed.

Changes in Livelihood Security: Thirteen of the livelihood zones saw a significant negative change in the Household Livelihoods Protection Score, while three have a positive change and 14 have remained within same range. In other words, the overall livelihood security and by inference resilience capacity of local inhabitants using a weighted average has declined. In most of these zones, production conditions as measured by rainfall anomalies were almost the same or in many cases better in the newer reference year than the older. It is possible to argue the decline in livelihood security is related to a worse quality or distribution of rainfall in the production year, but this is not the case in the other zones. The decline in livelihood security, can therefore be attributed to the impact of increased capital injections to sustain production levels given the impact of frequent droughts and floods, reduced land sizes requiring intensive investments to increase yields.

The various changes observed are not very conclusive on the attribution to climate variability and this is possibly because the time periods of data comparison are short and rainfall performance shows improvement in the compared data points. However, the results are indicative that some observed shifts if conditions persist there will be major impacts on ability of households to maintain livelihoods.

The remaining 11 zones saw a measured increase in livelihood security, despite having poorly distributed rainfall conditions in the second reference year. The basic sources of food that households draw on have not changed. The percentage changes observed are not significant, although there is a relative shift in importance of these sources with less contribution of crops and higher contribution of aid and food purchases. These shifts, food occur every year, related to changes in weather-dependent production, and changes in food prices. Thus, the changes observed do not necessarily indicate a longer-term structural change.

Key Recommendations

The following bullet points summarize recommendations for consideration:

- There is need to repeat analysis on a yearly basis to establish several data points that can indicate the direction of changes and shifts to allow for ongoing tracking of – climate related proxy indicators and outcomes on livelihood sources and the Resilience score.
- The analysis show that resilience capacity has declined even though access to main livelihood strategies show marginal changes which suggest increased cost to keep up with the production capacity. There is need to consider cost efficient production methods and techniques.
- The analysis shows growing reliance on humanitarian assistance – humanitarian actions need to focus on building resilience and adaptation particularly given the increase in rainfall fluctuations. A consideration of viable appropriate non-farm income sources should be prioritised.
- The vulnerability of households to variability in climate remains high and ongoing impact monitoring systems must be put in place to inform decisions and information on adaptation.

1. INTRODUCTION

1.1 Aims of the Research

Save the children commissioned this study in light of the regular occurrence of climatic shocks across the Sahel region in the last decade or so. An increase in both the severity and frequency of droughts, as well as the occurrence of flash floods and river floods has been noted, (Save the Children, 2017). Historically, the Sahel is known for its strong climatic variations, irregular rainfalls, and land degradation trends. These are considered to be important drivers of food insecurity and poverty. In the period 1970 to 2019, the region recorded over 30 years of severe drought, with the frequency and severity of droughts and floods having increased over this period. (ECOWAS-SWAC/OECD, 2008) It is estimated that by 2050, temperatures will be warmer by 3-5 Celsius and extreme weather events will become more common, (Ibid,2). The deterioration of soil and water resources is attributed to combined effects of population growth, deforestation, continuous cropping, and overgrazing, which in turn are a function of erratic rainfall patterns and the lack of a coherent, regional environmental policy.

This research intended to investigate and identify changes in livelihoods in areas where Household Economy Analysis (HEA) baselines have been conducted in the past fifteen years. The particular focus was one of exploring the possible impacts of weather and climatic variability on livelihoods with the objective of generating knowledge to guide long-term programming and policy decisions.

The specific study objectives of the research were to;

- Identify and assess the major changes in household livelihoods by comparing changes in sources of food, and cash income across agricultural, livestock and non-farm livelihood systems.
- Analyse key changes in livelihood assets ownership or access influencing observed changes in livelihoods such as, ownership/access to land, livestock available to different socio-economic groups.
- Analyse relevant contextual and policy changes that have occurred in past ten years that influenced changes in access to livelihoods at household level – such as economic factors, land use, and population change/movement.
- Provide an analysis of historical climate-related data (rainfall and temperature) and explore how variations have influenced changes in livelihoods over the years.
- Assess the resilience capacity of households in the context of climate variability and other exogenous shocks in the Sahel region.

Six core research questions were defined prior to the research, each assigned with several variables relevant to HEA baselines. These variables and their associated research questions form the basis of the analysis as well as the structure of the results presented in Section Three. The six core research questions are as follows:

| | |
|--|---|
| i. Have there been changes in wealth and assets? | ii. Have there been changes in the distribution of wealth for each livelihood zone? |
| iii. Have there been changes in household sources of food? | iv. Have there been changes in household source of cash income? |
| v. Have there been changes in expenditure patterns? | vi. What is the resilience capacity of households? |

Analysis of each of the variables in the table below was conducted for each wealth group (socioeconomic category), comparing first baseline with the second baseline for each of the thirty livelihood zones.

1.2 Core Research Questions

For each of the core research questions, various HEA parameters were assigned for the purpose of getting an indication of whether there have been changes. The table of HEA parameters is presented below.

| Core Questions | HEA Parameters |
|---|---|
| Have there been changes in wealth and assets? | % of households in each wealth group |
| | number of people in each wealth group |
| | area of land cultivated |
| | area of land owned |
| | number and type of livestock owned (Camels, cattle, sheep, goats) |
| | other productive assets |
| | total income (food and cash income combined) |
| | total cash income in food and cash terms |
| Have there been changes in the distribution of wealth for each livelihood zone? | Lorenz curves for each zone/weighted average |
| | income spread (very poor to better off) for each livelihood zone |
| Have there been changes in household sources of food? | % of annual minimum calories from own crop (combined crops) |
| | % of annual minimum calories from each crop grown |
| | % of annual minimum calories from own milk/meat |
| | % of annual minimum calories from payment in kind |
| | % of annual minimum calories from fish/wild foods |
| | % of annual minimum calories from food aid |
| | % of annual minimum calories from purchase |
| | total production by crop (in kg) |
| | total production of milk (in litres) |
| Have there been changes in household source of cash income? | % of annual cash income from crop sales |
| | % of annual cash income from livestock product sales |
| | % of annual cash income from livestock sales |
| | % of annual cash income from casual labor (local & migratory) |
| | % of annual cash income from self-employment |
| | % of annual cash income from petty trade |
| | absolute cash income from each crop sold |

| Core Questions | HEA Parameters |
|--|---|
| | absolute cash income from casual labor |
| | absolute cash income from livestock |
| | absolute cash income from self-employment |
| | absolute cash income from petty trade |
| | absolute cash income from other sources |
| Have there been changes in expenditure patterns? | % of annual cash income spent on the main staple food for poor |
| | % of annual cash income spent on non-staple food |
| | % of annual cash income spent on household items |
| | % of annual cash income spent on productive inputs |
| | % of annual cash income spent on school |
| | % of annual cash income spent on health |
| | % of annual cash income spent on phone credit |
| | % of annual cash income spent on water |
| | % of annual cash income spent on clothes |
| | % of annual cash income spent on other items |
| | breakdown of productive inputs category |
| | breakdown of non-staple food category |
| | changes in the share of expenditure on non-staple food vs the % of annual calories derived from non-staple food |
| What is the resilience capacity of households? | change in the proxy Livelihood Protection Score |
| | trends in the Livelihoods Resilience Score |

This report is divided into the following three sections following this introduction.

- I. **Section One** - an overview of the climatic, geographical, and social context of the Sahel. Livelihoods, as represented by HEA data, are a function of the interaction of several underlying factors that influence the extent to which households are able to exploit opportunities to generate food and cash income. In the Sahel these factors primarily include; climate as represented by rainfall and temperature, changes in macro-economic indicators, and policies. Section Two provides an overview of the regional context to understand and explain the information in the Sahel HEA baselines between the two time periods under consideration.
- II. **Section Two** - describes how the research was conducted using HEA data and the process of analysis used to determine the results. This section describes the technicalities of HEA including; the reference year, seasonality, wealth breakdowns, livelihood capital, sources of food and cash, patterns of expenditure, total income, and household livelihood protection scores. Limitations and caveats are included in this section.
- III. **Section Three** - presents the results of the analysis of the HEA variables listed above, across 30 livelihood zones, comparing and identifying what has or hasn't changed comparing the baseline data set with the endline data set.

2. SECTION ONE – THE SAHELIAN CONTEXT

2.1 Climate System, Geography and Livelihoods

The Sahel is generally considered to be one of the most, if not the most, complex geo-climatic system on Earth, with very significant inherent and systemic-level variability in precipitation, evapotranspiration, vegetation cover, albedo, and many other geographical parameters. The system manifests historically in ongoing and repeated cycles of high impact weather events ranging from decadal droughts to floods.

Latitudinally, the Sahel is located between around 10 and 20 degrees north of the equator and falls within the Hadley Cell atmospheric circulation. Longitudinally, it covers the area from the Atlantic coast, approximately 15 degrees West, through northern Senegal, southern Mauritania, the great bend of the Niger River in Mali, Burkina Faso, southern Niger, northeastern Nigeria, south-central Chad, and into Sudan, with many geographers extending the eastern limits of the Sahel to include Ethiopia, Kenya, and Somalia on the eastern coast of the African continent. The eastern limit relevant to this research is central Africa, around 20 degrees East. The Sahel is a somewhat narrow strip of dry land about 5500 kilometres west to east and 450 kilometres north to south, with an approximate area of 2,475,000 km².

Located between the Sahara Desert to the north and the Sudanian savanna to the south (and tropical areas further south of that), the Sahel can be thought of as a type of climatic and geographical “inter-tidal” zone between the arid topography and hot, dry air masses of the desert and the higher fertility regions of the south. It generally has an arid to semi-arid climate heavily influenced by the intertropical front and moist air masses associated with the tropical West African monsoon which exert a strong control on climate variability in the Sahel. Average annual rainfall ranges from 100-200mm in the north to 700-1000mm in the south, with precipitation in either one or two rainy seasons, depending on the location. Isolated precipitation starts in May when the intertropical front is around 15 degrees North. The commencement of the south-bound movement of the Inter Tropical Convergence Zone¹ in June brings more rainfall in the Sahel, indicating the beginning of the rainy season which continues until August/September. The last phase is the retreat of the monsoon front.

Topographically, the Sahel is mainly flat lowlands 200 to 400 meters above sea level punctuated by isolated plateaus and mountain ranges that are designated as different sub-ecoregions due to their distinct flora and fauna as compared with the expansive lowlands. It is worth noting that the term “the Sahel” implies a homogeneity that is not at all a reflection of reality. Indeed, the Sahel is highly heterogenous from a climatic, topographical, land cover and human livelihood point of view.

An estimated 44 million inhabitants reside in the Sahel, of which the majority are largely rural. Most livelihoods are fully dependent on the amounts of rainfall received, with the northern low-rainfall region being predominantly pastoral (with all types of livestock present), in contrast to the higher-rainfall south which is agricultural. Between the two is a large overlapping area where both livestock and crops are important. The performance of the West African monsoon and the rains it delivers is highly determinant of the seasonal success of livelihoods, be it livestock herd management or crop production.

Analysis of changes in livelihood production as associated with rainfall performance and similar factors, be it for a specific season or over several years, must be considered in the context of the historic climatic trend that pertains to the Sahel. Medium-term decadal trends (up to ten years) are relevant to understand, as are longer term inter-decadal trends going back well into the 20th century. A multi-year drought occurred across the region from the late 1960s to early 1980s, triggering a humanitarian tragedy that became a major

¹ ITCZ front from 5 degrees north to about 10 degrees north, where it stays almost stationary until the end of August

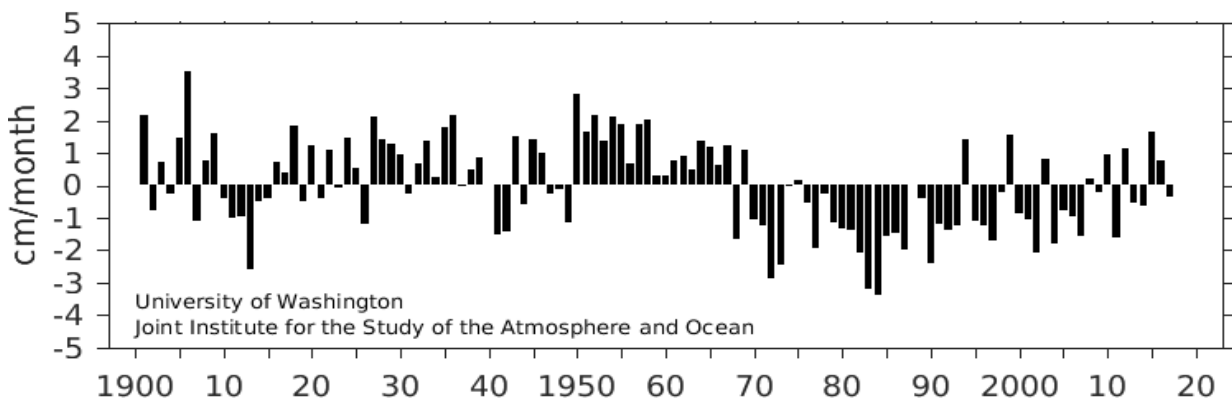
event on the landscape of development and humanitarian work. This is understood to have been the longest drought of the 20th century anywhere on the planet (Xue et al, 2016). Highlighting the range of variability, rainfall gauge data shows that the extended drought and famines of the 1960s, 1970s and 1980s were preceded by an extended period of above average precipitation. The same droughts were then followed by a recovery period in which the precipitation was closer to “normal” level. Most recently, a serious drought occurred in 2012.

West Africa experiences some of the most devastating precipitation variability anywhere in the world and has a history of prolonged and severe droughts, most notably the semi-arid Sahelian region. (Rameshwaran et al, 2021)

As demonstrated in Figure 1 below, seasonal, and decadal precipitation variability is part of the climate system and is indeed difficult to predict with confidence. The graph shows anomalies with respect to the 120-year average calculated from 1900-2017 data, in centimetres per month. An anomaly of -2cm equates to a 100mm deficit for that rainy season, which represents an extremely high percentage anomaly for more northern parts of the Sahel region, whilst still being significant even for southern parts where annual rainfall reaches around 1,000mm. Rainfall during the extended drought referred to above was around 44% lower than the average of the 1950-2010 period. It can be seen from Figure 1 below that the severity and frequency of negative anomalies was high.

When investigating livestock and crop production in any particular location, therefore, it is important to take into consideration the definition of “normal”. Local perceptions of what is normal would be determined by living human memory. The trend of both annual and decadal variability in the graph above highlights that such perceptions and the definitions that stem from them may be problematic.

Figure 1 Precipitation Anomalies in the Sahel, 1901-2017



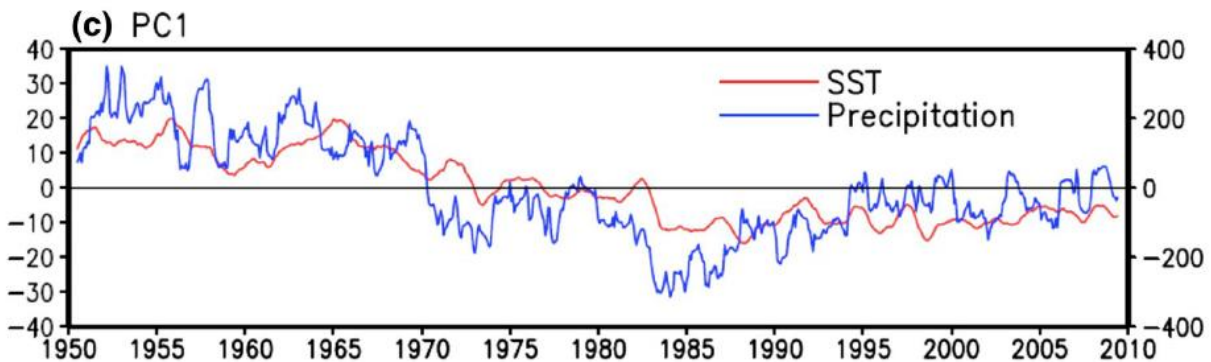
June through October averages over 20-10°N, 20°W-10°E. 1900-2017 climatology
 Deutscher Wetterdienst Global Precipitation Climatology Centre data

Source: <http://research.jisao.washington.edu/data/sahel/> (doi:10.6069/H5MW2F2Q)

According to most in silico climate modelling studies, the primary driver of variations in rainfall in the Sahel is sea surface temperature anomalies, with all the major oceans bearing a remote influence on the system. Analysis of decadal variability of the West African Monsoon by Xue et al (2016) gives a point estimate of up to 60% of the anomaly effect being driven by sea surface temperature. The strong correlation can be seen in Figure 2 below where SST refers to sea surface temperature (Ibid). In the same study, land use and land cover changes were analysed for their role in driving precipitation variability. These were rated as less

fundamental and influential as compared with sea surface temperatures, however, still a first-order magnitude driver. That is to say, natural adjustments in vegetation and land cover, as well as changes in human land use have a significant role in driving fluctuations in rainfall, both positive and negative. Land conditions influence evapotranspiration, and water balances, as well as albedo and surface energy, all which modify climatic patterns. Land cover includes natural vegetation, soil process and associated ecosystem components which adjust naturally to the decadal and inter-decadal phase of the climatic system. Land use changes are typically related to human activity and similarly shift across time, being both influenced by and in return influencing the decadal climate pattern. The Sahel is widely considered to be the geo-climatic system with the highest sensitivity to interactions between land and atmosphere.

