



RESILIENCE IN THE SAHEL-ENHANCED (RISE) INITIATIVE IMPACT EVALUATION: ENDLINE SURVEY REPORT

Volume I

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Tim Frankenberger, President

TANGO International

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ACRONYMS

ACDI/VOCA	Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance
ANR	Assisted Natural Regeneration
ATR	ability to recover
ATT	average treatment effect on the treated
BL	Baseline
CESAO	<i>Centre d'Études, d'Expérimentations Économiques et Sociales de l'Afrique de l'Ouest</i>
CNRM	community natural resource management
COVID	Coronavirus disease
CRP	Comprehensive Resilience Programming
CRS	Catholic Relief Services
DFSA	Development and Food Security Activity
DID-PSM	Difference-in-Differences Propensity Score Matching
DPM	Disaster preparedness and mitigation
EL	Endline
ET	evaluation team
FASO	Families Achieving Sustainable Outcomes
FAW	Fall armyworm
FEWSNET	Famine Early Warning Systems Network
FFP	Office of Food for Peace
FGD	focus group discussions
GEWE	gender equality <i>and</i> women's empowerment
GIS	Geographical Information System
HFIAS	Household Food Insecurity Access Scale
HH	household
IE	Impact evaluation
IGA	income generating activity
IPC	Integrated Food Security Phase Classification
MBD	markets and business development
ML	Midline
MSWEP	Multi-Source Weighted-Ensemble Precipitation
NGO	non-governmental organization
OFDA	Office of U.S. Foreign Disaster Assistance
OLS	Ordinary Least Squares
PPS	Probability Proportional to Size
PSM	Propensity Score Matching
REGIS-AG	Resilience and Economic Growth in the Sahel—Accelerated Growth
REGIS-ER	Resilience and Economic Growth in the Sahel—Enhanced Resilience
RISE	<i>Resilience in the Sahel Enhanced</i>
RMS	Recurrent Monitoring Survey

SCAP-RU	Community Early Warning System for Disaster Response <i>Système Communautaire d'Alerte Précoce et de Réponse aux Urgences</i>
TANGO	Technical Assistance to Non-Governmental Organizations, International
UN	United Nations
UNDP	United Nations Development Programme
USD	United States dollar
USAID	United States Agency for International Development
VDC	Village Development Committees
VIM	Victory Against Malnutrition
WHO	World Health Organization
XOF	West African CFA franc

EXECUTIVE SUMMARY

The *Resilience in the Sahel Enhanced I* (RISE I) initiative was implemented from 2014 to 2019 with the goal of increasing the resilience to shocks of chronically vulnerable populations in agro-pastoral and marginal agriculture livelihood zones of the West African Sahel. This report documents an impact evaluation of the initiative using data from the RISE endline survey conducted in September 2020 as well as Baseline (April 2015) and Midline (April 2017) surveys. The endline survey sampled 1,753 households residing in 88 villages and included both quantitative and qualitative data collection.

The RISE Initiative's comprehensive, integrative approach to enhancing resilience was to strategically layer, sequence, and integrate humanitarian and development efforts to end the Sahel's vicious cycle of crises and help vulnerable communities stay firmly on the path to development. RISE was funded by the United States Agency for International Development (USAID) and implemented in targeted zones of Burkina Faso and Niger.

This impact evaluation conceptualizes resilience according to the USAID definition as “the ability of people, households, communities, countries, and systems to mitigate, adapt to, and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth.” The operational definition of resilience employed is: “the ability to recover from shocks.”

The primary purpose of this report is to determine whether and how the RISE Initiative's package of interventions enhanced households' resilience and resilience capacities, the latter which are the foundational determinants of resilience. It also examines the impact of two additional outcomes that are crucial indicators of people's well-being in the Sahel: poverty and women's empowerment.

Before doing so, the report sets the context by documenting the shock environment and evolution of resilience capacities, food security, poverty, and women's empowerment over the initiative's operational period.

Evolution of Shock Exposure

Households in the RISE area experienced increasing shock exposure over the initiative's operational period, with an especially sharp escalation in its final years putting the entire area into an unprecedented crisis. According to both global climate database and household reports, the Burkina Faso and Niger initiative areas were subjected to great rainfall volatility leading to multiple droughts and floods that at times dipped into extreme territory. While the Sahel is known as a drought-prone region, flooding dominated over drought, especially in the Niger area.

The incidence of conflict shocks related to civil insecurity also saw a large increase over the initiative period. Increasing acts of violence and thefts by armed terrorist groups led to large populations of displaced peoples and had widespread impacts on markets, agricultural production, off-farm income-generating activities and, subsequently, on people's lives, livelihoods, and health. By April 2020, just as the security situation deteriorated further,

COVID-19 restrictions were imposed, including border closures, market restrictions, and restrictions on travel.

As would be expected, the combination of climate shocks, civil insecurity, and COVID-19 restrictions is associated with sharply increasing incidence of economic shocks, from food price inflation to unemployment and inability to access humanitarian assistance. A strong increase in the percentage of households reporting serious illnesses and deaths, particularly in the Burkina Faso area, is a clear indication that the multiple shocks of this time period took a serious toll on households' well-being. Other shocks that rocked the RISE area were "sudden increase in household size" associated with civil insecurity displacements and the COVID-19 shut down, and fall armyworm and other infestations that damaged crops.

The RISE endline survey data were collected 6 months after the start of the Coronavirus pandemic. To find out more about how this health shock affected households, a Coronavirus module was added to the endline questionnaire, and extensive qualitative data collection was undertaken.

The data show that there was widespread awareness of the Coronavirus among RISE Initiative households, with the top information sources being radio and television followed by friends/neighbors, family members, and health workers. The most commonly employed mitigation strategy was hand washing, followed by mask wearing and social distancing. The qualitative data reveal that awareness of Coronavirus did not always translate into acceptance of it as a disease agent and the use of mitigation strategies.

The most commonly cited impact of the pandemic among quantitative survey respondents was economic disruption caused by border closures and restrictions on travel and markets. The fallout included transportation disruptions, consumer price increases, and disruption of agricultural and livestock markets. The large majority of quantitative survey respondents indicated that the pandemic had a negative impact on their livelihoods, incomes, and access to food.

Very few households reported having a member who was actually diagnosed with COVID-19. The qualitative data indicated that those who were diagnosed recovered and returned to their villages (from isolation) without major issues. The shock from the pandemic was mainly caused by the containment measures¹ rather than the virus itself.

Household Coping Strategies

As households struggled to deal with increasing shock exposure, they both intensified and shifted their coping strategies in response. The most commonly employed strategy was to sell livestock. Others were borrowing or receiving gifts of money from friends or relatives, reducing food consumption or changing a source of food, drawing down on savings, migration (usually of individuals), and borrowing from a money lender. Large percentages of households diversified their livelihoods into low-return activities such as working on other people's fields, charcoal production, wild food sales, and petty trading. Many coping strategies were used

¹ The containment measures included isolation of those tested or suspected positive, but most impactful were closures or curtailment of public venues and markets, travel and border restrictions and the resulting increased costs of gasoline and transport.

increasingly over time as shock exposure grew, including some particularly negative coping strategies like taking children out of school and sending them to work for money, selling production assets, borrowing from money lenders, and compromising health by reducing food consumption.

Notably, reliance on humanitarian assistance was not a main coping strategy and, in fact, declined over the initiative period despite the increased shock exposure and crisis situation. A shock-responsive safety net could have helped prevent the decline in food security that took place (see below, “Household food security and resilience to shocks”), which represents a major reduction in the initiative gains that were achieved prior to the midline.

Trends in Household Resilience Capacities

There has been no improvement in overall resilience capacity in the RISE area since the baseline. A slight increase in adaptive capacity was accompanied by *declines* in both absorptive capacity and transformative capacity. The decline in absorptive capacity is due to erosion of households’ holdings of savings, and in their access to informal safety nets and hazard insurance, despite improvements in bridging social capital. The decline in transformative capacity is linked to declines in access to markets and basic services.

The improvement in adaptive capacity in the RISE area is due to improvements in: aspirations and confidence to adapt, livelihood diversity, asset ownership, and human capital. It should be noted that the improvement in livelihood diversity is likely partially due to households entering into low-return economic activities in response to the worsening shock environment. Similarly, the improvements in human capital may be due to the absorption of more literate and educated adults into households associated with displacement from conflict and COVID-19 restrictions. Also of note is that there was a large decline in one important aspect of adaptive capacity: access to financial resources.

With respect to differences across the initiative areas, the Niger area fared better in maintaining households’ resilience capacities. Niger households saw some improvement in their adaptive capacity, but no change in absorptive or transformative capacity. Conversely, Burkina Faso households saw a decline in absorptive capacity and no change in adaptive or transformative capacity. The reductions seen initiative-area-wide in access to markets and in access to financial services were only detected in the Burkina Faso area. Also of note is that the reductions seen in formal safety nets were only statistically significant in the Niger area.

Household Food Security and Resilience to Shocks

The RISE Initiative area experienced a steep decline in food security over its operational period extending into both the Burkina Faso and Niger initiative areas. The prevalence of food insecurity was already very high at baseline, at 77 percent of households. By endline, it was near universal—over 90 percent of households were food insecure. The prevalence of severe food insecurity, which is associated with behaviors such as going a whole day and night without eating, nearly doubled over the initiative period, from 26 to 49 percent, attesting to the stress households were under as shock exposure shot up.

Resilience is measured in this report using two indicators—one objective and one subjective. The objective indicator, termed “realized resilience,” is the change in food security between the midline and endline surveys, which is the period of focus for the impact evaluation (see below). It is complemented by a dichotomous variable indicating whether or not a household is resilient. The subjective indicator is an index of households’ perceived ability to recover from the shocks they experienced in the year prior to each survey.

According to the realized resilience measure, the average household was not able to maintain its midline level of food security or get back to it by endline. Forty-four percent of households were resilient, while the rest were not. The data show little difference in the resilience of Burkina Faso and Niger households. Further, trends in the perceived ability to recover measure (the subjective indicator of resilience) indicate that households’ resilience stagnated over the initiative period. By this measure, the percentage of households who were able to recover from all experienced shocks declined from an already low 13.9 at midline to just 5.7 at endline. Such a decline occurred in both the Burkina Faso and Niger areas.

Poverty and Women’s Empowerment

Throughout the RISE Initiative’s operational period, the prevalence of poverty was much higher in the Niger initiative area than the Burkina Faso area. The Niger area started out at a very high prevalence of 78.8 at baseline and the Burkina Faso area started out at 49.0 percent. While the poverty prevalence stayed steady between the baseline and endline in Niger, it increased precipitously in the Burkina Faso area, from 49.0 to 57.0 percent, an eight percentage-point rise.

Women’s empowerment is measured in this report using five indicators of women’s involvement in decision-making and ownership of assets relative to men. When combined into an index, they indicate that women’s empowerment saw significant improvements in the Niger area, especially between the midline and endline. The results are less clear for the Burkina Faso area, with some aspects of empowerment improving (especially regarding asset ownership) and others seeing little change. The qualitative data highlight changes in the role of women due to economic empowerment that allow them to help cover household expenses.

Engagement in resilience-strengthening interventions and receipts of humanitarian assistance

In order to determine impact, this evaluation relied on separate measures of household exposure to and participation in resilience-strengthening interventions.² To construct these measures, the initiative’s interventions were first divided into eight “interventions sets”:

- Improved technologies and management practices: agricultural production;
- Improved technologies and management practices: livestock rearing;
- Community natural resource management (CNRM);
- Markets and business development (MBD);

² A household is considered to have been exposed to an intervention if it is located in a village where the intervention was implemented. It is considered to have participated in an intervention if it took action to take advantage of the intervention.

- Financial services;
- Human capital;
- Disaster preparation and mitigation (DPM); and
- Governance.

Indexes for exposure to and participation in each category were then calculated. Recognizing the comprehensive, cross-sectoral nature of the RISE Initiative, a dichotomous measure of “Comprehensive Resilience Programming” (CRP) was then calculated. Households exposed to/participating in at least seven out of eight of the intervention sets were classified into the CRP group.

Forty-three percent of the households residing in the RISE area as a whole were exposed to CRP, and 12 percent directly participated in it. Burkina Faso households were more likely to be exposed to and participate in CRP.

Similar to the findings from the coping strategies data, very few households reported relying on any humanitarian assistance over the RISE Initiative period despite the escalating shock exposure. Only one-quarter of households received food assistance over the entire 5-year period, and just over 10 percent received cash assistance. Further, humanitarian assistance declined over the initiative period despite the increase in shock exposure, partly because of the inability of humanitarian actors to access areas of need.

Impact of RISE on Household Resilience and Resilience Capacity

The main technique employed to determine whether and how the resilience-strengthening interventions implemented in the RISE Initiative area served to increase households’ resilience and resilience capacities is Difference-in-differences Propensity Score Matching (DID-PSM). The evaluation period of focus is that between the midline and endline surveys, the period for which panel data are available. Panel data are needed in order to measure households’ realized resilience and to identify an adequate control group of households that matches the treatment group in initial (midline) shock exposure, food security, resilience capacities, and other household and community characteristics.

The analysis finds that household exposure to CRP, and thus multiple intervention sets simultaneously, did indeed strengthen their resilience despite the extreme and escalating shock exposure over the evaluation period. Translating that gain into real terms, exposure to CRP led to a 9.9 percentage-point smaller increase in food insecurity than would otherwise have taken place between the midline and the endline. It also led to a smaller increase in the prevalence of severe food insecurity—which is associated with such behaviors as going to bed without eating and going a whole day and night without eating. In terms of resilience capacity, it finds that exposure to CRP had strong, positive impacts on households’ absorptive and adaptive capacities, but no impact on transformative capacity.

Looking at individual resilience capacities—which are the actual programming levers for bringing about improvements in the capacities and thus resilience—exposure to CRP had a positive impact on the following nine capacities:

- Availability of hazard insurance

- Disaster preparedness and mitigation
- Asset ownership
- Bridging social capital
- Livelihood diversity
- Access to financial resources
- Exposure to information
- Access to infrastructure
- Access to formal safety nets.

Other findings regarding the impact of CRP are:

- (1) Direct participation of households in CRP benefited them more in terms of improvements in resilience and resilience capacities than did indirect exposure to CRP;
- (2) Exposure to CRP served to reduce the negative impact of climate shocks, including both drought and flooding, on households' food security. This is additional evidence that the interventions of the type implemented by RISE did, in fact, build resilience; and
- (3) The impact of exposure to CRP on resilience was stronger for the Burkina Faso area than the Niger area. Other initiative area differences found were that the impact of CRP on absorptive capacity was stronger for the Niger area and the impact of CRP on transformative capacity was stronger in the Burkina Faso area.

Looking individually at the contributions of the eight intervention sets, four had clear, positive impacts on both resilience and most resilience capacities. These are: Governance, Human Capital, DPM, and Financial Services. The Financial Services interventions had the strongest positive impact on resilience of the intervention sets. The rest of the interventions registered positive impacts on some capacities and negative impacts on others. The Livestock Rearing and MBD interventions, both of which are closely tied to markets, registered mostly negative impacts. However, this IE is unable to determine whether any estimated negative impacts are truly negative impacts or at least partly due to negative bias in the estimates.³

Impact of RISE on Poverty and Women's Empowerment

While household exposure to CRP had no statistically significant impact on poverty, it did boost households' ownership of farming implements, livestock, and land. Two intervention sets helped to mitigate poverty in the RISE area: financial services and DPM.

Exposure to CRP registered no impact on women's empowerment in the post-midline period overall, but this finding is due to some interventions registering a positive impact and some registering a negative impact. The intervention sets that had clear positive impacts are MBD and financial services, both of which strengthened women's decision-making over and ownership of assets relative to men's.

³ Potential negative bias is due to matching at midline rather than baseline, which was necessary because of the lack of panel data extending fully from the baseline to the endline survey.

Initiative Implications

The following are the implications for programming based on the findings of this impact evaluation.

- The humanitarian/development nexus is crucial to resilience programming. In situations where shock escalates into crisis, such as that in the RISE area, initiatives should pivot with a shock-responsive safety net providing humanitarian support in order to protect previous gains and generally prevent deterioration in resilience capacities and household well-being.
- Greater resilience impact is achieved when interventions from multiple sectors are combined than when they are implemented separately. Comprehensive Resilience Programming optimizes resilience impacts.
- Participation of households in RISE Initiative interventions had a greater impact on resilience and resilience capacity than only indirect exposure. Resilience initiatives should encourage direct participation in interventions.
- Governance, Human Capital, DPM, and Financial Services interventions had the most positive impacts on resilience and resilience capacities—despite extreme and escalating shock exposure. We have solid evidence that these interventions are important for achieving resilience in the face of shocks in the RISE area.
- Attention to gender targeting and analysis is critical to enhancing the positive impacts (and avoiding negative impacts) of interventions on women’s empowerment. In the RISE case, attention to gender targeting and analysis in two interventions is recommended: governance and MBD.
- Special attention needs to be given to addressing violent extremism, and activities need to be put in place, such as peace initiatives and conflict mitigation measures, as well as early warning and monitoring of potential violent encounters. Greater support needs to be provided to host communities that take on displaced households to help meet needs and avoid overburdening the hosts.
- Investments in disaster preparedness and mitigation should give more attention to floods. Flooding has become more serious in the initiative areas over the years, and more actions should be taken regarding relocation of households living in flood plains, construction of small dams and drainage structures, crop and livestock protection, and flood-proofing houses.
- Access to financial services in the Burkina Faso area declined over RISE I. The financial services intervention was found to have a positive impact on resilience and needs to be a high priority for RISE II going forward.
- With regard to lessons learned for conducting informative impact evaluations, it is crucial to collect panel data before and after an initiative’s operational period in order to clearly identify initiative impacts.

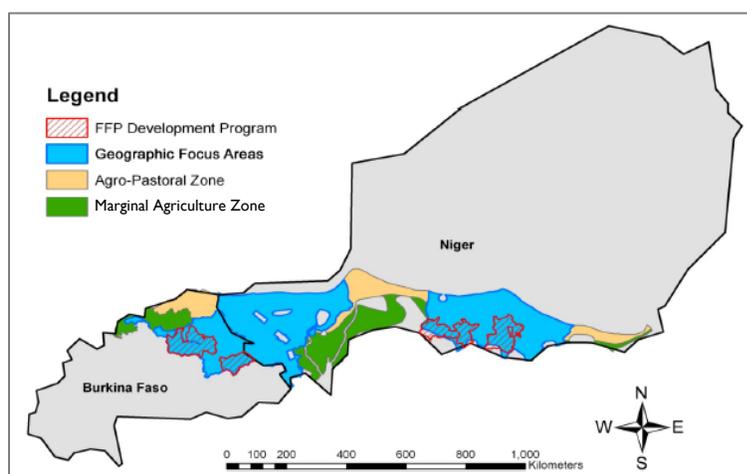
I. INTRODUCTION

The Resilience in the Sahel Enhanced I (RISE I) initiative was implemented from 2014 to 2019 with the goal of increasing the resilience to shocks of chronically vulnerable populations in agro-pastoral and marginal agriculture livelihood zones of the West African Sahel.⁴ The Sahel is the focus of RISE because of its mix of deeply-rooted chronic poverty, food insecurity, recurrent climate shocks, conflict, and violent extremism that drives vulnerable communities into recurrent crises. With regard to climate shocks, the region experienced three droughts over the course of a decade, in 2008, 2010, and 2012. More recently, it began to experience chronic rainfall variability and abnormal timing, at times leading to flooding.

This report documents the analysis of the RISE endline survey conducted in October/September 2020 as part of an impact evaluation of the initiative's activities. It also makes use of data collected in three previous RISE surveys: a baseline survey (April/May 2015), a midline survey (April/May 2017), and a recurrent monitoring survey (RMS) (August 2018–April 2019). As this report shows, the period of initiative implementation was marked by continual climatic variability with episodes of drought mixed with flooding, combined with an influx of violent extremism and restrictions associated with the COVID-19 pandemic. This combination of shocks, which became more extreme over time, has sent the initiative area into an unprecedented state of upheaval.

The RISE Initiative's comprehensive, integrative approach to enhancing resilience was to strategically layer, sequence, and integrate humanitarian and development efforts to end the Sahel's vicious cycle of crises and help vulnerable communities stay firmly on the path to development.⁵ RISE I was funded by the United States Agency for International Development (USAID) and implemented in targeted zones of Burkina Faso and Niger (Figure 1).

Figure 1. RISE Initiative area within Sahelian Burkina Faso and Niger



Source: TMG/SAREL (2018).

⁴ Some activities were instigated in 2013, and some extended into March 2021, but the large majority of project activities took place in the 2014–2019 period.

⁵ USAID 2015

The primary purpose of this endline report is to determine whether and how the RISE Initiative’s package of interventions enhanced households’ resilience. Did the interventions help households recover from the multiple shocks they faced over the initiative period? What can we learn to enhance the effectiveness of future resilience-strengthening initiatives? The report also examines how the initiative impacted two additional outcomes that are crucial indicators of people’s well-being in the Sahel: poverty and women’s empowerment.

In addition to providing a detailed accounting of the shocks households were exposed to over the initiative period, the report presents data on changes in households’ coping strategies, their resilience capacities (the underlying factors affecting their resilience), and well-being outcomes over the RISE I period. It then presents the results of an impact evaluation documenting how households’ resilience and other outcomes were affected by interventions falling into eight categories:

- Improved technologies and management practices: Agricultural production;
- Improved technologies and management practices: Livestock rearing;
- Communal natural resource management;
- Markets and business development;
- Financial services;
- Human capital;
- Disaster preparedness and mitigation; and
- Governance.

In recognition of the initiative’s comprehensive, integrative approach, it examines the combined impacts of these interventions under the concept of “Comprehensive Resilience Programming.” The report also provides an analysis of the associations between specific household resilience capacities—the actionable programming and policy levers for enhancing households’ ability to recover from shocks—and their actual resilience, adding to similar analyses undertaken using the baseline, midline, and RMS data sets. The analysis is based on qualitative and quantitative data, the latter collected from a representative panel of 1,758 households that were also included in the midline data set.

1.1. The Initiative Area: Sahelian Zones of Burkina Faso and Niger⁶

The Sahel is an ecologically fragile transition zone of grasslands and shrubs between the Saharan Desert to the north and savanna to the south that is highly susceptible to climate and economic shocks. The dominant livelihood activities are farming and livestock rearing. Given the semi-arid climate, the most commonly-grown crops and staple foods are millet and sorghum. Common livestock are cattle, small ruminants, and poultry.

The chronic vulnerability of households in the initiative area is marked by high levels of poverty—an estimated 61.8 percent of all people live on less than \$1.90 per day United States

⁶ The sources for this section are: FEWS NET (2010), USAID (2013), USAID/Senegal (2013), Refugees International (2013), Burkina Faso FEWS NET Food Security Outlook reports from April 2014–August 2015, Niger FEWS NET Food Security Outlook reports from April 2014–July 2015 (2015), and OECD and ECOWAS (2008).

dollar (USD)⁷—water scarcity, weak governance, and gender inequality. A complex set of drivers has resulted in a large and growing resilience deficit such that households are increasingly unable to mitigate, adapt to, and recover from shocks and stresses in a manner that does not further exacerbate their vulnerability.

Three main drivers are at the root of the area’s resilience deficit. The first is population growth, which exerts pressure on social and economic systems and strains already degraded natural resources, increasing conflicts over water, pasture rights, and agricultural land. Both Burkina Faso and Niger have among the world’s highest population growth rates.

The second driver of the area’s resilience deficit is climate change and variability. Climate change is already causing temperature and rainfall extremes that exceed historical patterns across the Sahel. Climate models predict increasing temperatures, more variable rainfall, and more frequent extreme events, such as droughts and floods, over the coming decades. Given that the large majority of households’ livelihoods depend on rainfall, the result is more uncertain production levels, food price volatility, income variability, asset depletion, and increased indebtedness.

The third driver is a growing reliance on markets to meet households’ food needs, leading to increased vulnerability to food price volatility. The area is structurally in food deficit, being increasingly dependent on the market for staple cereals from more productive regions to the south.

Together, these drivers underlie a trend towards populations in former pastoralist areas becoming increasingly involved in agriculture as well as wage labor and other cash income-generating activities such as petty commerce. Faced with repeated crises, more and more poor households are finding themselves with no other choice than to leave their villages in search of other forms of income. In Burkina Faso, this “distress migration” is often to work in gold mines, while in Niger, it is to seek employment in urban areas or even to beg.

Among the RISE Initiative area’s most vulnerable are its children under 5 years old. According to the midline data, the prevalence of chronic undernutrition (stunting) is 46.8 percent. The prevalence of acute undernutrition (wasting) is 15.9 percent,⁸ far higher than the 10 percent threshold deemed by the World Health Organization (WHO) to signify serious concern.^{9,10} Such high malnutrition is caused by the area’s excessive levels of food insecurity, as described in Chapter 6 of this report, poor child feeding practices, and unsanitary conditions.¹¹

For further background, Figure 2 presents data from the RISE baseline showing the percentage of households residing in the RISE Initiative area falling into three livelihood groups:

⁷ SAREL 2018

⁸ See TMG/SAREL 2018

⁹ In comparison, the stunting prevalence in Burkina Faso as a whole was 32.9 percent in 2012. That of Niger as a whole was 43.0 percent. The wasting prevalence of Burkina Faso was 10.9 percent, and that of Niger was 18.7 percent (United Nations Children’s Fund, WHO, & World Bank, 2015).

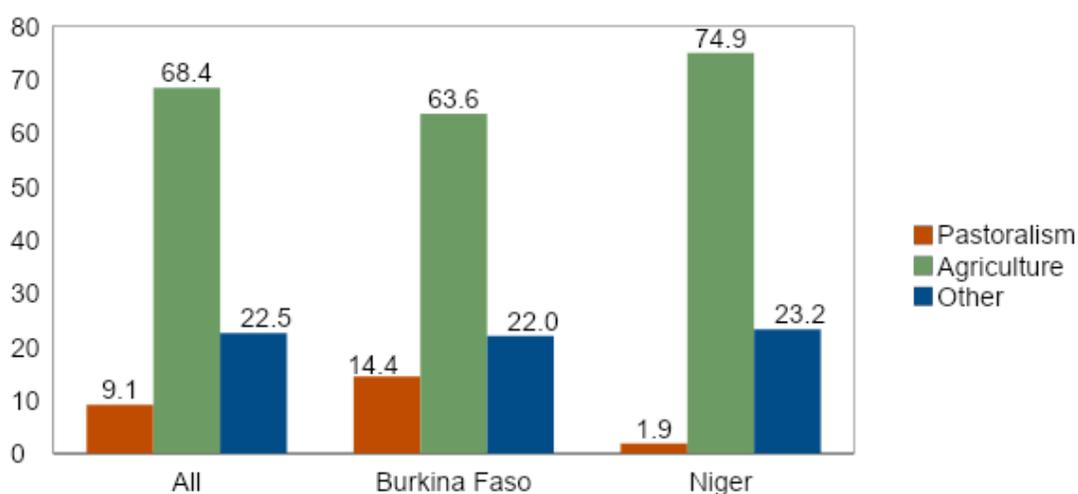
¹⁰ WHO 2000

¹¹ According to the SAREL midline report (TMG/SAREL 2018), only 5.7 percent of children 6–23 months in the initiative area receive a minimum acceptable diet, and 39.8 percent of children 0–6 months are exclusively breastfed. With respect to sanitation, although 68.9 percent of households use improved drinking water sources, only 19.4 percent have a sanitation system for human waste that is covered or otherwise intended to prevent contamination.

predominantly pastoralism, predominantly agriculture, and “other.”¹² The livelihoods of the latter group are dominated by retailing, remittances from migration, and artisanal mining.

Agriculture is the primary livelihood across the RISE area. Pastoralism as a main source of livelihood makes up a small but significant proportion of households in the Burkina Faso area (14 percent). Roughly one-fifth of households in the RISE area rely predominantly on non-climate-dependent occupations for their livelihoods. While one livelihood source may predominate, most households derive at least some of their food and income from both agriculture and livestock rearing, lying somewhere along the agro-pastoralism spectrum.

Figure 2. Percentage of households falling into livelihood groups, by initiative area



Source: RISE baseline data

1.2. Resilience and Resilience Capacity

As resilience and resilience capacity are both key concepts on which this report’s analysis is based, it is important to understand what each is and the distinction between them.

This impact evaluation conceptualizes resilience according to the USAID definition, which states that resilience is “the ability of people, households, communities, countries, and systems to mitigate, adapt to, and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth.”¹³ This report focuses on resilience at the household level. From a practical measurement standpoint, it defines resilience as the ability of a household to manage or recover from shocks and stresses and takes into account whether

¹² The classification of households into predominant livelihood groups is based on survey respondents’ reports of the proportion of food/income derived from various types of livelihood activities. The pastoralism group contains households reporting that “Livestock production and sales” provides the greatest proportion of their food/income. The agriculture group contains households reporting that “Farming/crop production and sales” provides the greatest proportion of their food/income. The “other” group contains all other households. The livelihoods of these households are dominated by retailing, remittances from migration, and artisanal mining, occupations that tend to be less climate-dependent than those of the pastoralism and agriculture-predominant groups.

¹³ USAID 2012

that recovery took place with the use of negative coping strategies that undermine the ability to recover from future shocks and stresses.

While resilience itself is an ability to manage or recover, resilience *capacities* are a set of conditions that enable households to achieve resilience in the face of shocks. These determinants of resilience can be classified into three categories:

- *Absorptive capacity* is the ability to minimize exposure to shocks and stresses (*ex-ante*) where possible and to recover quickly when exposed (*ex-post*).¹⁴
- *Adaptive capacity* involves making proactive and informed choices about alternative livelihood strategies based on changing conditions.
- *Transformative capacity* relates to governance mechanisms, policies/regulations, infrastructure, community networks, and formal safety nets that are part of the wider system in which households and communities are embedded. Transformative capacity refers to system-level changes that enable more lasting resilience.

Given their complexity, measuring household resilience capacities requires combining a variety of indicators of the underlying concepts relevant in a particular setting into one overall indicator. The measurement of absorptive, adaptive, and transformative capacity is described in Chapter 5.

1.3. The RISE Initiative

To reach its overall goal of increased resilience, the RISE Initiative has three specific objectives. They are:

- 1. Increased and sustainable economic well-being through**
 - Diversified economic opportunities;
 - Intensified production and marketing;
 - Improved access to financial services; and
 - Increased access to market infrastructure.
- 2. Strengthened institutions and governance through**
 - Improved natural resources management;
 - Disaster risk management;
 - Strengthened conflict management systems; and
 - Strengthened government and regional capacity and coordination.
- 3. Improved health and nutritional status through**
 - Increased access to potable water;
 - Improved health and nutrition practices, particularly for mothers and children;
 - Improved family planning; and
 - Better sanitation practices.

¹⁴ The descriptions in the paragraph of absorptive, adaptive, and transformative capacity are from Frankenberger et al. (2012).

In addition to longer-term development activities, when needed, USAID’s Office of Food for Peace (FFP) and Office of U.S. Foreign Disaster Assistance (OFDA)¹⁵ planned to target the most vulnerable with life-saving interventions. These include direct food provision through the World Food Programme as well as cash transfers, temporary employment, and improved access to seeds.

The RISE Initiative includes three activities:

1. **Resilience and Economic Growth in the Sahel–Enhanced Resilience (REGIS-ER).**
REGIS-ER is the flagship multi-sectoral resilience activity of the RISE Initiative launched in 2014. It addresses the root causes of chronic vulnerability by increasing economic well-being, strengthening institutions and governance, and improving health and nutrition status. The initiative integrates sustainable livelihoods, natural resource management, governance, and health and nutrition activities in collaboration with local communities.
2. **Resilience and Economic Growth in the Sahel–Accelerated Growth (REGIS-AG).**
REGIS-AG, a focused value chain activity launched in 2015, is designed to increase the resilience of vulnerable households through strengthening the performance and inclusiveness of cowpea, poultry and small ruminant value chains. It works with producers, input suppliers, transporters and other marketers, and processors, linking with national officials and partner initiatives to spur development of profitable markets.
3. **Ongoing FFP development and food security activities (DFSAs) underway since 2012.**
In Burkina Faso, the initiatives are: Families Achieving Sustainable Outcomes (FASO), Catholic Relief Services (CRS), and Victory Against Malnutrition (VIM) Initiative, Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance [ACDI/VOCA]). In Niger, they are Pasam-Tai (CRS), Sawki (Mercy Corps), and Livelihoods, Agriculture and Health Interventions in Africa (LAHIA, Save the Children).

Regarding the resilience-focused activities, USAID (2019) states that “By building on and out from other initiatives in the Sahel, such as the FFP development initiatives in the RISE zone of intervention, these investments will give an estimated 1.9 million of the region’s most vulnerable a real chance to break the cycle of crisis and lessen the need for humanitarian assistance in the future” (p. 1).

The targeted zones of the RISE Initiative include areas in the Centre-Nord, Est, and Sahel regions of Burkina Faso, which are highlighted in Figure 3, and the Maradi, Tillabery, and Zinder regions in Niger, highlighted in Figure 4. The combined population of the targeted zones is 11 million (USAID 2013).

¹⁵ FFP and OFDA merged into the USAID Bureau for Humanitarian Assistance (BHA) in June 2020.

Figure 3. Map of Burkina Faso delineating the three regions in which the RISE Initiative operates – Centre-Nord, Est, and Sahel

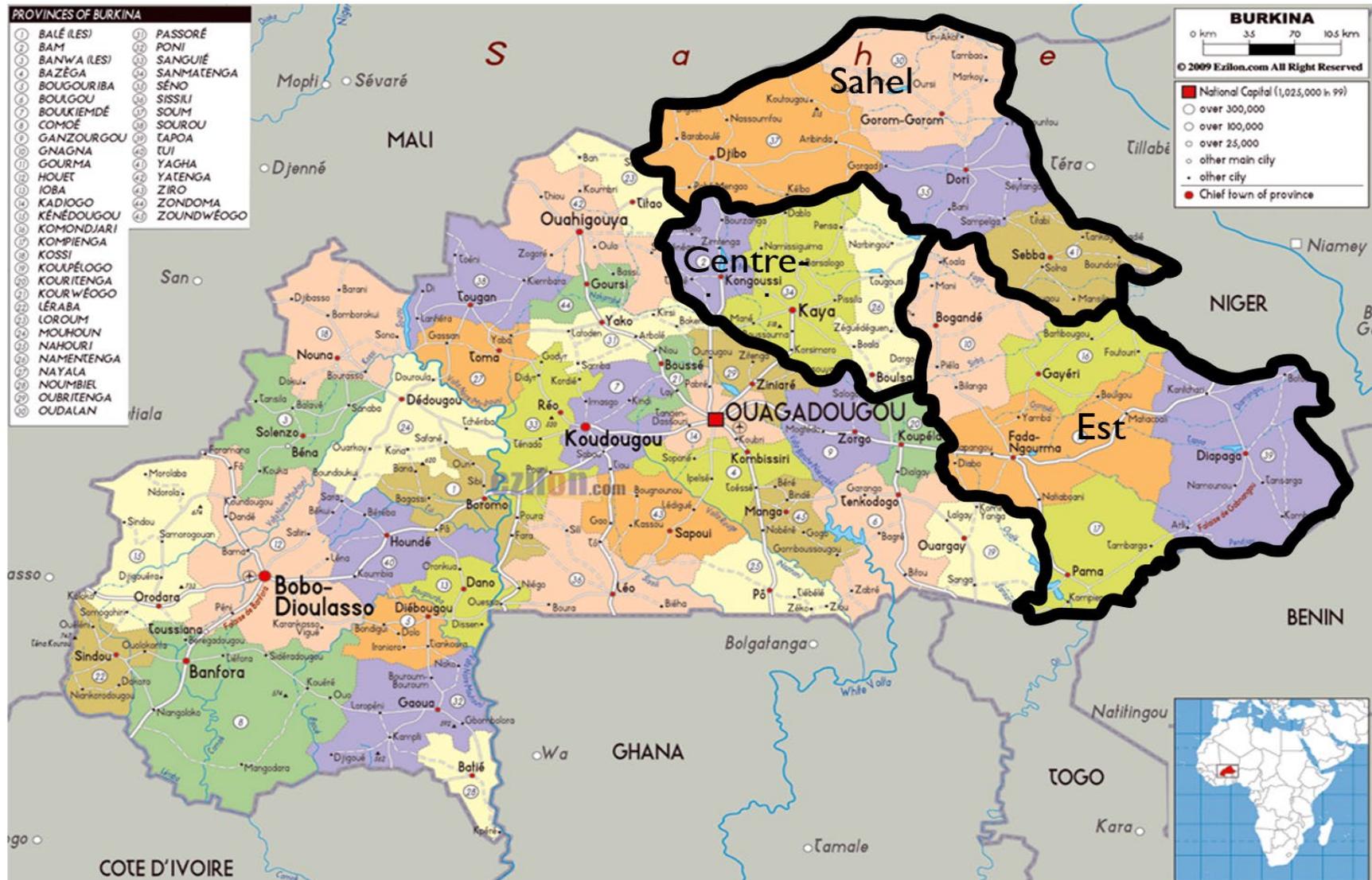


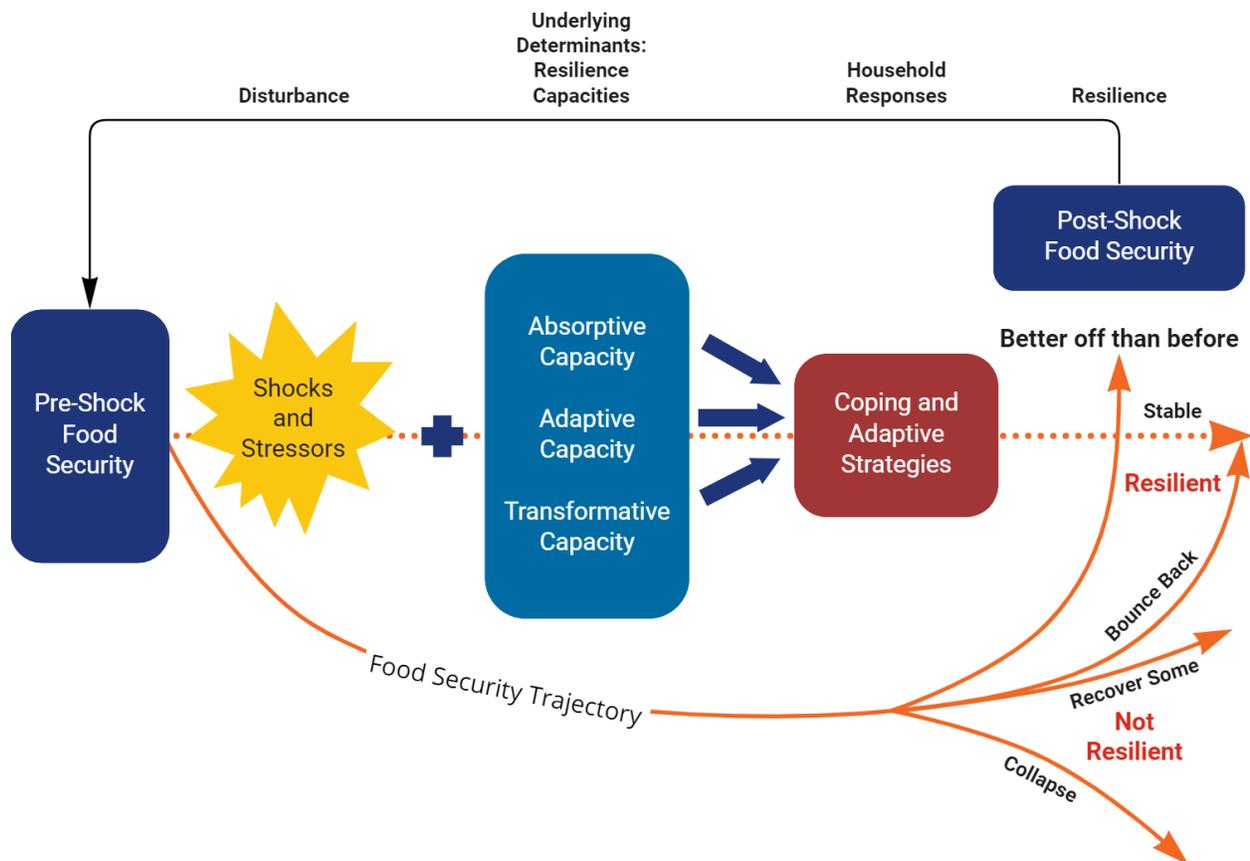
Figure 4. Map of Niger delineating the three regions in which the RISE Initiative operates – Maradi, Tillabery, and Zinder



1.4. Conceptual Framework and Research Questions

Figure 5 is TANGO’s conceptual framework for resilience measurement and analysis. Following this framework, households’ resilience, as measured by changes in well-being outcomes (in this example, food security) over the course of a period of shocks and stressors, is determined by their resilience capacities. Households’ resilience capacities, in turn, govern their coping strategies and, ultimately, whether they are able to bounce back to their previous well-being or better. Resilience-strengthening interventions alter households’ well-being trajectories in the face of shocks by impacting their resilience capacities and, thus, coping strategies. This framework guides the variables measured and specific research questions of the report.

Figure 5. TANGO International Conceptual Framework for Resilience Measurement and Analysis



Note: Dashed line indicates steady over time.

Research Questions

The research questions are:

Context

1. What shocks did households experience over the initiative period and how did their shock exposure and coping strategies for dealing with these shocks evolve?
2. What changes have taken place in households' resilience capacities? What changes have taken place in poverty and women's empowerment?
3. How resilient were households to the shocks they faced? Have households experienced any improvement in their resilience?
4. Did households' resilience capacities help them recover from the shocks they faced? Which specific capacities have bolstered households' resilience to shocks?

Impact Evaluation

5. What impact did RISE have on household's resilience to shocks? Did the initiative's comprehensive approach make a difference?
6. Which types of RISE interventions helped them recover?
7. What impact did RISE have on poverty and women's empowerment in the initiative area?
8. Did direct participation in interventions have a greater impact on these outcomes than only indirect exposure?

The analysis for Research Question 4 will be presented in an ancillary report.

1.5. Organization of the Report

Chapter 2 of this report presents the data collection and analysis methodologies. Chapters 3, 4, and 5 set the context by documenting the changes in households' shock exposure, coping strategies, and resilience capacities over the initiative period, with Chapter 4 looking in depth at impacts of the COVID-19 pandemic. Chapter 6 examines how resilient households were to the shocks they faced and how resilience has changed over the initiative period. Chapter 7 focuses on patterns of change in poverty and women's empowerment. In Chapter 8, a descriptive analysis of households' exposure to and participation in resilience-strengthening interventions as well as their receipt of humanitarian assistance is undertaken. The impact evaluation results are presented in Chapter 9, followed by conclusions and implications for programming in Chapter 10.

2. METHODOLOGY: DATA, MEASURES OF RESILIENCE, AND EMPIRICAL STRATEGY

2.1. Quantitative Data Collection

As noted in the introduction, to conduct the RISE I impact evaluation (IE), a suite of surveys was administered including a baseline, a midline, an RMS, and an endline. The dates of these surveys and sample sizes are given in Table I.

The baseline data were collected under the auspices of the Sahel Resilience Learning Initiative, the monitoring and evaluation arm of the RISE I initiative. The midline, RMS, and endline data were collected by TANGO and the *Centre d'Études, d'Expérimentations Économiques et Sociales de l'Afrique de l'Ouest (CESAO)*, an African international association based in Burkina Faso. Both household and community surveys were conducted, with community surveys administered in each survey village. The respondents for the household surveys were adult household members. The respondents for the community surveys were a group of four to six knowledgeable village members, including village leaders. The questionnaires can be found in Volume II of this endline report.

Table I. RISE I data sets: Dates of data collection and sample sizes

Survey	Start date	End date	Type of survey	Number of villages	Number of households
Baseline (BL)	April 2015	May 2015	Cross-sectional	100	2,492
Midline (ML)	April 2017	May 2017	Village panel with BL	100	2,492
RMS	April 2018	April 2019	HH panel with ML	36	828
Endline (EL)	September 2020	October 2020	HH panel with ML	88	1,758

Note: The sample sizes are for the “analysis data set,” giving the number of households after data cleaning.

To facilitate evaluation of the impact of RISE interventions, the sampling designs for the surveys were planned with the need to collect data for two intervention groups—high exposure and low exposure. The *high exposure* group consists of households residing in villages that, at the time of the baseline survey, were slated to benefit from all three sets of RISE activities described in Chapter I: ongoing FFP activities initiated prior to the start of RISE, the Resilience and Economic Growth in the Sahel–Enhanced Resilience (REGIS-ER) activity, and the Resilience and Economic Growth in the Sahel–Accelerated Growth (REGIS-AG) activity. The *low exposure* group, which

would serve as the control group, consists of households residing in villages not slated to receive support from these activities.

The **baseline survey**, conducted in April/May 2015, is the anchor survey on which the sampling of all other surveys is based. Data collection followed a two-stage, stratified sampling design with the high- and low-exposure intervention groups serving as the strata. In the first stage, 37 villages were randomly selected within the high exposure group and 63 villages within the low exposure group using Probability Proportional to Size (PPS) sampling.¹⁶ In the second stage, 25 households were randomly selected within each village to reach the desired sample size of 2,500.¹⁷

In the case of the **midline survey**, conducted in April/May 2017, the same 100 villages selected for the baseline served as the first-stage sampling units, forming a village panel. A new set of 25 randomly-selected households was sampled using updated household listings. Both the baseline and midline surveys had 99.7 percent response rates, yielding final analysis samples of exactly 2,492 households.

The **RMS**, conducted between August 2018 and April 2019, is a multi-round survey designed to collect real-time data during a shock period in order to provide deeper insight into the nature of the shock, how households cope with it, and their resilience.¹⁸ The survey was launched in response to signs that shock exposure was escalating in the initiative area. The data were collected over a period of 9 months in five rounds 2 months apart.¹⁹

Plans were set for the **endline survey** to be conducted at the same time of year as the baseline and midline surveys, in April/May 2020. However, the COVID-19 pandemic led to delays in survey implementation and a change in the data collection technique. The survey was conducted in September/October 2020 and was a phone, rather than in-person, survey. Use of a phone survey required shortening questionnaires (only including questions absolutely necessary for conducting this impact evaluation) and leaving out an important module requiring in-person data collection, the anthropometry module.²⁰

The endline was designed as a panel survey, collecting data from the same households that participated in the midline survey. Due to the disruptions of COVID-19 and the high incidence of climate and conflict shocks, the survey was conducted in only 88 of the original 100 baseline-midline villages. This factor, in addition to household non-response in included villages, means that only 1,758 of the 2,492 households in the midline survey participated in the endline survey,

¹⁶ The unbalanced allocation of villages across the high and low exposure groups is to facilitate this endline impact evaluation, in particular the application of Propensity Score Matching (see section 2.3 below).

¹⁷ The actual number of households sampled was 28 in order to reach the target of 25 needed to achieve the desired sample size.

¹⁸ See Scantlan and Sagara (2019) for further information on Recurrent Monitoring Surveys.

¹⁹ Like the baseline and midline surveys, sampling for RMS also took place following a two-stage, stratified design with the high- and low-exposure intervention groups serving as the strata. In this case, however, 18 villages were randomly selected from among the 37 high-exposure villages and 18 from among the 63 low-exposure villages. Thus, half of the 36 RMS sample villages are in the high-exposure group and half in the lower-exposure group. In the second stage of sampling, all households in each of the 36 RMS villages that were in the midline analysis were included in order to form the final 828-household panel data set.

²⁰ Phone interviews for quantitative and qualitative surveys sometimes required numerous calls to locate individuals or multiple calls to complete interviews when batteries discharged or phone signals were lost.

giving a response rate of 70.5 percent.²¹ For this reason, it is important to ensure that a representative sample was maintained.

Table 2 compares midline characteristics of the full midline household sample with that of the endline panel sample. While there are some differences in the locations of households within the two initiative areas, the two samples are similar in economic status, food security, resilience capacity and shock exposure (using the 5 percent level for determining statistical significance). The only exception is that endline panel sample households are slightly more highly educated than the full midline sample, with the implication that the endline panel sample may be slightly more educated than the RISE population. Also included in the table is the percent of households in the high-exposure sampling strata. No statistically significant difference is found across the midline and endline samples.

Note that data collected in the endline survey on households' exposure to resilience-strengthening interventions indicate that the planned intensity of implementation on which the sampling design was based was not in accordance with the actual intensity. For this reason, the original treatment and control groups used for sampling are not employed for this evaluation. Rather, data collected at endline on households' exposure to and participation in interventions are used to create treatment and control groups based on the concept of "Comprehensive Resilience Programming" (see Chapter 8).

Note also that the sample was not stratified by initiative area (Burkina Faso and Niger). Nevertheless, the sample sizes for the initiative areas is sufficiently large to be able to conduct comparative analyses of variable values across them.²²

Sample weights: For each of the two strata, the household-level sample weights are calculated as the inverse of the selection probability of a household. They are a ratio of the proportion of the entire population of households in the stratum to the proportion of sample households in the stratum. Because the sampling weights include a correction for differences between the village sizes used for the original PPS sampling of villages at baseline (from census data) and the actual sizes obtained from household listings (at midline), one sampling weight is calculated for each village (for a total of 88 sampling weights). Sampling weights are applied to all descriptive statistics.

²¹ Of the 734 midline sample households excluded from the endline, 300 were excluded because their village of residence was excluded and the rest due to household non-response in included villages.

²² At baseline the number of sample households residing in the Burkina Faso area was 1,449 (58.1%); the number of households residing in the Niger area was 1,043 (41.9). At midline, the numbers were 1,448 (58.1) and 1,044 (41.9), respectively. At endline they were 972 (55.3) and 786 (44.7), respectively.

Table 2. Comparison of midline household characteristics, food security, resilience capacity, and shock exposure across midline and endline samples

Characteristic	All			Burkina Faso			Niger		
	Midline Sample	Endline Sample	Percent Difference	Midline Sample	Endline Sample	Percent Difference	Midline Sample	Endline Sample	Percent Difference
Location (%)									
Burkina Faso	55.2	54.0	-2.3 *						
Centre-Nord	22.5	26.9	19.1 *	40.8	49.8	21.9 ***			
Est	13.3	10.1	-23.9 **	24.1	18.8	-22.1 *			
Sahel	19.4	17.0	-12.3 **	35.1	31.5	-10.3			
Niger	44.8	46.0	2.8 *						
Maradi	14.5	18.7	29.2 ***				32.3	40.6	25.7 **
Tillabery	11.1	9.7	-13.1				24.8	21.0	-15.5
Zinder	19.2	17.7	-7.9				42.8	38.4	-10.4
Socio-demographic characteristics									
Livelihood group (%)									
Pastoral	11.2	10.5	-5.7	16.6	16.2	-2.3	4.5	3.9	-13.1
Agricultural	61.1	60.8	-0.5	61.5	61.6	0.0	60.7	60.0	-1.1
Other	27.7	28.6	3.4	21.9	22.2	1.6	34.8	36.1	3.7
Household size	7.45	7.69	3.3	7.64	7.87	3.0	7.22	7.48	3.7
Female-headed household (%)	10.3	10.0	-2.4	11.2	12.7	13.0	9.1	6.9	-24.1
No education (%)	39.6	34.5	-12.9 ***	43.4	39.4	-9.2 *	35.0	28.8	-17.8 *
Primary education (%)	38.0	40.1	5.6	36.5	38.2	4.5	39.8	42.4	6.5
Secondary education (%)	22.4	25.3	13.3	20.1	22.4	11.6	25.2	28.8	14.3
Economic status									
Consumption asset index	8.18	8.41	2.8	9.15	9.46	3.4 *	6.98	7.17	2.8
Agricultural productive asset index	4.14	4.30	3.7 *	4.18	4.36	4.2	4.09	4.22	3.2
Tropical Livestock Units	3.61	3.23	-10.5 *	5.24	4.69	-10.5	1.60	1.52	-5.0
Land owned	3.41	3.41	0.0	3.13	3.13	0.2	3.76	3.73	-0.7
Food security	18.75	18.71	-0.2	19.74	19.51	-1.2	17.52	17.77	1.4
Resilience capacity	50.02	51.84	3.6	53.12	55.02	3.6	46.21	48.12	4.1
Shock exposure (Household-reported measure)	11.11	11.55	4.0 *	10.33	10.56	2.2 *	12.06	12.70	5.3
High exposure household (%)	37.1	34.9	-5.9	34.5	31.9	-7.5	40.7	38.7	-4.9
Number of households	2,492	1,758		1,448	972		1,044	786	

Notes: Stars indicate the difference is statistically significant at the 10% (*), 5% (**), and 1% (***) levels.

2.2. Measures of Resilience

In accordance with the operational definition of resilience on which this study is based—the ability to recover from shocks—and the conceptual framework (Figure 5), resilience is measured for this analysis using two indicators. The first, “realized resilience,” is an ex-ante, objective indicator that captures the trajectory of food security over the course of a shock period. The second, households’ perceived ability to recover, is a subjective or “experiential” indicator measured using data from households’ own reports of their ability to recover.

2.2.1. Realized Resilience

Realized resilience is measured as the total change in food security between the midline and endline surveys. Panel data are available for this period; hence the impact evaluation’s focus on it (rather than the full baseline to endline period). Realized resilience is a direct measure of households’ ability to recover from the specific series of shocks that occurred during this period. It is complemented by a dichotomous variable indicating whether a household was able to maintain or increase its food security and is thus considered “resilient” to the shocks.

The measure of food security employed is the inverse of the Household Food Insecurity Access Scale (HFIAS), an index constructed from the responses to nine questions regarding people’s experiences of food insecurity in the previous 4 weeks.^{23,24} Survey respondents indicate whether a member experienced the event or feeling in question and, if yes, how often (rarely, sometimes, or often). An index is then calculated based on these frequency responses. The inverse of the index is used so that the measure increases with increasing food security. The resulting food security index ranges from 0 to 27, and the realized resilience indicator from -27 to +27.

2.2.2. Perceived Ability to Recover

The perceived ability to recover (ATR) indicator is measured using data on survey respondents’ answers to the question, for each of $X_j, j = 1, \dots, 26$ shocks experienced, “To what extent were you and your household able to recover?”

²³ Coates, Swindale and Bilinsky 2007

²⁴ The nine experiences used for measuring the HFIAS are:

1. Worry that the household would not have enough food.
2. Any household member was not able to eat the kinds of foods preferred because of a lack of resources.
3. Any household member had to eat a limited variety of foods due to a lack of resources.
4. Any household member had to eat some foods that they really did not want to eat because of a lack of resources to obtain other types of food.
5. Any household member had to eat a smaller meal than he/she felt they needed because there was not enough food.
6. Any household member had to eat fewer meals in a day because there was not enough food.
7. There was ever no food to eat of any kind in the household because of lack of resources to get food.
8. Any household member went to sleep at night hungry because there was not enough food.
9. Any household member went a whole day and night without eating anything because there was not enough food.

The possible responses, with assigned values in parentheses, are:

- Did not recover (1)
- Recovered some, but worse off than before (2)
- Recovered to same level as before (3)
- Recovered and better off (4)
- Not affected (5).

The responses are used to calculate an ATR index for each household using data collected at baseline, midline and endline as follows:

$$ATR_i = \frac{\sum_{j=1}^{26} X_{ij}}{26}. (1)$$

2.3. Empirical Strategy for Quantitative Data Analysis

The quantitative data analysis was conducted in STATA using descriptive analysis along with Difference-in-differences Propensity Score Matching and regression techniques to conduct the impact evaluation.

2.3.1. Descriptive Analysis

The baseline, midline, RMS, and endline household and community survey data are used to conduct descriptive analysis of changes in key variables needed for conducting resilience analysis. These are: households' shock exposure and coping strategies (Chapter 3), resilience capacities (Chapter 5), and well-being outcomes and resilience to shocks (Chapter 6). Additional descriptive analyses are undertaken of changes over time in poverty and women's empowerment, and of the data on coronavirus awareness and impacts.

Indicator values are presented as percentages and means. In addition to the overall RISE area, the descriptive statistics are compared across the two RISE Initiative areas: Burkina Faso and Niger. In some cases, they are also compared across groups of "poor" and "non-poor" households. The methods for establishing these groups are explained in detail in Chapter 7 of this report. In short, an index of households' wealth was first calculated based on a housing quality index as well as their ownership of consumer durables, productive assets, livestock and land. Following, an appropriate index cut-off that corresponds to the \$1.90 poverty line was determined to form the final groups.

Representativeness of the various population groups (the RISE area as a whole, the two initiative areas, and the groups of poor and non-poor households) is maintained by applying the survey sampling weights described in Section 2.1 above.

2.3.2. Analysis of the Impact of RISE Interventions

An impact evaluation (IE) is a study conducted to determine whether changes in outcomes can be directly attributed, in a causal manner, to an initiative or intervention. A rigorous evaluation of such attribution requires comparing what happened to the outcome *with* an intervention or “treatment” (i.e., the factual) to what would have happened to the outcome *without* the treatment, the latter referred as the counterfactual. The counterfactual is never known with certainty because the exact same households that are engaged²⁵ in an intervention are not able to **not** be engaged in it at the same time. Given this issue, two necessary conditions for an impact evaluation to be conducted in a rigorous manner are that (1) a non-treatment control group be available so that a counterfactual can be identified; and (2) any selection bias be addressed. Selection bias can arise because of purposeful targeting of initiative interventions to specific populations (e.g., the most poor) and/or self-selection of households with particular characteristics (e.g., more highly educated) into interventions. Doing so renders the control group and the treatment group fundamentally different from one another prior to the commencement of initiative activities.^{26,27}

In the absence of a randomized controlled trial (an experimental method that could not be implemented in the context of RISE I), the quasi-experimental technique used here to meet these conditions is Difference-in-differences Propensity Score Matching (DID-PSM). Following, the PSM-derived control and treatment groups identified are used to conduct standard growth regression analysis that gives additional insight into the initiative’s impact.

The main purpose of this analysis is to evaluate the impact of RISE interventions on households’ resilience, resilience capacities, poverty and women’s empowerment. **Given the nature of the data collected, this impact will be evaluated over the 3.5-year period from the midline survey (April/May 2017) to the endline survey (September/October 2020).** This is the period for which the panel data needed to conduct a rigorous impact evaluation are available for the full sample.

2.3.2.1. Difference-in-Differences Propensity Score Matching

PSM is used to create a valid control group from among households that are not engaged in sets of RISE interventions (specified below) to serve as the counterfactual. The matching process in PSM takes place using measured indicators of characteristics that are believed to influence engagement in interventions as well as additional indicators of variables potentially influencing the outcome of interest. If these *observed* characteristics are the only ones influencing exposure, the impact estimates are deemed unbiased and the important “conditional independence”

²⁵ The general term “engaged” is used here to represent either exposure to or participation in an intervention. These different forms of engagement are defined below.

²⁶ Potential threats to the rigor of impact evaluations other than selection bias are attrition bias, spillovers and contamination. For this IE, attrition bias is address in Section 2.1 above where the midline and endline samples are compared. The risk of spillovers affecting the IE results is minimal because the control and treatment groups are defined post-project based on data collected from households/villages on their actual engagement in interventions (see Chapter 8). Contamination is also unlikely—there is no reason why treatment or control villages would be especially engaged in any unmeasured interventions.

²⁷ Gertler et al. 2016; Khandker et al. 2010

condition is met. However, if *unobserved* characteristics also influence exposure, then the estimates will be biased.²⁸ The challenge then, is to collect data on the entire universe of such characteristics so that none can be deemed unobserved.

As detailed in Chapter 8, impact analysis will take place for eight sets of interventions representing RISE resilience programming. These eight intervention sets are:

- Improved technologies and management practices: agricultural production
- Improved technologies and management practices: livestock rearing
- Communal natural resource management
- Markets and business development
- Financial services
- Human capital
- Disaster preparedness and mitigation
- Governance

To capture the overall impact of the initiative, consistent with RISE’s integrative, comprehensive approach (see Chapter 1), the impact of Comprehensive Resilience Programming (CRP) will be estimated. CRP is defined as engagement in at least seven of the eight intervention sets at some time over the initiative’s implementation period (between the baseline and endline surveys).

The IE will analyze the impact of two types of engagement in interventions: (1) households’ *exposure* to interventions; and (2) households’ *direct participation* in them—impact that may be quantitatively different than that of exposure. A household is considered to have been exposed to an intervention if it resides in a village in which the intervention was implemented. A household is considered to have participated in an intervention if a household member personally took actions related to the interventions.

Exposure to CRP is hypothesized to have been influenced by a variety of factors used for targeting by initiative administrators. The list of potential variables employed for matching on these factors are listed in the left-hand column of Table 3. They include a core set of variables included in all PSM exposure analyses: midline food security, resilience capacity, poverty and women’s empowerment, shock exposure between the midline and endline, various household socio-demographic characteristics, variables representing households’ economic status and, finally, core village characteristics as measured at baseline. Most of these characteristics are also potential determinants of the outcomes of interest in this IE: resilience, resilience capacity, poverty, and women’s empowerment. Additional variables used for matching that may be included for the purposes of ensuring that the conditions for implementing PSM are met (see PSM implementation steps two and three below) are also listed in the table.

For the participation analysis, additional core variables that may influence households’ participation are included: ownership of a radio and phone, variables affecting households’

²⁸ Khandker et al. 2010

aspirations and confidence to adapt, and bonding, bridging, and linking social capital, all measured at midline.

Note that the variables in Table 3 go far beyond those typically included in PSM impact evaluations to include many considered “unobservables”—for example, resilience capacities, shock exposure, aspirations, and social capital—thus increasing the validity of the resulting impact estimates.

Panel data also greatly increase the validity of the impact estimates. They were collected expressly for two purposes: 1) ensuring that the characteristics affecting exposure/participation used for matching are not affected by initiative activities administered over the evaluation period, that is, between the midline and endline surveys (a requirement for applying PSM), which is implemented by only using *midline or baseline* values for matching—see more on this below; and 2) controlling for all unobservable (that is, unmeasured) factors that do not change over time. The latter is implemented as part of the “difference-in-differences” portion of PSM—by using the difference in the *change* between midline and endline for all outcome variables evaluated rather than differences in levels. Examples of relevant factors that do not change over time might be cultural traditions, persistent health conditions and disabilities, and topographical traits of households’ areas of residence like rivers and mountains.

Table 3. Propensity Score Matching: Household and community characteristics used for matching

	Exposure to interventions	Participation in interventions
Core matching variables		
Outcome variables (midline)		
Food security		
Absorptive capacity		
Adaptive capacity		
Transformative capacity		
Poverty prevalence		
Women' empowerment index		
Shock exposure		
Household shock exposure index		
Number of months of drought (midline to endline)		
Number of months of flooding (midline to endline)		
Household socio-demographic characteristics (midline)		
Project area: Nigeria/ Burkina Faso		
Female-adult-only household		
Number of adult equivalents		
Percent males 0-16 a/ Males 16-30		
Males 30 plus		
Females 0-16		
Females 16-30		
Females 30 plus		
Any member has a formal education		
Predominant livelihood: Pastoralist a/ Agriculture		
Other		
Household economic status (midline)		
Consumption asset index		
Agricultural productive asset index		
Tropical Livestock Units		
Land owned (ha)		
Village characteristics (baseline)		
Population		
Distance from nearest town		
Number of community organizations		
Percent of hhs receiving humanitarian assistance		
Number of government programs		
Number of NGO programs		
Characteristics potentially influencing hh participation		
Household owns radio		
Household owns phone		
Absence of fatalism		
Individual power		
Exposure to alternatives		
Bonding social capital		
Bridging social capital		
Additional variables potentially used for meeting common support and balancing conditions		
Village characteristics (baseline)		
Institution providing food aid		
Piped water available		
Electricity available		
Health center		
Cell service available		
Market for agricultural products		
Veterinary facility		
Veterinary services within 20 km		
Secondary school		
Primary School		
Communal natural resource management rules in place		
Disaster preparation/mitigation program		

For any intervention, PSM is implemented in five steps.

The **first** step is to compute a propensity score for each household using a Probit treatment model:

$$P(T = 1|X_1, \dots, X_n) = \Phi(\beta_0 + \beta_1 X_1 \dots + \beta_n X_n), \quad (5)$$

where $\Phi(\bullet)$ is the cumulative standard normal distribution function.

In the **second** step, the matching is conducted. Treatment group households are matched with a group of non-treated households based on similarity of propensity scores. An important condition for the success of this step is “common support.” Treatment households must be similar enough to non-treated households in the observed characteristics so that there are sufficient non-treated households close by in the propensity score distribution with which to make matches. Any treated households whose propensity scores are higher than the maximum or lower than the minimum of the non-treated distribution are dropped. The criterion used to ensure adequate common support is that at least 80 percent of treatment households lie on the common support.

In the **third** step, matching effectiveness is evaluated based on the criteria that the mean standardized percentage bias across all matching variables post matching is less than or equal to 10.0, and all matching variables have an individual bias less than 20.0.²⁹ These criteria ensure that there are no unacceptably large differences in characteristics between the control and treatment groups, i.e. that the control group was essentially the same as the treatment group before the interventions were implemented.

In the **fourth** step the average value of the (change in the) outcome variable of the matched treated and non-treated groups of households are compared to calculate an estimate of the impact of the intervention, or the “Average Treatment Effect on the Treated” (ATT). Of the many techniques available, DID-PSM is conducted here using kernel matching, for which each treated household is matched to a group of non-treated households with propensity scores within a certain radius.³⁰ The control group outcome is computed as a weighted average, with a lower weight given the greater is the propensity score difference from that of the treated household.

²⁹ The standardized percent bias is the percent difference of the sample means in the treated and non-treated sub-samples as a percentage of the square root of the average of the sample variances in the treated and non-treated groups. Heinrich, Maffioli and Vazquez (2010) reference Rosenbaum and Rubin’s (1985) suggestion that a bias for any matching variable that is 20 or higher should be considered “large.” Garrido et al. (2014) write that “there is no rule regarding how much imbalance is acceptable in a propensity score. Proposed maximum standardized differences for specific covariates range from 10 to 25...” (p. 6). Note that in the rare cases where matching variables with standardized biases greater than 20.0 remain, these variables are noted and the results interpreted in light of the potential direction of bias in impact estimates.

³⁰ The radius (the distance between propensity scores of the treated and non-treated households) depends on the bandwidth of the kernel, which is set at 0.06 for all ATT estimates reported in this analysis.

The ATT for the realized resilience indicator, with time periods (midline and endline) denoted $\{t=1,2\}$, is:

$$ATT = \frac{\sum_{i \in T} (Y_{i2}^T - Y_{i1}^T)}{n^T} - \frac{\sum_{j \in C} \omega(i,j) \cdot (Y_{j2}^C - Y_{j1}^C)}{n^T}$$

Mean R of treated households
Weighted mean R of control households

where Y denotes food security, treated (T) and control (C) households are indexed i and j , respectively, n^T is the number of treated households, and ω is the weight used to aggregate the outcomes for the matched controls. The ATT for the ATR indicator is calculated similarly, but with the Y 's replaced with ATRs.

The analysis is conducted using PSMATCH2 in STATA, along with PSTEST to test for matching effectiveness.³¹ The statistical significance of ATT estimates is calculated using bootstrapping (with 100 repetitions), which yields valid standard errors in the context of PSM.³²

In the **fifth** and final step of PSM, the robustness of the kernel matching estimates is evaluated by comparing them with those derived from Nearest Neighbor (5:1) and radius matching, each with a caliper of 0.01.

As noted above, the evaluation period for this impact evaluation is from the midline to endline (3.5 years), and to meet the PSM requirement mentioned above, matching takes place using midline or baseline values of relevant household and community characteristics. However for practical reasons, measurement of households' engagement in interventions, described in Chapter 8, is for the entire initiative period (5 years). The treatment and control groups are thus formulated for the period extending from the baseline to the endline. Because midline values of the matching variables were already affected by interventions that took place in the first 1.5 years of the initiative, the results presented in this study are likely biased, and any inferences made from them should acknowledge this bias.

Theoretically, the direction of the bias could be positive or negative. However, if the initiative had any positive impacts prior to the midline—which is likely the case because, compared to the post-midline period, it was a time of relatively low shock exposure and unfettered intervention implementation—then the matching at midline (rather than baseline) will lead to a *downward* bias in estimates of the ATT. This negative bias is discussed in more detail in Chapter 9 and Annex 4.

³¹ Leuven and Sianesi 2003

³² Khandker et al. 2010

Note also that recent Difference-in-Differences literature raises the issue of the appropriateness of conditioning on pre-intervention values of outcome variables when applying techniques such as DID-PSM, that is, of matching using pre-intervention values of an outcome being evaluated. Annex 5 summarizes this literature and shows that “matching on outcomes” is indeed appropriate in the context of the RISE impact evaluation.

2.3.2.2. Standard Growth Regression with PSM-Derived Intervention and Control Groups

Resilience marks the ability of households to withstand and recover, specifically, from shocks and stresses. DID-PSM helps us to see how interventions of the type implemented as part of the RISE Initiative have impacted outcomes. Another way to assess their impact on resilience is to determine whether the interventions have actually served to *reduce the negative impact of such shocks and stresses* on households’ well-being. Here we do so using standard growth regression³³ where the change over time in households’ food security serves as the dependent variable. As for the DID-PSM analysis, the time period of analysis is from the midline to the endline. The independent variables are:

- The exposure/participation treatment dummy variable, one for each household i on the common support, derived using the PSM method above;
- Shock exposure between the midline and endline (SE_{i,ML_EL});
- Initial food security ($Y_{i,ML}$);
- Household characteristics as measured at midline (X_i).