Figure 2 Sea Surface Temperature and precipitation in the Sahel



It is important to note again that there is a risk associated with the lack of granularity in the term “Sahel”. An over-generalisation or aggregation of models and analyses risks leading to conclusions that miss what happens in specific areas of the Sahel, be that in the pastoral north, the agricultural south, or the expansive mixed agro-pastoral areas in the middle. Again from Xue et al (2016), “Both positive and negative anomaly areas show strong spatial heterogeneity with many small peak cells. This pattern has been confirmed by the analysis based on rain gauge data and the small cells may reflect the natural variability of mesoscale convective activity that is missed due to the relatively low resolution of the general circulation models.” Likewise, from another study which focuses on flood events, “A significant difficulty in the provision of [information on risks of global climate change on flood frequency] is that general circulation models (GCMs) - the primary tool for regional climate projection - are incapable of resolving mesoscale convective systems, due to their coarse resolution and the complexity of deriving robust storm statistics within parameterized convection schemes. This raises concerns about the suitability of GCMs for predicting the changing risk in severe Sahelian storms” (Rowell et al, 2020).

2.2 Recent Climate Patterns

As indicated above, there have been more negative rainfall anomalies than positive anomalies in recent decades, with a likely negative impact on pastoral and rain-fed agricultural livelihoods (Boyd et al. 2013). Other high impact weather events including flooding and other types of water stress have also occurred in some areas (Cissé et al. 2016). As will be described in detail in a subsequent section, this HEA analysis uses two data sets collected across a multi-year time period, for which it is relevant to understand the specific rainfall patterns both before and during the period. Whilst conducting HEA research in each of these two data phases, baseline and endline, communities were asked to identify the most recent “average” year for which they can provide a full set of information on production. From the rainfall data it is clear that determining a recent “average” year is complicated. For most HEA purposes, however, this complication is less relevant because the use of the data is to determine when future deficits are likely to occur, in the context

of recent patterns (i.e. last 2-3 years at most). Respondents are not asked to consider inter-decadal trends of production and what is average or normal on that time scale, nor indeed even a single decade. Only the last few years is relevant. However, the complication is relevant for this analysis which is attempting to investigate trends and changes in livelihoods that may be related to or being influenced by climatic patterns.

The baseline and endline data sets in 30 livelihood zones of the Sahel were collected in different years. The 30 baseline data sets relate to the years 2007 to 2011, with 2009 being the median year. The 30 endline data sets relate to the years 2011 to 2017, with 2015 being the median year. For the sake of simplicity, the baseline data will be referred to as <2009> baseline data, whilst the endline data will be referred to as <2015> endline data, although the ranges should be borne in mind.

The 2005-2011 period, relevant to the <2009> baseline data, was characterised by relatively more negative and fewer positive anomalous years (i.e. well below normal in balance). Conversely, the 2011-2017 period, relevant to the <2015> endline data, was characterised by more positive anomalies and fewer negative anomalies (see Figure 1). In summary it can be concluded that the <2015> endline data period, although still variable, had better overall rainfall performance compared to <2009> baseline data period. This unique year-on-year variation has an impact on livelihood differences investigated in this study.

2.3 Land Use, Population and Macroeconomic Trends

Population pressure in recent generations has become a prominent socioeconomic feature of Sahelian nations. Since the year 2000, populations have increased by at least 70% across the six countries included as part of this investigation – (World Bank, 2020). The rate of increase of populations in Niger and Chad is even higher, having doubled in the last 20 years. Since the 2007-2011 baselines, population in the six countries have increased by 12% to 17%, a very major change in a period of around 10 or so years. Accordingly, population density has also increased. In some countries from an average 24 to 33 people per square kilometre, an increase of 38%, whilst in Niger, Chad, and Mali the increase is more than 50%. According to demographic statistics from the World Bank, although the proportion of population considered rural is declining, it remains a majority of the population. In 2006, the proportion of populations considered rural ranged from 58% to 84%, depending on the country. In 2017 the range was from 47% to 84%. (World Bank Data, 2022).

The growth in population in rural areas and expansion of urban settlements has diminished land per capita over time resulted, consequently reducing the area of land available for cultivation and pasture, leaving less productive land per household, (Food and Agriculture Organisation, 2019). Additionally, the trend of growing urban population, may explain the shrinking of productive lands as cities expand, together with expansion of the Sahara southwards, further posing a threat to the sustenance of both rural and urban populations' livelihoods.

According to FAO estimates, the arable land and grazing area has increased since 1991, however this is at the expense of forests, which have been cleared to make way for agriculture. This is to be expected given the growing population, there is attempts to increase production and settlement areas, albeit the shrinking of forest areas. It is worth noting that a greater proportion of these lands are degraded – FAO estimates that over 80% of the Sahelian lands are degraded, which when juxtaposed with the characteristic climatic variations and irregular rainfalls, pose two of the biggest obstacles to food security and poverty reduction in the region, according to the UN Environment Programme (UNEP). A further, degradation of forests poses further threats to the already precarious environmental situation in the Sahel, transforming a large proportion of the Sahel into barren land, resulting in the deterioration of the soil and water resources.

The endemic violence in the Sahel has exacerbated livelihood challenges in the region. According to UNOCHA, more than 6.8 million people are affected directly or indirectly by forced displacement due to escalations in armed violence in parts of Burkina Faso, Mali, and Niger as well as persistent conflict across

the Lake Chad Basin and the Central African Republic². Such population displacement has two implications; a loss of livelihoods in the place of origin, and increased pressure in host areas resulting in competition for resources and opportunities and may lead to further conflicts.

According to recent employment data (2020) from the International Labour Organisation, the unemployment rate for the six Sahel countries fluctuates, but has increased overall from around 4% in 2000 to 6% in 2020. 12% was the highest rate reached during the period, (International Labour Organisation, 2020). The unemployment situation is marginally worse for youths, whose unemployment rate increased from 5% in 2000 to 9.5% by 2019.

There are three main sources of labor income: local agricultural labor, migratory labor, and urban/construction labor. These are relevant to varying degrees depending on livelihood zone and the importance of each has changed over time as opportunities emerge and dry up. Overall, the rural economy employs the highest number of people across the Sahel, with at least 50% of populations employed in jobs related to crop production or livestock rearing. These forms of local labour are a particularly critical cash income source for poorer households in livelihood zones where better off households cultivate large areas of land or own large livestock herds. Overall, local labour is as critical to household economies as it is for national economies. Migratory labour is also a central feature of Sahelian economies, particularly in the last decade or so, with an increase in opportunities on construction projects in the many expanding towns and cities. Men outnumber women in all employment sectors.

GDP per capita in the Sahel countries has generally been increasing in the last couple of decades. In some years the increasing trend slowed or reversed, in particular during the financial crisis of 2008/9, the 2013 drought and most recently in 2020 following the outbreak of SARS-CoV-2 when growth declined to less than 1% or was in some cases negative.

In terms of inequality, some studies analysing selected Sahelian countries comparing data from 2000/01 with 2019/20 show an increase in all consumption-based inequality measures over time. However, analyses of the Gini coefficient for consumption per capita shows slight decreases in inequality. In the absence of conclusive evidence, the most reasonable conclusion that can be reached is that inequality did not change to any significant degree in the last two decades.

High quality poverty data is not readily available and often outdated. According to World Bank analysis, the trends of poverty across Sahel countries is mixed. Although poverty remains high, statistics suggest a gradual decline in poverty in the period 2000 to 2015. Food aid or assistance remains a common feature in some livelihood zones, offsetting chronic deficits experienced even in average and good years. Due to the sustained nature of this external intervention many households now expect to receive assistance to be able to survive.

² [OCHA Report February 2020](#)

3. SECTION TWO – RESEARCH AND ANALYTICAL METHODOLOGY

This section introduces the Household Economy Analysis (HEA), the methodology used to collect the data across the period 2007 to 2017. Following that, a description of how this analysis utilized the existing data to identify changes in the various parameters of interest. This section is divided as follows: (i.) HEA Overview, (ii.) history of HEA in the Sahel, (iii.) first level of stratification, geographical division, (iv.) second level of stratification, socioeconomic division, (v.) reference years, (vi.) this analysis – comparing data points across a time series, and (vii.) limitations and caveats.

3.1 HEA OVERVIEW

Household Economy Analysis (HEA) is an analytical framework used to provide a comprehensive description of the economics that occur across a twelve-month period at household level, covering all three fundamental aspects of livelihoods: a) foods consumed from all sources b) cash incomes from sale of goods, produce or labour, and c) expenditures on all categories including food and other commodities. Regions of a country are differentiated based on geographical typology, predominant systems of production and trade and marketing patterns. Households are differentiated based on their socioeconomic typology within a community, a function of their productive and non-productive assets and the type and scale of their economically productive activities.

Numerically quantified data, as well as descriptive, qualitative data, is collected at village level directly from relevant households, in a disaggregated manner, allowing for specific and relatively realistic comparisons to be made. Because data is collected systematically and in the same way in all HEA work, using the same data storage structure and tools, as well as the same analytical framework, it is possible and reasonable to conduct valid comparisons between households of a certain type across two reference periods. Such comparisons across time enable the exploration of changes in livelihoods strategies that have been described and documented, in some cases allowing for insights and indications into possible drivers of changes in livelihoods over time.

3.2 History of HEA in the Sahel

The recurrent droughts of the 1970s and 1980s and the food crises that accompanied them, but more recently the food crises that have occurred since the early 2000s, have led to a rising demand for tools and approaches that can inform policy, intervention design and general decisions related to the capacity to manage impacts of and responses to major exogenous shocks on food production. Countries of the West African region have adopted a common early warning framework referred to as the “Cadre Harmonise”. The Cadre Harmonise enables an understanding of food insecurity risks by integrating the multiple drivers and parameters that underpin household food and nutritional security. This early warning process integrates different kinds of information for the development of specific predictions about how many people may be seriously affected by a negative event, where they are, when it will occur, how severe it will be and for how long. The Household Economy Analysis (HEA) methodology plays an important role in these efforts.

The first HEA baseline studies in the Sahel region were undertaken in 2007 in livelihood zones of central Niger, targeting project areas of Save the Children UK. Since then, baselines have been conducted in many more locations across various countries, around 85 in total. Of these 85 livelihood zones, 30 have had a second round of baseline research completed, providing comparable data points for assessing changes in livelihood access over time.

Since 2010, Save the Children has led a regional, multi-agency effort, known as the Household Economic Analysis Sahel project, initially funded by ECHO, and co-funded by OFDA since 2013. The project was broadly aimed at establishing a food and livelihood security monitoring and analysis system to understand the varied impacts of a single shock (e.g. drought, price changes, livestock disease, etc.). The institutionalisation of HEA capacity in the region has led to increased use of HEA information in early warning systems, providing timely guidance for CH analysis in Burkina Faso, Chad, Mali, Niger, Nigeria, Mauritania, Senegal, and Gulf of Guinea.

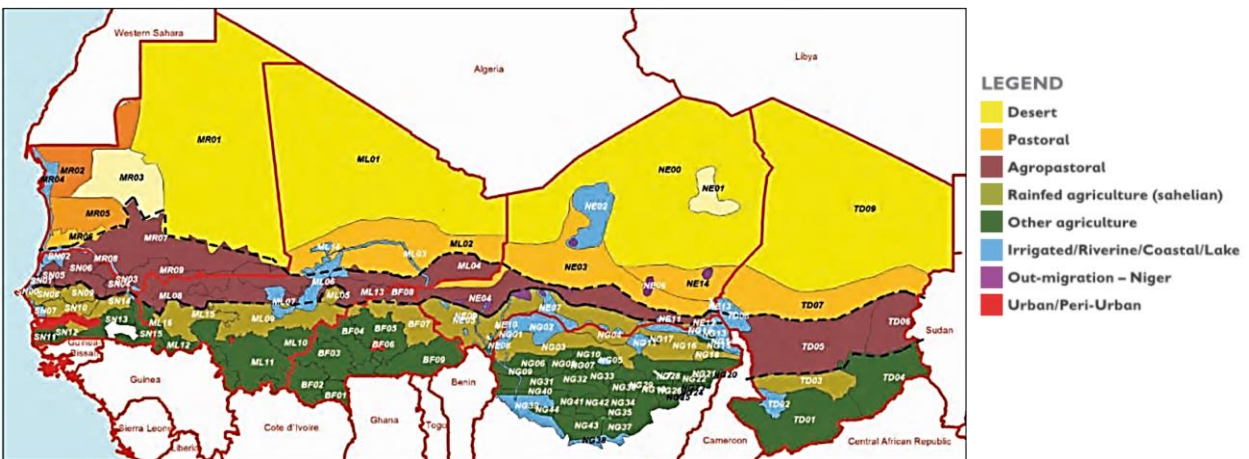
Understanding of household economies has developed significantly, providing improved understanding of how rural and urban households live and the cyclical vulnerability they need to deal with. Degree of exposure to real risks for households is now much better understood (past and future), variance in impact of a shock as stratified by household socioeconomic status (wealth group), intrinsic capacity of households to face risks and cover their annual food and income needs, the predicted degree of impact of various shocks on household access to food and income (i.e. referred to in HEA as “outcome analysis”).

3.3 Geographical Stratification – Livelihood Zones

Livelihood zoning is the first step in the HEA process. In essence, it is a geography-based stratification that separates regions of a country based on their dominant systems of production and markets. The livelihood zones the process produces are homogenous areas within which people share broadly the same means of production and the same access to markets. Dividing countries into livelihood zones allows for a more calibrated and detailed investigation into the livelihood systems that operate within the country, and a more nuanced understanding of how people in different areas will be affected by a wide range of shocks, including drought, market disruption, etc. Put simply, it ensures that data on poor households in pastoral communities is not being compared to poor households from a cropping area, or even between cropping areas with different conditions and crops, given they are subject to very different hazards and economic influences.

The following map of the Sahel region indicates two classifications (Figure 3 below). The colour coding indicates the broad agro-ecological category (see legend), whilst the written code references are the individual HEA livelihood zones within each agro-ecological region. The national livelihood zoning was produced independently in each country, and over the years adjustments have been made to better match similar zones across national frontiers. There are three broad overarching systems of production relevant to the Sahel: pastoral livestock rearing, agropastoralism and agriculture.

Figure 3: Map of Agro-Ecological Regions and Livelihood Zones



Pastoral areas: Mostly found in the very arid, northern part of the Sahel, areas which are either semi-desert or classic desert, nomadic and transhumant pastoralists follow seasonal grazing opportunities with their herds. Relevant countries include Chad, Niger, and Mali. Economically, the area is known by the presence of camel caravans and trucks on the trade routes to Libya and Algeria. Livelihoods are firmly based on keeping of livestock including cattle, camels, sheep, and goats, with live animals being sold and milk and meat being an important source of both food and cash income. Variations in the profile of herds are dependent on the pattern of dominant vegetation of the area, with predominance of browsing species (camel, goats) in some areas, grazing species (cattle, sheep) in other areas, and areas which are more heterogenous in vegetation cover supporting a mixed herd of browsers and grazers. Due to the very limited rainfall received in these zones, crop cultivation is not possible, and in the few areas it is done it is localized, minor and largely opportunistic, highly dependent on the extent of rainfall in a given season. The presence of oases in some parts of the northern Sahel provide additional economic opportunities through cultivation of date palm, particularly in Niger and Mauritania.

Agropastoral areas: This is a band of mixed crop agriculture and livestock production, with livestock being of higher economic importance than crops in most parts. Rainfall is slightly higher than in pastoral areas to the north, therefore only suitable for the cultivation of low moisture-requiring, drought resistant cereals, legume crops and some tubers. The main food crops are sorghum, millet, and tubers. In addition to these production-based livelihoods, inhabitants of this agropastoral area depend on local and migratory seasonal work, often crossing national frontiers.

Agriculture areas: Livelihood zones in this area are typified by smallholder, rainfed agricultural production. To a lesser extent, and in the south of this area, some irrigated cultivation is practiced where rivers and relevant infrastructure are present. This is in the hinter lands beyond the Sahel ecologies, with higher rainfall and with natural vegetation and crop production more in line with Sudanian ecology that predominates beyond the Sahel.

Relevant to this analysis, there were 30 livelihood zones. Four zones in pastoral areas and twenty-six in agropastoral. The breakdown of zone by country is presented in the table below.