To test for the mitigating impact of engagement in interventions, and employing an approach similar to that of Knippenberg and Hoddinott (2017), we also include an interaction term between the measure of shock exposure and the treatment dummy. The specification is:

$$Y_{i,EL} - Y_{i,ML} = \alpha + \beta_1 T_i + \beta_2 SE_{i,ML_EL} + \beta_3 T_i * SE_{i,ML_EL} + \beta_4 Y_{i,ML} + \beta_5 X_i + \mu_v + \varepsilon_i. \quad (2)$$

where α and the β s are coefficients to be estimated, the μ_v are dummy variables representing country of residence (Burkina Faso or Niger), and ε_i is an error term. A coefficient on the interaction term (β_3) that is statistically significant and positive indicates that the interventions did provide protection from shocks and thus served to bolster households’ resilience.

The household characteristics, X_i , included as independent variables are:

- Number of household adult equivalents;
- Percentage of members in 6 age-sex groups (female 0–16, female 16–30, female 30+, male 0–16, male 16–30 and male 30+);
- Whether any adult household member has a formal education (at least at the primary level);
- Whether the household is a female-adult-only household, that is, there are no adult male household members;

³³ Yamano et al. 2015; Hoddinott and Kinsey 2001

- Predominant livelihood (dummy variables for pastoralist, agro-pastoralist and other); and
- An asset index representing economic status.

2.4. Qualitative Data Collection and Analysis

The qualitative component of the data collection was intended to provide a complementary optic on the research questions to that of the quantitative survey, to investigate underlying social factors, and provide broader explanations. The initial design envisaged qualitative researchers gathering data from separate focus groups of men and women and key informants, and from sub-groups of interest as appropriate (e.g., youth, unemployed people, participants in different components of RISE Initiatives and other initiatives). An initial topic guide was prepared to explore impacts and resilience dynamics in communities, with a plan to interview different groups of community participants with questions tailored to each group and subject area. An initial village sample was drawn from across the RISE Initiative areas, 18 in each (see below).

In early 2020, 12 interviewers and two supervisors were hired by CESAO for Burkina Faso and Niger, to work in conjunction with the TANGO consultant, jointly comprising the evaluation team (ET). After preparations and training for the endline survey were done in February/March, fieldwork was postponed due to the onset of the coronavirus pandemic. The pandemic prevented the ET from travelling to the field, and the risk of transmission made it impossible to gather groups, thus precluding the possibility of focus group discussions (FGDs). As such, a modified design was created to permit interviews with key informants by phone, and this led to a simplified survey with a generic focus. In line with the aim of the evaluation on assessing initiative impact and household resilience, the effects of the pandemic were incorporated into the inquiry.

This resulted in two sets of interviews, one focused on initiative impact and pre-COVID resilience, and the other focused on the impacts and response to the coronavirus pandemic. A full topic guide is presented in Volume 2 of this report. The onset of the rainy season then delayed the fieldwork until September. The initiative impact and resilience interview was carried out by phone with three people from each village including a chief or councilor, women's group member, and agriculture extension officer. The coronavirus interview was held with two people, including a community leader such as a counselor or Village Development Committee member and a health educator. In each of the eighteen sampled villages per country, an average of five interviews were sought, for a total of 90 interviews per country. In Burkina Faso, with four non-responses, a total of 86 interviews were conducted (53 interviews on RISE impact and resilience, and 33 interviews on the coronavirus pandemic). In Niger, with six non-responses, a total of 84 interviews were conducted (50 interviews on RISE impact and resilience, and 34 interviews on the coronavirus pandemic).

A number of challenges affected the research exercise. Access to the communities became difficult due to the evolving security situation in Burkina Faso, and conducting interviews by phone made it difficult to guarantee village contacts. Thus a number of village substitutions were made by the field teams within the same regions. Holding long interviews by phone posed challenges, and at times respondents had technical difficulties, such as phones running out of

battery or losing cellular signal. These challenges made it more difficult to develop rapport, which is very important for qualitative research. Nonetheless, the required five interviews were completed in almost all villages. The limitations of time and of the telephone interviews did not always permit exploring detailed themes such as inclusivity and sustainability of activities. Because of multiple shocks that communities were facing, and the fact that external assistance to the areas was very limited, it was sometimes difficult for interviewers to secure the respondents' full attention. In some cases two sessions were required in order to complete the interview. Qualitative interviews were reviewed by supervisors regularly.

Regarding the selection of villages in Burkina Faso, the original sample of 18 villages was selected in February by the TANGO consultant in conjunction with the CESAIO team. Sample selection took into account the need to cover all three programming regions (Centre-Nord, Est, and Sahel) and to represent both high-exposure (intervention) villages and low-exposure (control) villages. The *original* sample was established with approximately a ratio of one control village to two initiative intervention villages evenly spread across the three regions. During the re-launch of the survey in September, modifications were made to the selection of villages with a replacement of four sampled villages, leaving seven control villages and 11 intervention villages according to initiative lists. Of these, two villages in Sahel were experiencing displacement, so many potential respondents were either residing outside their villages or had unstable residence. One of the 11 intervention villages was a REGIS-ER village, but it was eventually excluded from consideration because there was no evidence that RISE had actually operated there. Thus, ten villages were considered "high exposure" for the purposes of analysis of RISE impact and eight were considered low-exposure.

A similar process occurred in Niger, and several villages were replaced by the field teams due to insecurity and access problems. Among the 18 villages finally selected, three were control villages and 15 were initially designated as RISE intervention villages according to initiative lists. Of these, three villages in Zinder were subsequently excluded from the intervention category because respondents did not confirm that RISE had operated there. This left 12 villages that were clearly identified as intervention villages. The results that are mentioned for RISE impact are drawn from these 12 villages.

The questionnaire focused on the following areas, with corresponding research questions (RQs) from Section 1.4 above in parentheses:

- Shocks and stresses and coping strategies (RQ 1);
- Resilience capacities and resilience to shocks (RQ 2 and RQ 3);
- Impact of the RISE Initiative (RQ5, RQ6, RQ7);
- Impacts of and responses to the 2020 coronavirus pandemic.

The initial background review of the RISE Initiative was relatively high-level, and did not entail detailed review of reports of individual RISE Initiatives. A sheet of RISE stated interventions was made available to the ET, though the qualitative interviews were not designed to check whether each of these interventions was being applied. Instead, the questionnaire probed the impacts of all

development interventions, and when RISE activities were mentioned these were noted in most sections.

Interviews were conducted by a facilitator and a note-taker, and detailed notes were taken by interviewer teams, and typed into computer reports. Teams attempted to capture the exact meaning and to have direct quotes or be as close as possible to it.

During the analysis stage, the computer reports were read and analyzed thoroughly, and findings were selected and sorted according to themes and in line with the research questions. By reading through all the responses, and sifting through the commonalities and differences, the overall summary findings became apparent as well as notable outliers. Relevant findings were organized in the qualitative report. Direct quotations are useful to convey the meaning intended, rather than being filtered by the consultant. They allow the voices of interviewees to be more authentically conveyed and for understanding of the reasons why respondents state what they do and possible connections with other issues. The analysis effectively struck a balance between the inductive, theory-building approach of grounded theory with the deductive / descriptive emphasis of content analysis.

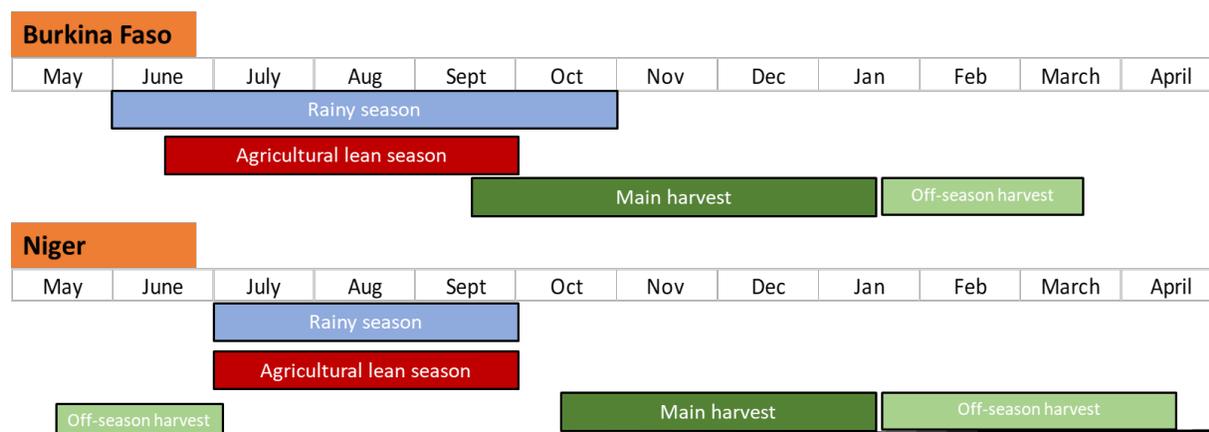
3. SHOCK EXPOSURE AND COPING STRATEGIES

As will be seen in this chapter, households in the RISE Initiative area experienced increasing shock exposure over the initiative’s operational period, with an especially sharp escalation in the last two years. As households struggled to deal with the shocks, they both intensified and shifted their coping strategies in response. A full understanding of the extent of households’ shock exposure, the types of shocks they faced, and how they coped with them is essential background for the resilience analysis of the rest of this report.

This chapter starts by describing the evolution of climate conditions over the initiative period using data from a global database of rainfall and related hydrological indicators. For context, Figure 6 gives the seasonal agricultural calendar of the Burkina Faso and Niger initiative areas. The chapter then looks at the shock exposure data reported directly by households, including those for climate, conflict, and economic shocks. Next, we examine the coping strategies households reported using to cope with the shocks they faced. Finally, we look at differences across poor and non-poor households’ shock exposure and coping strategies.

Throughout the chapter, qualitative data are used to help provide on-the-ground context and interpret the quantitative data. Famine Early Warning Systems Network (FEWSNET) reports bring additional information and perspectives to help understand the situation on the ground.³⁴

Figure 6. Seasonal calendar for Burkina Faso and Niger



Source: <http://fews.net/west-africa/niger>; <http://fews.net/west-africa/burkina-faso>

³⁴ FEWSNET reports for Burkina Faso include Key Message Updates from April 2019-September 2019 and Remote Monitoring Updates from June 2019-December 2020. Reports for Niger include Key Message Updates from March 2019-November 2020.

3.1. Climate Shock: Evolution of Climate Conditions over the Initiative Period

In this section the Multi-Source Weighted-Ensemble Precipitation (MSWEP) database is used to track the evolution of climate shock over the RISE Initiative's operational period. MSWEP is a global database of rainfall and related hydrological indicators. Current conditions are compared to historical data beginning in 1979 to develop measures of climate anomalies such as drought and flooding. The indicators are developed by merging three sources of information: rain gauge, satellite infrared imagery, and historical reanalysis data. The MSWEP database allows Geographical Information System (GIS) coordinates to be used to download data from the internet for localized geographical areas with 0.1° spatial resolution (11 km at the equator) and a 4-hour temporal resolution.³⁵

For the analysis of this report, month-by-month MSWEP-derived data accessed using GIS coordinates for each of the 88 sample villages are used to calculate two measures:

1. The 1-month rainfall anomaly: the number of standard deviations observed 1-month cumulative precipitation deviates from the climatological average;
2. The 1-month soil moisture anomaly: the number of standard deviations observed 1-month cumulative soil moisture deviates from the climatological average.³⁶

The rainfall anomaly measure is used to detect meteorological (rainfall induced) drought and flooding. The soil moisture anomaly measure is used to detect surface moisture anomalies that indicate drought and flooding, anomalies that are related to rainfall levels, temperature, topology, and soil characteristics, among other factors.

Figure 7 shows the rainfall deviation from the norm (in standard deviations) as it progressed from just before the baseline, through the midline and RMS surveys, and the endline in the Burkina Faso and Niger areas. The zero line is the norm; values consistently close to the norm represent the rainfall stability needed for normal agricultural and pastoral activity. As can be seen, the initiative period, which encompassed six rainy seasons, was one of great rainfall volatility with repeated episodes of both drought and flooding. For reference, meteorological drought and flooding are defined as follows:

Drought: rainfall deviation ≤ -0.8 (severe drought ≤ -1.3) (USDN 2021)

Flooding: rainfall deviation $\geq +1$ (severe flooding $\geq +1.5$) (NDMC 2016).³⁷

³⁵ Beck et al. 2019

³⁶ Data provided by Justin Sheffield of the Princeton Climate Institute. It is based on a hydrological model forced by MSWEP.

³⁷ The flooding cut-offs are derived from the "wet" and "very wet" category cutoffs used by the National Drought Mitigation Center.

Figure 7. Rainfall deviation from the norm in RISE Initiative areas, January 2015 to November 2020

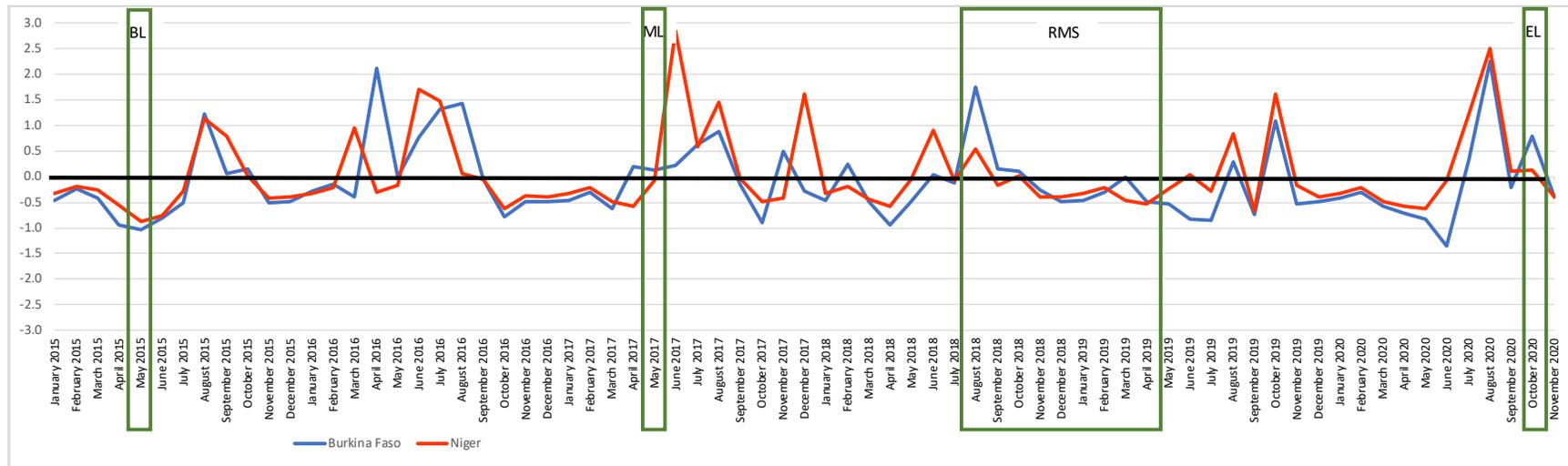
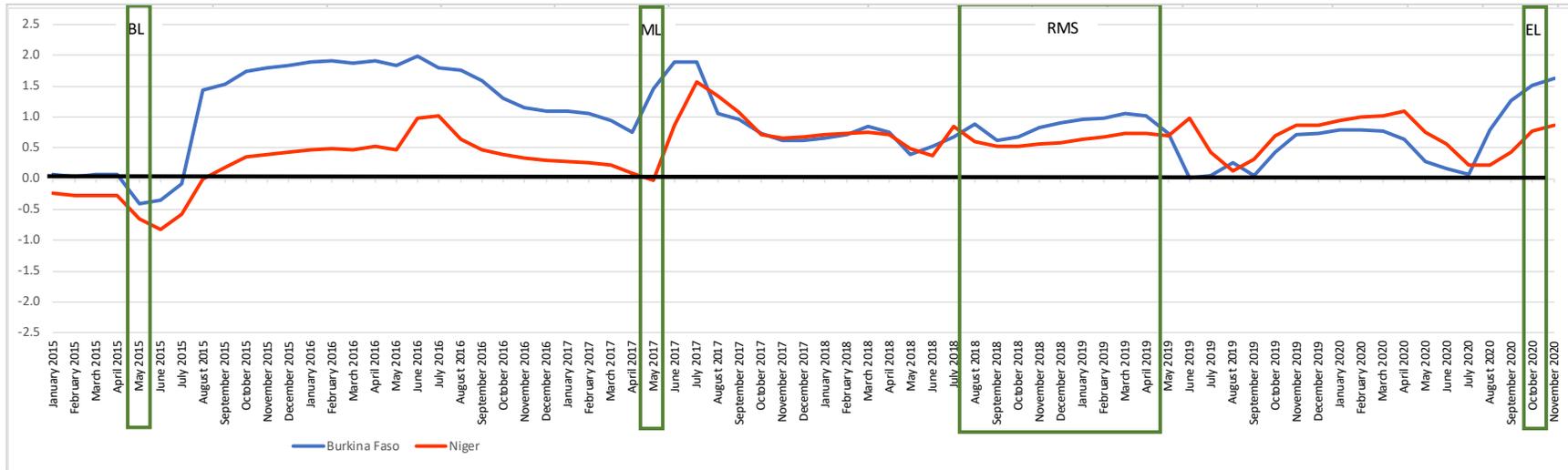


Figure 8. Soil moisture deviation from the norm in RISE Initiative areas, January 2015 to November 2020



In the Burkina Faso area, rainfall dropped into drought territory in all six rainy seasons. A short-term severe drought occurred in June 2020, when the rainfall deviation was -1.34. Over the same period, the area experienced flooding in five rainy seasons, rising to an episode of severe flooding in August 2020, just before the endline. The rainy season proceeding the endline was one of particular volatility, with households experiencing both severe drought *and* severe flooding. These conditions are consistent with reports from FEWSNET that the north and east regions of Burkina Faso experienced dry spells that “severely impacted yields and pastureland,” followed by prolonged rains in October 2020.

The Niger area experienced similar volatility, but rainfall surpluses were more severe than rainfall deficits. Drought-level rainfall was only apparent in June 2015, just after the baseline survey. Flooding subsequently occurred in all but the 2018 rainy season, with levels rising to severe flooding in the 2016, 2017, and 2020 seasons. Although rainfall dipped just before the endline, the “drought-followed-by-flooding” episode experienced in the Burkina Faso area was not as extreme. In contrast, FEWSNET reports indicate that the 2020 season heavy rains caused widespread flooding in Niger, with riverside flooding reaching its highest in 30 years.

Figure 8 displays the soil moisture deviation from the norm across the initiative period. Soil moisture more closely reflects conditions on the ground for agricultural production and livestock rearing. For reference, agricultural drought and flooding are defined here as follows:

Drought: Soil Moisture deviation ≤ -1

Flooding: Soil Moisture deviation $\geq +1$

The data indicate that neither the Burkina Faso nor Niger initiative areas experienced agricultural drought over the initiative period. However, consistent with the rainfall data, both experienced flooding. Between the baseline and midline, soil moisture in both areas was above normal. However, it was far above normal for the Burkina Faso area, consistently in the “flooding” category. Soil moisture levels dropped between the midline and endline and were more similar between the initiative areas. However, they remained above normal and, for Burkina Faso, rose into the “flooding” category just before and during the endline survey.

The upper panel of Table 4 reports summary measures of rainfall conditions between the baseline and endline surveys as well as for the midline-to-endline period, the latter which is the subject of this report’s impact evaluation (see Chapter 9). It gives the:

1. “total rainfall deficit” over the periods, which is proxied by the sum of the monthly rainfall deviations below the norm and the number of months of meteorological drought;
2. “total rainfall surplus,” which is proxied by the sum of the monthly rainfall deviations above the norm and the number of months of meteorological flooding.

Table 4. Rainfall and soil moisture deficits and surpluses over the initiative period, by initiative area

Characteristic	Baseline to endline			Midline to endline		
	All	Burkina Faso	Niger	All	Burkina Faso	Niger
Rainfall						
Total rainfall deficit	320.90	408.70	210.60	218.10	292.70	124.30
Total rainfall surplus	628.90	620.70	639.20	404.80	371.00	447.20
Months of meteorological drought	6.3	8.9	3.1	4.2	6.3	1.5
Months of meteorological flooding	8.2	7.4	9.1	5.0	4.1	6.1
Soil moisture						
Total soil moisture deficit	6.20	3.80	9.20	2.45	2.55	2.32
Total soil moisture surplus	56.20	65.70	44.30	31.90	32.90	30.70

Focusing on the midline-to-endline period, in both initiative areas, rainfall surpluses were bigger than rainfall deficits, but surpluses were higher for Niger and deficits higher for Burkina Faso. While the Niger area experienced 6.1 months of flooding and only 1.5 months of drought, the Burkina Faso area experienced *more* months of drought. The soil moisture summary indicators, which are measured similarly to the rainfall indicators (but may be based on less accurate information),³⁸ indicate that hydrological surpluses were equally severe for both initiative areas.

3.2. Household Reports of Exposure to Climate, Conflict, and Economic Shocks

The percentage of households in the RISE Initiative area that reported experiencing 26 different shocks in the 12 months prior to the baseline, midline, and endline surveys is given in Table 5. Also reported is the mean of an overall shock exposure index that takes into account the total number of shocks households experienced as well as their perceived severity. Perceived severity is measured using answers to the question, “How severe was the impact on your income and food consumption?” The five possible responses range from “None” to “Worst ever happened.” The index is calculated as a weighted average of the incidence of each shock and its perceived severity as measured on the five-point scale. That is, the incidence of each shock (0 or 1) is multiplied by its perceived severity (1, 2, 3, 4 or 5), and the resulting values are summed up across the 26 shocks. The index potentially ranges from 0 (for a household experiencing no shocks) to 130 (for a household experiencing all 26 shocks with a perceived severity score of 5).

³⁸ A key source of rainfall information is actually rainfall gauge data while the soil moisture measure is not grounded in actual on-the-ground information.

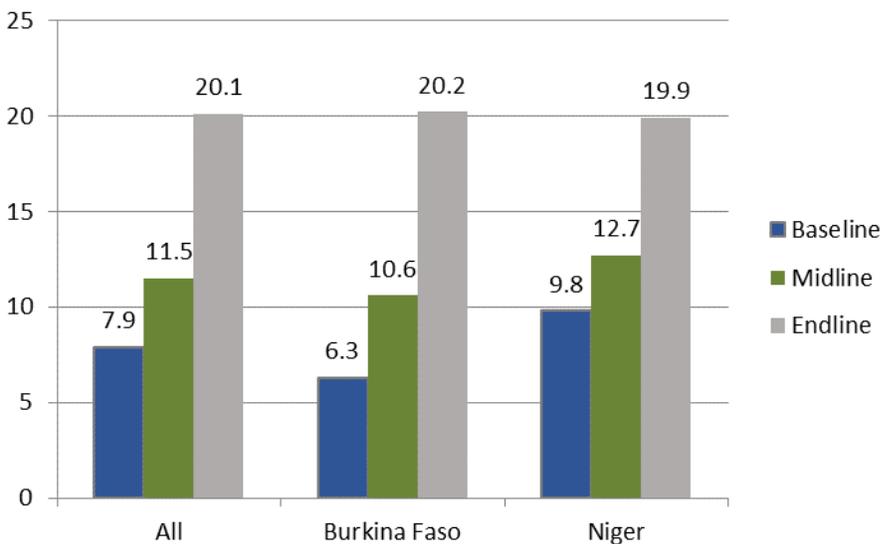
Table 5. Baseline-midline-endline comparison of household shock exposure in the last year (self-reported), by initiative area

Indicator	All			Burkina Faso			Niger		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Climate shocks (% of households)									
Excessive rains	4.2 ab	14.2 ac	67.5 bc	2.7 ab	14.0 ac	79.4 bc	6.0 ab	14.3 ac	53.6 bc
Too little rain/drought	53.7 ab	69.7 ac	20.4 bc	55.7 ab	74.6 ac	20.9 bc	51.3 b	63.9 c	19.7 bc
Massive insect invasion	20.1 b	25.8 c	39.0 bc	4.2 b	8.4 c	18.8 bc	39.8 b	46.3 c	62.6 bc
Animal disease outbreak a/	25.6 ^d	32.3 ^c	43.3 ^{bc}	25.4 ^{ab}	41.9 ^{ac}	55.4 ^{bc}	25.8	21.2	29.0
Bush fires	0.6 b	0.3 c	2.0 bc	0.6 b	0.3 c	2.8 bc	0.5	0.3 c	1.1 c
Conflict shocks (%)									
Land conflicts	2.1 b	1.3 c	5.6 bc	0.9 b	1.8 c	5.7 bc	3.5 a	0.8 ac	5.4 c
Conflict between farmers & herders	2.7 ab	0.8 ac	5.2 bc	2.9 ab	1.4 ac	6.3 bc	2.3 a	0.2 ac	3.9 c
Conflict between entire villages	0.0 b	0.3 c	1.9 bc	0.0 b	0.5 c	2.3 bc	0.0 b	0.1 c	1.5 bc
Theft of assets/holdups	7.8 b	5.4 c	13.5 bc	7.8 a	4.1 ac	10.6 c	7.8 b	6.9 c	17.0 bc
Economic shocks (%)									
Sharp food price increases	32.6 ab	71.4 a	78.0 b	24.1 ab	55.4 ac	77.7 bc	43.1 ab	90.0 ac	78.4 bc
Unavailability of inputs	11.3 b	14.0 c	28.5 bc	2.4 ab	10.2 ac	29.2 bc	22.2	18.5	27.6
Drop in demand for products	1.9 b	2.8 c	18.2 bc	1.1 b	2.6 c	18.7 bc	2.9 b	3.0 c	17.7 bc
Increase in price of inputs	8.1 b	12.0 c	44.7 bc	5.1 ab	13.5 ac	49.7 bc	11.7 b	10.3 c	38.8 bc
Drop in price of products	3.5 b	3.5 c	21.4 bc	3.0 ab	5.7 ac	22.2 bc	4.0 ab	0.8 ac	20.5 bc
Debt repayment	6.6 b	10.4 c	20.3 bc	4.1 b	3.2 c	14.9 bc	9.8 ab	18.8 a	26.5 b
Job loss by household member	0.5 b	0.4 c	6.2 bc	0.3 b	0.3 c	6.1 bc	0.8 b	0.5 c	6.4 bc
Long-term unemployment	1.2 b	1.0 c	7.8 bc	0.7 b	1.3 c	9.9 bc	1.8 b	0.8 c	5.3 bc
Abrupt end of assistance/regular support from outside the household	0.9 b	1.0 c	11.4 bc	0.9 b	0.6 c	10.3 bc	1.0 b	1.4 c	12.6 bc
Disease/exceptional health expense	20.2 ab	30.2 ac	47.4 bc	17.5 ab	35.0 ac	47.8 bc	23.5 b	24.6 c	47.0 bc
Other shocks (%)									
Death of household member	6.4 b	6.1 c	15.7 bc	7.8 b	6.0 c	17.6 bc	4.6 b	6.2 c	13.4 bc
Serious illness of member	10.6 b	13.3 c	34.6 bc	10.7 ab	18.2 ac	37.3 bc	10.4 b	7.6 c	31.6 bc
Emigration of household member	3.8 b	3.9 c	19.4 bc	0.7 b	1.4 c	15.0 bc	7.6 b	6.8 c	24.6 bc
Fire (house...)	1.4	0.9 c	2.3 c	0.7 b	0.8 c	1.9 bc	2.4	1.1	2.9
Forced repatriation	0.2 b	0.5 c	4.3 bc	0.1 b	0.0 c	1.1 bc	0.3 b	1.0 c	8.0 bc
Household dislocation	0.6 b	0.7 c	2.1 bc	0.3 b	0.4 c	2.5 bc	0.9	1.0	1.6
Sudden increase in household size	0.6 ab	3.1 ac	24.6 bc	0.4 b	2.7 c	31.0 bc	0.8 ab	3.6 ac	17.0 bc
Index (mean)									
Shock exposure index	7.9 ab	11.5 ac	20.1 bc	6.3 ab	10.6 ac	20.2 bc	9.8 ab	12.7 ac	19.9 bc
Shock exposure index (drought-related)	4.7 ^{ab}	7.0 ^{ac}	8.0 ^{bc}	4.3 ^{ab}	6.8 ^{ac}	8.2 ^{bc}	5.1 ^{ab}	7.3 ^a	7.7 ^b
# of shocks exposed to in last year	1.9 ab	2.7 ac	6.1 bc	1.6 ab	2.7 ac	6.5 bc	2.3 b	2.7 c	5.8 bc
Summary (%)									
Climate shocks	68.6 ab	84.7 a	88.5 b	62.0 ab	85.2 ac	92.0 bc	76.7 b	84.3	84.4 b
Conflict shocks	11.0 ab	7.7 ac	20.4 bc	10.5 ab	7.3 ac	19.2 bc	11.6 b	8.1 c	21.8 bc
Economic shocks	52.4 ab	82.2 ac	90.9 bc	39.9 ab	72.4 ac	93.9 bc	67.8 ab	93.7 ac	87.5 bc
Other shocks	20.8 ab	25.3 ac	60.6 bc	18.7 ab	26.6 ac	64.4 bc	23.4 b	23.9 c	56.1 bc

a,b,c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

As can be seen from the values of the shock exposure index in Figure 9, shock exposure has progressively increased over the course of the RISE Initiative, with a sharp increase between the midline and endline. Over this latter period, shock exposure nearly doubled for Burkina Faso households and increased by 57 percent for Niger households

Figure 9. Baseline-midline-endline comparison of overall household shock exposure, by initiative area



Note: Values are means of the household shock exposure index.

3.2.1. Climate Shocks

Reports of “excessive rains” increased from a small minority of households in both initiative areas to about 16 percent at midline and then jumped to nearly 70 percent of households by endline (see Table 5). “Too little rain” or drought was reported by high percentages of households at baseline and midline, dropping to 20 percent of households at endline. Closely related to climate shocks is animal disease outbreaks. The Burkina Faso area saw large increases in the percentage of households reporting this shock over the initiative period. The Niger area saw a similarly large increase for massive insect invasions.

The percentage of households experiencing any climate shocks is reported at the bottom of Table 5. Clearly, increases in these shocks contributed to the overall increase in shock exposure over the initiative period, especially in Burkina Faso. In this area, 62 percent of households reported experiencing one or more climate shocks in the year prior to the baseline; 92 percent of households reported the same at endline.

Qualitative findings on drought and flooding highlight that in all communities, lack of water (often expressed as drought, desertification, or irregular precipitation) has been a persistent shock affecting RISE areas. Consistent with the seasonal calendar above, Burkina Faso respondents described a lack of sufficient water from March to June until the commencement

of the rainy season from June to September, with a risk of flooding in August and September. While water is needed for human consumption, agriculture, and animal husbandry, it is also crucial for livelihoods such as gold mining in Burkina Faso, and these demands will increasingly compete with one other. The important role of women and children in securing water supplies warrants focus in RISE II.

Qualitative descriptions of accumulating drought and flooding over the last few years confirm the quantitative data reported above. Respondents in Burkina Faso confirmed an acute lack of rainfall in 2017 and 2019, and respondents in Centre-Nord also spoke of climate change patterns over the past 10 years or more, including poor rainfall, limited access to water, and flooding. Niger respondents cited drought at crucial times in the growing seasons from 2017 to 2020, with different patterns by region. Niger respondents detailed the ways lack of rain has affected crops (see quote, right).

A Zinder respondent stated: “[A] dry period often occurs at the beginning of the winter season when it delays planting, and on the other hand, it occurs towards the end of the season. This does not allow seedlings to mature properly. The drought [in 2017, 2018, and 2019] occurred for three weeks after we sowed... because of the delay, these seedlings did not reach maturity by the time the rain stopped.”

Inadequate rainfall also affects livestock grazing and watering. A respondent in Tillabery commented that in winter, herders use grasses to feed their herds, but with insufficient rain grass does not grow, and there is no fodder for the animals. Water points become scarce, and breeders are forced to sell their animals at low prices.

A Maradi respondent stated: “The floods had an impact on the community through the collapse of many houses. Many of the community... were left homeless overnight... some received help from the neighbors and the family to house them until they find a solution. Others have taken refuge in schools. Water blocked the lanes leading to the department. We have difficulty evacuating our patients to the city because the roads are either degraded or completely impassable which causes the death of the sick.”

Poor rainfall reduces water available for human use, and Burkina Faso respondents said this caused dams to dry up from March onwards. One village in the Est region had only one water pump, which was insufficient for its needs, so the majority of the population was drawing drinking water from the pond. This lack of water affects the whole community, but a Centre-Nord respondent stated that women are most affected because they are the ones who take care of the family.

Sampled villages flooded in August and September 2020 (World Food Programme 2020), especially in Maradi (UN News 2020).

The main effects emphasized by respondents was damage to houses and crops and disruption of transport (see quote, left). They described how water stagnates at the foot of the clay walls, and after two days of rain a house will collapse. Niger respondents explained that houses are

damaged when located where water accumulates, with fragile construction of “banco” (mud and straw) and poor-quality clay, and a lack of water drainage.

Floods have multiple effects on agriculture and infrastructure, such as damaging irrigation ditches and dams and cutting off access to sanitary facilities. A Zinder respondent stated that when crops are flooded, they are forced to abandon those fields to create another space to plant alternative crops like tomato or cassava. One Maradi respondent spoke of a heavy rain that swept away several cattle. Burkina Faso respondents stated that half the fields in their village flooded, resulting in destruction of homes and poor agricultural production. Respondents who had diversified into carpentry and tailoring were also affected by a decline in the number of customers. Some had sold many of their assets and became homeless.

3.2.2. Conflict Shocks

The incidence of conflict shocks nearly doubled over the initiative period (see bottom of Table 5). In the Burkina Faso area, the percentage of households experiencing a conflict shock rose from 10.5 at baseline to 19.2 by endline. A similar increase was reported in the Niger area, up from 11.6 percent at baseline to 21.8 at endline.

FEWSNET reports give some background on the nature of these shocks. Violence related to long-standing inter-communal tensions in neighboring Mali escalated in early 2018 and spread into northern Burkina Faso and Tillabery in Niger, providing a path for an upsurge of terrorist threats and attacks from Islamic extremist groups. In the two years prior to the endline survey, FEWSNET continued to report escalating insecurity in northern and eastern Burkina Faso, the locations of RISE activities, and specifically in Tillabery in Niger.

Increasingly frequent acts of violence by armed groups led to large populations of displaced peoples and had widespread impacts on households’ livelihoods and food security. People could not work in their fields for fear of being attacked, and many lost access to gold mining sites, an important livelihood in Burkina Faso. Further, access to local markets, health facilities, and humanitarian assistance were limited. For most of the two-year period preceding the endline survey, northern and eastern Burkina Faso and Tillabery were classified as being in an “acute” food insecurity crisis (Integrated Food Security Phase Classification (IPC), Phase 3), partly due to this increased violence. In Burkina Faso, FEWSNET also reported increased theft and looting of livestock.

By April 2020, just as the security situation deteriorated further, COVID-19 restrictions were imposed, including the closure of livestock and other markets as a preventative measure. All land borders were closed, which curtailed migratory work and led to reduced remittances as a source of household income.

In Niger, while Tillabery experienced the highest stress on food security from conflict, Maradi and Zinder were under strain as well, being classified as “Stressed” (IPC Phase 2). FEWSNET reported that by May 2020, COVID-19 cases were rising. The restrictions imposed, including

border closures, had led to significant losses of income for many households. At the same time, distribution of humanitarian assistance was limited.

The impacts of the COVID-19 pandemic are discussed further in Chapter 4.

Returning to Table 5, we can see these FEWSNET reports reflected in household reports as increased land conflicts, increases in conflicts between farmers and herders, and especially increases in hold ups and thefts of assets. In Burkina Faso, 10.6 percent of households reported theft and hold ups in the year before the endline; in Niger, the percentage was even higher, at 17.0.

A respondent in the Sahel region reported: *“...the losses caused by the flood created much more expense for these members, and also the loss of life [from conflict] has emotionally upset in another way the members of the community... the trauma has reached a certain level, or there are children who have nightmares because they have faced horrific scenes like the sight of a cadaver.”*

In qualitative interviews, terrorism and insecurity were major shocks mentioned in almost all Burkina Faso communities. The insecurity situation in several Burkina Faso regions has deteriorated in the past few years. Among the respondents were people displaced by insecurity, as well as residents of communities that had accepted displaced people from other villages. Respondents described the violence as very severe, and respondents in Centre-Nord stated that at one time of heightened violence there were fatalities every two days. This has led to fear and widespread psycho-social trauma (see quote, right).

Numerous respondents discussed how the insecurity was undermining social capital within households, communities, and at broader levels. Half of the Burkinabe villages reported problems with theft by terrorists and by other individuals. One of the responses to theft and insecurity is the growth of *Kolgweogo* self-defense groups, reported in 5 communities, all in the Est region. The groups were generally credited by respondents with having been effective against “open-air robbery,” but they raise questions about law and order and potential abuses of power.

According to qualitative respondents, the threat of insecurity in Burkina Faso interrupted or degraded the quality of government and NGO services, and it prevented people from carrying out their agricultural and community development activities, such as repairing boreholes. The insecurity compounds problems of poor roads and flooding, such that one respondent stated that their village was cut off, forming an “enclave.” Markets were either closed or inaccessible for many farmers, breeders and consumers. In Tillabery, qualitative respondents reported that terrorists demand “tax” payments from villagers and kidnap, attack and steal (see quote below).

A respondent in Tillabery stated: *“Groups of individuals of unidentified armed bandits have been organizing attacks against our country's defense and security forces since 2015. These same groups threaten and organize kidnappings of village chiefs, assault herders, and capture their herd of animals.”*

3.2.3. Economic Shocks

As would be expected, the combination of climate shocks, civil insecurity, and COVID-19 restrictions is associated with sharply increasing incidences of economic shocks. The overall percentage of households in the Burkina Faso area reporting economic shocks increased from 40 percent at baseline to 93.9 percent at endline (Table 5, bottom panel). In the Niger area, that increase was from 67.8 to 87.5.

The particular economic shocks that saw large increases were:

- Sharp food price increases
- Unavailability of and/or increases in the prices of inputs
- Drop in demand for and/or prices of products sold by households
- Debt repayment
- Job losses and unemployment
- Abrupt end of assistance or support from outside of the household
- Exceptional health expenses.

Note that FEWSNET reported that households were undertaking livestock de-stocking to escape looting and because of lack of sufficient livestock fodder. By June 2020, there were reports that livestock prices were 30 percent below average.

As will be discussed further in Chapter 4, the COVID-19 pandemic triggered a major economic shock through border closures, restrictions on travel, and market restrictions.

3.2.4. Other Shocks

Consistent with the increase in exceptional health expenses in the Burkina Faso area is a large increase in the percentage of households reporting serious illnesses and deaths. The endline percentage of households experiencing a death of a household member in the previous 12 months, at 17.6 percent, was highly unusual, increasing from 7.8 percent at baseline. In the Niger area, it increased from 4.6 at baseline to 13.4 at endline (Table 5). These deaths may be associated with several factors: civil insecurity, lack of adequate health care, and increased illness caused by lack of adequate food and disease associated with flooding. These disturbing trends are a clear indication that the multiple shocks of this time period were taking a serious toll on the well-being of RISE Initiative area residents.

In addition to illness and death, two other shocks saw large increases over the initiative period: sudden increase in household size and emigration of household members. The increase in the size of households that were still able to participate in the RISE endline

A respondent in Maradi stated:
“Caterpillars are the biggest obstacle to our production. They attack in a harsh way, and destroy the ears at full term or in the process of being full term. By the size of the damage they cause, the situation forces the women to invest in the recovery of what remains after the passage of the caterpillars in the field.”

survey was likely due to displacements caused by civil insecurity and members returning from urban areas during the COVID-19 shut down. FEWSNET reports a large influx of refugees in Maradi, leading to substantial increases in household size (from 7 to 10-12 people), and thus increased need for food.

The qualitative data point to an additional shock: caterpillar infestations. These infestations were cited in eight of the 18 communities included in the qualitative survey in Niger and one village in Burkina Faso (see quote, right).

This caterpillar may be the Fall armyworm (FAW), *Spodoptera frugiperda*, though none of the respondents referred to it by any name other than “*chenille*” (caterpillar). FAW is a moth that has spread rapidly across Africa since 2017, has had devastating effects, and is considered a pest. When the moths lay eggs in crops, the larvae then feed on and damage or destroy the plants.

Caterpillar infestation was reported in some villages over the past two to three years, but the pattern of attack is uneven, with some villages blanketed by the pest, while neighboring villages are spared. As for the timing of their appearance, some respondents said the caterpillars attack the seedlings before they reach maturity, while others reported attacks during the flowering of crops or the harvest period. A respondent in Maradi commented that if caterpillars attack at night, they eat all the grain within 48 hours. Most respondents were talking about millet infestation, but caterpillar infestation is found in sorghum, maize, and possibly other crops. In communities where caterpillar infestation was reported, a large percentage of surveyed households reported that the pest had wiped out the majority of their crops in the season before the survey. The fact that there was not a clear identification of the caterpillar and plan of action—in both intervention and control communities—shows a vulnerability and a need for a more vigorous coordinated response to this shock.

Qualitative respondents mentioned several other pests. In Zinder, a respondent stated that their millet and cowpea fields were destroyed by locusts (“*criquets*”) in 2018. A respondent in Maradi referred to a black insect (“*dan zukau*”), saying that it attacks the cowpea as the growing season approaches and that farmers could not afford pesticides to save their crops from this pest.

Such crop losses can have devastating impacts. A respondent in Maradi stated that caterpillars and other crop enemies reduce food availability, forcing people to sell off household assets and start small businesses, and obliging household heads to migrate in search of food (see quote, right).

A Zinder respondent stated: “We planted sorghum, cowpea, sesame. But it was only the cowpea that grew, the others were invaded by destructive insects. In some families people eat only once a day, and it's been 4 years.”

3.3. Household Coping Strategies

How did households cope with the extraordinary and precipitous rise in shock exposure seen in the RISE area?

Table 6 reports on the percentage of households employing various coping strategies to deal with the shocks. The most-employed strategies overall, with baseline, midline and endline percentages given in parentheses, are:

- Sell livestock (64.5, 75.7, 64.3)
- Borrow money from friends or relatives (35.5, 43.3, 54.9)
- Receive money or food from family (23.1, 26.3, 30.9)
- Reduce food consumption or change sources of food
 - Consume seed stock (19.1, 13.6, 25.9)
 - Reduce number of meals per day (31.1, 26.3, 25.9)
 - Limit portion sizes at meal times (33.6, 29.5, 31.6)
- Draw down on savings (19.0, 24.2, 29.5)
- Migration of some family members (25.0, 18.3, 18.3)
- Borrow from a money lender (11.4, 7.1, 17.8).

Among these, selling livestock was by far the most commonly-employed strategy throughout the initiative period (Table 6).

Many of the coping strategies were used increasingly over time as shock exposure grew, including borrowing money from friends and relatives, receiving money or food from family, consuming seed stock, drawing down on savings, and borrowing from a money lender. The percentage of households employing the strategy of migrating for work declined somewhat over time, most likely due to mobility restrictions associated with civil insecurity and COVID-19 restrictions.

Table 6. Baseline-midline-endline comparison of percent of households employing various coping strategies, by initiative area

Indicator	All			Burkina Faso			Niger		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Labor strategies									
Take up new wage labor	2.8 ^b	3.8 ^c	12.0 ^{bc}	1.9 ^b	5.2	6.0 ^b	3.8 ^b	2.1 ^c	19.0 ^{bc}
Take children out of school	1.3 ^b	1.0 ^c	3.2 ^{bc}	1.4 ^b	1.2 ^c	5.5 ^{bc}	1.2	0.7	0.5
Send children to work for money	2.4 ^b	3.0 ^c	7.8 ^{bc}	1.2 ^b	0.6 ^c	7.7 ^{bc}	3.6 ^b	5.7	7.9 ^b
Migration									
Migration of some family members	25.0 ^{ab}	18.3 ^a	18.3 ^b	6.0 ^b	6.0	11.6 ^b	43.8 ^{ab}	32.1 ^a	26.2 ^b
Migration of the whole family	1.2 ^a	0.2 ^{ac}	2.7 ^c	0.5 ^b	0.2 ^c	4.0 ^{bc}	1.9 ^a	0.3 ^a	1.1
Send someone to stay with relatives	1.6 ^b	4.3 ^c	0.0 ^{bc}	1.0 ^b	1.1 ^c	0.0 ^{bc}	2.2 ^b	7.8 ^c	0.0 ^{bc}
Asset Strategies									
Sell household items (e.g., radio, bed)	8.8 ^b	8.7	14.3 ^b	1.1 ^{ab}	0.3 ^{ac}	6.1 ^{bc}	16.4	18.1	23.9
Sell productive assets (e.g., plough)	2.5 ^{ab}	1.2 ^{ac}	7.0 ^{bc}	0.6 ^b	0.4 ^c	2.1 ^{bc}	4.4 ^{ab}	2.1 ^{ac}	12.8 ^{bc}
Send livestock in search of pasture	6.8	5.1	7.5	9.9	7.6	11.0	3.8	2.2	3.5
Sell livestock	64.5 ^a	75.7 ^{ac}	64.3 ^c	67.8 ^a	82.1 ^{ac}	63.7 ^c	61.3	68.5	65.1
Slaughter livestock	4.5	3.1 ^c	5.9 ^c	2.8	3.7	6.9	6.1	2.3	4.8
Lease out land	7.6	5.2	7.1	0.2	0.2	0.7	14.8	10.7	14.7
Move to less expensive housing	0.3 ^{ab}	0.0 ^{ac}	1.1 ^{bc}	0.3 ^{ab}	0.0 ^{ac}	1.9 ^{bc}	0.4	0.1	0.2
Borrow money or rely on savings									
Borrow money from an NGO	2.7 ^b	1.3	0.8 ^b	1.9 ^a	0.3 ^a	1.2	3.5 ^b	2.4	0.3 ^b
Borrow money from a bank	1.6 ^a	0.7 ^a	1.3	2.4	1.3	2.3	0.8 ^a	0.0 ^a	0.1
Borrow from a money lender	11.4 ^{ab}	7.1 ^{ac}	17.8 ^{bc}	6.8 ^b	10.2 ^c	19.0 ^{bc}	15.9 ^a	3.7 ^{ac}	16.5 ^c
Draw down on savings	19.0 ^b	24.2	29.5 ^b	30.8	33.1 ^c	42.3 ^c	7.4	14.4	14.5
Rely on formal sources of assistance									
Receive food aid from government	6.2 ^a	2.7 ^a	4.0	3.4	3.3 ^c	6.2 ^c	9.0 ^{ab}	2.1 ^a	1.6 ^b
Receive food aid from an NGO	8.4 ^a	3.2 ^a	5.5	5.5 ^a	1.9 ^{ac}	8.3 ^c	11.2 ^{ab}	4.7 ^a	2.2 ^b
Participate in food/cash-for-work	3.9 ^b	4.0	1.5 ^b	2.8	2.1	0.9	5.0	6.2	2.1
Rely on assistance from friends/relatives									
Receive money/food from family	23.1	26.3	30.9	29.1	26.0	29.4	17.1 ^{ab}	26.7 ^a	32.7 ^b
Receive remittances from relative	9.5	9.5	11.7	7.4 ^b	6.7 ^c	13.0 ^{bc}	11.7	12.5	10.2
Borrow money from friends/relatives	35.5 ^{ab}	43.3 ^{ac}	54.9 ^{bc}	25.7 ^b	25.7 ^c	48.9 ^{bc}	45.1 ^{ab}	63.0 ^a	61.8 ^b
Reduce food consumption/change source									
Eat lean season food (Anza, etc.)	3.8	2.3	2.5	3.2	1.5	2.0	4.3	3.2	3.0
Excavation of termite mounds	0.2	0.1	0.6	0.3	0.0	0.1	0.1	0.2	1.1
Hunting, gathering	4.7	4.8	5.6	2.0	1.4	1.0	7.3	8.6	11.0
Consume seed stock	19.1 ^a	13.6 ^a	12.7	15.3 ^{ab}	4.0 ^a	5.6 ^b	22.9	24.3	21.0
Reduce number of meals in a day	31.1	26.3	25.9	31.5 ^a	18.2 ^a	25.1	30.6	35.5	26.9
Limit portion sizes at mealtimes	33.6	29.5	31.6	30.6	25.5	32.6	36.6	34.0	30.4

a,b,c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

Some particularly negative coping strategies—strategies that undermine future livelihoods and food security—were used increasingly over time. Two of these were to take children out of school and send children to work for money, which undermine households' future human capital. Another was to sell productive assets, such as agricultural implements. Selling livestock, the most common coping strategy, can be a positive coping strategy in the short run, but only remains so if households' stocks can be built up again to cope with future shocks. Borrowing from money lenders at high interest rates often means that households go into long-term debt, which can also undermine their ability to prepare for future shocks.

Notably, reliance on humanitarian assistance—food aid and food/cash-for-work—was not a main coping strategy and in fact *declined* over the initiative period despite the increased shock exposure and crisis situation. According to FEWSNET reports, one reason for this decline was

the inability of humanitarian actors to access areas of need due to rising violence and insecurity. COVID-19 movement restrictions may have also contributed to the decline.

As will be discussed in Chapter 6, households in the RISE Initiative area experienced significant declines in food security between the midline and endline surveys—the period of escalating shock exposure—with severe food insecurity rising from 32.4 to 49.1 percent. A shock-responsive safety net could have helped prevent the decline in food security, which represents a major reduction in the initiative gains that were achieved prior to the midline.

Some coping strategies were used by far higher percentages of households in the Niger area than in the Burkina Faso area, including migration of family members, selling household items and productive assets, leasing out land, and consuming seed stock. It should be noted that migration was significantly curtailed in 2020 because of COVID-19, which likely explains the relatively low percentage of households using this strategy by endline in Niger. One strategy was more commonly used in Burkina Faso: drawing down on savings.

* * *

Qualitative respondents spoke about various aspects of responses to shocks and stresses, from individual actions to joint community actions and collaboration with government agencies and development partners. The responses often included reliance on households' bonding and linking social capital.

The coping strategies mentioned during qualitative interviews are similar to the quantitative findings, including:

- Sales of household goods
- Working for others
- Sales of livestock
- Diversifying livelihood activities
- Migration
- Borrowing money, sometimes using land as collateral.

Selling assets may help solve immediate problems, but it is often unfavorable in the longer term. A respondent in Maradi explained that when they sold household goods, it was considered an “abusive sale” (*“La vente abusive des actifs du ménage.”*). Presumably this is because they were not in a position to negotiate favorable prices, and others might be taking advantage of them. In terms of labor, a respondent in Zinder stated, “When you have nothing, you have to work for someone else to have enough to feed the family.”

Land leasing was explained by a Zinder respondent who stated that, “...there are people who have sold their fields. Others rented out their fields to buy food for the family. The fields are rented at 30,000F. Some women sell their animals to feed the family in the absence of their migrating husband.” Several others mentioned pawn arrangements.

Burkina Faso respondents stated that responses to economic shocks include the diversification of livelihood activities into such activities as animal breeding, gold mining, trading, market gardening, increasing land acreage, and drawing on enhanced agricultural techniques. People often do try out a new business activity. One respondent in Maradi stated: “For households that cannot recover, it is mainly [because of] the inability of some to get into a business. It's only if we *wake up*” [that we can be resilient - italics added for emphasis]. Another respondent from Maradi pointed out the advantage of those who have some assets: “...those who had it [money], had grasped the situation to increase their savings by reselling their production at the lean periods.”

Coping with drought: In addition to the core livelihood resilience strategies, there are strategies specific to drought that households used to enhance their agriculture and mitigate the specific effects of dry spells. There are some mitigation techniques that have been increasingly promoted by governments and development initiatives in recent years, which respondents in both RISE intervention and control communities cited. This would include the techniques of “modern agriculture” such as *zai* pits to increase soil moisture, which were promoted by RISE and seemed to gain widespread application. In a Tillabery control village, a respondent pointed out that women were using stone retention bands and half-moons to optimize their chances for improved soil moisture in the dry environment. For drinking water, respondents in one Centre-Nord village talked about traveling 5 to 7 km/day to other villages’ water points, while another spoke of traveling tens of kilometers. Others in Est and Centre-Nord spoke of moving residence. Herders in Est practice transhumance, taking their animals as far as Benin and Togo for pasture.

Coping with floods: Responses to flooding in Niger include solidarity to provide housing to victims, improving housing construction quality using stronger materials and better clays, helping victims to relocate to higher land, leveling the land, and building small rain barriers. In Est, one community constructed a dam in the village square, and another constructed earth barriers around houses. House repair is an important area of mutual support, and one Burkinabe community organized a prayer meeting to help rebuild fallen houses, with various neighbors, friends, and relatives contributing bricks and sheet metal. Responding to flooded fields required moving to new areas and diversifying crops. Respondents in Est diversified their incomes by making use of their dam to produce off-season crops such as corn and watermelons.

Coping with pest infestations: A number of efforts were made by communities to address pest infestations, particularly the “caterpillar” problem. Several respondents spoke of a strategy of delaying planting by two to three weeks. A Maradi women’s group member explained how they had experimented and applied new agricultural techniques of spacing plants in rows, but the caterpillars still reduced their production by 85 percent. A basic strategy mentioned in Maradi was to use improved seeds that are expected to be less vulnerable to pests, though the results were not confirmed. A Maradi respondent stated that they have used several pesticides and natural predators—provided by RISE and government or included in training—but these were not effective. A women’s group member said that the insects provided by the initiative

have aggravated the situation, and they believed it was these insects that have turned into caterpillars. This comment reflects the wider concern explained above about a lack of communication and/or understanding on this crucial issue, which RISE Initiatives should prioritize addressing in the interests not only of helping solve the immediate threat but also to help build long-term resilience capabilities.

On the positive side, other Maradi respondents stated that a group of people was trained and provided with equipment to help respond to the insect attacks, and those with finances or social connections could get pest control equipment. At the same time, they cited a lack of availability of spraying products, so producers needed to source them from Nigeria. Another respondent said that despite having established a village watch committee to help protect against disasters, they were unable to respond in time.

Coping with civil insecurity: When asked how they respond to terrorism and insecurity, respondents stated that they felt impotent, and a respondent in Est described it as feeling: “powerless, living in the skin of terrorists.” While there is no easy solution to any dimension of this shock, there are some coping mechanisms such as temporary displacement or the mobilization of self-defense groups. Est respondents mentioned avoidance and protection strategies, such as circumventing risky areas, taking long detours, and avoiding being out at night. Burkinabe respondents mentioned coordinating with security services, being vigilant for suspicious persons, and establishing an early warning system for terrorism. Insecurity can help strengthen social capital, but some say that it puts a strain on trust, so these are complex processes.

3.4. Differences in Shock Exposure and Coping for the Poor and Non-Poor

Table 7 compares summary measures of shock exposure for the poor and non-poor. Shock exposure is likely a primary driver of poverty in the initiative area. Thus, as would be expected, the shock exposure index and number of shocks are higher at baseline and midline among poor than non-poor households. However, by endline, shock exposure had equalized across the groups. This pattern indicates convergence of the shock exposure of poor and non-poor households as it rose sharply over time. The convergence pattern is reflected in all three shock categories: climate, conflict, and economic.

Table 7. Baseline-midline-endline comparison of shock exposure, by poverty status

Indicator	All			Non-Poor			Poor		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Index (mean)									
Shock exposure index	7.9 ^{ab}	11.5 ^{ac}	20.1 ^{bc}	6.4 ^{ab}	10.2 ^{ac}	20.0 ^{bc}	8.7 ^{ab}	12.3 ^{ac}	20.1 ^{bc}
Number of shocks exposed to in last year	1.9 ^{ab}	2.7 ^{ac}	6.1 ^{bc}	1.6 ^{ab}	2.5 ^{ac}	6.2 ^{bc}	2.1 ^{ab}	2.8 ^{ac}	6.1 ^{bc}
Summary (%)									
Climate shocks	68.6 ^{ab}	84.7 ^a	88.5 ^b	59.6 ^{ab}	81.5 ^{ac}	89.8 ^{bc}	73.8 ^{ab}	86.7 ^a	87.5 ^b
Conflict shocks	11.0 ^{ab}	7.7 ^{ac}	20.4 ^{bc}	9.0 ^b	5.7 ^c	18.0 ^{bc}	12.2 ^b	8.8 ^c	22.2 ^{bc}
Economic shocks	52.4 ^{ab}	82.2 ^{ac}	90.9 ^{bc}	41.2 ^{ab}	73.6 ^{ac}	91.8 ^{bc}	58.8 ^{ab}	87.3 ^a	90.2 ^b
Other shocks	20.8 ^{ab}	25.3 ^{ac}	60.6 ^{bc}	18.6 ^{ab}	24.3 ^{ac}	62.9 ^{bc}	22.1 ^b	26.0 ^c	58.8 ^{bc}

a,b,c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

In the case of coping strategies, two patterns of difference between poor and non-poor households can be detected (Table 8). The most common pattern is for the poor to employ coping strategies more than the non-poor throughout the initiative period. This pattern is apparent for the following strategies:

- Taking up new wage labor
- Migration of family members
- Selling household items
- Selling productive assets
- Leasing out land and
- Consuming seed stock.

The second pattern is more reflective of the convergence in the groups' shock exposure: higher use of the strategy among the poor at baseline and midline but then convergence across the groups by endline. This pattern holds for the following coping strategies:

- Borrowing from a money lender,
- Borrowing money from friends and relatives,
- Reducing the number of meals in a day, and
- Limiting portion sizes at meal times.

One coping was used strategy more by the non-poor than the poor throughout the initiative period: drawing down on savings. Being able to employ this strategy depends on the ability to accumulate savings, which is likely higher among richer households.

Table 8. Baseline-midline-endline comparison of percent of households employing various coping strategies, by poverty status

Indicator	All			Non-Poor			Poor		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Labor strategies									
Take up new wage labor	2.8 ^b	3.8 ^c	12.0 ^{bc}	2.4 ^b	5.4	8.8 ^b	3.0 ^b	2.8 ^c	14.5 ^{bc}
Take children out of school	1.3 ^b	1.0 ^c	3.2 ^{bc}	0.6 ^b	0.0 ^c	2.7 ^{bc}	1.7	1.5 ^c	3.6 ^c
Send children to work for money	2.4 ^b	3.0 ^c	7.8 ^{bc}	2.0 ^b	2.7 ^c	7.5 ^{bc}	2.6 ^b	3.2 ^c	8.0 ^{bc}
Migration									
Migration of some family members	25.0 ^{ab}	18.3 ^a	18.3 ^b	16.2 ^a	10.6 ^{ac}	15.5 ^c	29.3 ^{ab}	22.8 ^a	20.5 ^b
Migration of the whole family	1.2 ^a	0.2 ^{ac}	2.7 ^c	0.6	0.2 ^c	1.3 ^c	1.4 ^a	0.3 ^{ac}	3.7 ^c
Send someone to stay with relatives	1.6 ^b	4.3 ^c	0.0 ^{bc}	1.4 ^b	2.1	0.0 ^b	1.8 ^b	5.6 ^c	0.0 ^{bc}
Asset strategies									
Sell household items (e.g., radio, bed)	8.8 ^b	8.7	14.3 ^b	5.2 ^b	5.1	10.4 ^b	10.5 ^b	10.8	17.4 ^b
Sell productive assets (e.g., plough)	2.5 ^{ab}	1.2 ^{ac}	7.0 ^{bc}	1.6 ^b	0.4 ^c	4.9 ^{bc}	2.9 ^{ab}	1.6 ^{ac}	8.7 ^{bc}
Send livestock in search of pasture	6.8	5.1	7.5	6.7	4.0	8.8	6.9	5.6	6.5
Sell livestock	64.5 ^a	75.7 ^{ac}	64.3 ^c	57.8 ^a	75.7 ^{ac}	62.7 ^c	67.8 ^a	75.7 ^{ac}	65.6 ^c
Slaughter livestock	4.5	3.1 ^c	5.9 ^c	4.3	3.2 ^c	7.6 ^c	4.5	3.0	4.6
Lease out land	7.6	5.2	7.1	2.4	2.4	5.0	10.0	6.8	8.8
Move to less expensive housing	0.3 ^{ab}	0.0 ^{ac}	1.1 ^{bc}	0.4 ^a	0.0 ^a	1.3	0.2 ^b	0.1 ^c	1.0 ^{bc}
Borrow money or rely on savings									
Borrow money from an NGO	2.7 ^b	1.3	0.8 ^b	2.2 ^b	1.3	0.8 ^b	3.0 ^b	1.3	0.8 ^b
Borrow money from a bank	1.6 ^a	0.7 ^a	1.3	2.3	0.9	1.7	1.2	0.6	1.0
Borrow from a money lender	11.4 ^{ab}	7.1 ^{ac}	17.8 ^{bc}	7.9 ^b	5.6 ^c	17.0 ^{bc}	13.1 ^a	8.0 ^{ac}	18.5 ^c
Draw down on savings	19.0 ^b	24.2	29.5 ^b	24.5	36.9	36.0	16.4	16.9	24.4
Rely on formal sources of assistance									
Receive food aid from government	6.2 ^a	2.7 ^a	4.0	5.4 ^a	0.9 ^{ac}	4.7 ^c	6.6 ^b	3.7	3.5 ^b
Receive food aid from an NGO	8.4 ^a	3.2 ^a	5.5	8.1 ^a	2.2 ^{ac}	4.9 ^c	8.5 ^a	3.8 ^a	5.9
Participate in food/cash-for-work	3.9 ^b	4.0	1.5 ^b	3.5 ^b	3.8	1.2 ^b	4.2	4.2	1.7
Rely on assistance from friends/relatives									
Receive money/food from family	23.1	26.3	30.9	26.6	29.0	31.2	21.3 ^b	24.8	30.7 ^b
Receive remittances from relative	9.5	9.5	11.7	7.4 ^b	7.0 ^c	14.9 ^{bc}	10.6	10.9	9.3
Borrow money from friends/relatives	35.5 ^{ab}	43.3 ^{ac}	54.9 ^{bc}	27.3 ^b	31.0 ^c	53.0 ^{bc}	39.5 ^{ab}	50.5 ^a	56.3 ^b
Reduce food consumption/change source									
Eat lean season food (Anza, etc.)	3.8	2.3	2.5	1.8	1.4	2.5	4.7	2.8	2.5
Excavation of termite mounds	0.2	0.1	0.6	0.3	0.2	0.6	0.1	0.0	0.6
Hunting, gathering	4.7	4.8	5.6	2.4	3.0	3.4	5.8	5.9	7.4
Consume seed stock	19.1 ^a	13.6 ^a	12.7	15.8 ^{ab}	9.2 ^a	9.3 ^b	20.7	16.1	15.4
Reduce number of meals in a day	31.1	26.3	25.9	25.7	18.8	26.4	33.7	30.7	25.6
Limit portion sizes at mealtimes	33.6	29.5	31.6	29.3	22.8	32.2	35.7	33.3	31.1

a, b, c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

3.5. Summary: Shock Exposure and Coping Strategies

Households in the RISE Initiative area experienced increasing shock exposure over the initiative's operational period, with an especially sharp escalation in its final years. According to global climate database and household reports, both the Burkina Faso and Niger initiative areas were subjected to great rainfall volatility, leading to multiple droughts and floods that at times dipped into extreme territory. While the Sahel is known as a drought-prone region, flooding dominated over drought. In the 3.5 years between the midline and endline surveys (the time period on which the impact evaluation is focused), in both initiative areas rainfall surpluses were

bigger than deficits. However, surpluses and flooding were more of a problem in the Niger area, and deficits and drought more of a problem in the Burkina Faso area.

The incidence of conflict shocks related to civil insecurity also saw a large increase over the initiative period. Increasing acts of violence and thefts by armed terrorist groups led to large populations of displaced peoples and had widespread impacts on markets, agricultural production, off-farm income generating activities, and, subsequently, on people's livelihoods and health. By April 2020, just as the security situation deteriorated further, COVID-19 restrictions were imposed, including border closures, market restrictions, and restrictions on travel.

As would be expected, the combination of climate shock, civil insecurity, and COVID-19 restrictions is associated with a sharply increasing incidence of economic shocks, including food price inflation, unemployment, inability to access assistance, and exceptional health expenses to attend to, and price/availability disruptions to inputs to agricultural and livestock rearing and products sold by households.

Consistent with the increase in exceptional health expenses, there was a strong rise in the percentage of households reporting serious illnesses and deaths, particularly in the Burkina Faso area. This disturbing trend is a clear indication that the multiple shocks of this time period were taking a serious toll on the well-being of households of the RISE Initiative area. Other shocks hitting the RISE area were emigration of household members and "sudden increase in household size" associated with civil insecurity displacements, and armyworm infestations that damaged crops.

As households struggled to deal with increasing shock exposure, they intensified and shifted their coping strategies in response. The most commonly employed strategy was to sell livestock. Other strategies include borrowing or receiving gifts of money from friends or relatives, reducing food consumption or changing a source of food, drawing down on savings, migrating, and borrowing from a money lender. Large percentages of households were diversifying their livelihoods into low-return activities such as working on other people's fields, charcoal production, wild food sales, and petty trading. Many coping strategies were used increasingly over time as shock exposure grew, including some particularly negative coping strategies, such as taking children out of school and sending them to work for money, selling productive assets, borrowing from money lenders and reducing food consumption, which is debilitating to people's health.

Notably, reliance on humanitarian assistance was not a main coping strategy and in fact declined over the initiative period despite the increased shock exposure and crisis situation. A shock-responsive safety net could have helped prevent the decline in food security found in Chapter 6, which represents a major reduction in the initiative gains that were achieved prior to the midline.

4. CORONAVIRUS AWARENESS, MITIGATION STRATEGIES, AND IMPACTS

4.1. Coronavirus Background

The Coronavirus pandemic emerged as a global issue as the final preparations for the RISE I endline were underway. The survey was to have taken place in March–April 2020 but the decision was made in early March to postpone it. Shortly thereafter, both Burkina Faso and Niger enacted nationwide lockdowns,³⁹ including banning internal travel. The endline survey was eventually modified (shortened and an additional module added related to COVID-19) and conducted by telephone in Sept–Oct 2020. Subsequently, another state of emergency was enacted in late 2020 owing to a second wave of COVID-19.

The RISE I endline quantitative survey had specific modules related to shocks and coping strategies that would be relevant to understanding the impact of COVID-19. However, it was also deemed necessary to add some questions that would get at issues specifically related to COVID-19 awareness, mitigation measures and impacts. A COVID-19 qualitative survey was conducted with a sample of two key informants in 18 villages in each of Niger and Burkina Faso, including a chief or councilor and a community health worker.

From the beginning of the pandemic to September 2020 (when the endline data were collected), there was a campaign of awareness-raising and promotion of containment measures across Burkina Faso and Niger, particularly between March and May. During this time, most people became aware of the disease and were impacted by the containment measures imposed on gatherings and travel, which had been mostly lifted by the time of the interviews. The main impact of the coronavirus pandemic has been social and economic through the curtailment of community activities, restrictions on business activities, and the dampening effect on transport (higher cost of fuel and restrictions). The latter led to increases in food prices and other supplies during the lockdown period. The pandemic shows how the responses to a shock—the containment measures—can become a very significant shock in themselves.

Since the time of the RISE endline survey, there has been some initial research related to the socioeconomic impacts of COVID-19 in Africa. Early research noted that, in the spring of 2020, COVID-19 had not directly affected food systems, but lockdown measures were creating significant economic stress.⁴⁰ Similarly, government action to limit the spread of the disease appears to be associated with greater knowledge about the disease and increased uptake of precautionary measures.⁴¹

³⁹ Reuters 2021a, b

⁴⁰ Devereux et al. 2020

⁴¹ Josephson et al. 2020

4.2. Awareness of Coronavirus and Sources of Information

Analysis of the endline survey data indicates widespread awareness of Coronavirus in both initiative areas, with 99 percent of respondents indicating that they knew something about it (Table 9 and Figure 10). This finding aligns with research elsewhere in Africa.⁴² Even those living in remote villages or with limited social contact are aware of COVID-19, and its influence was such that a respondent in Zinder stated that coronavirus is called "*may saidaaikigabadaya*," translated as "the disease that stops all activity."

In both initiative areas, radio/television was the most important source of information for those households who knew about Coronavirus, with 94 percent in the Burkina Faso area and 93 percent in the Niger area indicating it as an information source. The second, third and fourth most important sources were friends/neighbors (63 and 46 percent respectively), family members (49 and 32 percent) and health workers (47 and 26 percent).

Qualitative findings confirm these trends and provide additional insights. In terms of sources of information, there was a notable difference between radio and TV, which has implications for communications strategies in future initiatives. In Niger, only one qualitative respondent (out of a total of 36) said TV was an important source of information on the pandemic, while most said that radio was a primary source. Most respondents refer to mainstream popular radio channels, though one health center director mentioned the effectiveness of community radio, which included question-and-answer sessions and nighttime broadcasts. Community leaders, including Muslim imams, also participated in raising awareness on the radio. In Burkina Faso, among the 33 respondents, 24 cited radio as a source of information and 23 cited television. This finding suggests that TV could be an effective medium for communication in Burkina Faso, but there is strong reason to doubt that the same would apply in Niger.