Table 1: Livelihood Zones included in Study

| Country | Baseline Code | Livelihood Zone Code | Livelihood Zone Name |
|------------|---------------|----------------------|--|
| Burkina | ZOME 1 | BF01 | South tubers and cereals |
| Burkina | ZOME 2 | BF02 | Southwest fruits, cotton, and cereals |
| Burkina | ZOME 3 | BF03 | West cotton and cereals |
| Burkina | ZOME 4 | BF04 | West cereals and remittances |
| Burkina | ZOME 5 | BF05 | Central plateau cereals and market gardening |
| Burkina | ZOME 7 | BF07 | North and east livestock and cereals |
| Burkina | ZOME 9 | BF09 | Southeast cereals, livestock, forestry and faune |
| Mali | TAR | ML02 | Northern Livestock |
| Mali | TEM | ML03 | Niger Loop Rice and Fishing |
| Mali | NIO | ML07 | Office du Niger Rice and Market Gardening |
| Mali | YOR | ML10 | Southeastern Sorghum, Millet, and Cotton |
| Mali | BAN | ML05 | Dogon Plateau Millet and Shallots |
| Mali | YEL | ML08 | Northwestern Sorghum, Remittances, and Livestock |
| Mauritanie | LZ7 | MR07 | Agropastoralism |
| Mauritanie | LZ5 | MR05 | Pastoral and trade |
| Mauritanie | LZ1 | MR01 | Nomadic pastoralist |
| Niger | ADC | NE05 | Rainfed Millet and Sorghum Belt |

| Country | Baseline Code | Livelihood Zone Code | Livelihood Zone Name |
|---------|---------------|----------------------|---|
| Niger | DKA | NE04 | Agropastoral Belt |
| Niger | MSD | NE04 | Agropastoral Belt |
| Niger | TSU | NE05 | Rainfed Millet and Sorghum Belt |
| Niger | TNO | NE04 | Agropastoral Belt |
| Niger | ZZC | NE05 | Rainfed Millet and Sorghum Belt |
| Niger | ZZI | NE07 | Southern Irrigated Cash Crops |
| Niger | OUA | NE04 | Agropastoral Belt |
| Niger | DPB | NE03 | Transhumant and Nomad Pastoralism |
| Tchad | MAN | TD05 | Central Agropastoral |
| Tchad | SAL | TD09 | Northern Oasis Cultivation with Camels and Natron |
| Tchad | MOUDJ | TD07 | Transhumance |
| Senegal | MAT | SN03 | Valley Rice and Remittances |
| Senegal | TAM | SN06 | Sylvopastoral Livestock and Gathering |

3.4 Socioeconomic Stratification – Wealth Groups

In HEA, wealth is defined in locally relevant and relative terms rather than in absolute or official, national terms. Community members are asked to describe the characteristics of broad groupings of households that exist in their community, typically defining four wealth groups - very poor, poor, middle, and better off. These wealth groups are differentiated based on how households in the four wealth groups typically obtain food and cash income using various forms of productive capital – land, livestock herds, human labour, etc. By the end of an HEA baseline process within a livelihood zone, a full set of data on food, cash and expenditures exists for each of the four wealth groups. Put simply, this step ensures that data from very poor households is not being generically aggregated and analysed alongside data from wealthier households.

In the Sahel, key determinants of wealth are determined by the production system. The number and type of livestock owned is the major wealth determinant in pastoral zones, in contrast to agropastoral areas where both the amount of land cultivated, and livestock numbers are major determinants of wealth. For agropastoral areas, it is important to note the difference between land ownership and land cultivated, the latter being more important. Ownership is a function of specific distribution models that exist historically in each region and country, whereas size of land cultivated and ultimately the level of actual production is a factor of availability of draught power, labour units and capacity for investment into the land (hiring of additional labour, rent in additional land, agricultural inputs, etc.).

3.5 Reference Periods

Methodologically, in each livelihood zone for which an HEA baseline process is conducted, a specific, historic, 12-month period is determined by local leaders and key informants at government level to be the most recent “normal” year. The baseline reference period typically commences with the month of the onset of rains and milk production in pastoral areas or harvests in an agricultural area. All data on production, foods, cash incomes and expenditures collected from households is fixed to this twelve-month reference period. The exact start and end month, as well as the calendar year itself, is different in different zones.

3.6 This Analysis

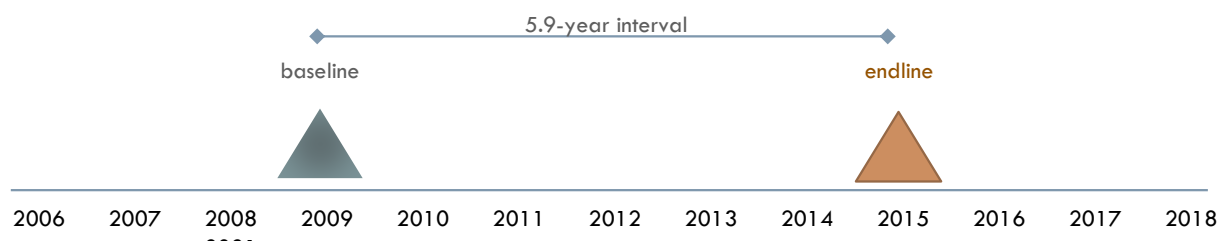
The characteristics of this study, which aims to ascertain potential relationships between changes in livelihoods and climate variability in the same time period, are summarized in the list below:

- ⇒ Retrospective study using existing data, mixed methods
- ⇒ Non statistical
- ⇒ Data from thirty zones, representing six countries in the Sahel
- ⇒ 30 livelihood parameters analysed, disaggregated by 4 wealth groups
- ⇒ Analysis period 2007 to 2017
- ⇒ Time series analysis comparing equivalent data sets – baseline and endline – in each of the thirty livelihood zones
- ⇒ A minimum five-year interval between baseline and endline. It should be noted that despite this selection criteria, one zone had only a three-year interval between baseline and endline (ZOME 1), and an additional four zones had a four-year interval (TSU, TNO, ZOME 5, MOUDJ).
- ⇒ Data is quantitative and qualitative
- ⇒ Climate related data was obtained from the [FEWSNET data portal](#)³.
- ⇒ Observed rainfall data were compared to modelled results from outcome analysis.
- ⇒ Microsoft Excel spreadsheets were compiled to import HEA data from separate baseline spreadsheets for each of the 30 livelihood zones and all four wealth groups. A separate spreadsheet was set up for each country to make it easier to access the data, which was then extracted to create graphs and tables used in the report.

3.7 Baseline and Endline Reference Years

This retrospective, time series analysis of existing reference data was completed using data from two reference periods, herein referred to as the baseline data and endline data. As can be seen in Figure 4 below, the initial phase of data collection from the 30 selected livelihood zones, the baselines, refers to 2006 to 2011, with 2009 being the median year. The second phase of data collection in the same 30 zones, the endlines, refers to the time period 2010 and 2017, with 2015 being the median year. (N.B. Previously defined as the <2009> baseline data and the <2015> endline data.) The average interval between the baseline and endline data sets was 5.9 years.

Figure 4: Schematic Diagram of Interval Between Baseline and Endline



³ Data applies satellite-based estimates normalised with station-based data

The reference year for most Sahel HEA baselines is October to September of the following year, and indeed in the case of the 30 selected zones all baseline reference periods were October to September (see Figures 5 and 6 below).

Figure 5: Reference years for baselines 2006-2011

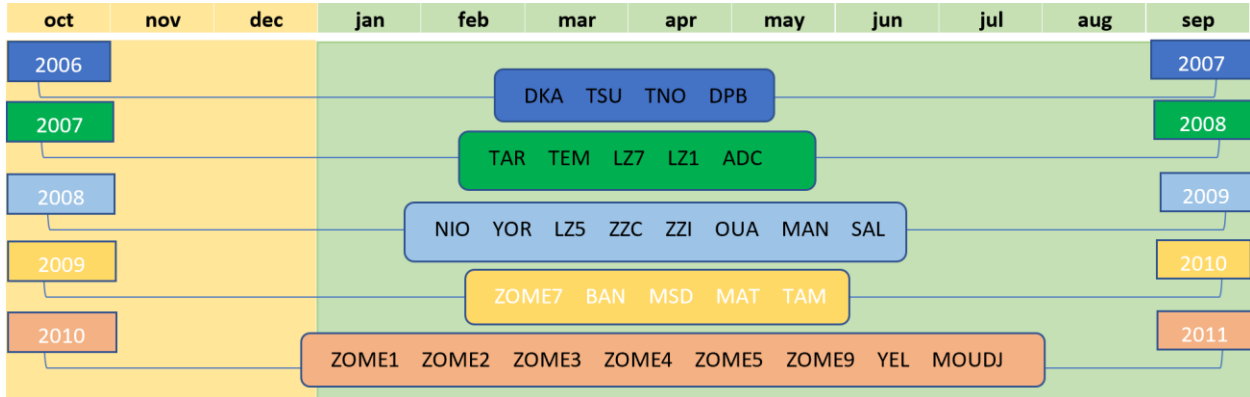
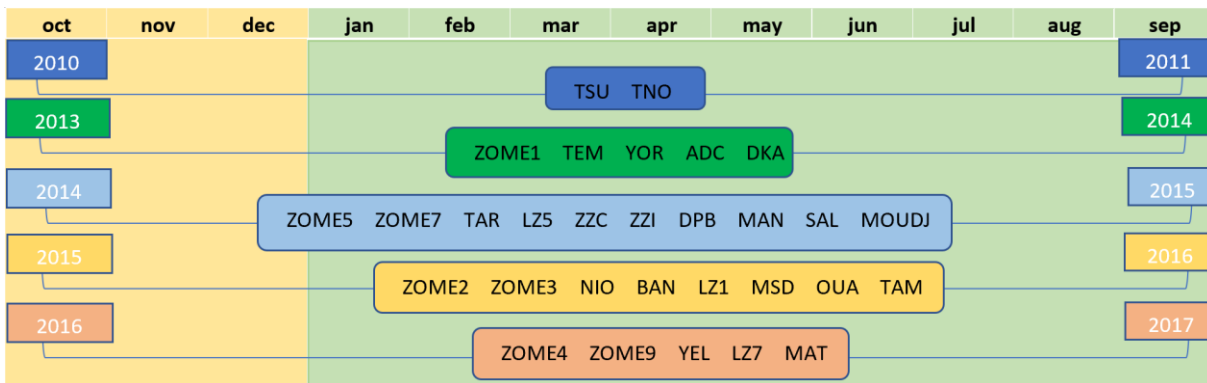


Figure 6: Reference years for endlines 2010 -2017



To contextualise changes that have occurred over time, as well as the potential drivers of change, the study reviewed available secondary information, as outlined in the Scope of Works for the research. Specifically, the following core research questions were analysed.

| Core question | Other data sources variable |
|---|---|
| What is the historical climate-related data trends? | Analysis of historical climate-related data (rainfall and temperature). |
| What are the contextual and policy changes? | Assess key economic indicator performance – GDP in past 10 years |

In order to make a valid comparison between the baseline and endline, the study reviewed climate-related products and reports, rainfall data and temperature data to gain contextual insight into the extent to which livelihoods might have been influenced by climate and weather events. This is not only important because of the centrality of climate to the viability of livelihoods, but is particularly crucial for the Sahel region given the scale of climate variance and historic shifts in the region, and how that has influenced rainfall performance and consequently livelihood outcomes.

In HEA research, the reference year selected represents an average or normal year. However, climatic conditions in the two reference years being investigated are never exactly the same. Thus, some of the changes observed when comparing baseline to endline might be explained by variations in short-term climate patterns. Lower rainfall in one reference year compared to the other reference year may explain a relative decrease or increase in access to food. Indeed, assuming a null hypothesis – that a change is attributable to normal flux of the system – is reasonable as a default explanation, unless there is evidence to the contrary. This is particularly true because of the very narrow time window – 5.9 years – between the baseline and endline. In general, livelihood trends move very slowly, and have inherent variability and flux.

When a discrete event such as a flood occurs, in many cases it can be shown to clearly correlate with a disruption in production after the fact. This would be described as a change or variation, rather than a trend, having a clear, cause-effect time relationship. In the case of repeated discrete events such as consecutive droughts, it must be ascertained whether the pattern of droughts is part of a longer-term permanent trend, or as is relevant for the Sahel, whether they may be another example of an inter-decadal trend that moves above and below the long-term average.

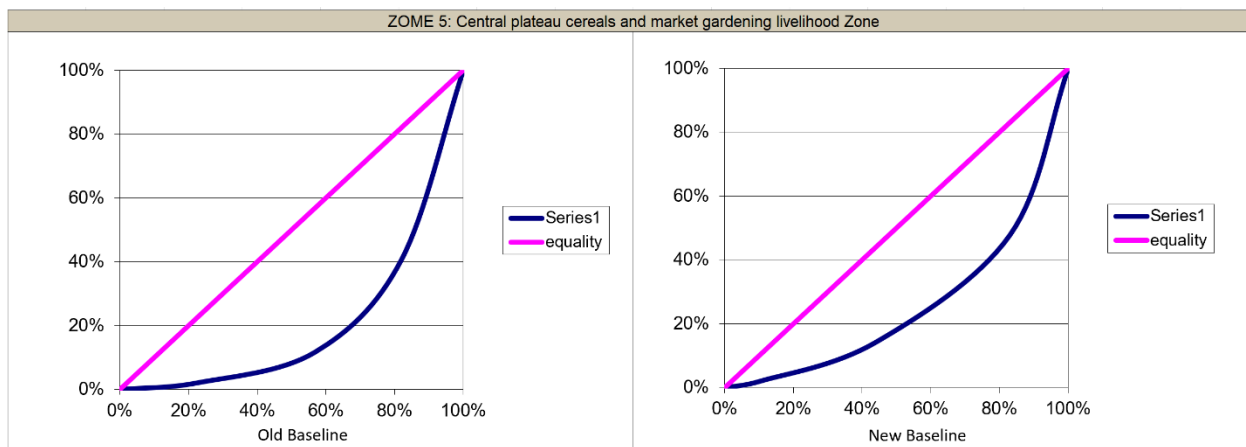
When there are significant changes between the baseline and the endline, such as, new, or lost income sources, or significant changes in the area of land cultivated, these may result in identifiable longer-term changes in the underlying structure of household livelihoods, rather than inherent variation from year to year that is seen in rural areas.

Changes in policy and programmes at the national level, in particular agricultural policies, were reviewed. This included a literature review of each country’s policy and programme context, and broad macro-economic indicators.

3.8 Lorenz Curve Analysis

Lorenz curves⁴ were produced for each livelihood zone, see example in Figure 7. These graphs show the cumulative percentage of total income plotted against the cumulative percentage of the population. An increasing 45° straight line from 0% to 100% indicates a system with no inequality – for each increment of 1% of the population on the X-axis there is a corresponding increase of 1% of the total wealth on the Y-axis. Therefore, the extent to which a plotted curve of population versus wealth falls below a straight diagonal line indicates the degree of inequality of distribution of wealth in the system. The Gini coefficient is

Figure 7: Example of Lorenz Curve Results for Zone 5 in Burkina Faso



⁴ Inequality calculations are inexact and depends on data sets used – the HEA based Lorenz curves may differ from the Lorenz curves and Gini coefficients produced using other data sets

the ratio of the area between the line of perfect equality and the observed Lorenz curve. The higher the coefficient, the more unequal the distribution of wealth.

A separate analysis developed a ratio of how much more total income had been generated by better off households in relation to very poor households in the same zone. Average total income for better off households was divided by average total income for very poor households in each livelihood zone for each time period. A higher ratio indicated a bigger difference in total income.

The above two calculations are measures of inequality. The total income ratio tells us about the difference in food and cash income between a typical better off household and a typical poor or very poor household. The Lorenz curve tells us about the distribution of food and cash income among a zone's population. These two measures may not always be positively correlated. It is possible for the average income divergence between better off and very poor households to decrease over time, but for income inequality to still have grown if the percentage of households falling into the wealthier wealth groups decreases in relation to the size of the poorer wealth groups.

As regards comparisons of HEA data with World bank poverty data, it is important to bear in mind that HEA describes poverty in a different way - local and relative (HEA) versus national and absolute (WB) - and that the timeframe for the trend analysis of the national survey data - from 2000/1 to 2009/10 - is different to the time period of the HEA data.

3.9 Analysis of Averages and Definitions of Change and Differences

The parameters investigated in this retrospective study were converted to a percentage difference over time. This percentage difference was the primary factor used to analyse and understand change. The example below shows how the process was conducted. In the example, averages for ownership of sheep and goats (shoats) by Poor households are presented. In Step One, 30 data points of a single wealth group from the baseline are averaged, which is compared with the average of the 30 data points from the endline. In Step Two, the averages for the four wealth groups are merged into a single figure for the baseline and endline respectively. In Step Three, the difference between the baseline and endline is converted into a single percentage difference.

Step One

| Baseline Data – 30 Zones – Poor | | | | Endline Data – 30 Zones – Poor | | | |
|---------------------------------|----|----|-------------|--------------------------------|----|----|-------------|
| Number of Sheep/Goats | | | | Number of Sheep/Goats | | | |
| 4 | 0 | 3 | Average 5.9 | 4 | 0 | 3 | Average 5.8 |
| 4 | 5 | 4 | | 7 | 5 | 3 | |
| 2 | 3 | 1 | | 4 | 3 | 3 | |
| 3 | 19 | 2 | | 6 | 25 | 2 | |
| 6 | 4 | 1 | | 5 | 6 | 2 | |
| 3 | 6 | 11 | | 4 | 6 | 3 | |
| 5 | 2 | 4 | | 7 | 2 | 5 | |
| 12 | 12 | 3 | | 14 | 9 | 3 | |
| 3 | 10 | 22 | | 6 | 10 | 15 | |
| 1 | 6 | 16 | | 3 | 5 | 6 | |

Step Two

| Av. # Shoats Very Poor | | Av. # Shoats Poor | | Av. # Shoats Middle | | Av. # Shoats Better Off | |
|--|-----|-----------------------------|-----|-------------------------------|------|-----------------------------------|------|
| Base | End | Base | End | Base | End | Base | End |
| 4.1 | 4.2 | 5.9 | 5.8 | 15.0 | 14.5 | 10.1 | 12.2 |
| Baseline Average – $4.1 + 5.9 + 15.0 + 10.1 / 4 = 8.7$ | | | | | | | |
| Endline Average – $4.2 + 5.8 + 14.5 + 12.2 = 9.2$ | | | | | | | |

Step Three

| | |
|---|------------------------------|
| Difference between averages | $9.2 - 8.7 = 0.5$ |
| Converted to percentage | $0.5 / 8.7 \times 100 = 5\%$ |
| Aggregated Difference across 4 wealth groups, all Sahel | +5% |

The averaged degree of difference between the baseline data set and the endline data set was interpreted as follows:

- No significant difference – up to 10% plus/minus - this was interpreted as most likely being a function of inherent and normal fluctuation of livelihoods within the system, etc.
- Significant difference – 10% to 20% plus/minus – this was interpreted as being indicative of a difference that was significant enough that it was worth considering potential drivers for the difference.
- Very significant difference – 20% or higher plus/minus – this was interpreted as being very important.

Based on the above thresholds, the +5% increase in ownership by all four wealth groups of sheep and goats across the whole of Sahel is interpreted as not being of significance. In other words, it could just as easily be a normal fluctuation of herds as would be expected from year to year based on weather variations or market demand, as it could be part of a directional shift over time. In any case, even if it represents a real directional shift, it is not realistic to confidently attribute such a small change to a specific driver.

This is relevant when considering the following statement from Climate Journal Volume 21, (Biasutti, et al. 2008). “The outlook for Sahel precipitation in many model simulations is very uncertain, with many disagreements on sign of future trends. However, what is noticeable is the increasing fluctuation of droughts and floods from year to year.” (Biasutti, 2019)

NOTE: The consultant acknowledges that the time period of comparison is too short to be conclusive about climate change. The majority of HEA baseline data points used in the analysis are 5-8 years apart. Given this short period, variations in climate data – mainly rainfall – will be used as the basis for discussion, not climate change *per se*.

3.10 Results Dashboards

For each parameter a summary dashboard is presented in which the data for each wealth group is available for review. It shows the average value at time of baseline (B), the average value at time of endline (E), the percentage difference (X%), and the number of livelihood zones in which there was an increase (10), decrease (10) or no change (10) in the value of the parameter. A blank version of the dashboard is presented below.

| | Very Poor | | | Poor | | | Middle | | | Better Off | | | Overall Summary | | |
|--|------------|----|---------------------------------|------------|----|---------------------------------------|------------|----|---------------------------------|------------|----|-----|-----------------|-------|-----|
| | "B" to "E" | | | "B" to "E" | | | "B" to "E" | | | "B" to "E" | | | | | |
| | %Δ | | | %Δ | | | %Δ | | | %Δ | | | | | |
| | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | | | |
| All Sahel | B | | E | B | | E | B | | E | B | | E | Av. B | Av. E | |
| | X % | | | X % | | | X % | | | X % | | | Av. X % | | |
| | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Pastoral Zones | B | | E | B | | E | B | | E | B | | E | Av. B | Av. E | |
| | X % | | | X % | | | X % | | | X % | | | Av. X % | | |
| | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Agro-Pastoral Zones | B | | E | B | | E | B | | E | B | | E | Av. B | Av. E | |
| | X % | | | X % | | | X % | | | X % | | | Av. X % | | |
| | 8.0 | 10 | 8.0 | 8.0 | 10 | 8.0 | 8.0 | 10 | 8.0 | 8.0 | 10 | 8.0 | 8.0 | 10 | 8.0 |
| B – baseline value | | | X ↑ - # of LZs increased B to E | | | Y ± - # of LZs more or less unchanged | | | Z ↓ - # of LZs decreased B to E | | | | | | |
| E – endline value | | | | | | | | | | | | | | | |
| %Δ - overall percentage change from B to E | | | | | | | | | | | | | | | |

4 SECTION THREE – RESULTS

This section presents the results of the investigation, delving into the six, core research questions. As introduced in an earlier section of this report, the six core research questions are as follows:

| | |
|--|---|
| i. Have there been changes in wealth and assets? | ii. Have there been changes in the distribution of wealth for each livelihood zone? |
| iii. Have there been changes in household sources of food? | iv. Have there been changes in household source of cash income? |
| v. Have there been changes in expenditure patterns? | vi. What is the resilience capacity of households? |

Have there been changes in wealth and assets?

Eight HEA parameters are investigated in answer to this core question.

| | |
|--|--|
| 1. % of households in each wealth group | 2. Number of people in each wealth group |
| 3. Area of land cultivated | 4. Area of land cultivated |
| 5. Number and type of livestock owned (camels, cattle, sheep, goats) | 6. Other productive assets |
| 7. Total income (food income + cash income) | 8. Total cash income food and cash terms |

Table 2 below presents the overall summary of averaged data for main parameters that determine wealth across the Sahel. The percentages in the table are percentage differences between baseline data and endline data, with data representing 30 livelihood zones across the Sahel region and aggregated across all wealth groups from Very Poor to Better Off. All values are below a threshold of 10% were categorized as not significant, in that they could well be part of the intrinsic fluctuation of livelihoods inherent within the system. However, there is a general increase in livestock ownership, whilst size of land cultivated has declined, this trend suggests a better situation for livestock owners whilst decline in land cultivated may require households to increase production techniques and improved inputs to maintain production.

Table 2: Summary table for change in Assets

| Variable | Percentage change | Interpretation |
|-------------------|-------------------|-----------------|
| Assets | | |
| # Livestock total | 6% | Not significant |
| # Camels | 9% | Not significant |
| # Cattle | 6% | Not significant |
| # Sheep & Goats | 5% | Not significant |
| Land cultivated | -9% | Not significant |

4.1 Proportion of Community in Each Wealth Group

| | Very Poor | | | Poor | | | Middle | | | Better Off | | |
|---------------------|-------------|----|----|------------|----|----|------------|----|----|------------|----|----|
| | "B" to "E" | | | "B" to "E" | | | "B" to "E" | | | "B" to "E" | | |
| | % Δ | | | % Δ | | | % Δ | | | % Δ | | |
| | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | |
| All Sahel | 29 | 25 | 25 | 33 | 34 | 34 | 24 | 27 | 27 | 14 | 14 | 14 |
| | -14% | | | 4% | | | 13% | | | -2% | | |
| | 5 | 10 | 15 | 13 | 11 | 6 | 14 | 13 | 3 | 8 | 12 | 10 |
| Pastoral Zones | 34 | 27 | 27 | 26 | 30 | 30 | 22 | 27 | 27 | 18 | 17 | 17 |
| | -21% | | | 12% | | | 22% | | | -4% | | |
| | 1 | - | 3 | 2 | 2 | - | 2 | 2 | - | 1 | - | 3 |
| Agro-Pastoral Zones | 28 | 29 | 29 | 34 | 35 | 35 | 24 | 27 | 27 | 14 | 13 | 13 |
| | 3% | | | 3% | | | 11% | | | -2% | | |
| | 4 | 10 | 12 | 11 | 9 | 6 | 12 | 11 | 3 | 7 | 12 | 7 |

In the table above it can be seen that across the Sahel there is a noticeable decline in the proportion of households categorized as Very Poor, a noticeable increase in the proportion of households categorized as Middle, and no change in the proportions of households categorized as Poor and Better Off. This trend corresponds with what has been noted in national poverty statics in the previous section, which describes a decline in population below national poverty lines.

Of the 30 zones, 15 of them saw a reduction in the proportion of the Very Poor, and another 10 saw no change. Only 5 saw an increase in the proportion of Very Poor. For Middle households, 14 of the zones saw an increase in the proportion of households categorized as Middle, whilst another 13 zones saw no change.

The general trend suggests a positive relative improvement.

This relative positive improvement in wealth distribution from the poorest to wealthier households, also noticeable on the national averages for the selected six Sahel countries (see Table 3).

Table 3: Changes in wealth breakdown by Country: % of households per wealth group

| Country | Very Poor | | Poor | | Middle | | Better - Off | |
|------------|-----------|-----|------|-----|--------|-----|--------------|-----|
| | Old | New | Old | New | Old | New | Old | New |
| Chad | 31 | 29 | 29 | 30 | 24 | 24 | 17 | 18 |
| Burkina | 22 | 20 | 40 | 40 | 25 | 25 | 13 | 13 |
| Senegal | 28 | 21 | 34 | 37 | 26 | 30 | 12 | 12 |
| Niger | 32 | 32 | 31 | 34 | 23 | 23 | 15 | 12 |
| Mauritania | 42 | 27 | 25 | 30 | 20 | 26 | 12 | 17 |
| Mali | 29 | 20 | 31 | 33 | 25 | 32 | 16 | 16 |

4.2 Area of Land Cultivated

| | Very Poor | | | Poor | | | Middle | | | Better Off | | | Overall Summary | | |
|---------------------|------------|-------------|-----|------------|-------------|-----|------------|------------|-----|------------|------------|-----|-----------------|------------|-----|
| | "B" to "E" | | | "B" to "E" | | | "B" to "E" | | | "B" to "E" | | | | | |
| | % Δ | | | % Δ | | | % Δ | | | % Δ | | | | | |
| | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | | | |
| All Sahel | 1.6 | | 1.2 | 2.6 | | 2.1 | 4.9 | | 4.6 | 8.4 | | 8.0 | 4.4 | | 4.0 |
| | | -24% | | | -19% | | | -7% | | | -5% | | | -9% | |
| | 4 | 5 | 17 | 4 | 5 | 17 | 12 | 2 | 13 | 10 | 4 | 11 | 8 | 4 | 15 |
| Pastoral Zones | - | | - | - | | 0.1 | - | | 0.1 | - | | 0.2 | - | | 0.1 |
| | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Agro-Pastoral Zones | 1.8 | | 1.6 | 3.0 | | 2.4 | 5.7 | | 5.3 | 9.6 | | 9.2 | 5.0 | | 4.6 |
| | | -14% | | | -19% | | | -7% | | | -5% | | | -9% | |
| | 4 | 5 | 17 | 4 | 5 | 17 | 12 | 2 | 13 | 10 | 4 | 11 | 8 | 4 | 15 |

There was a 9% decline in overall land cultivation across all Sahel, and across all wealth groups. As per the defined thresholds this is interpreted as marginally below the threshold of significance.

There was a significant decrease in the area of land cultivated by Very Poor and Poor households in agro-pastoral areas, during the time period under investigation. In absolute terms this is a reduction from 1.8 to 1.6 for Very Poor and from 3.0 to 2.4 for the Poor. Meanwhile, there was no significant difference in the size of land cultivated by Middle and Better Off households.

On average, a decline in the area cultivated by households may influence changes in production and wealth, but is not necessarily an indication of change in assets. This finding corresponds with the trends in land area per capita discussed in an earlier section, associated with a growth in population and corresponding subdivision of land into smaller plots. Conversely, however, this decline does not correspond to other data that suggests an overall increase in area planted, from the opening up of forest lands. It is essential to explore further the possible reasons for this decline, considering that recent baseline data saw higher levels of rainfall.

4.3 Total Number of Livestock Owned

| | Very Poor | | | Poor | | | Middle | | | Better Off | | | Overall Summary | | |
|---------------------|------------|---|----|------------|---|----|------------|---|----|------------|---|----|-----------------|---|----|
| | "B" to "E" | | | "B" to "E" | | | "B" to "E" | | | "B" to "E" | | | | | |
| | % Δ | | | % Δ | | | % Δ | | | % Δ | | | | | |
| | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | | | |
| All Sahel | 8 | | 9 | 11 | | 13 | 32 | | 33 | 29 | | 31 | 20 | | 21 |
| | 9% | | | 11% | | | 4% | | | 5% | | | 6% | | |
| | 9 | 3 | 12 | 16 | 7 | 6 | 13 | 4 | 13 | 15 | 5 | 10 | 13 | 5 | 10 |
| Pastoral Zones | 35 | | 30 | 44 | | 40 | 91 | | 84 | 82 | | 77 | 63 | | 58 |
| | -15% | | | -10% | | | -8% | | | -6% | | | -10% | | |
| | 1 | - | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 2 |
| Agro-Pastoral Zones | 4 | | 8 | 7 | | 9 | 23 | | 25 | 21 | | 24 | 14 | | 17 |
| | 123% | | | 33% | | | 12% | | | 12% | | | 22% | | |
| | 8 | 3 | 9 | 14 | 6 | 5 | 12 | 3 | 11 | 13 | 4 | 9 | 12 | 4 | 9 |

There was a 6% increase in ownership of total combined types of livestock (all livestock converted to shoat equivalent⁵) across all Sahel, and across all wealth groups. As per the defined thresholds this is interpreted as below the threshold of significance.

Percentage differences for each wealth group were small, however they were all in the positive. This aggregated analysis hides the fact that the pastoral parts of the Sahel saw a marginal decline in overall livestock numbers across all four wealth groups, however only the Very Poor's herd decline was significant. For agro-pastoral areas of the Sahel, the opposite trend was observed. There were significant increases in total livestock holdings for all four wealth groups, particularly so for the Very Poor and Poor.

4.4 Total Number of Camels Owned

| | Very Poor | | | Poor | | | Middle | | | Better Off | | | Overall Summary | | |
|---------------------|------------|---|-----|------------|---|-----|------------|---|-----|------------|---|-----|-----------------|---|-----|
| | "B" to "E" | | | "B" to "E" | | | "B" to "E" | | | "B" to "E" | | | | | |
| | % Δ | | | % Δ | | | % Δ | | | % Δ | | | | | |
| | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | | | |
| All Sahel | 0.4 | | 0.4 | 0.5 | | 0.6 | 1.0 | | 1.0 | 0.8 | | 0.9 | 0.7 | | 0.7 |
| | 18% | | | 13% | | | 5% | | | 6% | | | 9% | | |
| | 1 | - | 1 | 1 | - | 1 | 1 | 1 | 2 | 2 | - | 2 | 1 | 0 | 2 |
| Pastoral Zones | 2.5 | | 2.0 | 3.5 | | 3.0 | 6.4 | | 5.0 | 5.4 | | 4.5 | 4.4 | | 3.6 |
| | -20% | | | -14% | | | -22% | | | -16% | | | -18% | | |
| | - | - | 1 | - | - | 1 | - | 1 | 2 | 1 | - | 2 | 0 | 0 | 2 |
| Agro-Pastoral Zones | 0.0 | | 0.4 | 0.1 | | 0.2 | 0.2 | | 0.4 | 0.1 | | 0.3 | 0.1 | | 0.3 |
| | 928% | | | 200% | | | 175% | | | 167% | | | 253% | | |
| | 1 | - | - | 1 | - | - | 1 | - | - | 1 | - | - | 1 | - | - |

⁵ For this conversion 1 Camel = 6 shoats and 1 cattle = 4 goats

There was a 9% increase in ownership of camels across all Sahel, and across all wealth groups. As per the defined thresholds this is interpreted as marginally below the threshold of significance.

Ownership of camels in pastoral areas of the Sahel saw a decline that can be considered significant over the time period under investigation. This was relevant for all four wealth groups. Declines ranged from around 14% to 22%. The results in the above table for All Sahel and Agro-Pastoral are not particularly valid, given the numbers of actual camels in the latter are very small.

The reason for a decline in camel numbers in pastoral areas is unknown.

4.5 Total Number of Cattle Owned

| | Very Poor | | | Poor | | | Middle | | | Better Off | | | Overall Summary | | |
|---------------------|------------|---|---|------------|---|---|------------|---|----|------------|---|----|-----------------|---|---|
| | "B" to "E" | | | "B" to "E" | | | "B" to "E" | | | "B" to "E" | | | | | |
| | % Δ | | | % Δ | | | % Δ | | | % Δ | | | | | |
| | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | X↑:Y±:Z↓ | | | | | |
| All Sahel | 0 | | 0 | 1 | | 1 | 3 | | 3 | 4 | | 3 | 2 | | 2 |
| | 13% | | | 39% | | | 14% | | | -6% | | | 6% | | |
| | 3 | - | 2 | 4 | 1 | 2 | 9 | 9 | 10 | 9 | 9 | 11 | 6 | 5 | 6 |
| Pastoral Zones | 2 | | 2 | 2 | | 2 | 5 | | 6 | 7 | | 6 | 4 | | 4 |
| | 0% | | | 0% | | | 23% | | | -11% | | | 3% | | |
| | 1 | - | 1 | 1 | - | 1 | 1 | 2 | - | 1 | - | 2 | 1 | 1 | 1 |
| Agro-Pastoral Zones | 0 | | 0 | 0 | | 1 | 2 | | 3 | 3 | | 3 | 2 | | 2 |
| | 117% | | | 70% | | | 11% | | | -4% | | | 11% | | |
| | 2 | - | 1 | 3 | 1 | 1 | 8 | 7 | 10 | 8 | 9 | 9 | 5 | 4 | 5 |

There was a 6% increase in ownership of cattle across all Sahel, and across all wealth groups. As per the defined thresholds this is interpreted as below the threshold of significance.

Very Poor, Poor, and Middle households across the Sahel saw significant increases in ownership of cattle, ranging from 13% increase to 39% increase. It should be borne in mind that the percentage increases for Very Poor and Poor are in fact very small in real terms. The increases for these three wealth groups was counterbalanced by a decrease in cattle ownership by Better Off households across the Sahel, although this decline was below the threshold of significance and may not be a real decline.