The qualitative findings also show that health workers and health centers were also an important source of information. In Burkina Faso, health workers were cited by half of respondents, and in Niger more than half of respondents cited the health center (see quote, right).

Other sources of information in both Burkina Faso and Niger included phone calls or SMS messages sent by phone companies to phone subscribers, advising of the COVID-19 symptoms and management measures. This can be an effective channel, though not all have phones.

Social networks such as Facebook were mentioned by numerous respondents as a source of information, often used for transmitting educational videos and reinforcing what villagers heard on the radio. Personal networks and communication by word of mouth are important, and several Niger respondents mentioned the word "*fada*" which refers to people sitting under a

A Zinder respondent reported that:
"The activity that has taken place in my community to fight against the coronavirus is awareness raising by health workers. There are no measures other than those mentioned that could be useful in combating the coronavirus."

⁴² Josephson et al. 2020

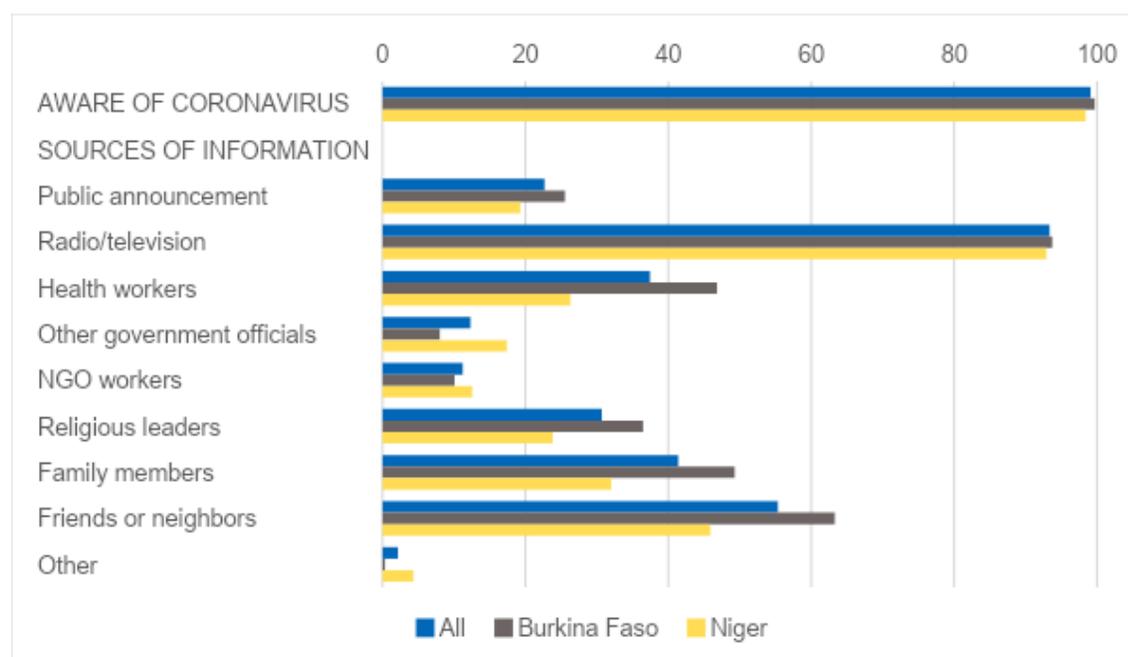
village tree and conversing. Public meetings were also cited by about a third of Burkina Faso respondents.

Table 9. COVID-19 awareness, mitigation strategies, and impact on households, by initiative area

Indicator	All	Burkina Faso	Niger
	Endline	Endline	Endline
Awareness of Coronavirus			
Aware of Coronavirus	99.1	99.7	98.4
Sources of information (% of HHs aware of Coronavirus) a/			
Public announcement	22.7	25.5	19.3
Radio/television	93.4	93.7	92.9
Health workers	37.4	46.8	26.3
Other government officials	12.3	8.0	17.4
NGO workers	11.2	10.1	12.6
Religious leaders	30.7	36.5	23.8
Family members	41.4	49.3	32.0
Friends or neighbors	55.3	63.3	45.9
Other	2.2	0.3	4.3
Mitigation strategies employed a/			
Strategies adopted to reduce spread¹			
Quarantine	32.1	45.4	16.2
Used physical separation to distance sick member from others	43.1	38.3	48.9
Avoided contact with sick member	22.2	16.2	29.3
Washed hands with water and soap	86.7	90.6	82.1
Washed hands more frequently	65.1	71.4	57.6
Sought help at a health clinic.	9.2	3.6	15.9
Did nothing	8.1	4.1	12.9
Engaged in spiritual efforts (e.g., prayed, sacrifices, etc).	29.8	33.6	25.3
Wore a mask	69.5	78.9	58.4
Other	2.2	2.1	2.3
Impact on households a/			
Coronavirus had an impact on household livelihood/income			
Better off as a result of Coronavirus (% of HHs indicating an impact)	8.5	6.1	11.7
Worse off as a result of Coronavirus (% of HHs indicating an impact)	91.5	93.9	88.3
Coronavirus had an impact on access to food			
Better off as a result of Coronavirus (% of HHs indicating an impact)	9.1	6.6	13.0
Worse off as a result of Coronavirus (% of HHs indicating an impact)	90.6	93.1	86.7
Prevalences of symptoms and diagnoses a/			
Household member showed symptoms such as high fever, coughing, shortness of breath, difficulty breathing	21.7	11.3	34.0
Household member was diagnosed with Coronavirus	3.3	2.7	4.1

a/ Multiple responses allowed. Totals may add up to more than 100 percent

b/ Among households aware of Coronavirus.

Figure 10. Awareness of and sources of information about COVID-19

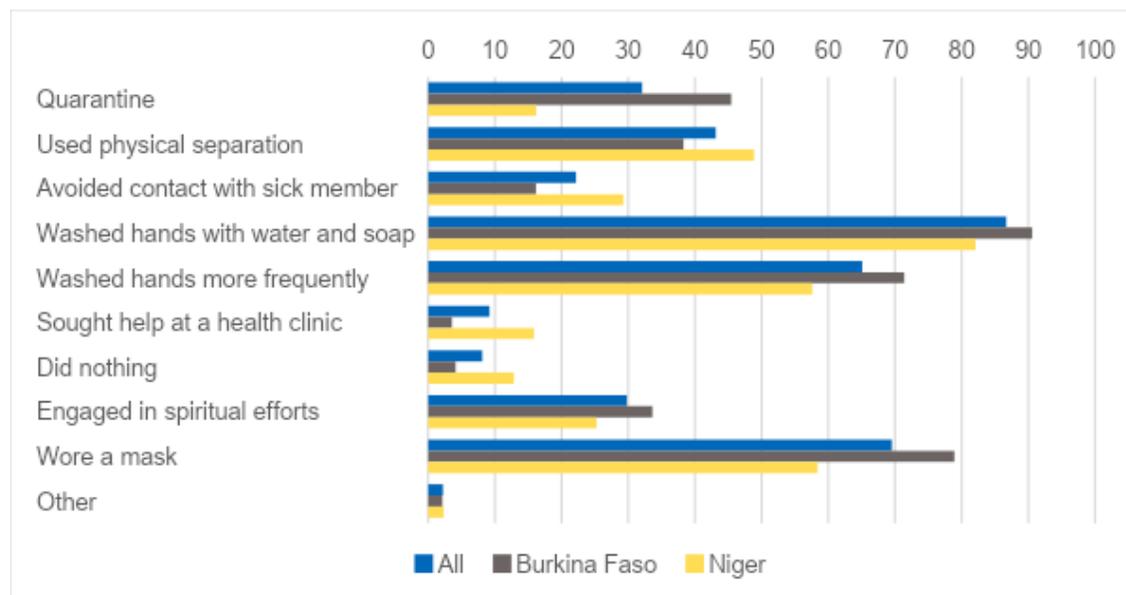
4.3. Use of Coronavirus Mitigation Strategies

In terms of mitigation strategies, similar to findings elsewhere⁴³ the adoption of handwashing was near universal with 91 percent of households in the Burkina Faso initiative area and 82 percent in the Niger initiative area indicating that washing hands with soap and water was one of the strategies adopted to reduce the spread (see Table 9 and Figure 11). The next most important strategies in the Burkina Faso area were mask wearing (78 percent), more frequent hand washing (72 percent) and quarantining (45 percent). In contrast to this, the next most important in the Niger area were mask wearing (58 percent), more frequent hand washing (58 percent) and physical separation of sick household members (49 percent).

From the qualitative data there are some indications that while there is a high awareness of some preventive measures, most people cannot list all of them, which would be optimal.

Some qualitative respondents in Maradi explained that some didn't use masks because of a lack of availability and of the means to obtain masks, while one respondent reported that people have made their own fabric masks. Some people ask at health centers for masks, and several NGOs have distributed masks at schools and elsewhere, including some RISE partner organizations. Even when masks were provided, however, reusing the same paper mask (or failing to wash fabric masks adequately) can be a potential problem.

⁴³ Josephson et al., 2020

Figure 11. Strategies adopted to reduce the spread of Coronavirus

Hand washing was limited by availability of water and soap, which made it impossible for some to regularly practice handwashing. Several stated that hand washing only was done at village health posts or town halls that have facilities, and in Maradi a clinic attendant educated people to wash their hands before meeting the health worker.

As stated above, awareness and acceptance of COVID-19 generally increased over time in both Burkina Faso and Niger, and likewise there was growing adherence to protective measures. Through awareness-raising and closures, people were both encouraged and forced to respect the measures. Still, a Maradi respondent said that at one point people stopped complying with preventive measures, until the health center director renewed an awareness campaign. In another Maradi village, the community had abandoned the implementation of containment and prevention measures because it was said that the disease had been eradicated. A Zinder respondent said that adherence waned when some people felt that the pandemic was at an acceptably low level of threat, yet others believed that the pandemic still exists and continued to maintain the measures.

Awareness of the disease, and actually internalizing and complying with containment measures, are two different things, but the connection between them may not be straightforward. Some respondents in the Est region said that there are those who neglect the disease, mostly young but also some adults, and these individuals say that COVID-19 does not exist, and they are less informed (see quote, right).

A respondent in Maradi said:
"...there are people who know and those who do not know, because they do not believe, and have not even bothered to try to understand."

These and other comments suggest that while for some people, increased understanding will lead to changed behavior, other people may balk at the implications and the need to change their behavior and therefore will not be open to learning.

A respondent in Maradi said: *“After the deaths that occurred, then they began to believe, though these [deaths] were not in their communities.”*

In Niger, some qualitative respondents said that there are people who say that COVID-19 doesn't exist, or that it is nothing more than a cold. Some say that it is a disease of white people or the rich, and not a disease of the Hausa people who work the land. Some thought it was a way of taking money from donors (see quote, left).

The pandemic has been difficult for religious communities in Niger, because the distancing guidelines led to a prohibition of large gatherings at places of worship, which some respondents said seemed like an attack on their religion. Although some Muslim imams were calling on the public to respect the preventive measures—taking part in regular radio awareness-raising initiatives—other Islamic leaders didn't believe in the disease and taught that it was a Western invention to harm Islam. The enforced closure of places of worship was announced by the state before there was much awareness raising about COVID-19, so this suggests that a better approach for government could have been to provide more explanation before closing the mosques. Burkina Faso did not report a similar issue with religious communities.

Several Sahel Region respondents pointed out that there was initially a belief that the coronavirus in Africa must be a non-lethal type since there were not many victims.

Nevertheless, multiple awareness sessions around the disease had helped establish a greater understanding.

In Sahel, it was pointed out that: *“...women respect the measures more than everyone else because they say they are at the heart of the family and supposed to take care of the property and the health of the household.”*

In Niger, there were diverse views expressed about which groups tended to adhere to measures. Several respondents said that migrants, young, and “religious fanatics” were more skeptical, while one respondent said that returned migrants were more aware and complied with prevention measures. In Burkina Faso, some respondents felt that women were more compliant (see quote, right).

4.4. Impacts of Coronavirus on Households

4.4.1. Economic Effects of the Pandemic

In order to adequately assess the effects of COVID-19, it is valuable to look at the mechanisms of these effects, including aspects of the food system (e.g., infrastructure, processes, people) and food entitlements. According to Devereux et al. 2020, the major effect of COVID-19 has been economic, through border closures and restrictions on travel and markets, which was concentrated during the lockdown period but partly continued until the time of the endline

survey in September–October. The fallout included the loss of income and remittances, marked price increases in major commodities and fuel, the disruption of agriculture and livestock inputs, and the reduction of household reserve funds and assets. Meanwhile, livestock prices fell due to the closure of markets domestically and in neighboring countries, which affected RISE participants and other animal breeders.

RISE qualitative survey respondents provided further details on the containment measures that affected the economy and household resilience. Formal containment measures in both Burkina Faso and Niger included closures of public venues and travel for up to 3 months, from April to June 2020. Respondents gave slightly varying reports about these measures, however, suggesting that there was not a consistent application of the rules across all communes. For example, one respondent in Burkina Faso stated that markets and places of worship were only closed for three weeks. After June, and at the time of the survey in September–October, life had partially returned to normal.

Transport was affected by these rules and by the cost of gasoline. Transport within Niger was affected due to distancing rules which allowed only 50 percent passenger capacity in buses, increasing the cost of transport and leading to a reduction of local travel. Only essential travel was allowed in many communities, and a respondent in Est region explained that apart from city quarantines, there was a curfew in place. Several Burkinabe respondents reported that there were no formal restrictions of movement within their community, but that it was difficult to leave the community because of the fuel shortages resulting from border closures. This affected traders and migrants, but also students travelling to their schools and colleges, among others. Gasoline retailers had stopped operating according to an Est respondent, leading to bus ticket price increases of up to 25 percent. These are communities which already suffer from inadequate infrastructure and isolation.

Restrictions on travel and cross-border trade had numerous effects, reducing migration and constraining exports and imports. The border closure was particularly complicated for animal breeders and dealers, and this closure may have been more strictly enforced and lengthy than was the case with markets. A respondent in Est, for example, said that this affected the export of sheep to Ivory Coast and other countries, especially during *Tabaski* (late July). Border closures were compounded by the closure of markets in neighboring countries, such as in Nigeria; this would drastically reduce goods that normally are imported from Nigeria and offered in Niger markets. Another dynamic is the use of alternative cross-border roads and mechanisms, called *fraud routes* from the French “*voies de fraude*” or the Hausa term “*barawniyahagna*”⁴⁴ (see quote, right).

A respondent in Maradi explained fraud routes: “*There are no roads, traders use the channels of fraud to bring food and other products to the villagers that is why all prices have risen in the markets.*”

⁴⁴ For purposes of this report, the term “fraud route” will be used, as it is sufficiently clear, without intending to condone or condemn this common practice

When vehicles take these alternate routes, transport prices can rise up to double the original amount, which also leads to increased prices of marketed products. These illegal channels for migration and contraband trading helped sustain livelihoods during the lockdown period and subsequent to it, according to a respondent in Zinder.

Markets were partly closed in Niger during the pandemic due to border restrictions, though some said that markets remained open but with reduced accessibility (see quote, below).

Burkina Faso had an official closure of the main markets from 28 March to 15 May, but people often found ways to work around them, such as using stores or kiosks outside of markets. Interestingly, even in these circumstances, the traders were observing handwashing and distancing rules. Respondents in Est region stated that while the markets were ostensibly closed, this was not upheld rigorously, and food supplies were partly accessible because prior to the closures, merchants had stored their goods in their homes or in shops. At some point,

A Zinder respondent said: *“The markets have not been closed but due to the restriction of movement and the closure of borders we have experienced difficulties in access to food and the high cost of living.”*

markets were open but with reduced hours of operation. Still, an Est respondent reported that farmers were affected by the slump in sales of their agricultural products, such as peanuts, sesame, and a Sahel respondent stated food was less accessible because trucks carrying basic necessities were becoming increasingly scarce.

Food and input prices tended to increase from the border closures and curfews limiting local travel, and the reduced availability and higher cost of gasoline according to several respondents in Zinder. One Est respondent mentioned restrictions on the transport of goods, and a Sahel respondent said there was a continued shortage of food because transporters avoided travelling to big city markets to pick up products because of fear of contagion. These factors compounded other shocks occurring in 2020 (see quote, right).

Millet had dropped in price in some locations during the years of RISE intervention, owing to the implementation of effective production techniques, then the price rose again during 2020. A respondent in Zinder reported that it rose from 300 XOF per measuring cup to 800–900. In Tillabery a respondent said the price of high-quality millet rose from 25,000 XOF per sack prior to the pandemic to 35,000 XOF. Since cereals are often used in animal feed, this represented an increased cost for herders. An Est respondent reported an increase in the price of a bag of animal feed from 7,500 to 10,000 XOF due to inaccessibility of the flour which was caused by road closures. A Sahel respondent stated that the price of agricultural inputs had not risen, but they were not

A Maradi respondent stated: *“There has been a shortage of food and other basic necessities such as millet, cowpeas. There are households that only had one meal a day. This price increase is the result of the invasion of crop pests last year and also the closure of borders during the coronavirus pandemic.”*

available, and livestock inputs were not accessible owing to transport difficulties. Niger respondents reported reduced availability and increased cost of fertilizer, while some individuals qualified for seeds provided by the state. Similarly, an Est respondent reported that farmers could register with the government to benefit from 30 kg of fertilizer, and NGO initiatives were also providing subsidized inputs.

Credit opportunities were significantly reduced because of the pandemic. An Est region respondent stated that access to financial services was more difficult than before, and whereas previously individuals were lending to others, no one was in a position to help others. In the Sahel region, in some cases a loan that was initially taken out for a business activity was repurposed to pay for food and expenses, in response to the pandemic. In Niger, many respondents said tontine (savings) groups were not currently active.

While the COVID-19 pandemic has had a depressing effect on livelihoods, similar to (and compounding) other recent shocks like drought, floods and pest infestations, there are some unique characteristics in terms of how it restrained the practice of alternative livelihood activities and migration.

Migration is a normal coping mechanism to ongoing stress, but the coronavirus pandemic had cut off that opportunity for the yearly migration cycle due to cross-border travel restrictions. This led some to cancel plans to migrate, while other migrants were already in their destination countries and were confined there. Some migrants tried to travel on alternative and less-travelled routes, which entailed additional risks and police fines if they were intercepted at the border. As a result, remittances stopped or were reduced during the pandemic. Numerous factors affect the viability of migration as an economic activity, and at times a migrant may not find a good job, owing to economic constraints in the receiving country. By the time of the survey, some migrants had been able to travel and send funds.

A respondent in Est stated that: “...we have relatives who send us money from time to time, but for some time we have not received anything... they tell us that they are also affected by coronavirus, which is so difficult everywhere.”

Because of the financial difficulties caused by restrictions, many were being supported by relatives living outside the community. And yet, the pandemic was affecting remittances for many (see quote, right)

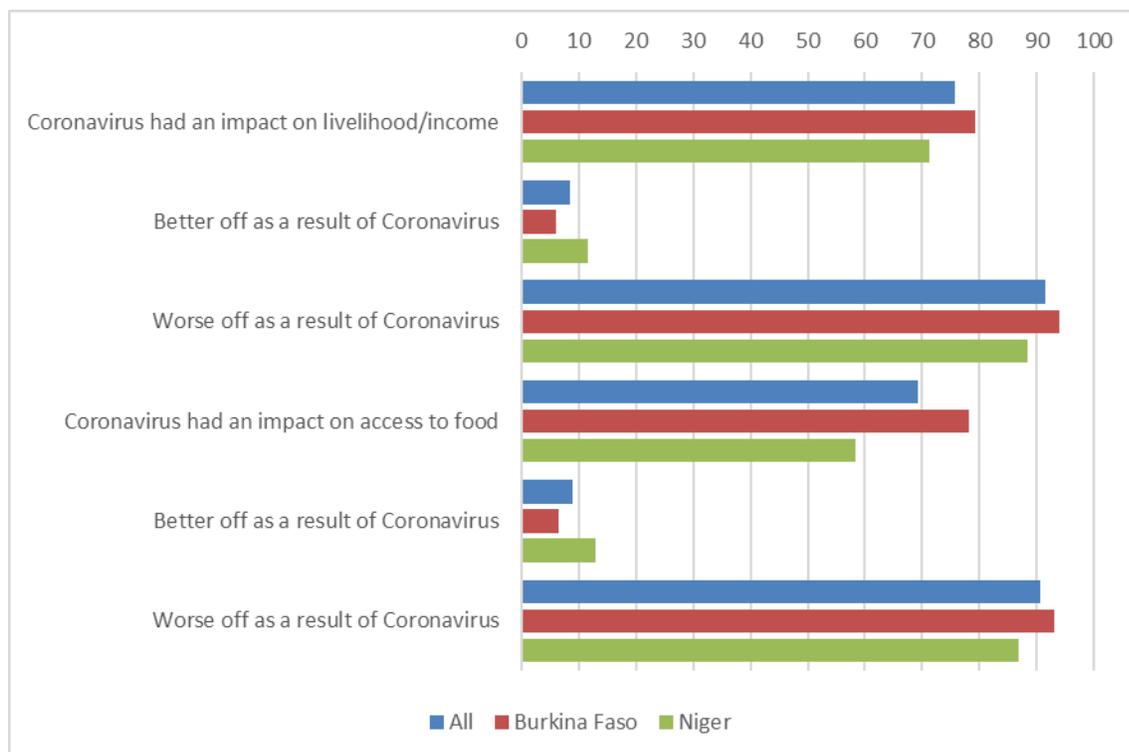
4.4.2. Livelihood and Food Security Impact: Quantitative Survey Results

In their work, Josephson et al. (2020) found that three-quarters of households had lost income as a result of the Coronavirus pandemic in the countries that they studied.

In the Burkina Faso initiative area, 79 percent of households indicated that the Coronavirus had an impact on their livelihood or income, which was almost universally negative (94 percent versus 6 percent indicating a positive impact) (see Table 9 and Figure 12). In the Niger initiative

area, 71 percent reported an impact on their livelihood or income, with 88 percent indicating that the effect was negative (and 12 percent positive). The perceived impact on access to food was similar for both initiative areas.

Figure 12. Impact of Coronavirus on households



4.4.3. Social and Psychological Effects

Analysis of the qualitative data indicates that the pandemic affected people both psychologically and socially. A Sahel respondent stated that people were affected by fear, boredom and tension, and as families confined together, this led to some arguments. Respondents were asked if this could lead to gender-based violence, but none stated that there was such an effect. On the other hand, the pandemic also had positive side-effects in terms of family bonding (see quote, right).

Several Sahel respondents stated that the pandemic increased the community's ability to deal with other shocks and to renew solidarity and mutual aid between people. One example in Sahel was that the community had thought about how to prevent conflicts between farmers and herders, and establish places for animals to graze. Now, the different age groups

"...Confinement was experienced as a reunion in this sense where people spent less time together before the disease and were more concerned about the anxieties of their work rather than their family life, the advent of the pandemic was a time... to strengthen their family bond."

—Sahel Respondent

were pooling their ideas and working together, as compared to before when a shock affected the community, people tried to think of the solution “alone in their corner.” A respondent in Maradi said that social cohesion was the only factor that has helped households to overcome the impacts of coronavirus, especially since few households received donations to overcome the shock.

4.4.4. Impacts on Government and NGO Programming and Assistance

According to community leaders participating in the qualitative interviews, most development initiatives stopped operations during the Coronavirus shut down. Respondents from Niger indicated that, NGOs had been operating in their village, but many initiative interventions were paused. Of those that were active, respondents mentioned initiatives that formed part of RISE, and several others.

The nature of coronavirus virus response ranged from food assistance to medium-term support with sustainable consequences, as well as awareness-raising, and distribution of masks.

In terms of government support, several respondents in Zinder spoke of the sale of food at subsidized prices. Only a few respondents mentioned NGO initiatives in terms of transmitting knowledge of coronavirus, though several mentioned assistance from World Vision and Save the Children. In Burkina Faso, respondents mentioned that REGIS-ER was providing face masks, soap, sanitizer gels, awareness-raising, handwashing kits and training for building tippy taps (hands-free device for washing hands) which included a pedal, wood, a 5-litre can and wire.

“Households with low financial capacity ... already lost their capital, and rain-fed crops are affected by lack of rain and crop enemies. There are some who have completely given up and are waiting to see what God will do. They are struggling to revive themselves....”

— Zinder Respondent

4.4.5. Most Affected Groups

According to qualitative respondents, those who depend on cereal crop production are very vulnerable to shocks, especially those with very little land. Mutual support was put to the test, and even savings groups mostly stopped functioning during the pandemic. The recovery will take considerable time, as mobility and migration are restored, particularly for those who were negatively affected by insect infestation (in Niger) and flooding.

Tillabery respondent highlighted the situation of men, stating that “Heads of households are responsible for meeting the needs of the household... Strict measures to prevent coronavirus disease have halted much of the economic activity, leaving many heads of households without livelihoods.”

A number of respondents highlighted the plight of migrants and traders, who were directly constrained by the pandemic. One issue that was discussed was the different impacts on women and men. One view is that men are most affected by the impacts of coronavirus because many of them have lost their jobs (see quote, left).

It's also important to take into account how the pandemic affected others indirectly, applying a gender perspective (see quote, right). Women often have the burden of caring for children and elders, as well as maintaining agriculture activities. Children are also affected by the economic difficulties, being unable to continue schooling. Other categories that respondents said would particularly suffer included widows, women-headed households, and those who are unwell or disabled.

A respondent in Zinder stated:
“Women are affected because they are in charge of the household, with the husband being away, and he cannot send cash.”

4.4.6. Outsiders, Stigma, and Testing

Most qualitative respondents stated the pandemic caused moderate changes in treatment of outsiders (whether nationals or internationals, see quote, below).

In one Sahel community, a respondent felt that there was not a significant change in perception of outsiders over the last 90 days, except with those coming from the ESSAKANE site⁴⁵ where there were confirmed cases, in which case villagers were distancing themselves as a protective measure.

A Maradi respondent explained: *“Long before the pandemic, when welcoming a foreign person or a villager back to the village, people spend time with them for greetings. But since the outbreak of the pandemic people are skeptical about foreigners from wherever they come from. For the last three months, people have not returned to the old way of welcoming people.”*

The subject of stigma was somewhat complex, because respondents sometimes spoke of preventive measures as constituting stigma. Distancing and protective measures may be called for in a pandemic, but these can be damaging to those suspected of being positive, especially if there are no alternative arrangements to help them meet their needs. One respondent in Est, for example, said that when people show the signs, others

immediately distrust them and deny them access to markets, and that health workers would even ask them to stay at home for 14 days to better observe the signs. It doesn't help that testing was not very available, so even the presence of symptoms may lead to premature judgements on the part of others.

Most respondents in Niger stated that there was no stigma, and that even if a person has fever, cough, and shortness of breath, they are not discriminated against because people believed that COVID-19 only existed outside the village. One respondent in Maradi stated that if a person

⁴⁵ ESSAKANE is a gold mine operated by the Canadian company, IAMGOLD.

showed signs of COVID-19, they were not excluded from the life of the group, but still people are hesitant to make contact. Another Maradi respondent pointed out that while previously friends and family would accompany a sick person to get medical attention, this hadn't been happening recently.

With regard to testing, some respondents stated that villagers are afraid to report their symptoms and be tested, because a positive test would result in restrictions and social effects. There were some initial safety concerns about reporting. As a Zinder respondent stated "...at the beginning of corona disease, people were afraid to come to the health center thinking they're going to get the disease, but after ... the withdrawal of the measures they understood that there was no risk." Initially in the pandemic, people were afraid to say they have a fever or cough so as not to be stigmatized. Another respondent in Maradi stated: "People are not afraid to report their symptoms because as Muslims we do not want to be the cause of the spread of the disease."

In one village in Sahel that had confirmed cases of COVID-19, respondents reported that people who have been cured of coronavirus are not stigmatized. After being infected with the disease and recovering from it, life went back to normal, and there were no cases of resocialization problems. They pointed out that once an individual was no longer infected, people accept them without fear, knowing that they could be in the same situation.

4.5. Prevalence of Coronavirus Symptoms and Diagnoses

From the quantitative data collection, the percentage of households where a member experienced one or more symptoms that could be a sign of COVID-19 was very low in the Burkina Faso area (just over 10 percent) whereas it was about one third in the Niger initiative area (see Table 9). On the other hand, very few residents of these communities were reportedly diagnosed with the virus—perhaps reflecting that the survey was conducted in rural areas where access to the relevant testing would have been very difficult.

It has been noted that, apart from those who fell ill and/or lost a family member due to the virus, the main impact of the pandemic derived from the lockdown and mobility restrictions and the effect of the subsequent loss of income and purchasing power on food security (particularly among the poor).⁴⁶ Our results would seem to support this conclusion in the case of the two RISE I initiative areas.

In qualitative surveys, respondents (including health workers) in the surveyed villages discussed the diagnosed cases they were aware of. In Burkina Faso, four villages had patients who tested positive for COVID-19, with between two and six patients in each case. All patients apparently recovered and returned to their villages without major issues. In the Niger survey area, there were only four positive diagnoses reported, all in one health center. This highlights that the

⁴⁶ Béné 2020

shock from the pandemic was mainly social and economic, caused by the containment measures.

4.6. Summary: Coronavirus Awareness, Mitigations Strategies, and Impacts

The Coronavirus pandemic emerged on the scene in the RISE Initiative area in March 2020, 6 months before the endline survey was conducted. To find out more about how this health shock affected households, a Coronavirus module was added to the endline questionnaire, and extensive qualitative data collection was undertaken.

The data show that there was widespread awareness of the Coronavirus among RISE Initiative households, with the top information source being radio and television followed by friends/neighbors, family members and health workers. Additional information sources cited by qualitative survey respondents were text messages from phone companies, social networks, word of mouth, and public meetings.

In terms of mitigation strategies, the top strategy employed was hand washing followed by mask wearing and social distancing. The qualitative data reveal that awareness of Coronavirus did not always translate into acceptance of it as a disease agent and the use of mitigation strategies.

The top impact of the pandemic was economic disruption caused by border closures, and restrictions on travel and markets. The fallout included transportation disruptions, consumer price increases, disruption of agricultural and livestock markets and, for households, loss of income and increased food insecurity. The large majority of quantitative survey respondents indicated that the pandemic had a negative impact on their livelihoods, incomes and access to food.

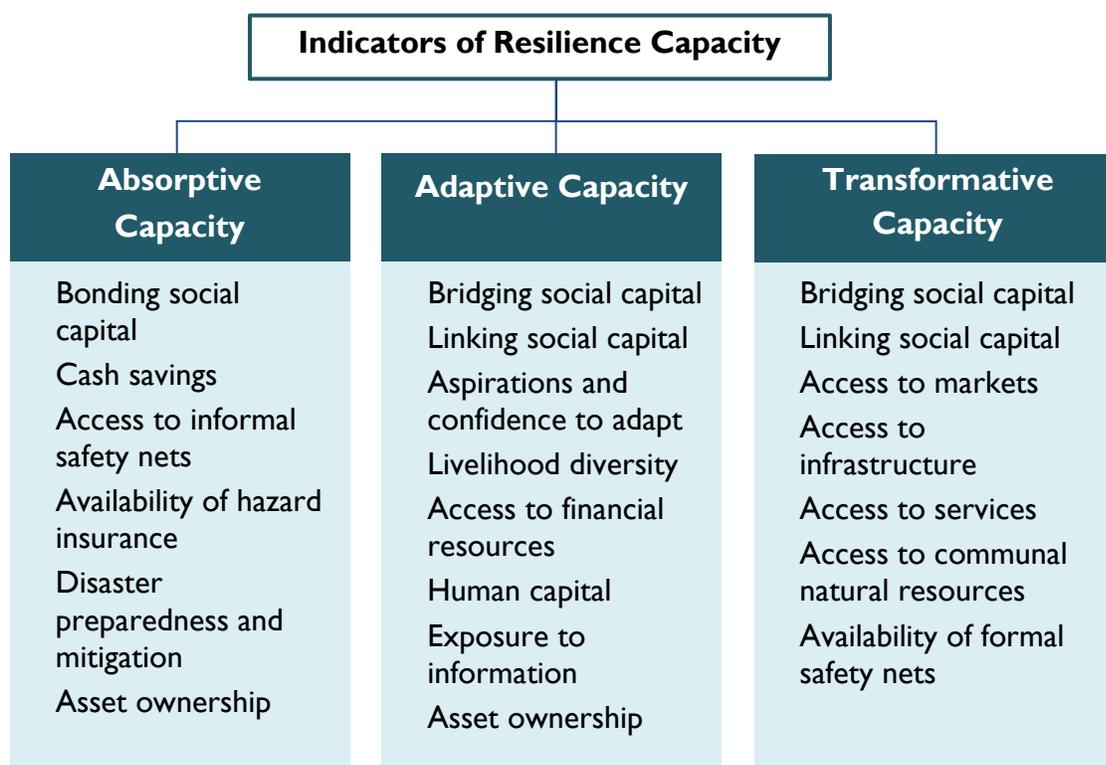
Very few households reported having a member who was actually diagnosed with the Coronavirus. The qualitative data indicate that those who did recovered and returned to their villages without major issue. The shock from the pandemic was mainly caused by the containment measures rather than the virus itself.

5. HOUSEHOLD RESILIENCE CAPACITIES

While resilience itself is an ability to manage or recover from shocks, resilience capacities are a set of conditions, attributes, or skills that enable households and communities to achieve such resilience. As noted in Chapter 2, household resilience capacities can be classified into three categories: absorptive capacity, adaptive capacity, and transformative capacity. Given their complexity, measuring these concepts requires combining multiple indicators of the underlying concepts into an overall indicator.

The technique used to calculate the indexes and ensure comparability over time is detailed in Annex 3. Figure 13 lays out the indicators of the three capacities that are used to measure them in this report. For this chapter’s analysis, these indicators, described in detail in the baseline resilience report (Feed the Future FEEDBACK 2016) and further discussed in the midline report,⁴⁷ are combined into indexes of the three capacities and an overall index of resilience capacity using factor analysis.

Figure 13. Indicators employed to measure resilience capacity



Data collected on all of the indicators at baseline, midline, and endline give the opportunity to determine whether households’ resilience capacities have been increasing over the period of the RISE I initiative.

⁴⁷ Smith et al. 2018

Table 10 compares baseline, midline and endline values of the indicators of household resilience capacity for the RISE I area as a whole and individually for the Burkina Faso and Niger areas. Some of the indicators are multiple-indicator indexes themselves calculated using various methods.⁴⁸ In these cases, the values of many of the underlying indicators are reported in Tables 5.1–5.9 and discussed in the relevant sections that follow.

Table 10. Indicators of resilience capacity at baseline, midline and endline, by initiative area

Indicator	All			Burkina Faso			Niger		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Social capital									
Bonding social capital	71.3	75.3	71.0	75.7 ^b	71.9	66.4 ^b	65.9 ^{ab}	79.2 ^a	76.5 ^b
Bridging social capital	52.6 ^b	55.9 ^c	62.0 ^{bc}	51.7	46.4 ^c	54.0 ^c	53.7 ^{ab}	67.1 ^a	71.3 ^b
Linking social capital	47.1	45.2	47.5	54.1	49.1	52.2	38.6	40.6	42.0
Aspirations and confidence to adapt	39.2 ^b	40.2	42.6 ^b	43.1 ^b	44.6 ^c	48.5 ^{bc}	34.3	35.0	35.6
Livelihood diversity	2.6 ^b	2.5	3.7 ^{bc}	2.7 ^{ab}	2.5 ^{ac}	3.3 ^{bc}	2.4 ^{ab}	2.6 ^{ac}	4.2 ^{bc}
Asset ownership									
Index of consumer durables owned	7.8 ^{ab}	8.4 ^{ac}	9.0 ^{bc}	9.3 ^b	9.5 ^c	10.6 ^{bc}	5.9 ^{ab}	7.2 ^a	7.1 ^b
Index of farming implements owned	4.4 ^b	4.3 ^c	5.1 ^{bc}	4.8 ^a	4.4 ^{ac}	5.3 ^c	3.8 ^{ab}	4.2 ^{ac}	4.8 ^{bc}
Animals owned (Tropical Livestock Units)	3.7 ^b	3.2 ^c	2.2 ^{bc}	5.5 ^b	4.7 ^c	3.3 ^{bc}	1.5 ^b	1.5 ^c	0.9 ^{bc}
Land owned (ha)	3.7 ^b	3.4 ^c	2.7 ^{bc}	3.7 ^{ab}	3.1 ^{ac}	2.3 ^{bc}	3.7	3.7	3.3
Overall index of asset ownership	23.6 ^b	24.0 ^c	26.0 ^{bc}	27.1 ^a	25.8 ^{ac}	28.9 ^c	19.1 ^{ab}	21.8 ^a	22.7 ^b
Access to financial resources									
Access to credit (% of hhlds)	68.7 ^b	65.2 ^c	44.0 ^{bc}	74.3 ^b	72.1 ^c	41.7 ^{bc}	61.7	57.1	46.8
Access to savings (%)	50.5 ^b	57.9 ^c	33.0 ^{bc}	49.1 ^b	64.6 ^c	31.1 ^{bc}	52.2	50.1	35.3
Index of access to financial resources	1.2 ^b	1.2 ^c	0.8 ^{bc}	1.2 ^b	1.4 ^c	0.7 ^{bc}	1.1	1.1	0.8
Currently holding savings	37.1 ^b	36.0 ^c	28.7 ^{bc}	55.1 ^b	47.7 ^c	37.2 ^{bc}	15.0	22.3	18.8
Access to markets, infrastructure, services and communal natural resources									
Index of access to markets	1.6	1.9 ^c	1.4 ^c	1.8 ^{ab}	1.7 ^b	1.0 ^a	1.3 ^a	2.1 ^a	1.9
Access to infrastructure	1.3	1.2 ^c	1.5 ^c	1.3	1.3	1.6	1.3	1.1	1.4
Access to basic services	4.0	4.4 ^c	3.7 ^c	4.2	4.6 ^c	3.8 ^c	3.8	4.2 ^c	3.6 ^c
Access to communal natural resources	1.9	1.8 ^c	2.1 ^c	1.8	1.7	2.1	2.1	1.9	2.3
Human capital and access to information									
Human capital	27.2 ^b	27.8 ^c	41.7 ^{bc}	25.9 ^b	27.6 ^c	39.9 ^{bc}	28.9 ^b	28.0 ^c	43.8 ^{bc}
Exposure to information	3.5 ^a	2.8 ^a	3.1	3.4 ^b	2.9	2.7 ^b	3.5 ^a	2.6 ^{ac}	3.5 ^c
Safety nets									
Formal safety nets	1.0	0.9	0.7	0.8	1.0	0.9	1.2 ^b	0.7 ^c	0.4 ^{bc}
Informal safety nets	2.0	2.1 ^c	1.7 ^c	2.2	2.6 ^c	1.8 ^c	1.8	1.6	1.6
Index of disaster preparedness and mitigation	0.7	0.5	0.6	0.4	0.5	0.5	1.0	0.5	0.9
Hazard insurance (% of hhlds)	46.2 ^{ab}	27.4 ^a	21.1 ^b	40.6 ^a	19.4 ^a	27.3	53.2 ^b	36.9	13.8 ^b
Institution providing conflict mitigation (%)	55.4	42.1	47.6	62.5	56.3	67.8	46.6	25.4	24.0
Indexes of resilience capacity									
Absorptive capacity	46.2 ^b	43.6	41.3 ^b	48.7 ^b	47.2	43.9 ^b	43.0	39.4	38.2
Adaptive capacity	50.4 ^b	50.0 ^c	55.3 ^{bc}	55.8	53.0	56.3	43.7 ^b	46.3 ^c	54.1 ^{bc}
Transformative capacity	47.1	49.2 ^c	45.0 ^c	50.8	52.0	47.7	42.6	45.8	41.8
Overall resilience capacity	52.2	51.9	53.5	57.0	55.3	55.4	46.3	47.9	51.3

a,b,c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

5.1. Social Capital

Bonding social capital (the bonds between people living in the same communities) and bridging social capital (the bonds between people living in different communities) have both risen

⁴⁸ See Feed the Future FEEDBACK 2016; Smith et al. 2018

substantially in the Niger initiative area during the life of the RISE I initiative (from baseline (BL) to endline (EL)). In the Burkina Faso area, bridging social capital has improved modestly while bonding social capital has declined (see Table I I). According to the quantitative results, linking social capital (vertical links between households and entities with authority or power) shows no change in either initiative area.

Table I I. Baseline-midline-endline comparison of social capital indicators, by initiative area

Indicator	All			Burkina Faso			Niger		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Social capital									
Bonding social capital (indexes)	71.3	75.3	71.0	75.7 ^b	71.9	66.4 ^b	65.9 ^{ab}	79.2 ^a	76.5 ^b
Bridging social capital	52.6 ^b	55.9 ^c	62.0 ^{bc}	51.7	46.4 ^c	54.0 ^c	53.7 ^{ab}	67.1 ^a	71.3 ^b
Linking social capital	47.1	45.2	47.5	54.1	49.1	52.2	38.6	40.6	42.0

a, b, c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

* * *

Qualitative findings shed some light on these quantitative findings.

Mutual support is central to livelihood coping strategies, as a respondent from Maradi stated: “People help each other ... Those who have lost their homes are housed in the school or with relatives and friends.” An interesting question is how much people are able to give. A Tillabery respondent stated: “When my neighbor doesn’t have enough to eat, I can give him some, if I have it, which can hold him for two meals.” Another Tillabery respondent said: “Support is when your neighbor doesn’t have enough to eat, you can give him a cup.”

In both Niger and Burkina Faso, respondents point out that when a shock or stress is putting everyone in a similarly difficult situation, it creates limits to solidarity mechanisms. An Est respondent stated that households in their community have a reduced ability to prepare for future shocks, as resources, savings and crop surplus had run out. In this situation, a person would hesitate to share resources to support others, because they feared that if the disease persisted, they would eventually be in need and there would be no one left who could help them. It is important to combine these forms of solidarity with external assistance, to avoid overtaxing others.

An Est respondent explained that ongoing shocks can degrade mutual support, because people become isolated from others and unaware of their situation. A different perspective was shared by a Sahel respondent who cited an expression: “we sucked honey together, and when it’s bitter we have to taste that together.” They explained that this meant that whatever the situation, community members remain united, which is the Sahelian custom. Still, with financial resources having been exhausted in the wake of coronavirus and heavy rains, the means are limited even if there is solidarity within the community.

5.1.1. Bonding and Bridging Social Capital

In Burkina Faso, all the intervention communities spoke of the importance of different aspects of social capital, and respondents from 9 out of 11 treatment communities indicated that this had been strengthened through RISE. Multiple respondents from the Centre-Nord communities spoke of the *chain of learning* as a foundation of social capital. Learning and working together led to group and community cohesion, and to the building of mutual self-confidence, and they said this helps people learn to listen to people from their own village (see quote, left).

Women respondents in Centre-Nord discussed sharing knowledge of hygiene practices with other women, who then put them into practice in their households. They also shared agriculture knowledge with other farmers to enable them to produce better, so there is sharing of experiences and a growing solidarity and generosity within the community. While these kinds of statements about the

initiative impact were common among Centre-Nord respondents, similar statements were made in several Sahel communities, where the respondents stated that RISE had promoted a change towards greater solidarity in sharing food or water with those in need.

In Niger, respondents in 9 of the 12 sampled villages reported that they had increased social cohesion through the initiative. A respondent from Zinder confirmed that RISE had specifically raised awareness about the importance of strengthening social cohesion. Respondents from Maradi stated that community organization had strengthened the establishment of a management system, and women's groups with their various agriculture activities had been crucial in this process. One women's group in Maradi had experienced stronger cohesion, thanks to the initiative, and the group grew from 15 to 20 members (see quote below). A respondent credited the initiative with a change in the culture of the village, with reduced domestic violence and gender-based violence.

This positive dynamic of *bonding* social capital was clearly extended from RISE Centre-Nord participants to other communities, demonstrating *bridging* social capital, according to numerous respondents (see quote, right).

A respondent in Centre-Nord stated: “The training received has led to the sharing of knowledge from those trained to those who have not received the training and this has become like a chain, giving way to a communication network through which there is more exchange of knowledge and skills. This has led to cohesion in the community, even beyond with neighboring communities.”

Peace and conflict resolution seems to build naturally on this cohesion, as a respondent in Centre-Nord explained, that the sharing of knowledge and social cohesion helps to strengthen peace. A respondent in Sahel specifically stated that RISE (REGIS-ER and REGIS-AG) was working for livestock development, reforestation and community peace. A number of villages were reporting conflict between farmers and pastoralists, and social capital strengthened by RISE can help resolve this. In Centre-Nord, a respondent stated: “When there is a dispute between a farmer and a pastoralist, the parties consult with the community leaders to find a solution.”

A key informant in Centre-Nord reports: *“This spirit of knowledge sharing and solidarity between us has strengthened social cohesion, and our networks of inter-community knowledge, strengthening social ties. And who says new social relations (friendships) means more networks so easily from one village to another where you pass, you feel at home.”*

Another concrete example given was with relation to resilience and housing. When asked about RISE impact in terms of how the community dealt with shocks, one respondent in Est explained the support for house protection, while also highlighting the real challenges in working with government institutions in the face of terrorism (see quote below).

5.2. Aspirations and Confidence to Adapt

“Aspirations and confidence to adapt” is a psychosocial capacity measured by combining indicators of: (1) the absence of fatalism; (2) belief in individual power to enact change; and (3) exposure to alternatives to the status quo. An increase in the index of this capacity for the RISE I area overall is linked to a moderate uptick for the Burkina Faso initiative area, itself stemming from an increase in the absence of fatalism (see Table 12). The latter is measured using information about the respondent’s views in connection with statements related to the degree of control they have over their lives. While it did not translate into a change in the overall index, households in Niger did experience a significant increase in exposure to alternatives.

A respondent in Est stated: *“Yes, I do [see a change in our community]. The involvement of the population in the resolution of crisis; for example, the construction of earth around houses to reduce the risk of flooding. The application of improved practices and the use of the relevant authorities. However, terrorism has sowed fear in people’s heads and caused the flight of state institutions and those of the NGOs.”*

Table 12. Baseline-midline-endline comparison of aspirations indicators, by initiative area

Indicator	All			Burkina Faso			Niger		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Aspirations and confidence to adapt									
Index	39.2 ^b	40.2	42.6 ^b	43.1 ^b	44.6 ^c	48.5 ^{bc}	34.3	35.0	35.6
Index components									
Absence of fatalism	25.4 ^b	26.1 ^c	30.2 ^{bc}	28.8 ^b	29.7 ^c	38.2 ^{bc}	21.1	21.8	20.7
Belief in individual power to enact change	50.9	51.3	50.5	54.4	56.7	57.9	46.5	45.0	41.9
Exposure to alternatives to the status quo	23.1 ^b	24.1	25.9 ^b	24.9	25.1	24.4	20.8 ^b	22.9 ^c	27.8 ^{bc}
a,b,c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.									

Note: Index components are themselves indexes constructed from multiple indicators. All indexes range from 0 to 100.

When Burkina Faso respondents were asked about the likelihood for communities to recover from the impacts of coronavirus, 32 out of the total 33 answered in the affirmative, though they noted some households that were more vulnerable and would face challenges in recovering. In Niger, some respondents were positive, and for example a respondent in Zinder said that the population was resilient with the benefit of migration and other practices. Alternative agricultural activities are giving hope, and the fact of having passed through the winter (rainy) season will soon provide income and supports households to overcome coronavirus impacts. A bleaker outlook is given by some other Niger respondents, who said that these shocks have undercut the ability of households to rebuild a foundation to climb out of poverty, even when some of them had previously been feeling positive about their ability to improve their situations through the support of RISE and other initiatives. The impact of coronavirus should be interpreted as part of a set of shocks, and in Centre-North a respondent said that their community had not taken concrete actions to prepare to mitigate the consequences of future shocks and stresses.

5.3. Economic Sources of Resilience Capacity

Diversity of livelihood sources, asset ownership, and access to financial resources are important economic enablers of households' resilience to shocks.

5.3.1. Livelihood Diversity

Livelihood diversity has risen in both the Burkina Faso and Niger initiative areas (index increases of 22 percent and 75 percent, respectively) over the life of RISE I.

In Burkina Faso, this increase is driven by increases in the number of households engaged in various agricultural activities (especially sales of wild products but also agricultural laborer, sales of fodder, charcoal and firewood) as well as non-agricultural sources including petty commerce, technical/professional services, artisanal mining, migration (remittances), and gifts/inheritance (see Table 13).

In Niger, the increase in livelihood diversity is driven by increases in the percentage of households engaging in livestock production and sales, work as an agricultural laborer, the

production/sales of seedlings, seeds and fodder as well as firewood, charcoal and lumber, sales of wild products, petty commerce, remittances, and relying on gifts/inheritance as their primary livelihood.

Some of this diversification may be due to RISE activities while some may be due to households' adaptations to rising shock exposure and worsening economic conditions.

Qualitative findings do confirm that RISE had a role to play in training and encouraging livelihood diversification into activities that were more viable, and Niger respondents in 9 of the 12 sampled villages mentioned this. The availability of funds and new income-generating activities (IGAs) have created greater opportunities for participants, such as a Zinder woman who bought an ox with the earnings from her IGAs. In conjunction with livelihood activities in agriculture, savings and IGAs, RISE promoted a value chain approach and sought linkages with markets and various partners. A respondent in Zinder stated that: "Women practice oil extraction and bring it to sell at the market. After the sale, they have profits from 2000F to 3000F." However, these livelihood diversification efforts were not at a large enough scale to prevent many other households from turning to less viable strategies.

Table 13. Baseline-midline-endline comparison of economic resources of resilience capacity, by initiative area

Indicator	All			Burkina Faso			Niger		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Livelihood diversity	2.6 ^b	2.5 ^c	3.7 ^{bc}	2.7 ^{ab}	2.5 ^{ac}	3.3 ^{bc}	2.4 ^{ab}	2.6 ^{ac}	4.2 ^{bc}
Livelihood sources (percent of households)									
Agricultural sources									
Crop production and sales	93.1 ^{ab}	86.0 ^{ac}	72.8 ^{bc}	90.8 ^{ab}	81.2 ^a	76.7 ^b	96.0 ^{ab}	91.9 ^{ac}	68.3 ^{bc}
Livestock production and sales	64.3	64.6	63.9	84.7 ^b	84.4 ^c	72.4 ^{bc}	39.1 ^b	40.2	53.8 ^b
Agricultural laborer	3.5 ^b	4.1 ^c	27.3 ^{bc}	1.6 ^{ab}	0.1 ^{ac}	5.3 ^{bc}	5.9 ^b	9.1 ^c	53.1 ^{bc}
Production/sales of seedlings, seeds, and fodder	0.7 ^{ab}	2.7 ^{ac}	14.3 ^{bc}	0.2 ^b	0.0 ^c	3.5 ^{bc}	1.2 ^{ab}	6.1 ^{ac}	27.0 ^{bc}
Production/sales of firewood, charcoal, and lumber	1.6 ^b	2.6 ^c	17.9 ^{bc}	0.8 ^b	0.1 ^c	6.7 ^{bc}	2.6 ^{ab}	5.6 ^{ac}	31.1 ^{bc}
Sales of wild products	1.1 ^b	0.7 ^c	13.1 ^{bc}	1.2 ^{ab}	0.2 ^{ac}	11.3 ^{bc}	1.1 ^b	1.2 ^c	15.3 ^{bc}
Employed in a commercial agricultural enterprise	0.4 ^b	0.2 ^c	3.9 ^{bc}	0.6 ^b	0.2 ^c	1.9 ^{bc}	0.1 ^b	0.1 ^c	6.2 ^{bc}
Private agricultural service provider									
Non-Agricultural sources									
Petty commerce	24.8 ^b	26.6 ^c	39.2 ^{bc}	25.4 ^b	24.5 ^c	41.3 ^{bc}	24.1 ^b	29.1 ^c	36.8 ^{bc}
Non-agricultural service provider	3.3 ^b	1.3 ^c	6.9 ^{bc}	4.0 ^a	0.6 ^{ac}	7.6 ^c	2.3 ^b	2.3	6.0 ^b
Technical/professional	6.8 ^b	6.9 ^c	13.8 ^{bc}	7.9 ^b	8.0 ^c	18.4 ^{bc}	5.5	5.5	8.4
Artisanal mining	13.3 ^{ab}	10.1 ^{ac}	18.3 ^{bc}	21.6 ^{ab}	16.1 ^{ac}	30.7 ^{bc}	3.1	2.8	3.9
Non-agricultural worker	1.0 ^b	1.0 ^c	3.8 ^{bc}	1.1 ^b	0.5 ^c	4.8 ^{bc}	0.9 ^b	1.6	2.6 ^b
Household help	0.3 ^b	0.2 ^c	2.7 ^{bc}	0.5	0.1 ^c	0.9 ^c	0.1 ^b	0.3 ^c	4.9 ^{bc}
Artisan	2.6 ^b	4.1	5.3 ^b	3.9 ^a	1.9 ^a	2.8	1.0 ^{ab}	6.8 ^a	8.3 ^b
Transportation/dockers	1.2 ^b	1.4 ^c	11.8 ^{bc}	1.1	0.3 ^c	2.8 ^c	1.3 ^{ab}	2.8 ^{ac}	22.3 ^{bc}
External, non-agricultural sources									
Migration (remittances)	25.8 ^{ab}	21.8 ^{ac}	33.1 ^{bc}	9.7 ^b	10.8 ^c	20.9 ^{bc}	45.7 ^a	35.2 ^{ac}	47.5 ^c
Gifts/inheritance	5.7 ^b	6.5 ^c	15.5 ^{bc}	8.9 ^b	7.5 ^c	15.6 ^{bc}	1.6 ^{ab}	5.2 ^{ac}	15.4 ^{bc}
Asset ownership									
Index of asset ownership	23.6 ^b	24.0 ^c	26.0 ^{bc}	27.1 ^a	25.8 ^{ac}	28.9 ^c	19.1 ^{ab}	21.8 ^a	22.7 ^b
Index of consumer durables owned	7.78 ^{ab}	8.41 ^{ac}	9.02 ^{bc}	9.28 ^b	9.46 ^c	10.63 ^{bc}	5.94 ^{ab}	7.17 ^a	7.14 ^b
Index of farming implements owned	4.35 ^b	4.30 ^c	5.06 ^{bc}	4.76 ^a	4.36 ^{ac}	5.31 ^c	3.84 ^{ab}	4.22 ^{ac}	4.76 ^{bc}
Animals owned (Tropical Livestock Units)	3.71 ^b	3.23 ^c	2.18 ^{bc}	5.54 ^b	4.69 ^c	3.26 ^{bc}	1.47 ^b	1.52 ^c	0.91 ^{bc}
Land owned (ha)	3.69 ^b	3.41 ^c	2.72 ^{bc}	3.65 ^{ab}	3.13 ^{ac}	2.25 ^{bc}	3.73	3.73	3.27
Access to financial resources									
Index of access to financial resources	1.19 ^b	1.23 ^c	0.77 ^{bc}	1.23 ^b	1.37 ^c	0.73 ^{bc}	1.14	1.07	0.82
Access to credit (% of hh olds)	68.7 ^b	65.2 ^c	44.0 ^{bc}	74.3 ^b	72.1 ^c	41.7 ^{bc}	61.7	57.1	46.8
Access to savings (%)	50.5 ^b	57.9 ^c	33.0 ^{bc}	49.1 ^b	64.6 ^c	31.1 ^{bc}	52.2	50.1	35.3
Currently holding savings	37.1 ^b	36.0 ^c	28.7 ^{bc}	55.1 ^b	47.7 ^c	37.2 ^{bc}	15.0	22.3	18.8

a,b,c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

5.3.2. Asset Ownership

Asset ownership has seen a moderate increase in the Niger area (see Table 12, second panel). This increase is seen in ownership of consumer durables and in productive assets but not livestock (which declined from ML to EL).

By contrast, asset ownership in the Burkina Faso area showed mixed results—after a decline between BL and ML due to drops in ownership of farming implements and land it recovered

somewhat by the EL with improvements in both consumer durables and productive assets but declines in livestock and land owned.

In Zinder, respondents underline the importance of economic independence of women engaged in IGA practices, which led to increased retail locations, lower prices for products, the installation of competition and especially women's access to the market to sell their products. In addition to agriculture-related livelihoods and savings activities, RISE also supported training in technical vocational areas, such as plumbing, metalwork, sewing and appliance repair. Masons were trained to construct latrines as part of the sanitation initiative.

5.3.3. Access to Financial Resources

There was a decline in access to financial resources in the RISE Initiative area over the life of the initiative, including both access to credit and access to savings (see Table 12, third panel). There was also a decline in the percent of households currently holding savings. Note, however, that these changes were only statistically significant in the Burkina Faso sub-sample of households. In the Burkina Faso area, the largest reduction can be seen in the percent of households with access to credit, which fell from 74.3 at BL to 41.7 at EL, a full 33 percentage-point drop.

This overall decline of access to savings and credit in the initiative area may be explained partly by the interruption of savings groups and credit services during the COVID-19 pandemic. The Niger qualitative data collection revealed that while women's savings groups are important and would be expected to help members weather the storm of a new shock like COVID-19, most respondents that mentioned them said that they were not functioning actively due to restrictions on commercial activities and an inability of women to continue their regular payments. Even mutual support was reduced according to some, and a Zinder respondent said that whereas before the pandemic a single trader or large farmer could take care of 2 to 3 vulnerable households over several months. Now it was impossible for them to do so.

The same challenges were seen in Burkina Faso. For example, an Est respondent said that while individuals were lending to others before the pandemic, everyone had been affected by the consequences of COVID-19 so no one was able help others. In another Est community, access to financial services was reduced because the credit union was closed at the beginning of the pandemic. Sahel respondents said that credit was unavailable from a micro finance service because the agents were not working, and while one MECAP⁴⁹ microfinance office was still operating, it had a reduced budget.

⁴⁹ Microcredit institution in Burkina Faso. See: <https://www.entwicklung.at/en/projects/detail-en/refinanzierung-der-mikrofinanzinstitutionen-mecap-in-burkina-faso-zusatzfinanzierung>

Putting aside the overriding impact of COVID-19 in 2020, the RISE village saving approach was well-executed in at least some villages in Niger, and respondents from 7 of the 12 villages mentioned savings activities. While there may be variations among the various RISE partners, there was a common approach of saving among members, and obtaining access to savings after a fixed time period (see quote, right).

A respondent from Zinder explained: “We set up a cash fund for women. This fund mobilizes 15 women who will make a payment twice a month. After 2 to 3 months the fund is opened [for members to access], the proceeds are distributed among the members and each invested its share in an IGA or buy an animal to raise.”

The impact of these savings activities was illustrated by Maradi respondents who stated that they have seen an empowerment of women, who manage their income-generating activities better, and contribute to household expenses, allowing them to pay children's school fees “without too much stress.” More than just providing additional income, respondents emphasized the importance of the economic independence of women gained from practicing IGAs. The savings groups generally benefit women, and a Maradi respondent clarified that: while savings groups were exclusive to women, they also help their husbands in household management. For some RISE activities, men’s savings groups also are formed, as confirmed by a respondent in Zinder.

In Burkina Faso, the finance and credit approach of RISE was not readily apparent based on the qualitative interviews. There was no discussion in any savings group interventions such as village savings and loan associations. What was present was some kind of credit activity in three villages of Est and Sahel, such as “establishment of institutions of microcredit” or credit provided directly by an initiative, and it was not stipulated if this was due to RISE.

5.4. Access to Markets, Services, Infrastructure, and Communal Natural Resources

Access to markets, infrastructure, services, and communal natural resources are all important aspects of transformative capacity.

5.4.1. Access to Markets

Access to markets is measured using an indicator of access to three types of markets: livestock, agricultural products, and agricultural inputs. Market access saw a slight improvement from BL to ML in the Niger initiative area, but this did not continue between ML and EL as the overall change from BL to EL was not statistically significant (see Table 14). The rise between BL and ML was due to a considerable increase in access to markets for livestock and agricultural inputs. In the Burkina Faso area access to markets shows a statistically significant decline driven by declines in access to livestock and agricultural product markets between BL and ML and BL and EL.

Qualitative findings related to market access were strongly reflective of the way that COVID-19 caused an economic crisis, which is discussed in Chapter 4. The pandemic reduced access to producers and consumers of food, livestock, and agriculture inputs, through direct shutdowns, closure of borders, and increased costs of gasoline. Terrorism and insecurity in Burkina Faso and Tillabery also severely constrained these markets, and these factors likely explain much of the decline in Burkina Faso.

Table 14. Baseline-midline-endline comparison of market, infrastructure, services and resources indicators, by initiative area

Indicator	All			Burkina Faso			Niger		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Markets									
Livestock	51.6 ^a	73.0 ^{ac}	46.9 ^c	59.6 ^{ab}	65.0 ^b	24.8 ^a	42.0 ^{ab}	82.3 ^a	72.8 ^b
Agricultural products	61.6	54.4	45.7	65.1 ^{ab}	55.2 ^b	38.7 ^a	57.5	53.5	53.9
Agricultural inputs	44.9 ^a	60.3 ^a	49.5	55.6	47.6	39.0	31.9 ^{ab}	75.0 ^a	61.8 ^b
Index of access to markets	1.58	1.88 ^c	1.42 ^c	1.80 ^{ab}	1.68 ^b	1.02 ^a	1.31 ^a	2.11 ^a	1.89
Infrastructure									
Piped water is a main source of drinking water	18.2 ^b	26.9	43.2 ^b	18.2 ^b	22.0	39.7 ^b	18.3 ^b	32.6	47.3 ^b
Electricity used by >50% of hhs	7.5	5.4	9.0	9.4	4.4	6.4	5.1	6.6	12.0
Phone access	78.5	72.6	74.1	79.0	81.8	80.3	78.0	61.9	66.9
Paved road	22.2	17.9	25.1	17.8 ^b	22.1	35.5 ^b	27.5 ^{ab}	13.0 ^a	12.9 ^b
Index of access to infrastructure	1.27	1.23 ^c	1.51 ^c	1.25	1.30	1.62	1.29	1.14	1.39
Services									
Primary school within 5 km	98.7	99.5	99.2	100.0	99.0	100.0	97.2	100.0	98.2
Health center within 5 km	71.2	79.6	71.5	65.7	69.5	65.3	78.0	91.4	78.6
Veterinary services within 5 km	25.9	26.1	29.2	23.5	30.1	29.0	28.9	21.3	29.4
Agricultural extension available	54.2	54.5	42.2	69.3	60.1	57.3	35.4	47.9	24.5
Credit institutions	51.8	57.3 ^c	41.1 ^c	61.8 ^b	67.9 ^c	37.5 ^{bc}	39.5	44.8	45.4
Savings institutions	46.1	56.0 ^c	32.3 ^c	46.4	64.6 ^c	29.7 ^c	45.8	45.8	35.3
Security services are available	55.5	70.4	56.5	55.1	70.7	62.7	56.0	69.9	49.2
Index of access to basic services	4.05	4.43 ^c	3.72 ^c	4.24	4.62 ^c	3.82 ^c	3.81	4.21 ^c	3.61 ^c
Communal natural resources									
Village has communal grazing areas	63.9 ^b	59.2 ^c	80.9 ^{bc}	41.7 ^b	40.1 ^c	73.6 ^{bc}	91.5	81.2	89.5
Village has communal water sources for livestock	58.4	69.2	65.4	61.0	66.4	60.1	55.1	72.5	71.7
Firewood can be obtained from communal land	69.9 ^a	50.0 ^{bc}	68.0 ^c	77.2	65.4	71.2	60.8 ^a	31.6 ^{bc}	64.2 ^c
Index of access to communal natural resources	1.93	1.79 ^c	2.14 ^c	1.79	1.73	2.05	2.10	1.87	2.25

a,b,c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

5.4.2. Access to Infrastructure

Access to infrastructure is measured using an indicator of access to piped water, electricity, phone services, and paved roads. While there was no significant change in the index of access in either initiative area, there were some important changes in the underlying measures. There were statistically significant improvements from BL to EL in the use of piped water as the main source of drinking water in both initiative areas (see Table 14). RISE had some provision for water and sanitation improvement in selected villages, which would have contributed to this measured improvement. On the other hand, while access to paved roads declined considerably in the Niger area, it improved in the Burkina Faso area.

5.4.3. Access to Basic Services and Local Governance

Access to basic services is measured using data on access to schools, health centers, veterinary services, agricultural extension services, credit institutions, savings institutions, and security services. There was a statistically significant decline in access to these services in both initiative areas since the midline (see Table 14). In Burkina Faso, this was the result of a large, statistically significant decline in access to credit institutions (from 68 to 37.5 percent of households) and savings institutions (from 64.6 to 29.7 percent of households) between ML and EL. On the other hand, in Niger the change in the overall index is not reflected in statistically significant changes in access to any individual service.

The qualitative findings on local governance provide additional insights into households' access to basic services in the RISE area as well as other capacities, such linking social capital. They are broken down in terms of the following components:

- Local institutional capacity-building,
- community consultation,
- community communication to government departments,
- receipt and handling input by various government officials,
- response by government

Local institutional capacity-building: RISE has made good headway working with Village Development Committees (VDCs) and associated institutions, and perhaps the most positive result has been women's empowerment through their associations and more equitable practices to take part in community affairs, according to multiple testimonies. These formal institutions build on bonding social capital and represent an incremental step towards more structured governance. In Burkina Faso, VDCs were mentioned as being part of the normal functioning and shock responses of communities, but respondents did not specifically state that they noted a change in their functioning because of RISE. However, a careful analysis of the findings from 18 villages showed that several communities stood out in terms of the clear and detailed analysis of the respondents, and their ability to work with authorities. These included 3 RISE communities from Centre-Nord, and 1 non-RISE community in Est where other NGOs had worked with community associations and officials. This is strongly suggestive of a positive impact of these types of initiatives on local governance capacity-building, and that the RISE approach (exemplified in Centre North) had been effective.

In Niger, VDCs do exist in some communities, though they are often not active and they were not mentioned by respondents. *Village watch committees* were more commonly mentioned in Niger, called "*Comitin Hanguen Nesa*"⁵⁰ (committee for preparation for crises). They identify problems and share information to the authorities through the village chief or the town hall. Several respondents explained how RISE had supported capacity-building of these committees (see quote, left). This same respondent added that the *Comitin Hanguen Nesa* was not able to

⁵⁰ Presumably this would be the SCAP-RU committee, but this was not confirmed by the ET.

adequately respond to shocks on its own, but it did transmit needs to authorities. Only one Niger village mentioned the name of the SCAP-RU committee,⁵¹ which is the standard terminology that government and partners can easily recognize. Burkinabe villages didn't speak of these committees, instead referring to VDCs and the mechanisms of transmitting needs to authorities.

“The establishment of a village committee ‘Comitin Hanguen Nesa.’ This committee is composed of 5 members of the village... influential people from the village and who communicate well, that is to say who are used to doing community mobilization. The mission of this committee is to raise awareness about the problems facing the village, the issues of children's health, women's health, the shocks that can occur in the village...”

Respondents often expressed the function of their committees as being to pass on requests to authorities for help, as opposed to communities taking action in partnership with government. Still, a community in Zinder had informed the municipal government of insect crop damage and malfunctioning water wells, but when they received no response, the community gathered money and dealt with the problem on their own. Examples of other independent community work included

dam construction, raising funds for school, community storehouses (with the help of RISE), self-help protection efforts for relocating cattle for care, and self-defense groups. This does not represent an alternative to linking social capital, rather it can be seen as a basis for more effective advocacy based on a partnership approach.

Community consultation: The most common respondent explanation about community-government linkages was that communities convey a request to the VDC or the councilor (elected member of the municipal government), who then sends it to the town hall. Beyond this, however, some respondents (particularly those in RISE intervention communities) provided more details of the overall process, such as the process of consultation among community members, the communication channels, and how authorities receive and process input. These additional details reveal an increased sense of engagement and maturity in understanding the complexities of local governance.

The foundation of a bottom-up governance process is to promote equitable participation and consultation of various community members. There are positive signs that RISE has helped strengthen institutions, such as women's empowerment to take part in community affairs, according to multiple testimonies. One Est respondent spoke of initial meetings in focus groups, after which their concern is passed on to the Village Development Advisor who consults with the councilor, and ultimately the town hall. RISE intervention communities showed signs of the inclusion of women and men in community consultations; Centre-Nord and Maradi respondents stated that first the women's and men's associations discuss issues, then they are

⁵¹ SCAP-RU stands for *Système Communautaire d'Alerte Précoce et de Réponse aux Urgences* (Community Early Warning System for Disaster Response)

discussed in community meetings, and then presented to councilors and institutions (see quote below).

A respondent in Maradi stated: “...we note the [importance of] “hadinguwa”: doing it together, the participation of the actors in community meetings—participating and expressing points of view... The expressions of our needs are made through village structures put in place. That is what we call the planning (“prevision”) committee... we can make requests such as: the assistance of the municipal representative for the fight against caterpillars, a building of a school and health box, installation of a drinking water addition. What is written is put in an envelope that we deposited at the level of the town hall of ... which is in charge of monitoring the process of the letter. We gather in village assembly where the people share their concerns, and the committee takes note of the points made by participants.”

Several non-RISE communities reported the exclusion of women. As a woman respondent in Est (non-intervention) said: “The men gather in meetings, then they pass on our concern to the VDC who consults with the councilor and then they pass it on to the town hall” (see quote, left).