4.6 Total Number of Sheep and Goats Owned

| | Very Poor | Poor | Middle | Better Off | Overall Summary |
|---------------------|-------------------|--------------------|----------------------|---------------------|--------------------|
| | "B" to "E" | "B" to "E" | "B" to "E" | "B" to "E" | |
| | % Δ | % Δ | % Δ | % Δ | |
| | X↑:Y±:Z↓ | X↑:Y±:Z↓ | X↑:Y±:Z↓ | X↑:Y±:Z↓ | |
| All Sahel | 4 2% 9 3 12 | 6 -1% 15 7 7 | 15 -3% 12 8 10 | 10 20% 15 7 6 | 9 5% 13 6 9 |
| Pastoral Zones | 13 -18% 1 3 | 15 -8% 2 2 | 34 -11% - 2 2 | 23 16% 3 1 - | 21 -6% 2 1 2 |
| Agro-Pastoral Zones | 3 56% 8 3 9 | 5 3% 13 7 5 | 12 0% 12 6 8 | 8 23% 12 6 6 | 7 13% 11 6 7 |

There was a 5% increase in ownership of sheep and goats across all Sahel, and across all wealth groups. As per the defined thresholds this is interpreted as below the threshold of significance.

The only significant difference in sheep and goat holdings was for Better Off households, who saw an increase of around 20% across the time period investigated. The measured difference for all other wealth groups was below 10%. The situation is slightly different when pastoral areas are analysed separately from agro-pastoral areas. In pastoral areas, there were significant declines in sheep and goat herds for Very Poor and Middle households, an insignificant decline for Poor households, and a significant increase in herd sizes for Better Off households. The trend was opposite in agro-pastoral areas where significant increases in herds were observed for both Very Poor and Better Off households, with an overall increase of 13% across all four wealth groups.

4.7 Total Income in Food Terms

| | Very Poor | Poor | Middle | Better Off | Overall Summary |
|---------------------|-----------------------|-----------------------|----------------------|------------------------|----------------------|
| | "B" to "E" | "B" to "E" | "B" to "E" | "B" to "E" | |
| | % Δ | % Δ | % Δ | % Δ | |
| | X↑:Y±:Z↓ | X↑:Y±:Z↓ | X↑:Y±:Z↓ | X↑:Y±:Z↓ | |
| All Sahel | 214% -9% 6 6 18 | 240% -4% 7 6 17 | 366% 2% 7 6 17 | 458% 8% 11 6 13 | 319% 1% 8 6 16 |
| Pastoral Zones | 245% -10% 1 1 2 | 266% -9% 1 1 2 | 448% -8% 1 - 3 | 577% -9% 1 - 3 | 384% -9% 1 1 3 |
| Agro-Pastoral Zones | 209% -8% 5 5 16 | 236% -3% 6 5 15 | 353% 4% 6 6 14 | 439% 12% 10 6 10 | 310% 3% 7 6 14 |

There was a 1% increase in total food and cash income expressed in kilocalories across all Sahel, and across all wealth groups. As per the defined thresholds this is interpreted as below the threshold of significance.

Although total income is not itself a measure of wealth, but rather a measure of how much income a household is able to generate given its array of livelihood capital - which will vary depending on local production and market conditions - it nevertheless provides an indicator of wealth, since the more wealth and assets, a household has, the more food and cash income it is able to generate. Total income expressed in food terms is essentially a statement about the purchasing power of households in relation to food. Taken as aggregate across the whole Sahel, there was no significant difference for any of the four wealth groups with all results below the 10% threshold. The same observation is made for the pastoral areas, although it was noticeable that all results were in the negative direction. A similar result was found for agro-pastoral areas, with the exception of the Better Off whom saw a moderately significant increase in total income across the period of investigation, around 12%.

4.8 Gini Coefficient

| Overall Summary | | | |
|-----------------|------|------|------|
| "B" to "E" | | | |
| % Δ | | | |
| X ↑ : Y ± : Z ↓ | | | |
| All Sahel | 0.47 | 0.41 | -13% |
| | 4 | 5 | 21 |
| Pastoral Zones | 0.45 | 0.39 | -15% |
| | - | 1 | 3 |
| Agro-Zones | 0.47 | 0.41 | -13% |
| | 4 | 4 | 18 |

There was a 13% decrease in inequality across all Sahel. The wealth distance between Very Poor and Better Off households has narrowed over the period between the baseline and endline.

The Lorenz curve results, indicate that the level of income inequality has decreased in 21 zones while increasing in 4 zones and remained the same in 5 zones. In zones where inequality has decreased, it suggests that there is an improved share of wealth across wealth groups.

It is notable that the spread of income decreased in every zone between the two time periods. The data suggests that the decreased spread is the result of a decline in total income for middle and better off households and stagnant or marginal increases in total income for poor and very poor households.

Have there been changes in household sources of food?

A fundamental component of HEA is the attempt to understand how households obtain their food in a typical year. Households in Sahel rely on four main pathways for obtaining food: i.) they grow or produce it themselves; ii.) they purchase it from the market; iii.) they receive it in kind in exchange for a service/commodity; and iv.) they receive it in the form of gifts/aid. In this study, the changes in the composition of sources of food as well as components in each source were considered, including own crop production, livestock production, market purchases, and food aid.

It is important to keep in mind that there are normal variations in the relative importance of different sources of food from year to year, relating to changes in weather-dependent production, and changes in food prices. Thus, the changes below do not necessarily indicate a longer-term structural change. However, the newer baseline year has production on smaller pieces of land, which suggest that decline in production could possibly indicate structural changes.

Table 4 below presents the overall summary of changes in sources of food. The percentages in the table are percentage. All values below a threshold of 10% were categorized as not significant, in that they could well be part of the intrinsic fluctuation of livelihoods inherent within the system. However, there is a small decline in food from crops while there is an increase in food purchase and aid, this is indicative of possible shifts in reliance on food production.

Table 4: Summary table Sources of food

| Variable | Percentage change | Interpretation |
|-------------------------|-------------------|-----------------|
| Food Consumption | | |
| Food – all sources | 1% | Not significant |
| Food from crops | -2% | Not significant |
| Food from livestock | 5% | Not significant |
| Food from purchase | 3% | Not significant |
| Food from food aid | 7% | Not significant |

4.9 Food Calories from Own Crops

| | Very Poor | | Poor | | Middle | | Better Off | | Overall Summary | | | | | | |
|---------------------|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|----|----|----|----|----|
| | "B" to "E" | | "B" to "E" | | "B" to "E" | | "B" to "E" | | | | | | | | |
| | % Δ X↑:Y±:Z↓ | | % Δ X↑:Y±:Z↓ | | % Δ X↑:Y±:Z↓ | | % Δ X↑:Y±:Z↓ | | | | | | | | |
| All Sahel | 30% | 30% | 38% | 38% | 55% | 54% | 69% | 65% | 48% | 47% | | | | | |
| | 1% | | 0% | | -1% | | -6% | | -2% | | | | | | |
| | 10 | 7 | 10 | 10 | 7 | 10 | 9 | 3 | 14 | 6 | 8 | 12 | 9 | 6 | 12 |
| Pastoral Zones | 1% | 0% | 1% | 1% | 0% | 1% | 0% | 1% | 0% | 1% | 0% | 1% | 0% | 1% | |
| | -100% | | 12% | | | | | | 58% | | | | | | |
| | - | - | 1 | 1 | - | - | - | - | - | 0 | - | 0 | 0 | 0 | |
| Agro-Pastoral Zones | 34% | 35% | 44% | 44% | 64% | 63% | 80% | 75% | 55% | 54% | | | | | |
| | 1% | | 0% | | -2% | | -6% | | -2% | | | | | | |
| | 10 | 7 | 9 | 9 | 7 | 10 | 9 | 3 | 14 | 6 | 8 | 12 | 9 | 6 | 11 |

There was a 2% decrease in the contribution of crops to household food consumption across all Sahel, and across all wealth groups. As per the defined thresholds this is interpreted as below the threshold of significance.

Very Poor, Poor, and Middle households in agropastoral areas of the Sahel experienced 0 to 2 percentage differences above and below the baseline averages, whilst Better Off households experienced a marginally bigger decline, around 6%, although this was still below the threshold of significance. This food from crops parameter has limited relevance for pastoral areas.

A substantial reduction in the amount of food obtained from households' own crop production can be seen in 6 of the 30 zones, whilst it has substantially increased in 4 or 5 of the zones (See Figure 8 below). Various factors are relevant as regards increases or decreases in crop production – rainfall differences between the baseline and endline years, as well as the years in between, and also changes in access to inputs and labour. Comparing area cultivated and production together with rainfall received in the baseline and endline years,

there is an indication that weather was an influence in household production decisions as regards cultivation of land. Specifically, it appears that production increased in zones where rainfall was significantly higher in the endline as compared with the baseline and decreased or did not change in areas where rainfall only marginally increased (less than 10% change), remained the same or declined. As discussed in Section 1.3, increase in national population is postulated to have led to reduction in land sizes per household – directly affecting the amount of land households have to both cultivate crops and raise livestock.

Figure 8: % Change in crop calories weighted average by livelihood zone

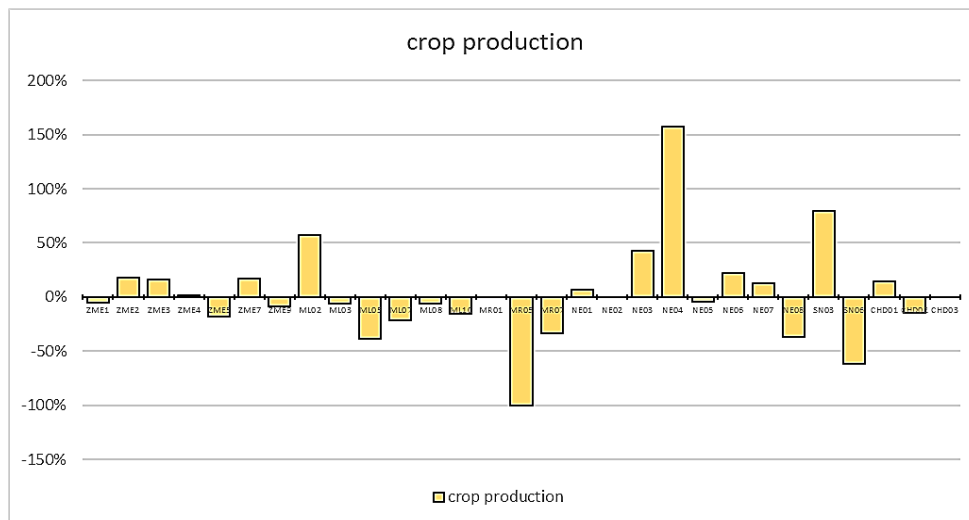
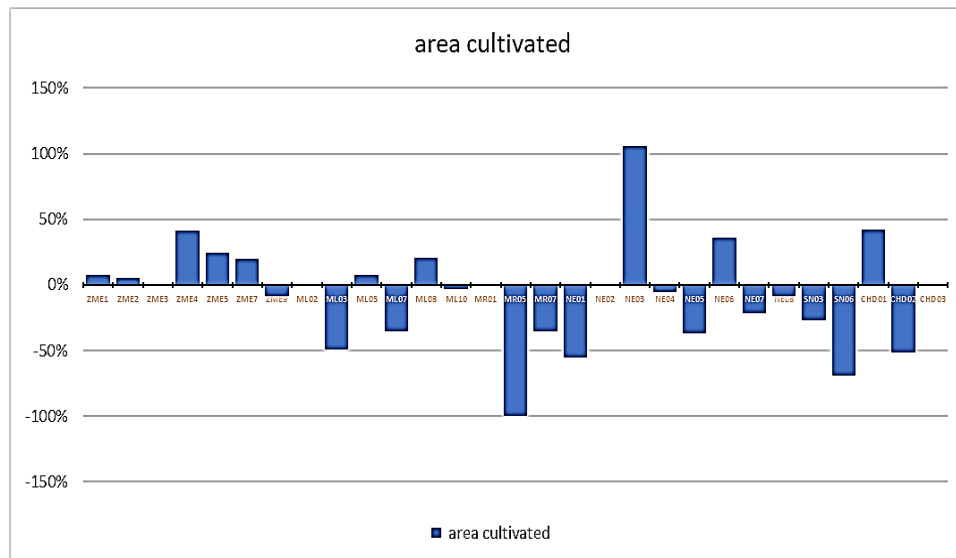


Figure 9: % Change in area cultivated weighted average by livelihood zone



It is reasonable to expect that when land area is reduced households respond by investing in increasing their yield per unit area. This could be through increased uptake of inputs and improved seed varieties, promoting soil conservation and moisture retention, intensifying production through micro-dams, river diversion, ponds, and shallow wells as well as some larger operations such as irrigation. It is worth keeping in mind that although rainfall was generally better during the endline as compared with the baseline period (in terms of volume), yields in some zones declined. Therefore, better weather conditions can't be the single explaining factor. In

fact, the lower and higher yields appear to be a result of variations in investment level. The significant spending in areas that show higher yields suggest that rainfall alone is not adequate to increase production and that more investments helped households increase their production. Households invested more of their cash in crop production, some of which comes from credit.

The graphs below present evidence from baseline and endline years. Yields have remained the same or declined in 14 zones whilst increasing in 10 livelihood zones.

Figure 10: Comparison of average yields (kg/ha)

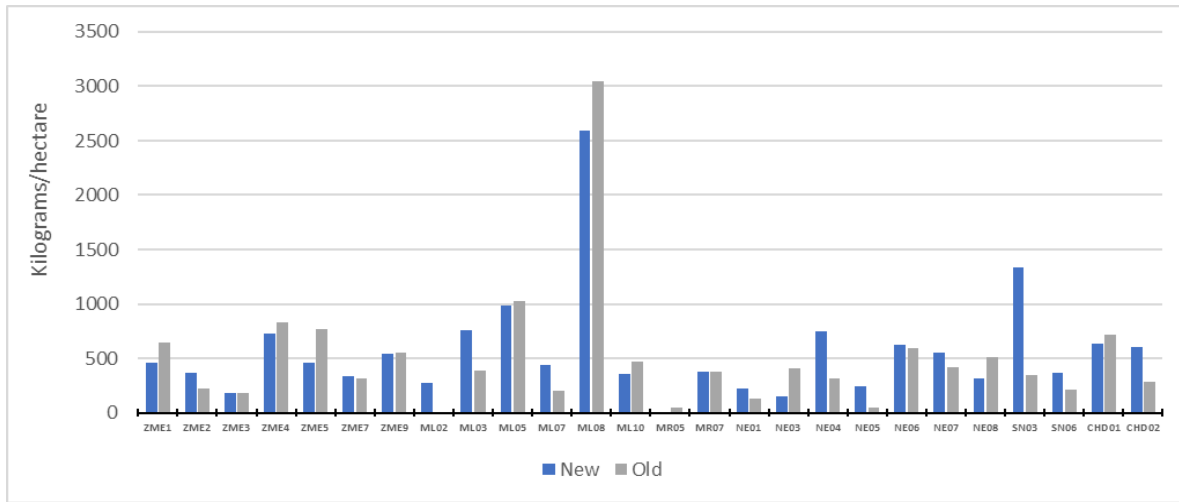
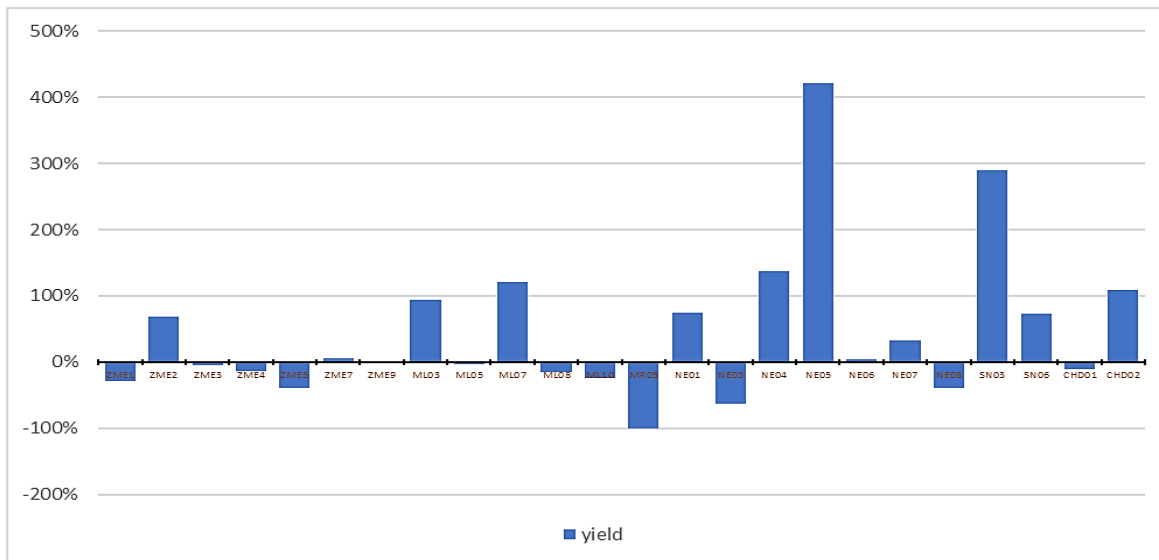


Figure 11: % Change in average yields (kg/ha)



4.10 Food Calories from Livestock

| | Very Poor | | Poor | | Middle | | Better Off | | Overall Summary | | | | | | |
|---------------------|------------|----|------------|----|------------|-----|------------|-----|-----------------|-----|---|----|----|---|----|
| | "B" to "E" | | "B" to "E" | | "B" to "E" | | "B" to "E" | | | | | | | | |
| | % Δ | | % Δ | | % Δ | | % Δ | | | | | | | | |
| | X↑:Y±:Z↓ | | X↑:Y±:Z↓ | | X↑:Y±:Z↓ | | X↑:Y±:Z↓ | | | | | | | | |
| All Sahel | 1% | 2% | 2% | 3% | 6% | 7% | 10% | 10% | 5% | 5% | | | | | |
| | 23% | | 32% | | 4% | | -2% | | 5% | | | | | | |
| | 6 | 1 | 8 | 11 | 1 | 7 | 14 | 3 | 13 | 9 | 3 | 18 | 10 | 2 | 12 |
| Pastoral Zones | 6% | 6% | 7% | 8% | 17% | 18% | 23% | 26% | 13% | 15% | | | | | |
| | 11% | | 8% | | 10% | | 13% | | 11% | | | | | | |
| | 3 | - | 1 | 3 | - | 1 | 3 | - | 1 | 3 | - | 1 | 3 | - | 1 |
| Agro-Pastoral Zones | 1% | 1% | 1% | 2% | 5% | 5% | 8% | 7% | 4% | 4% | | | | | |
| | 38% | | 55% | | 1% | | -9% | | 2% | | | | | | |
| | 3 | 1 | 7 | 8 | 1 | 6 | 11 | 3 | 12 | 6 | 3 | 17 | 7 | 2 | 11 |

There was a 5% increase in the contribution of livestock to household food consumption across all Sahel, and across all wealth groups. As per the defined thresholds this is interpreted as below the threshold of significance.