Community communication to government departments: Respondents generally mention several actors that are part of the community and can be intermediaries for them, mainly councilors and VDCs, who then contact the town hall of the municipality. The subject matter of what is communicated was not explored in depth—it was often expressed as being “needs” or requests/demands, and it will often be information about shocks or stresses that are affecting the communities. A Sahel respondent provided an example of how their representatives shared difficulties related to financial support and support for agriculture and livestock. The way to formulate messages and inputs to authorities is worth considering in greater detail, as it may

A woman respondent in an Est, non-RISE intervention community stated: “Women do not have a grouping and are not listened to. Only men hold meetings with local elected officials.”

imply appropriate indicators for the RISE Initiative to monitor. A respondent from Zinder outlined how the *Comitin Hanguen Nesa*, composed of 5 village members raised awareness about shocks and issues of children's and women's health, women's health, and call on the town hall or implementing partner for assistance.

Receipt and handling of community inputs by various government officials: There seems to be relatively little knowledge of government processes, as most respondents spoke only of communicating needs to the mayor or “town hall.” This may be partly because government services in general are not always very visible at the village level, aside from a few isolated examples such as a vaccination campaign mentioned by Niger respondents. It seems crucial for communities to be able to visualize decision-making processes within local government, and know how to garner support from the various officials at local and higher levels. Several respondents were able to pinpoint specific actors, such as “social action” [committee]. Another respondent in Est highlighted that the *prefect* is a key point of coordination of development

initiatives. Other line ministry officials may become involved on a given issue, such as agricultural extension workers, and despite the importance of reaching these officials this was only mentioned by one respondent.

Coordination with support agencies: Closely related to the above point, communities should understand something about the workings of development assistance agencies, and how they work with government departments. This was a subject about which community members had little to say, even in response to a specific question about it. One view in Sahel (intervention community) was that: “The community communicates its needs through the town hall and it in turn makes a report which it sends to NGOs and government.” Several respondents simply said that they didn’t know how agencies coordinate their activities, but they coordinate generally with the town hall. There was only one comment about the government health representatives being part of that coordination. Throughout the Burkina Faso and Niger survey communities, there tended to be a limited memory among community leaders about which NGOs were doing what, and this could be interpreted as a sign of weak partnerships.

Response by government: To the extent that government response to community needs depends on decisions in ministries and at communal or higher levels of government, it may be more difficult for NGOs to have significant influence, but it is helpful to learn from RISE I so as to inform ways for RISE II (along with USAID and possibly other partners) to work with government to strengthen government responsiveness. A key result of the community-government linkage should be that there is some kind of answer to community requests or communications, and ideally that it addresses their concerns at least to some extent (whether through government support or international assistance). On the first issue, Burkinabe respondents often received delayed responses or no responses at all, even after meeting with town hall representatives. On the other hand, several Centre-Nord respondents said that they do often receive funds, equipment, and support through awareness-raising and accompaniment. One women’s group leader (Centre-Nord, VIM) said that because their association was recognized, the government supported them with seeds and often also with fertilizers.

As stated above, these types of statements by RISE participants illustrate a positive impact in terms of a more nuanced and constructive approach to working with the government.

In Niger, government responses to shocks and community petitions were seen as often not being adequate, though a number of respondents did comment that *at times the government* was effective and helped meet their needs. There is a sense that the mechanisms for community engagement with the government are being put in place, but the response is still lacking. Respondents also

A respondent from Centre-Nord also provided a realistic statement of their expectations:

“...often the town hall does not respond favorably, since it is also limited in capacity...”

When, it is an urgent problem like ... the displaced... the town hall is trying to see how it can help us set up our people so that the government's help will follow. After that, when there is flooding it allows us to shelter affected households in the school. It's doing what it can.”

stated that often it is only development organizations that help them, but a Maradi respondent said that neither government nor NGOs helped them respond to shocks.

One of the obvious challenges is that assistance initiatives usually don't reach all neighboring villages or everyone in a given village, so questions arise about targeting. In a Zinder village, respondents didn't know why nearby villages had benefited from a government seed assistance initiative in response to insect infestation, while leaving out their own. There may be a lack of transparency in the criteria used in choosing beneficiaries of NGO initiatives or government social safety nets, and some respondents felt that they should be more involved in deciding on beneficiaries and types of assistance. The way that assistance initiative staff enter the community and consult with the community is important, and a respondent in Maradi spoke positively about one example of transparency and participation of the community in initiative planning.

5.4.4. Access to Communal Natural Resources

Access to communal natural resources (CNR) is measured at the village level based on access to communal grazing areas, communal water sources for livestock, and firewood from communal land. There has been no change in the overall index of access to CNR in either initiative area (see Table 14). However, within the components of this index, there was a large and statistically significant improvement in the percentage of villages that have access to communal grazing areas (an improvement of 84 percent from ML to EL) in the Burkina Faso area. At ML it was noted that access to firewood from communal lands had declined in the Niger initiative areas. However, that trend reversed between ML and EL, resulting in no statistically significant decline from BL in the Niger initiative area (in fact there was a slight, if non-significant, improvement over BL).

In qualitative interviews, respondents spoke of several changes in land conservation and management and tree planting, due to RISE. Numerous respondents in Niger mentioned "ANR" (Assisted Natural Regeneration) as a method they had learned, and a respondent in Zinder stated: "Every person in this village knows how to do the ANR and you can also show this to your neighbor..." This approach was apparently being used in Maradi RISE communities with a WFP activity, so positive impacts may be attributed to several RISE activities. Several respondents in Niger spoke of tree nurseries, planting moringa and tree plantation species like guava, lemon, and mango. In Burkina Faso, several villages were engaged in tree planting, and in Sahel this was specifically linked to RISE work (REGIS-ER and REGIS-AG) in livestock development, reforestation and community peace.

The quantitative data shows that most villages in Niger have communal grazing land (90 percent at endline), and in Burkina Faso there has been a marked increase in access (from 41.7 percent at baseline to 73.6 percent at endline (see Table 14). The qualitative survey did not have specific questions related to this (and numerous other detailed issues), but the issue was raised when discussing shocks, resilience, and the effects of RISE and other initiatives. Conflict between farmers and herders was mentioned in five communities in Burkina Faso, mostly in Est and Sahel. Respondents say that all members of these communities are affected by the tension

produced by these conflicts, but the conflicts are not permanent. A respondent in one of these villages discussed how the community had reflected on the problem and formed a common vision and strategy which included planning access to certain areas of land, and taking into account the needs of different age groups. Two communities had resolved this problem in this way, and both were control communities in Sahel. Reviewing the list of NGO interventions in those two villages in Sahel, from the information available it wasn't possible to identify an initiative or organization that had specifically supported this type of work. It could be fruitful to investigate further these experiences of communal land and conflict management.

5.5. Human Capital and Access to Information

Human capital, measured here using literacy, formal education levels, and training received, endows people with the ability to use information and other resources to cope with shocks and stressors. Exposure to information allows people to apply such human capital.

In both initiative areas, there were statistically significant improvements in human capital over the life of the initiative—from BL and ML to EL (see Table 15). While the mean number of different types of trainings received by adult household members declined in the Burkina Faso area between BL and ML, there was a recovery between ML and EL. There was also an increase in the number of households with a literate adult and with primary or higher education between ML and EL.

The Niger area saw a significant increase in the mean number of trainings as well as the number of households with a literate adult and with primary or higher education, with particular large increases between ML and EL. Some RISE activities do include adult literacy initiatives, and these likely contributed to the positive results in increased literacy.

Another possible explanation for both the increased number of literate adults and those with formal education in households in both Niger and Burkina Faso could be the impact of conflict and COVID-19. Conflict caused displacement of households from some villages that were later absorbed by other households. A higher proportion of these members that were absorbed could be literate or have formal education. In addition, because of containment policies put in place in response to COVID-19, literate and highly educated adults that were working in urban areas or in markets returned to their home villages. Both of these factors could have led to the increase in human capital.

Table 15. Baseline-midline-endline comparison of human capital and access to information, by initiative area

Indicator	All			Burkina Faso			Niger		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Percent of households with a literate adult	33.2 ^b	32.7 ^c	55.9 ^{bc}	32.9 ^b	35.7 ^c	54.0 ^{bc}	33.7 ^b	29.1 ^c	58.1 ^{bc}
Percent of households with an adult having primary or higher education	29.2 ^b	32.9 ^c	46.0 ^{bc}	25.5 ^b	29.7 ^c	43.8 ^{bc}	34.3 ^b	36.7 ^c	48.6 ^{bc}
Number of different types of trainings received by adult household members	0.24 ^b	0.18 ^c	0.37 ^{bc}	0.26 ^a	0.15 ^{ac}	0.32 ^c	0.21 ^b	0.20 ^c	0.43 ^{bc}
Index of human capital	27.2 ^b	27.8 ^c	41.7 ^{bc}	25.9 ^b	27.6 ^c	39.9 ^{bc}	28.9 ^b	28.0 ^c	43.8 ^{bc}
Index of exposure to information	3.46 ^a	2.76 ^a	3.06	3.43 ^b	2.87	2.66 ^b	3.50 ^a	2.64 ^{ac}	3.54 ^c

a,b,c. Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

Exposure to information saw an initial decline in the Niger area, with the index falling by around 25 percent between BL and ML. However, the index recovered in Niger between ML and EL. On the other hand, there was a decline in exposure to information over the life of the initiative in the Burkina Faso area.

The quantitative data indicate that participation in training had increased by the endline survey in the RISE I area, and this was reinforced by qualitative respondents who generally spoke of receiving RISE training in resilience, livelihood and agriculture, health and nutrition. Burkinabe respondents often referred to a chain of learning, extending from those who receive training directly, to other community members and other villages in several cases. This was echoed in Niger, and particularly well exemplified with the Farmer Field Schools. A respondent appreciated that the RISE Initiative had provided them with documentation to be able to train other women and encourage them in new practices, and the format helped them answer common questions.

5.6. Access to Formal and Informal Safety Nets

Safety nets, both formal and informal, are important capacities for coping in the aftermath of shocks. While there had been no statistically significant change in the measures of access to safety nets between the BL and ML, this had changed by the EL (see Table 16). There was a large and statistically significant decline in the index of availability of formal safety nets in Niger, with the value at EL being lower than that at either BL or ML. This was due to a dramatic decline in the percentage of households receiving food assistance (from 55 percent at BL to 36 percent at ML and only 9 percent at EL). This pattern is a concern given the numerous shocks experienced by households between the ML and EL (drought, flooding, COVID-19, conflict, pests in Niger)—the need for a food or cash transfer was as serious as ever. At the height of the first wave of COVID-19, external assistance initiatives (including RISE) were mostly shut down, and while government food subsidy initiatives were operating these were on a limited scale (see Chapter 4). The consequences of this lack of formal social safety net support are that many households were left on their own to cope with the worsening risk environment which led to higher food insecurity, pursuit of negative coping strategies, and reduction in livestock and land assets.

Table 16. Baseline-midline-endline comparison of formal and informal safety net indicators, by initiative area

Indicator	All			Burkina Faso			Niger		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Formal safety nets (percent of households)									
Food assistance	51.4 ^b	41.9 ^c	21.4 ^{bc}	48.2	47.2	31.8	55.3 ^{ab}	35.6 ^{ac}	9.2 ^{bc}
Housing and other non-food assistance	17.9	24.5	14.3	16.8	35.7	22.8	19.3	11.4	4.4
Assistance in the case of livestock losses	13.1	10.1	17.1	6.6 ^b	6.8 ^c	26.7 ^{bc}	21.1	14.0	5.9
Assistance in the case of a disaster (from government or an NGO)	14.8	8.7	12.5	6.5	5.6	6.4	25.0	12.5	19.7
Index of availability of formal safety nets	0.97	0.85	0.65	0.78	0.95	0.88	1.21 ^b	0.74 ^c	0.39 ^{bc}
Informal safety nets (community organisations)									
Credit or microfinance group	28.7 ^b	27.0	14.3 ^b	29.0	28.8	14.9	28.4	24.8	13.5
Savings group	29.7	32.4	25.1	19.6	28.6	18.7	42.2	36.9	32.6
Mutual help group	25.1 ^b	16.9 ^c	5.0 ^{bc}	33.2 ^b	24.0	6.8 ^b	15.1	8.4	3.0
Civic (improving community) group	9.0	11.6	16.3	7.6	16.9	19.7	10.8	5.4	12.2
Charitable group	5.7	5.3	11.0	5.7	6.0	13.6	5.8	4.5	7.9
Religious group	29.8	41.5	25.3	43.4 ^a	70.3 ^{bc}	30.7 ^c	13.0	7.7	19.1
Women's group	73.3	79.8	75.3	78.0	85.2	80.4	67.5	73.5	69.3
Index of availability of informal safety nets	2.01	2.15 ^c	1.72 ^c	2.16	2.60 ^c	1.85 ^c	1.83	1.61	1.58

a,b,c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

In terms of informal safety nets, even though there was no significant change in the overall index in the Niger initiative area there were some important changes in Burkina Faso, which arose from changes in two of the index components. In particular, communities indicated a significant decline in the presence of two types of community organizations—mutual help groups and religious groups. There had been an increase in the presence of religious groups from BL to ML, but this had declined again by the EL. Over the life of the initiative, the percentage of households in communities with a mutual help group had declined from 33 percent at BL to 7 percent at EL (see Table 16). The significance of COVID-19 in this regard should not be understated: savings associations in Niger were mostly not operating as a result, and other mutual support arrangements were reduced as all became constrained in their ability to help others.

5.7. Disaster Risk Reduction

There has also been no change in the index of disaster preparedness and mitigation or in any of the components of the index in either initiative area (see Table 5.7). On the other hand, there has been a decline in the percentage of households with hazard insurance in the Burkina Faso and Niger initiative areas. No change was found in the percentage of households living in a village with an institution providing conflict mitigation. Given the changing risk environment, disaster risk reduction activities should have been expanded over time.

Table 17. Baseline-midline-endline comparison of disaster risk reduction indicators, by initiative area

Indicator	All			Burkina Faso			Niger		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Disaster preparedness and mitigation (percent of households)									
Availability of a government disaster planning or response	15.1	7.0	6.3	10.0	7.3	2.6	21.3	6.6	10.7
Availability of an NGO disaster planning or response	16.6	11.1	18.5	9.4	10.2	14.4	25.6	12.2	23.2
Availability of a disaster planning group	14.9	9.2	17.9	0.5	5.3	7.2	32.6	13.9	30.4
Emergency plan for livestock offtake if a drought hits	21.9	23.7	22.0	21.4	27.0	21.4	22.6	19.7	22.7
Index of disaster preparedness and mitigation	0.68	0.51	0.65	0.41	0.50	0.46	1.02	0.52	0.87
Availability of hazard insurance (%)	46.2 ^{ab}	27.4 ^a	21.1 ^b	40.6 ^a	19.4 ^a	27.3	53.2 ^b	36.9	13.8 ^b
Availability of an institution providing conflict mitigation (%)	55.4	42.1	47.6	62.5	56.3	67.8	46.6	25.4	24.0
a,b,c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.									

Qualitative findings provide a somewhat contrasting view, as discussed in previous sections on local governance. Almost all villages had some kind of disaster response procedure, including the ability to seek assistance from government and external agencies, and there were village watch committees (*Comitin Hanguen Nesa*) operating in some communities in Niger, and VDCs in Burkina Faso. The degree to which there would be a positive response was varied, and there was limited assistance especially in response to the economic crisis caused by COVID-19—and this inadequacy may have been foremost in the minds of respondents to the quantitative endline survey.

It is possible that the impact of shocks could have been attenuated if there was more consistent implementation of some of the stated RISE interventions related to disaster preparedness, such as early warning systems support, village development committees, and conflict management. There was no mention of some of the other stated RISE interventions, such as community resilience plan development and local conventions for land use planning (though several non-RISE communities specifically mentioned having done this).

5.8. Absorptive, Adaptive, and Transformative Capacity

Table 18 compares baseline, midline and endline values of the indexes of absorptive, adaptive, and transformative capacity as well as the overall index of resilience capacity. There is no significant difference in the mean of the overall index over time. Figure 14 compares its distribution at baseline, midline and endline for the RISE I population as a whole. While the BL and ML distributions are very similar, there is a slight flattening and widening of the distribution between ML and EL and, perhaps, some additional density on the right-hand shoulder of the distribution—a slight positive change.

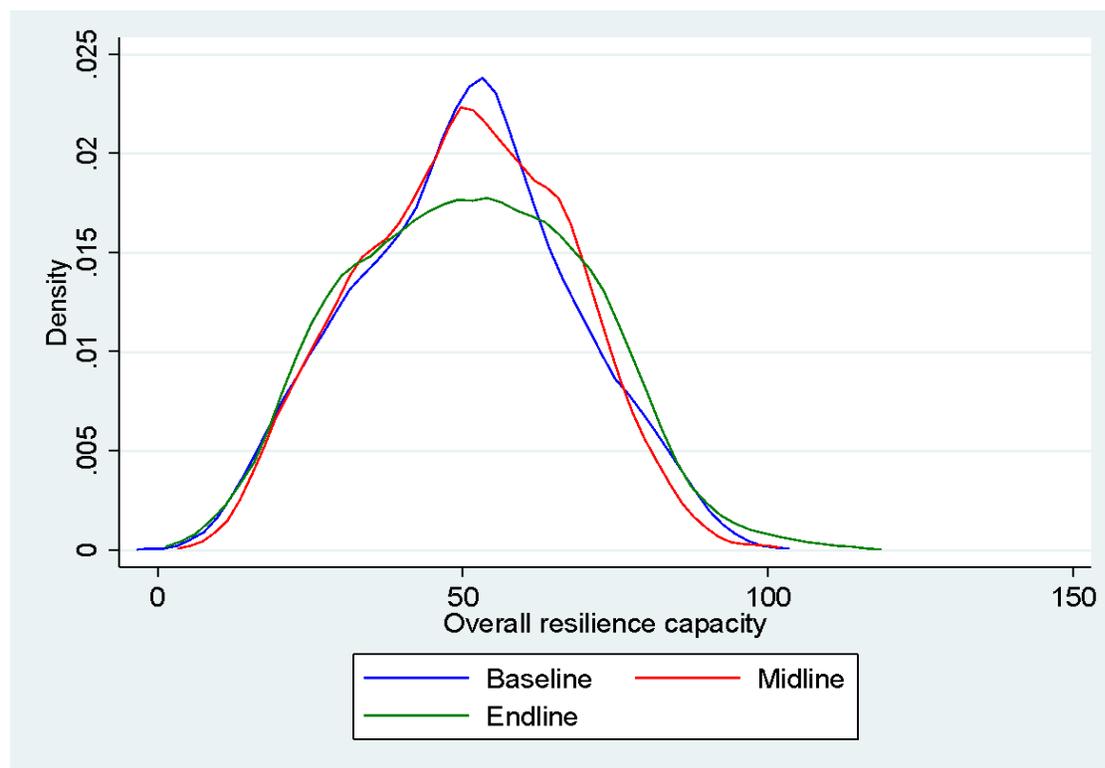
Table 18. Baseline-midline-endline comparison of resilience capacity indicators, by initiative area

Indicator	All			Burkina Faso			Niger		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Indexes of resilience capacity									
Absorptive capacity	46.2 ^b	43.6	41.3 ^b	48.7 ^b	47.2	43.9 ^b	43.0	39.4	38.2
Adaptive capacity	50.4 ^b	50.0 ^c	55.3 ^{bc}	55.8	53.0	56.3	43.7 ^b	46.3 ^c	54.1 ^{bc}
Transformative capacity	47.1	49.2 ^c	45.0 ^c	50.8	52.0	47.7	42.6	45.8	41.8
Overall resilience capacity	52.2	51.9	53.5	57.0	55.3	55.4	46.3	47.9	51.3

a,b,c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

Looking at the three indexes that make up the overall index, some differential changes by initiative area are apparent. There has been a 10 percent decline in the absorptive capacity index in Burkina Faso from BL to EL. The decline in absorptive capacity is itself rooted in drops in bonding social capital, access to financial resources, the presence of household savings, availability of informal safety nets, and the availability of hazard insurance. These declines indicate that households are losing their ability to absorb shocks which is a disconcerting pattern. The Niger area saw a 24 percent increase in adaptive capacity from BL to EL. Although this appears to be a positive outcome, when we look at the changes in livelihood diversity and improvements in human capital, the possible explanation for these changes is more nuanced and indicates that the situation is actually deteriorating.

Figure 14. Distribution index of overall resilience capacity, baseline versus midline and endline



5.9. Differences in the Resilience Capacities of the Poor and Non-Poor

Trends for the poor and non-poor are summarized in Table 19. As would be expected, the resilience capacity of the non-poor is higher than the poor with few exceptions.

Table 19. Indicators of resilience capacity at baseline, midline and endline, by poverty status

Indicator	All			Non-Poor			Poor		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Social capital									
Bonding social capital	71.3	75.3	71.0	75.9	75.8	72.0	68.6 ^a	74.9 ^a	70.3
Bridging social capital	52.6 ^b	55.9 ^c	62.0 ^{bc}	54.2 ^b	52.8 ^c	62.3 ^{bc}	51.6 ^{ab}	57.8 ^a	61.7 ^b
Linking social capital	47.1	45.2	47.5	52.1	47.9	51.8	44.3	43.5	44.1
Aspirations and confidence to adapt	39.2 ^b	40.2	42.6 ^b	43.5	41.9 ^c	45.6 ^c	36.7 ^b	39.1	40.2 ^b
Livelihood diversity	2.6 ^b	2.6 ^c	3.7 ^{bc}	2.6 ^b	2.6 ^c	3.8 ^{bc}	2.6 ^b	2.6 ^c	3.6 ^{bc}
Asset ownership									
Index of consumer durables owned	7.8 ^{ab}	8.4 ^{ac}	9.0 ^{bc}	9.4 ^{ab}	9.9 ^{ac}	10.7 ^{bc}	6.9 ^{ab}	7.5 ^a	7.7 ^b
Index of farming implements owned	4.4 ^b	4.3 ^c	5.1 ^{bc}	4.7 ^b	4.6 ^c	5.7 ^{bc}	4.2 ^b	4.1 ^c	4.5 ^{bc}
Animals owned (Tropical Livestock Units)	3.7 ^b	3.2 ^c	2.2 ^{bc}	4.3 ^b	3.3 ^c	2.6 ^{bc}	3.4 ^b	3.2 ^c	1.9 ^{bc}
Land owned (ha)	3.7 ^b	3.4 ^c	2.7 ^{bc}	3.4	3.3	2.9	3.9 ^b	3.5 ^c	2.6 ^{bc}
Overall index of asset ownership	23.6 ^b	24.0 ^c	26.0 ^{bc}	26.6 ^b	26.6 ^c	30.1 ^{bc}	21.8	22.4	22.8
Access to financial resources									
Access to credit (% of hholds)	68.7 ^b	65.2 ^c	44.0 ^{bc}	77.2 ^b	73.9 ^c	51.7 ^{bc}	63.7 ^b	60.0 ^c	38.0 ^{bc}
Access to savings (%)	50.5 ^b	57.9 ^c	33.0 ^{bc}	57.0 ^b	69.7 ^c	38.9 ^{bc}	46.7 ^b	50.9 ^c	28.4 ^{bc}
Index of access to financial resources	1.2 ^b	1.2 ^c	0.8 ^{bc}	1.3 ^b	1.4 ^c	0.9 ^{bc}	1.1 ^b	1.1 ^c	0.7 ^{bc}
Currently holding savings	37.1 ^b	36.0 ^c	28.7 ^{bc}	48.8 ^b	52.4 ^c	36.1 ^{bc}	30.5 ^b	26.2	22.9 ^b
Access to markets, infrastructure, services and communal natural resources									
Index of access to markets	1.6 ^a	2.0 ^{ac}	1.5 ^c	1.7	2.0 ^c	1.4 ^c	1.5 ^a	1.9 ^{ac}	1.5 ^c
Access to infrastructure	1.3	1.2 ^c	1.5 ^c	1.4	1.4	1.6	1.2	1.1 ^c	1.4 ^c
Access to basic services	4.0	4.4 ^c	3.7 ^c	4.4	4.7 ^c	4.1 ^c	3.9	4.2 ^c	3.5 ^c
Access to communal natural resources	1.9	1.8 ^c	2.1 ^c	1.8	1.8	2.1	2.0	1.8 ^c	2.2 ^c
Human capital and access to information									
Human capital	27.2 ^b	27.8 ^c	41.7 ^{bc}	29.0 ^b	30.2 ^c	44.1 ^{bc}	26.1 ^b	26.4 ^c	39.7 ^{bc}
Exposure to information	3.5 ^a	2.8 ^a	3.1	3.4 ^a	2.8 ^a	3.3	3.5 ^{ab}	2.8 ^a	2.9 ^b
Safety nets									
Formal safety nets	1.0	0.9	0.7	0.9	1.0	0.8	1.0 ^b	0.8	0.5 ^b
Informal safety nets	2.0	2.1 ^c	1.7 ^c	2.2	2.6 ^c	2.0 ^c	1.9 ^b	1.9 ^c	1.5 ^{bc}
Index of disaster preparedness and mitigation	0.7	0.5	0.6	0.6	0.5	0.7	0.7	0.5	0.6
Hazard insurance (% of hholds)	46.2 ^{ab}	27.4 ^a	21.1 ^b	47.6 ^{ab}	22.3 ^a	24.9 ^b	45.5 ^b	30.5	18.1 ^b
Institution providing conflict mitigation (%)	55.4	42.1	47.6	61.4	49.3	51.8	51.9	37.8	44.4
Indexes of resilience capacity									
Absorptive capacity	46.2 ^b	43.6	41.3 ^b	50.6	48.7	46.5	43.6 ^b	40.5	37.1 ^b
Adaptive capacity	50.4 ^b	50.0 ^c	55.3 ^{bc}	56.0 ^b	54.3 ^c	61.4 ^{bc}	47.2	47.4	50.5
Transformative capacity	47.1	49.2 ^c	45.0 ^c	52.0	53.2	49.9	44.3	46.8 ^c	41.1 ^c
Overall resilience capacity	52.2	51.9	53.5	57.8	56.6	59.6	49.0	49.0	48.7

a,b,c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

With respect to trends, the increases in bridging social capital between the BL and EL seen for the sample as a whole can be seen for both the non-poor and the poor. Similarly, there were also significant improvements in aspirations as well as in livelihood diversity for both the non-poor and the poor. Again, the change in livelihood diversity has to be assessed with caution,

taking into account the fact that both the non-poor and the poor may be starting to pursue similar livelihood activities that have lower returns.

While there was no overall increase in the index of asset ownership for the poor, there was a slight increase for the non-poor. Underlying these figures are some important differences. Both the non-poor and poor experienced statistically significant improvements in the ownership of consumption and productive assets, though the magnitude of the changes were greater for the non-poor. More important were the magnitude of the relative declines in animals owned (39.5 percent for non-poor and 44.1 percent for the poor) and in land owned (14.7 percent for non-poor and 25 percent for the poor). These declines were large enough for the poor to offset any improvements in productive and consumption assets. Given that animals and access to land are the major assets of agro-pastoral people, the declines are noteworthy.

With respect to access to financial resources, both the non-poor and the poor experienced declines in access to credit and savings.

Changes in access to markets, infrastructure, services, and communal natural resources as well as human capital and access to information were similar for both groups. Also similar were the changes in indicators of access to disaster risk reduction. However, there was a notable disproportionate decline in access to formal safety nets among the poor compared to the non-poor during a period when such transfers were needed the most.

Overall, as for the different initiative areas, there was no change in the overall resilience capacity index throughout the period of RISE I for the non-poor or the poor. That being said, there were some differences in trends in the underlying indexes of the three dimensions of resilience capacity. The non-poor saw a significant improvement in adaptive capacity from BL to EL that the poor did not. Again, this was likely partly due to the pursuit of low return livelihood activities in response to shocks households were facing and the absorption of literate adults into households due to conflict displacement and COVID-19 containment policies. By contrast, the poor saw declines in absorptive and transformative capacity. This is important because it indicates that poor households are disproportionately losing their ability to absorb shocks and access to formal safety nets to cope with the deteriorating risk environment.

5.10. Summary: Resilience Capacities

There has been no improvement in overall resilience capacity in the RISE area since the baseline. A slight increase in adaptive capacity was accompanied by *declines* in both absorptive capacity and transformative capacity. The decline in absorptive capacity is due to erosion of households' holdings of savings, and in their access to informal safety nets and hazard insurance, despite improvements in bridging social capital. The decline in transformative capacity is linked to declines in access to markets and basic services.

The improvement in adaptive capacity in the RISE area is due to improvements in: aspirations and confidence to adapt, livelihood diversity, asset ownership, and human capital. It should be noted that the improvement in livelihood diversity is likely partially due to households' entering

into low-return economic activities in response to the worsening shock environment. Similarly, the improvements in human capital may be due to the absorption into households of more literate and educated adults associated with displacement from conflict and COVID-19 restrictions. Also of note is that there was a large decline in one important aspect of adaptive capacity: access to financial resources.

With respect to differences across the initiative areas, the Niger area fared better in maintaining households' resilience capacities. Niger households saw some improvement in their adaptive capacity, but no change in absorptive or transformative capacity. Conversely, Burkina Faso households saw a decline in absorptive capacity and no change in adaptive or transformative capacity. The reductions in access to markets and in access to financial services seen initiative-area-wide were only detected in the Burkina Faso area. Also of note is that the reductions in formal safety nets seen were only statistically significant in the Niger area.

With respect to differences between the non-poor and the poor, the non-poor had considerably higher resilience capacity throughout the RISE operational period and fared better in terms of maintaining household resilience capacities. Non-poor households as a group saw notable improvements in their adaptive capacity. The reductions seen in absorptive and transformative capacity initiative-area-wide only occurred for poor households. Further, only non-poor households saw an increase in asset ownership and only poor households saw a decline in access to formal safety nets.

As we've seen in Chapter 3, the risk environment got significantly worse over the course of the RISE Initiative, and food insecurity increased substantially (see Chapter 6). The analysis of this chapter shows that households'—especially poor households'—absorptive and transformative capacities eroded. A crucial adaptive capacity also declined: access to financial services. Given this deterioration, efforts should have been made to expand humanitarian support to households. Instead, there was no change in access to formal safety nets initiative-area-wide and a *reduction* among Niger households and poor households. The humanitarian/development nexus is a crucial part of resilience programming. Shock responsive safety nets are a critical component of resilience investments and they did not get the attention they deserved at the time they were needed.

6. HOUSEHOLD FOOD SECURITY AND RESILIENCE TO SHOCKS

As seen in Chapters 3 and 4, households were exposed to an extreme degree of shock over the course of the RISE Initiative's implementation, including climate shock, economic shock, conflict shock and a health-related shock. Chapter 3 also documented the shifts that have taken place over the 5-year period in households' coping strategies, and Chapter 5 in their resilience capacities. This chapter examines the changes that have taken place in households' food security and in the outcome of prime interest in this report: household resilience to shocks.

6.1. Household Food Security

6.1.1. Measurement of Food Security, Hunger, and Dietary Diversity

Food security. The measurement of the key indicator of food security used in this report is described in Chapter 2. To recap, it is the inverse of an experiential indicator of food insecurity, the Household Food Insecurity Access Scale (HFIAS).⁵² The HFIAS is an index constructed from the responses to nine questions regarding people's experiences of food insecurity in the previous 4 weeks. Responses range from worry about not having enough food to actual experiences of food deprivation associated with hunger. In this chapter, the inverse of the index is utilized so that the measure increases with increasing food security. The resulting food security index ranges from 0 to 27. The HFIAS can also be used to classify households into various food security groups.

Hunger. The "Household hunger scale", ranging from 0 to 6, is similar to the HFIAS but is only based on the three HFIAS questions pertaining to the most severe forms of food insecurity. The prevalence of hunger is calculated as the percentage of households whose scale value is greater than or equal to two, which represents "moderate to severe hunger."⁵³

Household Dietary diversity. The HFIAS combines information on the sufficiency of food consumption with information on the quality of households' diets, both of which are important dimensions of food security. A measure focused specifically on dietary quality is also employed here: a dietary diversity score calculated as the total number of food groups, out of 12, from which household members consumed food in the day prior to the survey.⁵⁴

6.1.2. Trends in Food Security

Table 20 documents the changes in food security that took place between the RISE baseline and endline surveys. As illustrated in Figure 15, both initiative areas experienced a steep decline in

⁵² Coates, Swindale and Bilinsky 2007

⁵³ Ballard, Coates, Swindale and Deitchler 2011

⁵⁴ Swindale and Bilinsky 2006

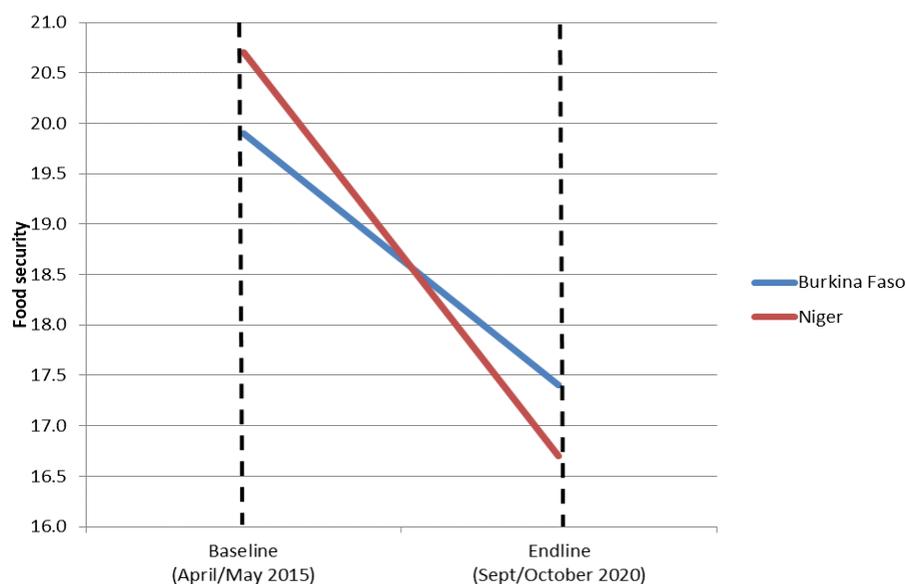
food security. The Niger area experienced a somewhat steeper decline, of 19.3 percent on the food security scale, versus 12.7 percent for the Burkina Faso area.