The baseline contribution of livestock products for Very Poor and Poor households was very low, 1% to 2% respectively. It appears to have increased for these households – significantly in terms of a percentage change, although still minor as an overall contribution. There is less of a change for Middle and Better Off households who of course had higher contributions from livestock products at baseline. The proportion of zones that had an overall increase across the four wealth groups was roughly equal to the number of zones that had a decrease, 10 and 12 respectively.

The marginal but still insignificant increase in food calories from livestock products matches the similarly minor and insignificant increase in livestock numbers. As will be seen in a following graph on cash earned from livestock, it appears that the modest increases in livestock ownership translate more into cash outcomes than food outcomes.

The following graphs reveal the interaction between livestock products and ownership.

Figure 12: % Change in contribution of livestock products - weighted average by livelihood zone

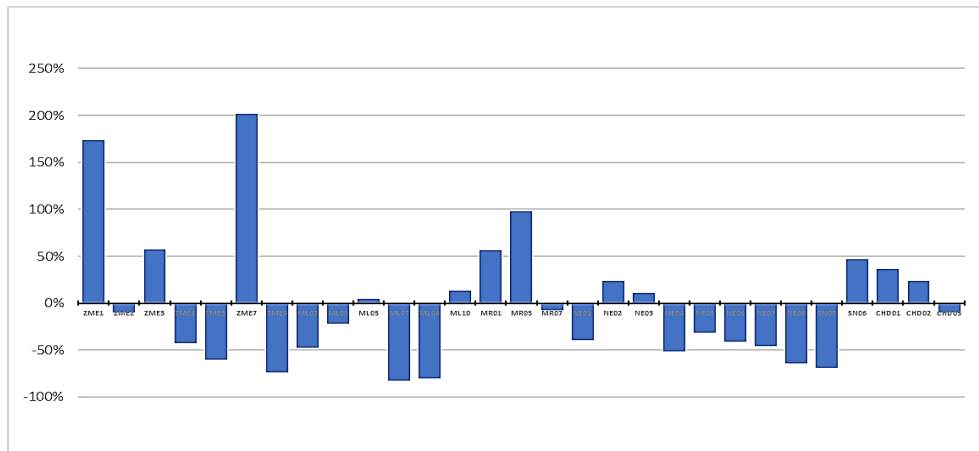


Figure 13: Typical number of cattle per household weighted average by livelihood zone

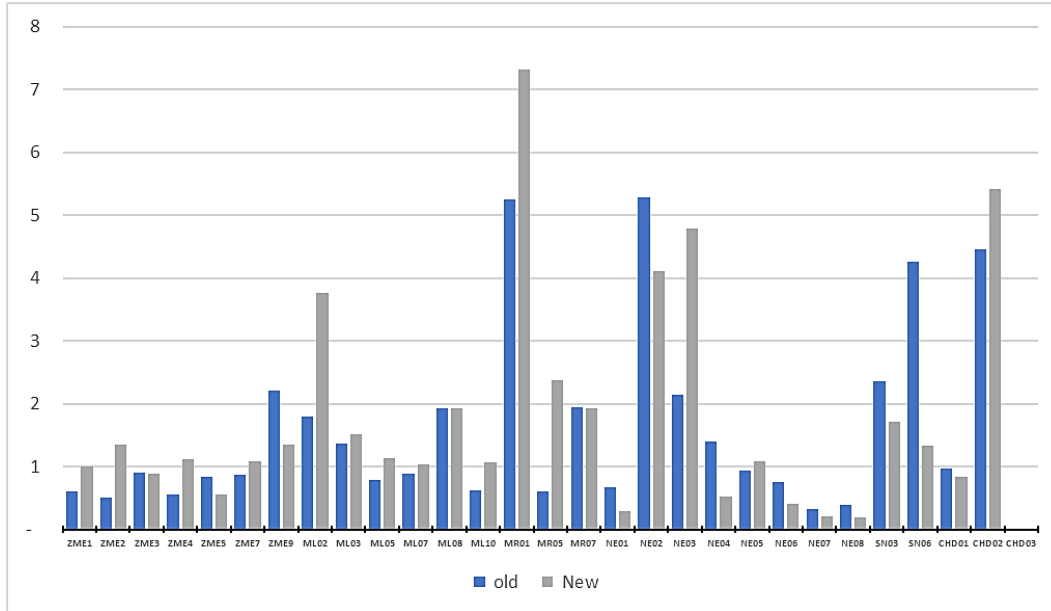
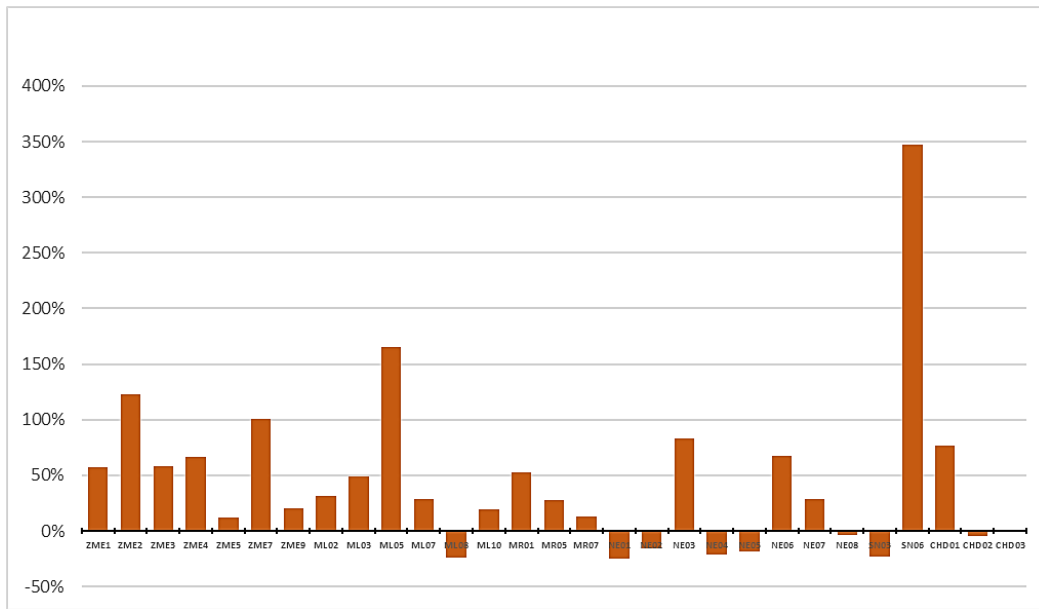


Figure 14: % Change in goat/sheep numbers per household weighted average by livelihood zone



The increased numbers of goats and sheep account for many of the positive values in the last set of graphs; in 22 of the 30 livelihood zones, there are more animals at endline than at baseline.

4.11 Food Calories from Purchased Food

| | Very Poor | Poor | Middle | Better Off | Overall Summary |
|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|
| | "B" to "E" | "B" to "E" | "B" to "E" | "B" to "E" | |
| | % Δ | % Δ | % Δ | % Δ | |
| | X↑:Y±:Z↓ | X↑:Y±:Z↓ | X↑:Y±:Z↓ | X↑:Y±:Z↓ | |
| All Sahel | 50% 0% 10 8 12 | 49% 3% 9 9 12 | 48% 3% 12 7 11 | 45% 7% 16 7 7 | 48% 3% 12 8 11 |
| Pastoral Zones | 64% 1% 1 2 1 | 68% 5% 1 2 1 | 83% 5% 1 3 - | 85% 10% 2 2 - | 75% 6% 1 2 1 |
| Agro-Pastoral Zones | 48% 0% 9 6 11 | 47% 2% 8 7 11 | 42% 2% 11 4 11 | 39% 6% 14 5 7 | 44% 2% 11 6 10 |

There was a 3% increase in the contribution of foods purchased in the market across all Sahel, and across all wealth groups. As per the defined thresholds this is interpreted as below the threshold of significance.

Market purchases were a very significant contributor to household food needs both at the time of baseline and endline, for all wealth groups. The minor but insignificant increase mentioned above was true for each of the four wealth groups, whether looking at the Sahel generally, or considered by region – agro-pastoral or pastoral.

4.12 Food Calories from Food Aid

| | Very Poor | Poor | Middle | Better Off | Overall Summary |
|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | "B" to "E" | "B" to "E" | "B" to "E" | "B" to "E" | |
| | % Δ | % Δ | % Δ | % Δ | |
| | X↑:Y±:Z↓ | X↑:Y±:Z↓ | X↑:Y±:Z↓ | X↑:Y±:Z↓ | |
| All Sahel | 3% 14% 9 1 9 | 3% 15% 7 2 9 | 2% -7% 7 2 8 | 2% 1% 5 1 10 | 2% 7% 7 2 9 |
| Pastoral Zones | 3% 54% 2 - 1 | 3% 13% 1 1 1 | 3% 3% 1 1 1 | 1% 61% 1 - 1 | 3% 30% 1 1 1 |
| Agro-Pastoral Zones | 3% 7% 7 1 8 | 2% 15% 6 1 8 | 2% -9% 6 1 7 | 2% -6% 4 1 9 | 2% 3% 6 1 8 |

There was a 7% increase in the contribution of food aid across all Sahel, and across all wealth groups. As per the defined thresholds this is interpreted as below the threshold of significance.

Most of the food aid is school feeding which cuts across all wealth groups. The absolute amounts of food aid in both the baseline and endline data sets was small. In agropastoral areas it ranged from 1% to 3%, with

an upper level of 5% for the Very Poor in pastoral areas. Therefore, the 7% increase across all Sahel and all wealth groups is a very minor change in real terms – despite large percentages in the above table. The 14% and 15% increases for Very Poor and Poor households (all Sahel) in the table above are above the threshold of significance, however the average absolute level of food aid rounds to 3% for both baseline and endline, for both wealth groups.

4.13 Total Food Calories from All Sources

| | Very Poor | | | Poor | | | Middle | | | Better Off | | | Overall Summary | |
|---------------------|-----------------|------|------|-----------------|------|------|-----------------|------|------|-----------------|------|------|-----------------|------|
| | "B" to "E" | | | "B" to "E" | | | "B" to "E" | | | "B" to "E" | | | | |
| | % Δ X↑:Y±:Z↓ | | | % Δ X↑:Y±:Z↓ | | | % Δ X↑:Y±:Z↓ | | | % Δ X↑:Y±:Z↓ | | | | |
| All Sahel | 102% | 104% | 104% | 106% | 108% | 108% | 117% | 118% | 118% | 130% | 130% | 130% | 114% | 115% |
| | 1% | | | 2% | | | 1% | | | 0% | | | 1% | |
| | 1 | 28 | 1 | 1 | 28 | 1 | 5 | 23 | 2 | 7 | 17 | 6 | 4 | 24 |
| Pastoral Zones | 104% | 108% | 108% | 104% | 110% | 110% | 113% | 118% | 118% | 119% | 131% | 131% | 110% | 117% |
| | 4% | | | 5% | | | 5% | | | 10% | | | 6% | |
| | - | 4 | - | 1 | 3 | - | 1 | 3 | - | 2 | 2 | - | 1 | 3 |
| Agro-Pastoral Zones | 102% | 103% | 103% | 106% | 107% | 107% | 118% | 118% | 118% | 132% | 130% | 130% | 114% | 115% |
| | 1% | | | 2% | | | 1% | | | -1% | | | 0% | |
| | 1 | 24 | 1 | - | 25 | 1 | 4 | 20 | 2 | 5 | 15 | 6 | 3 | 21 |

There was a 1% increase in the total food calories consumed from all sources, across all Sahel, and across all wealth groups. As per the defined thresholds this is interpreted as below the threshold of significance.

Percentage changes for each wealth group were very minor, ranging from 0% to 2%. Only in pastoral areas were there marginally larger changes, ranging from 4%/5% for Very Poor, Poor, and Middle households to 10% for the Better Off.

Have there been changes in household sources of cash income?

In the 30 rural livelihood zones analysed in this study the main sources of cash income in both baseline and endline years includes formal employment, livestock and crop sales, seasonal agricultural labour, and self - employment activities such as, firewood/charcoal sales, handicrafts, etc. To determine whether there might be changes in these sources of cash in between the baseline and endline, we looked at changes in the general composition of household cash income, as well as changes in each of the components of the total cash 'basket', including changes in the annual percentage of cash coming from i.) households' own crop sales; ii.) sales of milk/meat; iii.) sales of livestock; iv.) employment (both casual and formal); v.) self-employment; vi.) petty trade; and vii.) social protection and credit. The observed changes in these main income sources are discussed in the following section.

Table 5 below presents the overall summary of averaged data for various cash income sources. All values below, with exception cash from livestock are below the threshold of 10%, which suggest they could well be part of the intrinsic fluctuation of livelihoods inherent within the system. The significant change in livestock cash income is attributed to change in livestock prices and the increase in livestock holdings.

Table 5: Summary table of changes in cash income

| Variable | Percentage change | Interpretation |
|-----------------------|-------------------|-------------------------|
| Cash Income | | |
| Cash – all sources | 31% | Significant improvement |
| Cash from crops | 7% | Not significant |
| Cash from labour/jobs | -4% | Not significant |
| Cash from livestock | 42% | Significant improvement |

4.14 Total Cash Income from All Sources

| | Very Poor | | | Poor | | | Middle | | | Better Off | | | Overall Summary | | |
|---------------------|-------------------------------|---------|-----|-------------------------------|---------|-----|-------------------------------|-----------|-----|-------------------------------|-----------|-----|-----------------|-----------|-----|
| | "B" to "E" % Δ X↑:Y±:Z↓ | | | "B" to "E" % Δ X↑:Y±:Z↓ | | | "B" to "E" % Δ X↑:Y±:Z↓ | | | "B" to "E" % Δ X↑:Y±:Z↓ | | | | | |
| All Sahel | 312,655 | 366,773 | 17% | 482,289 | 622,320 | 29% | 1,174,100 | 1,501,023 | 28% | 2,098,713 | 2,831,041 | 35% | 1,016,939 | 1,330,289 | 31% |
| | 19 | 4 | 7 | 18 | 9 | 3 | 20 | 4 | 6 | 20 | 3 | 7 | 19 | 5 | 6 |
| Pastoral Zones | 492,392 | 583,453 | 18% | 618,959 | 792,572 | 28% | 1,412,188 | 1,831,476 | 30% | 2,550,315 | 3,027,951 | 19% | 1,268,463 | 1,558,863 | 23% |
| | 3 | - | 1 | 2 | 2 | - | 2 | 2 | - | 2 | 1 | 1 | 2 | 1 | 1 |
| Agro-Pastoral Zones | 285,004 | 333,437 | 17% | 461,262 | 596,127 | 29% | 1,137,471 | 1,450,184 | 27% | 2,029,235 | 2,800,748 | 38% | 978,243 | 1,295,124 | 32% |
| | 16 | 4 | 6 | 16 | 7 | 3 | 18 | 2 | 6 | 18 | 2 | 6 | 17 | 4 | 5 |

There was a 31% increase in the averaged total cash income across all Sahel, and across all wealth groups. As per the defined thresholds this is interpreted as **very significant**.

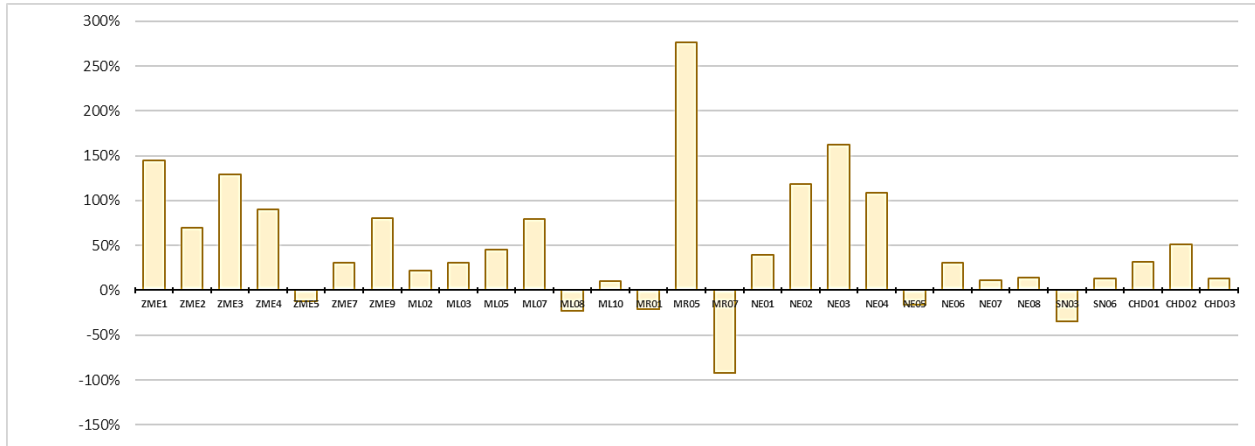
For all Sahel, each of the four wealth groups had a significant increase in total cash incomes (adjusted for inflation).

- Very Poor had the smallest percentage change, an increase of 17% from the averaged 312,655 at baseline to 366,773 at endline. 19 of the 30 zones had an increase, 4 saw no change, and 7 had a decrease.
- Poor households saw their total cash income increase by around 29% from an average 482,289 at baseline to 622,320 at endline. 18 zones had an increase, 9 no change, and 3 had a decrease.
- Middle households had a similar increase in total cash income, around 28%, which was an increase from the average 1,174,100 at baseline to 1,501,023 at endline. 20 zones had an increase, 4 had no change, and 6 had a decrease.
- Better Off households total cash incomes increased by around 35%, from 2,098,713 at baseline to 2,831,041 at endline. 20 zones had an increase, 3 had no change, and 7 had a decrease.

The changes in cash income will be broken down in further detail below but are mainly driven by increases in livestock sales and better prices, but also labour payments and crop sales to a lesser extent.

The following graphs reveal the percentage change of cash income across the studied zones.

Figure 15: % change of total cash income - adjusted for inflation



4.15 Cash Income from Crop Sales

| | Very Poor | | | Poor | | | Middle | | | Better Off | | | Overall Summary | | |
|---------------------|-------------------------------|--------|-----|-------------------------------|---------|-----|-------------------------------|---------|-----|-------------------------------|-----------|-------|-----------------|---------|-------|
| | "B" to "E" % Δ X↑:Y±:Z↓ | | | "B" to "E" % Δ X↑:Y±:Z↓ | | | "B" to "E" % Δ X↑:Y±:Z↓ | | | "B" to "E" % Δ X↑:Y±:Z↓ | | | | | |
| All Sahel | 40,927 | 55,563 | 36% | 105,948 | 147,971 | 40% | 284,577 | 416,757 | 46% | 959,020 | 869,835 | -9% | 347,618 | 372,531 | 7% |
| Pastoral Zones | - | - | - | - | - | - | - | - | - | 965,938 | - | -100% | 241,484 | - | -100% |
| Agro-Pastoral Zones | 47,223 | 64,111 | 36% | 122,248 | 170,736 | 40% | 328,358 | 480,873 | 46% | 957,956 | 1,003,656 | 5% | 363,946 | 429,844 | 18% |
| | 15 | 1 | 9 | 12 | 1 | 12 | 15 | 1 | 9 | 13 | 3 | 9 | 14 | 2 | 10 |

There was a 7% increase in the averaged cash income from crops across all Sahel, and across all wealth groups. As per the defined thresholds this is interpreted as below the threshold of significance. However, for this parameter it is valid to look at the situation of each of the four wealth groups separately rather than the overall summary. As can be seen in the above table, Very Poor, Poor, and Middle households saw cash incomes from crops rise very significantly by 36%, 40% and 46% respectively. Conversely, cash incomes for Better Off households saw a moderate decrease of 9%, which is below the level of significance. The reason that the overall summary is not reflective of the situation of the majority of households (Very Poor, Poor, and Middle) is that the absolute amounts of cash income for these three wealth groups is so much lower than for Better Off households, which means the average is more heavily weighted by the amounts of the Better Off.

Very Poor and Middle households in 15 of the 30 zones saw increases in cash incomes from crop sales, there was no change in 1 zone, and declines in 9 zones. Poor households saw increases in 12 zones, declines in 12 zones and no change in 1 zone.

These significant increases in cash income from crop sales for most households comes at the same time that there were marginal declines in areas being cultivated, in particular for Very Poor and Poor households. As discussed previously, there have been changes in crop investments which have influenced yields. Presumably this explains some of the increases in cash incomes from crops, as well as possible increases in crop prices.

4.16 Cash Income from Sale of Livestock and Livestock Products

| | Very Poor | | Poor | | Middle | | Better Off | | Overall Summary | | | | | | |
|---------------------|-------------------------------|---------|-------------------------------|---------|-------------------------------|-----------|-------------------------------|-----------|-----------------|-----------|---|---|----|---|---|
| | "B" to "E" % Δ X↑:Y±:Z↓ | | "B" to "E" % Δ X↑:Y±:Z↓ | | "B" to "E" % Δ X↑:Y±:Z↓ | | "B" to "E" % Δ X↑:Y±:Z↓ | | | | | | | | |
| All Sahel | 61,375 | 77,628 | 113,506 | 174,548 | 457,330 | 654,393 | 900,306 | 1,275,505 | 383,129 | 545,519 | | | | | |
| | 26% | | 54% | | 43% | | 42% | | 42% | | | | | | |
| | 18 | 3 | 7 | 23 | 2 | 5 | 21 | 3 | 6 | 18 | 6 | 6 | 20 | 4 | 6 |
| Pastoral Zones | 212,653 | 224,750 | 333,200 | 426,761 | 1,144,683 | 1,458,058 | 2,175,305 | 2,666,265 | 966,460 | 1,193,958 | | | | | |
| | 6% | | 28% | | 27% | | 23% | | 24% | | | | | | |
| | 2 | 1 | 1 | 3 | 1 | - | 2 | 2 | - | 1 | 2 | 1 | 2 | 2 | 1 |
| Agro-Pastoral Zones | 38,101 | 54,994 | 79,707 | 135,746 | 351,583 | 530,752 | 704,152 | 1,061,542 | 293,386 | 445,759 | | | | | |
| | 44% | | 70% | | 51% | | 51% | | 52% | | | | | | |
| | 16 | 2 | 6 | 20 | 1 | 5 | 19 | 1 | 6 | 17 | 4 | 5 | 18 | 2 | 6 |

There was a 42% increase in averaged cash incomes from livestock across all Sahel, and across all wealth groups. As per the defined thresholds this is interpreted as **very significant**.

For all Sahel, each of the four wealth groups had a significant increase in cash incomes from livestock, of which sales of live animals (cattle, goats, and sheep) was more important than sales of milk, meat etc. In addition to increasing investments in crop production, households are benefitting from an increased number of animals to sell. This is in contrast to prices of live animals, which after adjustment for inflation, have decreased markedly over the past 5-10 years. Comparing the average prices during the baseline period with the prices during the endline period (all Sahel) there is an average decrease in prices of around 55% for cattle, 15% for goats and 10% for sheep.

- Very Poor had the smallest percentage change, an increase of 26% from the averaged 61,375 at baseline to 77,628 at endline. 18 of the 30 zones had an increase, 3 saw no change, and 7 had a decrease.
- Poor households saw cash incomes from livestock increase by around 54% from an average 113,506 at baseline to 174,548 at endline. 23 zones had an increase, 2 no change, and 5 had a decrease.
- Middle households had an increase in cash incomes from livestock of around 43%, which was an increase from the average 457,330 at baseline to 654,393 at endline. 21 zones had an increase, 3 had no change, and 6 had a decrease.
- Better Off households also saw cash incomes increase significantly, by around 42%, from 900,306 at baseline to 1,275,505 at endline. 18 zones had an increase, 6 had no change, and 6 had a decrease.

The percentage changes were more significant in the agropastoral zones, ranging from 44% to 70% increase. However, in absolute terms, the increases were higher in the pastoral areas, which had higher corresponding baseline levels.

4.17 Cash Income from Employment and Self Employment

| | Very Poor | | Poor | | Middle | | Better Off | | Overall Summary | | | | | | |
|---------------------|-------------------------------|---------|-------------------------------|---------|-------------------------------|---------|-------------------------------|---------|-----------------|---------|---|---|----|---|----|
| | "B" to "E" % Δ X↑:Y±:Z↓ | | "B" to "E" % Δ X↑:Y±:Z↓ | | "B" to "E" % Δ X↑:Y±:Z↓ | | "B" to "E" % Δ X↑:Y±:Z↓ | | | | | | | | |
| All Sahel | 210,352 | 213,616 | 263,525 | 276,840 | 414,531 | 357,850 | 633,429 | 609,267 | 380,459 | 364,393 | | | | | |
| | 2% | | 5% | | -14% | | -4% | | -4% | | | | | | |
| | 15 | 5 | 10 | 16 | 3 | 11 | 15 | 5 | 10 | 19 | 2 | 7 | 16 | 4 | 10 |
| Pastoral Zones | 229,392 | 316,195 | 240,946 | 346,009 | 180,588 | 328,669 | 250,088 | 332,943 | 225,253 | 330,954 | | | | | |
| | 38% | | 44% | | 82% | | 33% | | 47% | | | | | | |
| | 3 | - | 1 | 3 | - | 1 | 3 | - | 1 | 2 | - | 1 | 3 | - | 1 |
| Agro-Pastoral Zones | 207,423 | 197,835 | 266,999 | 266,198 | 450,523 | 362,340 | 692,405 | 651,778 | 404,337 | 369,538 | | | | | |
| | -5% | | 0% | | -20% | | -6% | | -9% | | | | | | |
| | 12 | 5 | 9 | 13 | 3 | 10 | 12 | 5 | 9 | 17 | 2 | 6 | 14 | 4 | 9 |

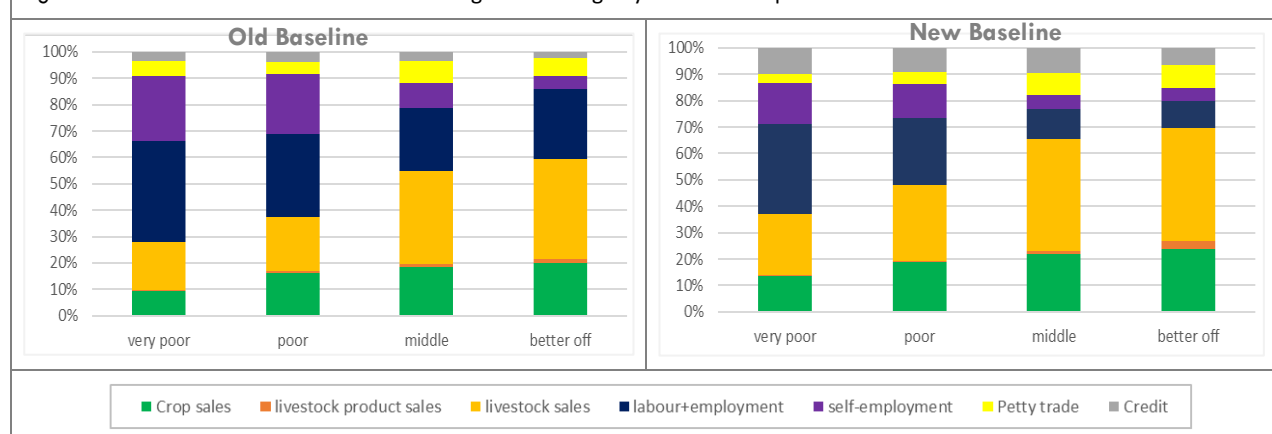
There was a 4% decline in the cash incomes from labour, jobs, and self-employment, across all Sahel, and across all wealth groups. As per the defined thresholds this is interpreted as below the threshold of significance.

Very Poor, Poor, and Better Off households were all in the range of insignificant, whereas Middle households did experience a decline of 14%, which is significant. Middle households across the Sahel saw cash incomes from jobs and self-employment fall from an average 414,531 at baseline to 357,850 at endline. It is not known why Middle households specifically would have experienced a decline of this magnitude whilst households in other wealth groups had no significant change.

Households in pastoral zones saw much higher differences in cash incomes from jobs and self-employment than households in agropastoral areas, with differences between baseline and endline ranging from 33% to 82%. This is in contrast to 0% to 20% differences in agropastoral areas.

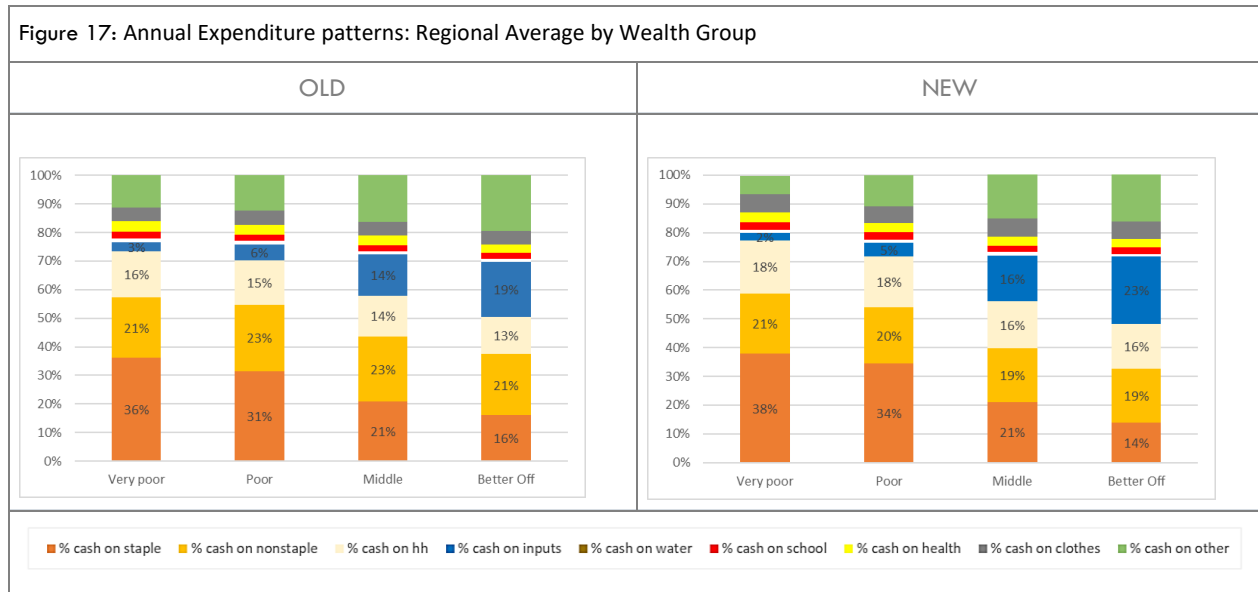
Figure 16 below shows average income sources for the Sahel Region. The heavy investment in agriculture has probably resulted in increased borrowing to meet the growing capital needs for increasing yields in crops and maintaining larger livestock herds. Therefore, this raises concerns of rising indebtedness among populations, given the increased proportion of credit in the new baselines compared to old baselines.

Figure 16: Annual Household Cash Income: Regional Average by Wealth Group



Have there been changes in household expenditure patterns?

To answer this question, changes in each of the components of the total expenditure basket were considered, including changes in the annual percentage of cash income spent on staple food, non-staple food, household items, productive inputs, schooling, health, clothes, phone credit, and miscellaneous other items. Changes in the composition of the productive inputs category was also investigated. Figure 17 provides average expenditure patterns across the region.



Expenditure on staple and non-staple foods shifted marginally from baseline to endline. Compared to the baseline, Very Poor households marginally increased expenditure on staple foods, from 36% to 38% at endline, a relative increase of around 6%. There was no change in spend on non-staples. Similarly, Poor households increased the proportion of their annual spend on staples from 31% to 34%, an increase of around 10%. Their spend on non-staples declined marginally, from 23% at baseline to 20% at endline. Middle households had a decline in spend on non-staples, from 23% to 19%, whilst proportional expenditure on staples did not change (although absolute spending increased with increased total cash income). Better Off households spent proportionally less on both staples and non-staples at endline, as compared with baseline.

Middle and Better Off households spent proportionally more on inputs by endline, Middle households increasing from 14% to 16% and Better Off households from 19% to 23%. Conversely, Very Poor, and Poor households spent proportionally less on inputs. Differences in investment such as this, whether by wealth groups or generally across livelihood zones, explains in part why some wealth groups/livelihood zones saw increases in production despite the increased population pressure on land sizes. The productive inputs include animal feed & drugs, ploughing, seeds/tools, and agricultural labour hire.

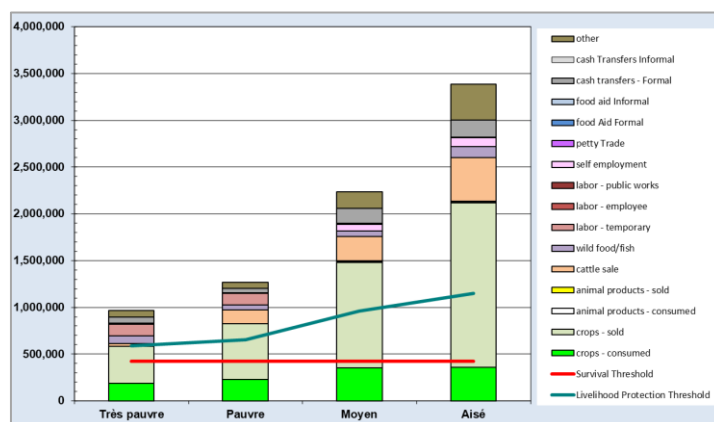
The increases for Middle and Better Off households can also be attributed to increases in prices of inputs.

4.18 Total Income and Household Livelihood Protection Scores

The graphs in the previous sections provided a comparison of food and cash income separately. In this section total aggregate income (food plus cash) levels are combined after a standardization of units, in cash or food equivalents.

The total income amount is a more complete representation of 'real' income than cash income alone, especially in areas where people produce a significant proportion of their own food (i.e. the production is not monetized into cash). An example from livelihood zone ZME2 is presented in Figure 18 to the right, expressed in cash terms.

Figure 18: Total income example: ZME2



We can see from this example the cumulative values of all food and cash sources, highlighting the importance of crop, livestock, and milk/meat sales for the wealthier Middle and Better Off households. Likewise, the relative importance of labor income for Very Poor and Poor households is evident. The graph shows that Better Off households' total income once everything is converted to cash form was over 3 million, in contrast to Very Poor households' whose total income was just under 1 million.

Figure 19: Total income: at Endline, by livelihood zone

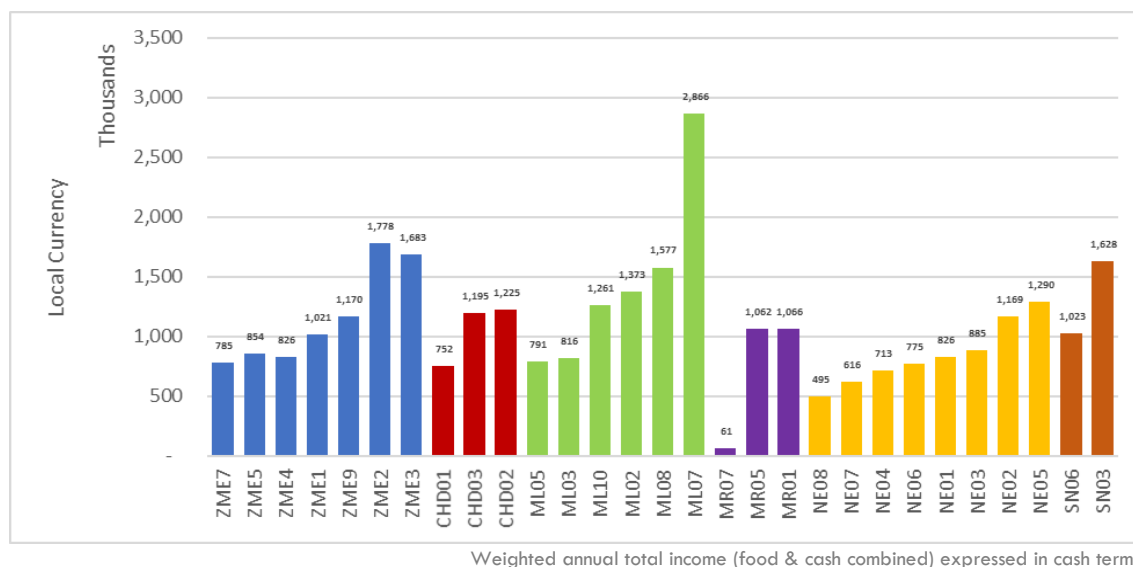


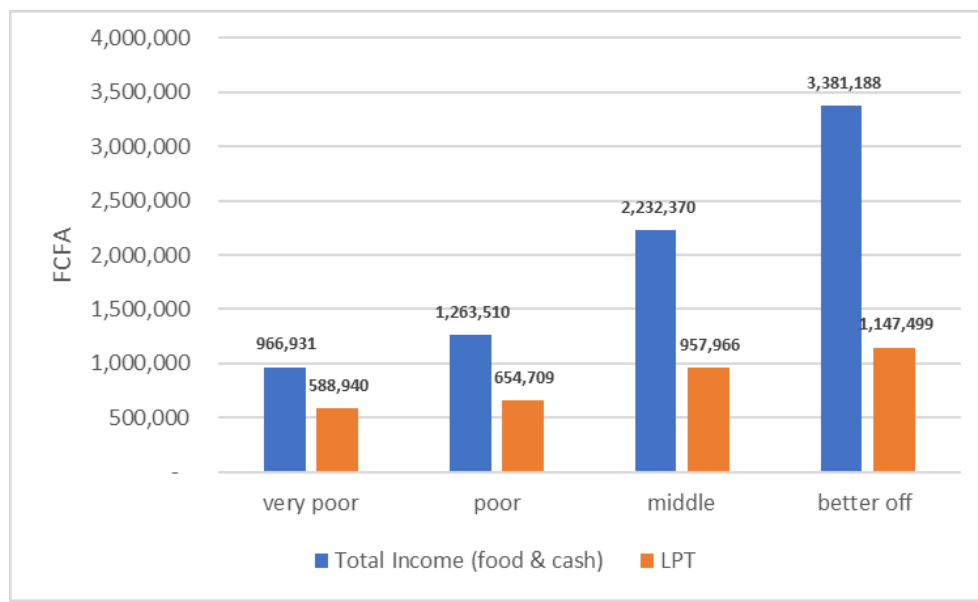
Figure 19 shows total income levels as a weighted average for each livelihood zone at endline. The bar graphs are arranged from lowest to highest, colour-coded by country. The zones with higher incomes tend to be where there is higher crop and livestock production.

Livelihoods Protection Threshold: Total income quantifies how much households are able to generate on an annual basis, but to understand what this means in terms of livelihood security, it is necessary to know the cost of generating this income to maintain livelihoods. This is indicated by the Livelihoods Protection Threshold (LPT). The LPT is the cost of covering:

- minimum food and non-food requirements for the household,
- minimum survival requirements such as fuel and other food preparation costs, as well as basic hygiene and household items,
- the cost of maintaining local livelihoods including productive inputs, education, health.

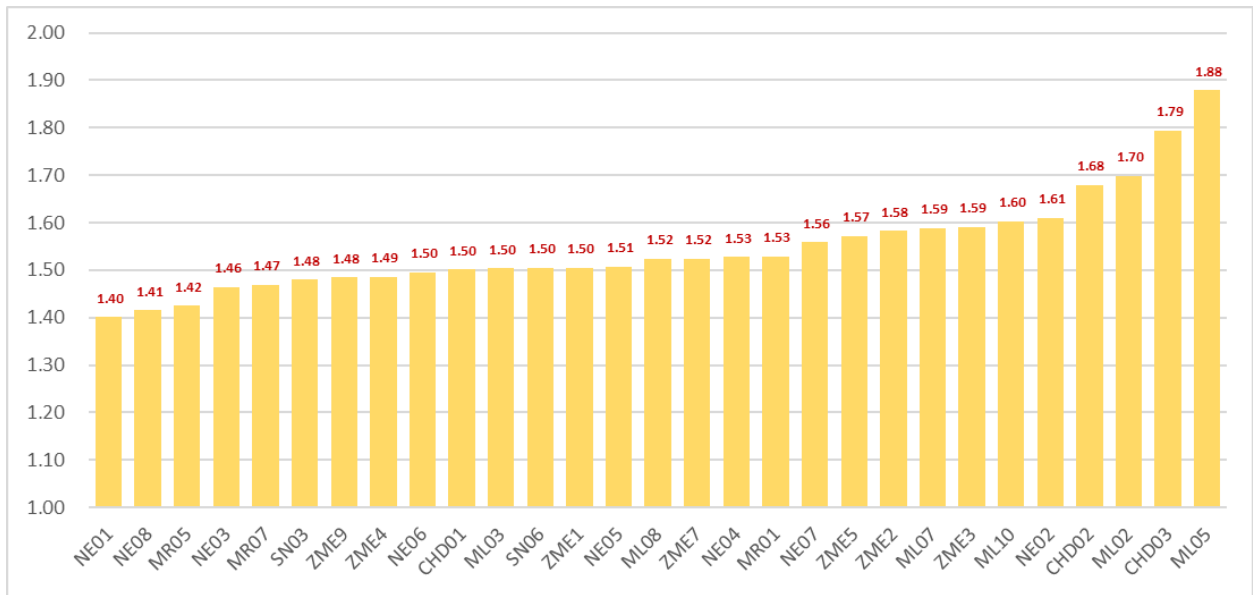
By comparing these costs with total income, we have a sense of how close to the “edge” households are. If households have almost no surplus between their total income and their Livelihoods Protection Threshold, even small disruptions in cash or food income can result in a deficit. A bigger surplus between total income and the LPT means households have a larger buffer, which usually translates to a higher capacity to cope in the face of shocks. Figure 20 provides an illustrative example of this point and introduces the concept of the Household Livelihood Protection Score (HLPS), which is the ratio between total income and the LPT.

Figure 20: The household livelihood protection score: ZME2 example



Household Livelihoods Protection Score: The Household Livelihoods Protection Score (HLPS) is a way of expressing with one number the information contained in the graphs above –total income and the LPT. The Household Livelihoods Protection Score (HLPS) is calculated by dividing a household’s total income for a given year (either baseline or endline) by the Livelihoods Protection Threshold for that household in the same year. In other words, the HLPS is the ratio of what households generate in cash and food income in the reference year to what they need in order to cover their survival and livelihood requirements. The higher a score is above “1” the higher the buffer a household has to cover and protect their livelihood needs. Conversely, scores closer to 1 indicate less of a buffer. Figure 19 shows the HLPS as a weighted average by livelihood zone at endline.

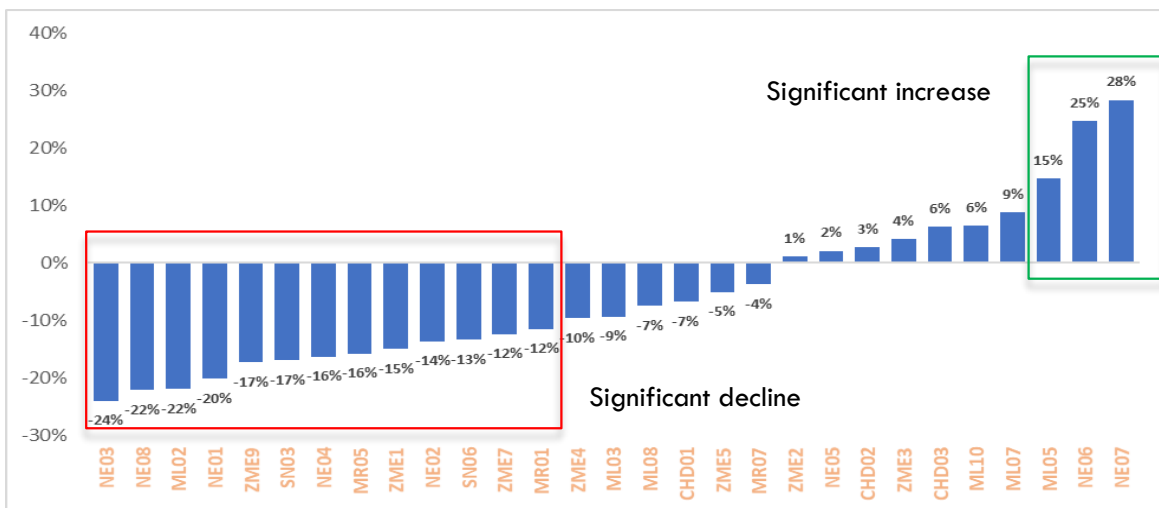
Figure 21: HLPs weighted average by livelihood zone: at endline



Is there a change in the HLPs?

Nineteen of the livelihood zones saw a negative change in the Household Livelihoods Protection Score (Figure 22). This would suggest, therefore, that overall livelihood security and resilience capacity of households has declined, despite the increases observed in incomes and marginal changes on food sources. Production conditions (as measured by rainfall anomalies) in a majority of zones were broadly the same or generally better at endline as compared with baseline. It is possible to argue that the decline in livelihood security is related to poorer distribution of rainfall in the production year, but this is not the case in the other zones. 3 of the zones saw a significant measured increase (above 10%) in livelihood security, despite having poorly distributed rainfall conditions at endline. The correlation between changes in rainfall and changes in the HLPs is not perfect, suggesting a need to look at other underlying causes to the change in status. About 13 zones have seen a significant reduction in livelihood security.

Figure 22: Percentage change in HLPs: Endline Vs Baseline



Comparing relative levels of livelihood security across zones (see Figure 23), we see that NE01 is now the most livelihood insecure (“new” refers to endline, “old” refers to baseline). This is in contrast to the baseline period when livelihood zone NE06 was the most insecure. On the opposite end of the spectrum, ML05 is the most livelihood secure of all the zones at endline, whereas ML02 was at this position at baseline.

Figure 23: Comparison of HLPS as weighted average

| | | Bottom 15 livelihood zones | | | | | | | | | | | | | |
|-----|-------|-------------------------------|------|------|------|------|------|------|-------|-------|-------|------|-------|------|------|
| OLD | NE06 | NE07 | ML07 | NE05 | ML10 | MR07 | ZME3 | ZME2 | CHD01 | CHD02 | ML05 | ZME4 | ML08 | ZME5 | ML03 |
| | 1.20 | 1.21 | 1.46 | 1.48 | 1.51 | 1.53 | 1.53 | 1.57 | 1.61 | 1.63 | 1.64 | 1.65 | 1.65 | 1.66 | 1.66 |
| new | NE01 | NE08 | MR05 | NE03 | MR07 | SN03 | ZME9 | ZME4 | NE06 | CHD01 | ML03 | SN06 | ZME1 | NE05 | ML08 |
| | 1.40 | 1.41 | 1.42 | 1.46 | 1.47 | 1.48 | 1.48 | 1.49 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.51 | 1.52 |
| | | Top fourteen Livelihood Zones | | | | | | | | | | | | | |
| OLD | CHD03 | MR05 | MR01 | SN06 | ZME7 | NE01 | ZME1 | SN03 | ZME9 | NE08 | NE04 | NE02 | NE03 | ML02 | |
| | 1.69 | 1.69 | 1.73 | 1.74 | 1.74 | 1.76 | 1.77 | 1.78 | 1.80 | 1.82 | 1.83 | 1.87 | 1.93 | 2.18 | |
| new | ZME7 | NE04 | MR01 | NE07 | ZME5 | ZME2 | ML07 | ZME3 | ML10 | NE02 | CHD02 | ML02 | CHD03 | ML05 | |
| | 1.52 | 1.53 | 1.53 | 1.56 | 1.57 | 1.58 | 1.59 | 1.59 | 1.60 | 1.61 | 1.68 | 1.70 | 1.79 | 1.88 | |

Taking an average, livelihood security for the region as a whole saw a decline. The average for the region went from 1.66 to 1.55, a decline of around 7%. One explanation for this might relate increased spending on agricultural inputs. Thus, even though households in most zones appear to have increased their total income levels, they need to invest more in order to achieve and maintain this level of improvement.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The following are the conclusions on the major questions of the study:

Have there been changes in wealth and assets?

There are positive improvements in livestock assets though they do not exceed the significant threshold that could point to trend of structural change. On the other hand, land cultivated has declined. There is no sufficient change to suggest impact of climate variability on ownership of assets.

Have there been changes in the distribution of wealth for each livelihood zone?

The Lorenz curve results, indicate that inequality has decreased across most of the zones in the Sahel. This reduction is corresponded with increase of population among the middle and reduction in the very poor household population. This relative distribution suggest reduction in wealth and assets.

Have there been changes in household sources of food?

There are no significant changes in sources of food. All change values are below the 10% threshold significance. The observed changes, fall within the range of possible intrinsic fluctuation of livelihoods inherent with changes of factors that impact production that also include performance and quality of seasons. However, there is a small decline in food from crops while there is an increase in food purchase and aid, this is indicative of possible shifts in reliance on food production.

Have there been changes in household source of cash income?

There was a very significant 31% increase in the averaged total cash income across all Sahel, and across all wealth groups. This change is mostly from livestock sales due to increase in prices and number of animals owned

Have there been changes in expenditure patterns?

There is largely increased investment in input, particularly by the middle and better-off households. This high investment is part of the reason why yields and production have been maintained. However, this is also correlating to increase in credit, a situation which indicates that to maintain the observed production it is costing households more resources and exposing them to indebtedness.

What is the resilience capacity of households?

Taking an average, livelihood security for the region as a whole saw a declined but not significant. The average for the region went from 1.66 to 1.55, a decline of around 7%. Even though households in most zones appear to have increased their total income levels, they need to invest more in order to achieve and maintain this level of improvement, which explain negative decline in livelihood security. When explored by livelihood zone thirteen of the livelihood zones saw a negative change in the Household Livelihoods Protection while only three saw an increase in the Score, while 14 remained the same. The highlighted, increased investment to maintain production in highly variable climate is making putting a high risk on livelihood security.

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