Table 20. Baseline-midline-endline comparisons of food security indicators, by initiative area

Indicator	All			Burkina Faso			Niger		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Access to food									
Household food security scale	20.2 ^{ab}	18.7 ^{ac}	17.1 ^{bc}	19.9 ^b	19.5 ^c	17.4 ^{bc}	20.7 ^{ab}	17.8 ^a	16.7 ^b
Food secure	23.1 ^{ab}	17.4 ^{ac}	9.8 ^{bc}	16.3 ^b	18.7 ^c	9.5 ^{bc}	31.5 ^{ab}	16.0 ^a	10.2 ^b
Mildly food insecure	11.0 ^b	11.0	7.9 ^b	14.0 ^b	13.6	10.0 ^b	7.4	8.0	5.4
Moderately food insecure	39.6	39.1	33.2	44.8	42.6	36.5	33.2	35.1	29.2
Severely food insecure	26.3 ^b	32.4 ^c	49.1 ^{bc}	24.9 ^b	25.1 ^c	44.0 ^{bc}	28.0 ^{ab}	40.9 ^{ac}	55.1 ^{bc}
Percent food insecure	76.9 ^{ab}	82.6 ^{ac}	90.2 ^{bc}	83.7 ^b	81.3 ^c	90.5 ^{bc}	68.5 ^{ab}	84.0 ^a	89.9 ^b
Percent moderately and severely food insecure	65.9 ^b	71.6 ^c	82.2 ^{bc}	69.7 ^b	67.7 ^c	80.5 ^{bc}	61.2 ^{ab}	76.1 ^{ac}	84.3 ^{bc}
Hunger									
Household hunger scale	0.5 ^b	0.5 ^c	1.0 ^{bc}	0.4 ^b	0.5 ^c	0.9 ^{bc}	0.5 ^b	0.5 ^c	1.0 ^{bc}
Percent households in hunger	13.0 ^b	13.5 ^c	28.7 ^{bc}	12.5 ^b	13.9 ^c	29.5 ^{bc}	13.6 ^b	12.9 ^c	27.7 ^{bc}
Dietary quality									
Dietary diversity score	5.1	5.1	5.4	6.1 ^a	5.4 ^a	5.7	3.9 ^{ab}	4.7 ^a	5.0 ^b

a,b,c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

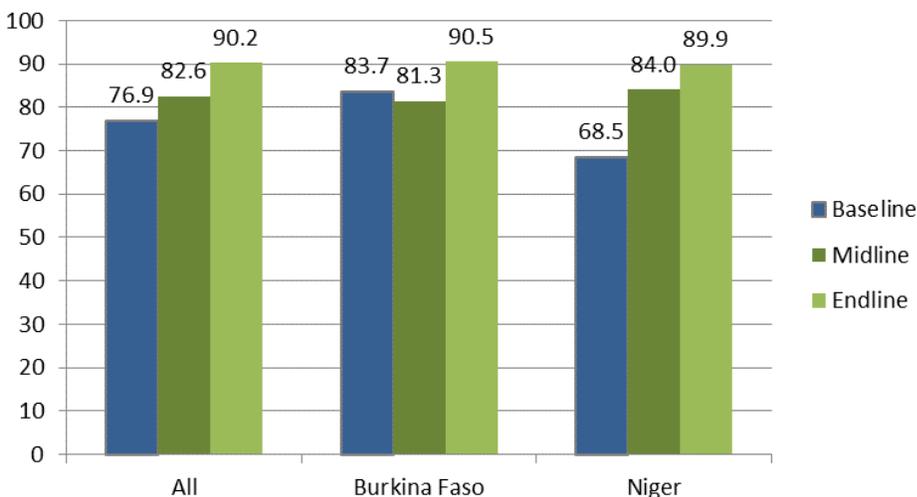
Figure 15. Trajectory of food security between the baseline and endline, by initiative area



The prevalence of food insecurity was already very high at baseline and, as can be seen in Figure 16, it had increased to extreme levels by the endline, with over 90 percent of households food insecure. These high and rising percentages are also reflected in the data on severe food

insecurity and on hunger. The prevalence of households in hunger more than doubled in both initiative areas, attesting to the stress households were under as shock exposure shot up over the RISE Initiative’s implementation period. Note that the prevalence of “moderately and severely” food insecure, a commonly used indicator, also increased substantially over the initiative period.

Figure 16. Percent of households that are food insecure, baseline versus midline versus endline for the initiative areas

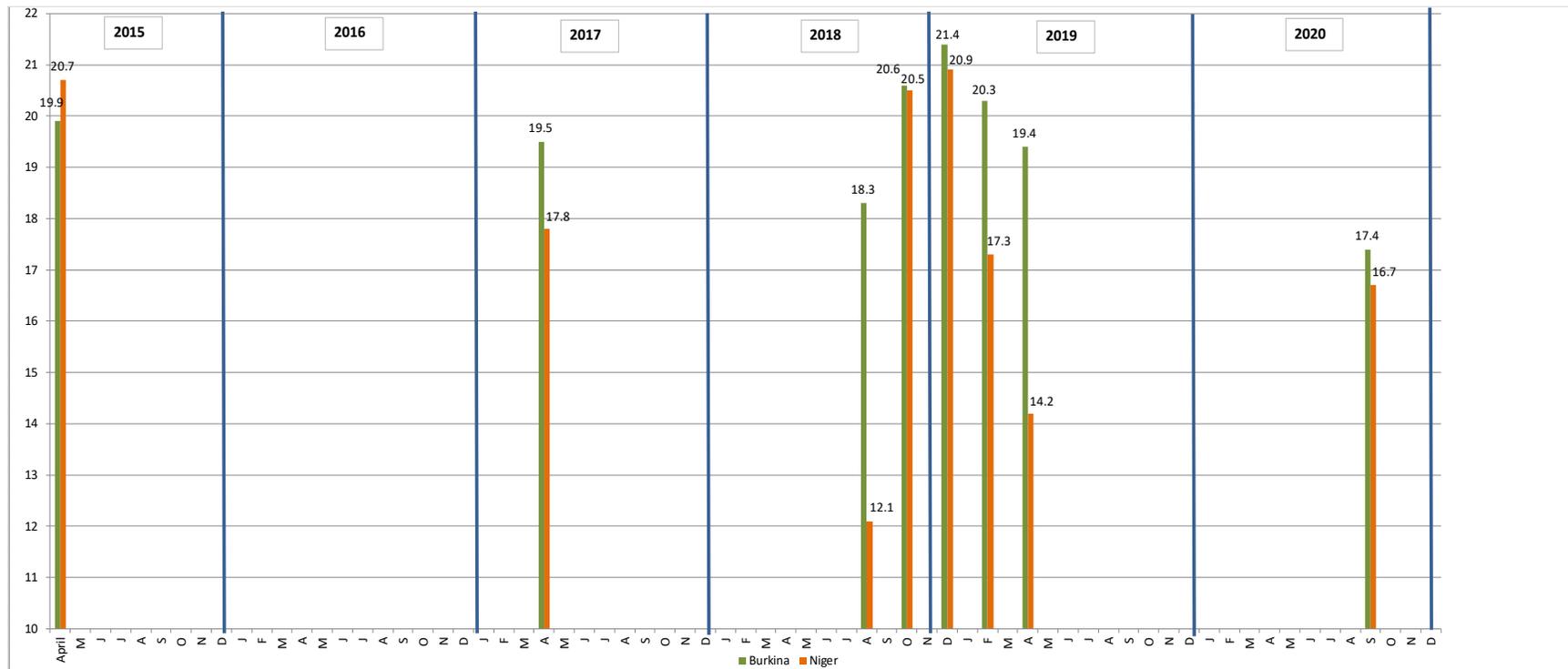


Dietary diversity declined slightly among Burkina Faso households but increased fairly strongly among Niger households. The food groups that saw increased consumption in Niger (in terms of percentages of households) were vegetables, dairy products, fats/oils, sugar/honey and “other foods”, such as condiments, alcoholic beverages, and coffee/tea. The consumption of fruits and legumes saw significant declines.

Figure 17 shows food security levels at various times over the initiative period, including that spanning the RMS data collection (August 2018–April 2019). These extra data points help to interpret the changes in food security in terms of the seasonal patterns of the normal agricultural cycle (depicted in Chapter 3, Figure 6). Bars for the Burkina Faso area are colored green; those for the Niger area are colored orange.

The baseline and midline data were collected in the period building up to the typical lean season (April/May). The endline data were collected in the early stages of harvest, and thus should be a better time of year in terms of food security. The RMS data bear this out, showing some of the highest levels of food security in September/October 2018. Thus, we would not expect such a large drop in food security by the endline survey based solely on the difference in its timing from the baseline and midline surveys. This drop is consistent with the sharp increase in households’ shock exposure.

Figure 17. Changes in food security between the baseline and endline with RMS data points, by initiative area



6.2. Resilience to Shocks

Which initiative area has been the most resilient? Did households' ability to recover from shocks improve over the RISE Initiative's operational period? As noted in Chapter 2, two indicators of resilience—one objective and one subjective—are employed to answer these questions and, in Chapter 9, determine whether the initiative's interventions strengthened resilience.

The **objective** indicator, termed “realized resilience,” is the change in food security between the midline and endline surveys, the period of focus for the impact evaluation due to the availability of panel data.⁵⁵ This indicator directly measures households' ability to recover, with ability indexed to a well-being outcome related to households' basic survival. It is complemented by a dichotomous variable indicating whether or not a household is “resilient” and the calculation of the percent of households resilient. The Conceptual Framework in Chapter 1, Figure 5 illustrates the various possible trajectories of food security over a shock period: “collapse”, “recover some” (both of which indicate that a household was not resilient), and “bounce back” and “better off than before” (which indicate resilience).

The **subjective** indicator of resilience is an index of households' perceived ability to recover from the shocks they experienced in the year prior to each survey. It is constructed based on households' reports of their ability to recover from each specific shock they were exposed to. The measurement of this indicator is detailed in Chapter 2, Section 2.2.

Table 21 reports on changes in food security between the midline and endline, with initial (midline) food security and shock exposure levels given to aid in interpretation of initiative area comparisons. The “unadjusted” values are calculated directly from the data. The “adjusted” values reflect true differences across the initiative areas, taking into account the fact that group mean *changes* in food security are highly dependent on their initial food security and must be corrected before valid comparisons can be made.⁵⁶

⁵⁵ Note that it was not possible to construct another important objective indicator of resilience, stability of food security, because panel data were not collected for all sample households at regular intervals.

⁵⁶ The higher is initial food security, the lower is the subsequent change in food security and vice-versa because a households' pre-shock food security value circumscribes the range of its realized resilience. For extreme examples, households starting out at a food security index value of 0 can only take on realized resilience values of 0 to 27; their food security cannot go down. Households starting out at the maximum value of 27, by contrast, can only take on realized resilience values of 0 to -27; their food security cannot go up. This inherent “regression to the mean” (RTM) (Trochim 2020; Dalliard 2017) is due to the bounds imposed on *changes* in food security by upper and lower bounds on the food security index. Much as human calorie consumption is bounded by human physiology, these bounds validly represent the finite phenomenon of food security. The significance of RTM for our analysis is twofold. First, initial food security must be controlled for in the evaluation of the impact of interventions on households' resilience, which is done in the IE analysis of Chapter 9. Second, when population groups have differing mean initial food security index values, simple comparison of realized resilience across these groups is not an accurate representation of differences in the true course of change in food security due to factors like shocks, resilience capacities, and initiative interventions. Valid group comparisons can be accomplished using Analysis of Covariance (ANCOVA) modelling (e.g., Barnett et al. 2005; Linden 2013) to correct for RTM. The groups that are compared in this analysis are those residing in the two project areas, Burkina Faso and Niger, and the poor and non-poor.

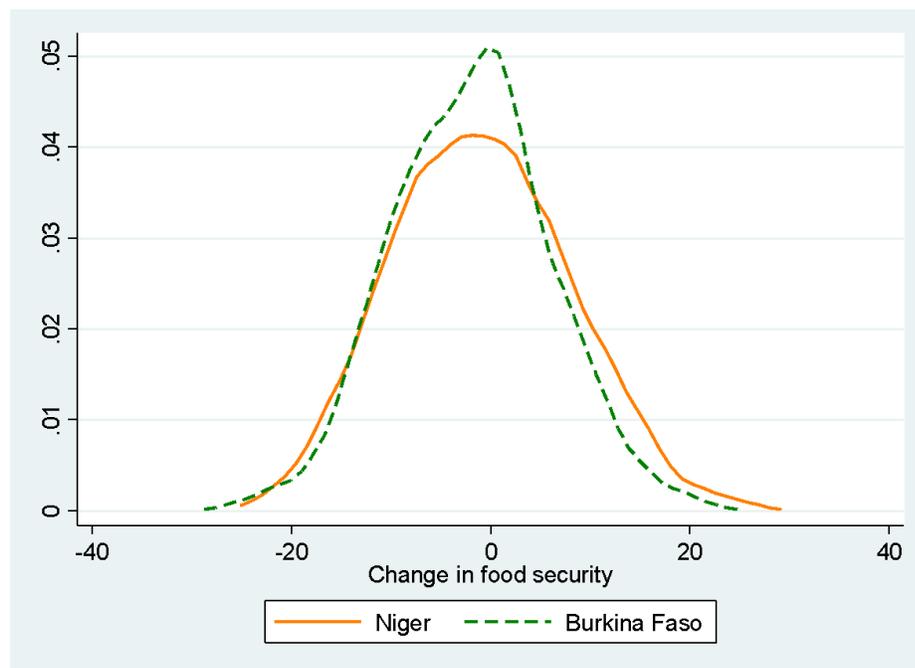
Table 21. Realized resilience: Changes in food security between the midline and endline, by initiative area

Indicator	Unadjusted			Adjusted		
	All	Burkina Faso	Niger	All	Burkina Faso	Niger
Change in household food security	-1.6	-2.1	-1.1	-1.6	-1.4	-1.9
Percent of households that are resilient	43.9	42.4	45.7	43.9	45.5	41.5
For reference						
Midline food security	18.7	19.5	17.8			
Shock exposure						
Shock exposure index (last year, endline)	20.1	20.2	19.9			
Number of shocks in last year (endline)	6.1	6.5	5.8			
Total rainfall deficit (ML to EL)	218.1	292.7	124.3			
Number of months of drought (ML to EL)	4.2	6.3	1.5			
Total rainfall surplus (ML to EL)	404.8	371.0	447.2			
Number of months of flooding (ML to EL)	5.0	4.1	6.1			

The adjusted mean change in food security in the RISE area as a whole, at -1.6, is negative, indicating that the average household was not able to maintain its midline level of food security or get back to it by endline. The probability densities⁵⁷ of the change in food security shown in Figure 18 indicate wide variation in individual households' recovery, however. Forty-four percent were resilient—able to get back to or improve upon their midline level of food security—while the rest were not (Table 21).

⁵⁷ A probability density function shows the probability of attaining each value of a variable in a sample. The total area under the function is equal to 1 (covering 100 percent of the sample).

Figure 18. Probability density of the change in food security between the midline and endline, by initiative area



While the average realized resilience of households in Burkina Faso (-1.4) is somewhat higher than households in Niger (-1.9), the difference is small. The percentage of households resilient is also very similar across the initiative areas, as are the distributions of realized resilience shown in Figure 18. The relatively small initiative-area differences found here lines up with the little difference found in the degree of shock exposure (see bottom of Table 21)—the household shock exposure index and number of shocks experienced are roughly equal. Rainfall deficits and drought are higher for Burkina Faso, but rainfall surpluses and flooding are higher for Niger.

The results for perceived ability to recover are shown in Table 22. At both baseline and endline, the perceived ability to recover measure showed a similar pattern (to that of realized resilience) of Burkina Faso and Niger households as groups having roughly equal abilities to recover.

Unlike the objective measure of resilience, the perceived ability to recover index allows us to look at *changes* in resilience over the initiative period. Given that the ability to recover index ranges from 1 to 5, the changes over time seen here are minor.

Trends in the percentage of households that were able to recover from all the shocks they experienced are more telling. This percentage has declined in both initiative areas, from 14.3 to 6.4 in Burkina Faso, and from 13.5 to 4.8 in Niger. The specific shocks for which there has been a decline in the recovery percentage are: excessive rains/flooding, disease/exceptional health expense, serious illness of a household member, and sudden increase in household size.

Table 22. Resilience: Changes in perceived ability to recover in the last year (baseline-midline-endline comparison), by initiative area

Indicator	All			Burkina Faso			Niger		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Mean ability to recover	1.93 ^b	1.80 ^c	2.06 ^{bc}	1.97 ^b	1.99 ^c	2.14 ^{bc}	1.89 ^a	1.59 ^{ac}	1.96 ^c
Recovered from all shocks experienced (%)	13.9 ^{ab}	9.3 ^{ac}	5.7 ^{bc}	14.3 ^b	14.3 ^c	6.4 ^{bc}	13.5 ^{ab}	3.8 ^a	4.8 ^b

a,b,c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

6.3. Differences in Food Security and Resilience for the Poor and Non-Poor

As would be expected, the poor have lower food security than better-off households (Table 23). This is reflected in all three indicators of food security—the household food security scale, the household hunger scale, and the dietary diversity score. In terms of changes over time, the poor have seen greater reductions in their food security over the initiative period, with their food security index falling by 17.8 percent (versus 15.0 percent for the non-poor). The percentage of households in hunger rose by nearly 20 percentage points (versus 12.5 for the non-poor). Dietary diversity has changed very little for both groups.

Table 23. Baseline-midline-endline comparison of food security indicators, by poverty status

Indicator	All			Non-Poor			Poor		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Access to food									
Household food security scale	20.2 ^{ab}	18.7 ^{ac}	17.1 ^{bc}	21.3 ^a	20.1 ^a	18.2 ^{bc}	19.7 ^{ab}	17.9 ^{ac}	16.2 ^{bc}
Percent of hhs in food security groups									
Food secure	23.1 ^{ab}	17.4 ^{ac}	9.8 ^{bc}	25.4 ^b	23.6 ^c	12.2 ^{bc}	21.7 ^{ab}	13.8 ^{ac}	8.0 ^{bc}
Mildly food insecure	11.0 ^b	11.0	7.9 ^b	14.2 ^b	11.4	9.3 ^b	9.2	10.7 ^c	6.9 ^c
Moderately food insecure	39.6	39.1	33.2	39.8	42.6	37.5	39.5 ^b	37.1 ^c	29.7 ^{bc}
Severely food insecure	26.3 ^b	32.4 ^c	49.1 ^{bc}	20.6 ^b	22.4 ^c	41.0 ^{bc}	29.6 ^{ab}	38.5 ^{ac}	55.5 ^{bc}
Percent food insecure	76.9 ^{ab}	82.6 ^{ac}	90.2 ^{bc}	74.6 ^b	76.4 ^c	87.8 ^{bc}	78.3 ^{ab}	86.2 ^{ac}	92.1 ^{bc}
Hunger									
Household hunger scale	0.5 ^b	0.5 ^c	1.0 ^{bc}	0.4 ^b	0.3 ^c	0.8 ^{bc}	0.5 ^b	0.6 ^c	1.2 ^{bc}
Percent households in hunger	13.0 ^b	13.5 ^c	28.7 ^{bc}	10.0 ^b	8.1 ^c	22.5 ^{bc}	14.6 ^b	16.7 ^c	33.6 ^{bc}
Dietary quality									
Dietary diversity score	5.1	5.1	5.4	5.8	5.6	5.8	4.7	4.8	5.0

a,b,c. Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

By both the realized resilience and perceived ability to recover measures the poor have been less resilient than the non-poor throughout the initiative period (Table 24 and Table 25). The data on changes in the ability to recover since the baseline indicate that the non-poor had a slightly greater percentage reduction in resilience than the poor, 66.0 versus 56.8 percent.

Table 24. Realized resilience: Changes in food security between the midline and endline, by poverty status

Indicator	Unadjusted			Adjusted		
	All	Non-poor	Poor	All	Non-poor	Poor
Change in household food security	-1.6	-1.1	-2.1	-1.6	-1.2	-1.9
Percent of households that are resilient (%)	43.9	47.7	41.0	43.9	47.5	42.5
For reference						
Midline food security	18.7	20.1	17.9			
Shock exposure						
Shock exposure index (last year, endline)	20.1	20.0	20.1			
Number of shocks in last year (endline)	6.1	6.2	6.1			

In terms of changes over time in resilience, by the “recovered from all shocks experienced” measure the non-poor show a *greater* reduction in their resilience than the poor (Table 25). The non-poor started with a relatively high percentage of households able to recover from all shocks, at 19.7 percent, and ended with a much lower percentage, 6.7. This 13 percentage-point reduction can be compared to the 6.3 percentage-point reduction among the poor.

Table 25. Resilience: Changes in perceived ability to recover in the last year (baseline-midline-endline comparison), by poverty status

Indicator	All			Non-Poor			Poor		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Mean ability to recover	1.93 ^b	1.80 ^c	2.06 ^{bc}	2.04	1.90 ^c	2.16 ^c	1.88	1.74 ^c	1.97 ^c
Recovered from all shocks experienced (%)	13.9 ^{ab}	9.3 ^{ac}	5.7 ^{bc}	19.7 ^b	14.6 ^c	6.7 ^{bc}	11.1 ^{ab}	6.3 ^a	4.8 ^b

a,b,c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

6.4. Summary: Household Food Security and Resilience to Shocks

The RISE Initiative area experienced a steep decline in food security over the initiative's operational period. This decline was experienced in both the Burkina Faso and Niger initiative areas, although the Niger area experienced a somewhat steeper decline. The prevalence of food insecurity in the RISE area was already very high at baseline, at 77 percent of households. By endline it was near universal, with over 90 percent of households that are food insecure. The household prevalence of extreme food insecurity nearly doubled, from 26 to 49 percent, attesting to the stress households were under as shock exposure shot up over the period.

Resilience is measured in this report using two indicators—one objective and one subjective. The objective indicator, termed “realized resilience,” is the change in food security between the midline and endline surveys, the period of focus for the impact evaluation due to the availability of panel data. It is complemented by a dichotomous variable indicating whether or not a household is resilient. The subjective indicator is an index of households' perceived ability to recover from the shocks they experienced in the year prior to each survey.

According to the realized resilience measure, the average household was not able to maintain its midline level of food security or get back to it by endline. Forty-four percent of households were resilient, while the rest were not. The data show little difference in the resilience of Burkina Faso and Niger households.

Did household's resilience improve over the initiative period? The perceived ability to recover measure indicates that the percentage of households able to recover from all shocks experienced declined from 13.9 to just 5.7 over the initiative period. Such a decline occurred in both the Burkina Faso and Niger areas.

As would be expected, the poor have lower food security than the non-poor. They also saw greater reductions in their food security between the baseline and endline surveys. Between the midline and endline surveys—the shock period of focus in this impact evaluation—the poor had lower resilience than the non-poor, but the non-poor experienced somewhat greater reductions in their resilience.

7. POVERTY AND WOMEN'S EMPOWERMENT

Poverty and women's empowerment are important aspects of household well-being in the RISE Initiative area. Understanding the levels and changes in them over the initiative's operational period help to put the resilience analysis of this report into context.

7.1. Poverty

For the baseline and midline surveys, poverty estimates were calculated from expenditures data. However, it was not possible to collect expenditures data for the endline survey due to time limitations of the phone surveys. Instead, data on asset ownership and housing characteristics were used to develop an index of asset wealth from which poverty estimates were calculated. The five measures used to calculate the asset wealth index are:

1. Consumer durables: An index based on ownership of 32 consumer durables
2. Productive assets: An index based on ownership of 15 productive assets
3. Livestock: An index based on ownership of 13 types of livestock (specifically the number of Tropical Livestock Units owned)
4. Land owned (hectares)
5. A housing quality index based on roofing and flooring materials and number of rooms.

These measures were available for all three surveys, the baseline, midline and endline. The index of asset wealth was calculated by first creating an index from the five measures using factor analysis and then dividing by household size.⁵⁸

The midline data were used as an anchor to determine the appropriate cut-off on the asset index to identify poor and non-poor households. Specifically, the poverty rate derived from midline expenditures data analysis corresponding to the percentage of households falling below the \$1.90 poverty line was determined. Then the point along the asset-poverty index at which this rate (63.8) falls was used as the asset-poverty cut-off.

The resulting poverty prevalences are reported in Table 26, along with the values of the five measures used to calculate them. For the sample as a whole, the data show a rise in the poverty prevalence from 62.3 to 67.0 between the baseline and endline surveys, a total of 4.7 percentage points. While this increase is not statistically significant, there are notable, statistically significant changes in the underlying measures used to calculate the poverty rate. There were declines in animal ownership and land owned, both of which were reflected in the coping strategies documented in Chapter 3. While the ownership of consumer durables, farming implements, and the housing quality index increased, household size also increased

⁵⁸ In the baseline and midline surveys, household size data were calculated using data from a full household roster. A household roster module was not included in the endline survey. However data were collected on the number of household members over 18 years. These data were combined with information from the midline survey on the proportion of household members above and below 18 years for six groups: the three livelihood groups within each project area. The proportions were then used to estimate the endline number of household members under 18 years and, subsequently, total household size.

sharply, from 7.4 to 10.5 members on average. Much of the increase in this asset ownership and housing quality is likely due to the absorption of more people into households along with their assets. Note that the aspect of housing quality that is driving up this measure over time is the number of rooms in homes, which is also probably associated with increases in household size, rather than roofing or flooring materials.

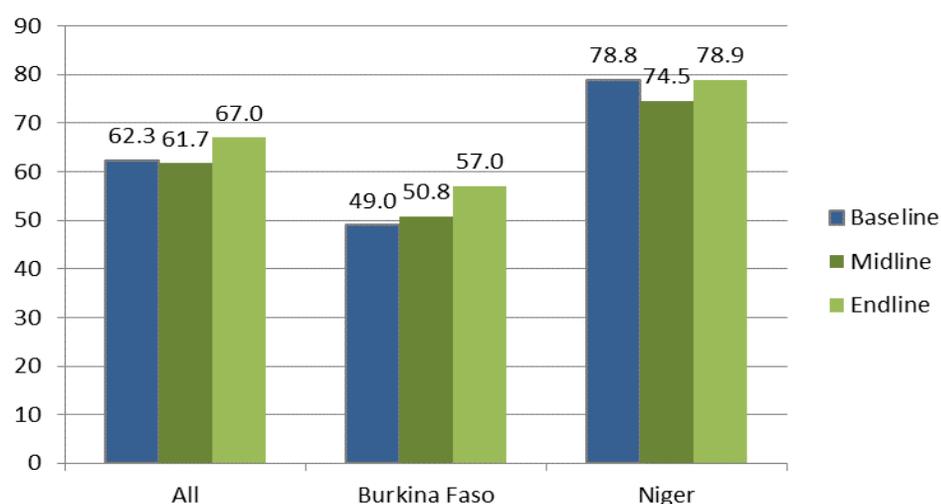
The absorption of more people into homes itself can be linked to two factors: (1) the welcoming of displaced persons into homes; and (2) an influx of family members who were returning home from urban areas during the Coronavirus shut down.

Table 26. Baseline-midline-endline comparison of poverty, by initiative area

Indicator	All			Burkina Faso			Niger		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Asset poverty									
Index of consumer durables owned	7.74 ^{ab}	8.38 ^{ac}	9.10 ^{bc}	9.21 ^b	9.43 ^c	10.65 ^{bc}	5.92 ^{ab}	7.15 ^a	7.17 ^b
Index of farming implements owned	4.35 ^b	4.29 ^c	5.09 ^{bc}	4.76 ^a	4.35 ^{ac}	5.35 ^c	3.84 ^{ab}	4.21 ^{ac}	4.80 ^{bc}
Animals owned (TLUs)	3.71 ^b	3.23 ^c	2.18 ^{bc}	5.54 ^b	4.69 ^c	3.26 ^{bc}	1.47 ^b	1.52 ^c	0.91 ^{bc}
Land owned (ha)	3.69 ^b	3.41 ^c	2.72 ^{bc}	3.65 ^{ab}	3.13 ^{ac}	2.25 ^{bc}	3.73	3.73	3.27
Housing index	0.89 ^{ab}	1.06 ^a	1.15 ^b	1.22 ^{ab}	1.47 ^a	1.52 ^b	0.47 ^{ab}	0.59 ^{ac}	0.70 ^{bc}
Overall index	5.7 ^b	5.9 ^a	5.1 ^{ab}	6.7 ^a	6.6 ^b	5.8 ^{ab}	4.4	5.0	4.2
Poverty rate (%)									
	62.3	61.7	67.0	49.0 ^a	50.8	57.0 ^a	78.8	74.5	78.9
Household size	7.42 ^a	7.76 ^b	10.50 ^{ab}	7.64 ^a	7.87 ^b	10.80 ^{ab}	7.15 ^a	7.48 ^b	10.23 ^{ab}

While the increase in the poverty prevalence for the initiative area as a whole is not statistically significant, that for the Burkina Faso area is. There, the prevalence rose precipitously from 49.0 to 57.0, an increase of 8 percentage points (see Figure 19). The poverty prevalence in the Niger area was already much higher than that of the Burkina Faso area at baseline; it showed no statistically significant change between the baseline and endline.

Figure 19. Baseline-midline-endline comparison of poverty, by initiative area



7.2. Women's Empowerment

According to the 2020 United Nations Development Programme (UNDP) Gender Inequality Index, Niger was ranked at 154 and Burkina Faso at 147 out of a total of 162 countries, that is, they rank near the *worst* off in terms of general inequality.⁵⁹ Niger has the highest rate of early marriage in the world according to the 2012 Demographic and Health Survey.⁶⁰ Gender equality *and* women's empowerment (GEWE) are complementary aspects that are both highlighted in the formulation of Sustainable Development Goal 5. The acronym is a helpful reminder of the need for specific efforts along both lines.

A number of gender equality interventions in the areas of women's and family health and women's economic empowerment were implemented as part of the RISE Initiative. The quantitative survey sought to measure some of these aspects—particularly in the areas of women's decision-making power and their ownership of assets relative to men. Three indicators of women's decision making power were measured:

- (1) Percent of decisions over aspects of household life in which women are involved;⁶¹
- (2) Women's level of input into decision making about the livelihood activities they are engaged in;⁶²
- (3) Women's level of input into decision making about the use of revenue from the livelihood activities they are engaged in.⁶³

Two indicators of women's asset ownership relative to men's were measured:

- (1) Percent of household productive assets owned by women;⁶⁴
- (2) Percent of household productive assets for which women participate in buying/selling decisions.⁶⁵

An index of women's empowerment was then calculated based on these five indicators using factor analysis. The index was placed on a 0 to 100 scale.

⁵⁹ UNDP, n.d. Gender Inequality Index (GII) | Human Development Reports [WWW Document]. URL <http://hdr.undp.org/en/content/gender-inequality-index-gii> (accessed 5.7.21).

⁶⁰ Shakya, H.B., Weeks, J., Challa, S., Fleming, P.J., Cislighi, B., McDougal, L., Boyce, S.C., Raj, A., Silverman, J.G., 2020. Spatial analysis of individual- and village-level sociodemographic characteristics associated with age at marriage among married adolescents in rural Niger. *BMC Public Health* 20, 729. <https://doi.org/10.1186/s12889-020-08759-6>.

⁶¹ Female respondents were asked about eight aspects of household life: Obtaining inputs for agricultural production, type of crops to be grown, taking crops to the market, livestock, the woman's own income or paid job, major household expenses, minor household expenses, and migration/exodus for paid labor.

⁶² The score is calculated by taking the mean across six possible activities (food production, cash crop production, livestock rearing, non-agricultural economic activities, salaried work, and fish rearing) of a 5-point scale for input into decision making. Specifically, for each activity engaged in, female respondents are asked to score their input into decision making using the following point system: 1: none; 2: input in very few decisions; 3: input in some decisions; 4: input in most decisions; 5: input in all decisions.

⁶³ As for (2) but referring specifically to decision making over the use of revenue generated.

⁶⁴ This indicator measures the percent of productive assets, out of a possible 14, that the female respondent owns, either solely or with another household member or person.

⁶⁵ This indicator measures the percent of productive assets, out of possible 14, for which the female respondent indicates she participates in buying and/or selling decisions.

Comparison of the baseline, midline and endline values of the overall index of women's empowerment indicates that there has been a small increase in empowerment between the midline and endline in the RISE area as a whole (see Table 27). There has been no change in the Burkina Faso area. However, there has been a substantial increase in the Niger area, with the index rising by nearly 15 percent. This increase is associated with increases in both women's decision-making power and women's ownership and control over productive assets. While no increase in the index of women's empowerment was detected for the Burkina Faso, the data do indicate that there has been notable progress made in women's ownership and control over productive assets.

Table 27. Baseline-midline-endline comparison of women's empowerment indicators, by initiative area

Indicator	All			Burkina Faso			Niger		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Percent of decisions over aspects of household life in which woman is involved	39.1 ^b	38.6 ^c	47.2 ^{bc}	44.3	39.4 ^c	47.4 ^c	32.9 ^b	37.8	46.9 ^b
Women's input into decision making about livelihood activities (1-5 scale)	3.24 ^a	3.03 ^{ac}	3.21 ^c	3.03 ^a	2.778 ^a	2.87	3.49	3.31 ^c	3.67 ^c
Women's input into decision making about the use of revenue from livelihood activities (1-5 scale)	3.21	3.04 ^c	3.27 ^c	2.95	2.781	2.93	3.51	3.33 ^c	3.73 ^c
Percent of household productive assets owned by woman	29.5 ^b	27.0 ^c	35.3 ^{bc}	27.7 ^b	23.6 ^c	34.1 ^{bc}	31.8 ^b	30.7 ^c	37.0 ^{bc}
Percent of household productive assets for which woman participates in buying/selling decisions	30.5 ^b	28.8 ^c	37.1 ^{bc}	28.4 ^b	25.9 ^c	33.0 ^{bc}	33.2 ^b	31.9 ^c	42.7 ^{bc}
Index of women's empowerment	44.45	42.89^c	47.57^c	41.49^a	38.41^a	41.21	48.12^b	48.14^c	55.03^{bc}

a,b,c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

Perhaps more important are the results for the poor (see Table 28)—the primary target of RISE activities. For all measures of decision making and asset ownership, as well as the overall index of women's empowerment, there was improvement between the baseline and endline, with a 16 percent increase in the index of empowerment from midline to endline.

Table 28. Baseline-midline-endline comparison of women's empowerment indicators, by poverty status

Indicator	All			Non-Poor			Poor		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
Percent of decisions over aspects of household life in which woman is involved	39.1 ^b	38.6 ^c	47.2 ^{bc}	41.8	39.2	45.2	37.6 ^b	38.3 ^c	48.8 ^{bc}
Women's input into decision making about livelihood activities (1-5 scale)	3.2 ^a	3.0 ^{ac}	3.2 ^c	3.3 ^a	2.9 ^a	3.1	3.2	3.1 ^c	3.3 ^c
Women's input into decision making about the use of revenue from livelihood activities (1-5 scale)	3.2	3.0 ^c	3.3 ^c	3.2 ^a	3.0 ^a	3.1	3.2	3.1 ^c	3.4 ^c
Percent of household productive assets owned by woman	29.5 ^b	27.0 ^c	35.3 ^{bc}	31.0 ^a	26.7 ^{ac}	33.8 ^c	28.7 ^b	27.1 ^c	36.7 ^{bc}
Percent of household productive assets for which woman participates in buying/selling decisions	30.5 ^b	28.8 ^c	37.1 ^{bc}	31.5	28.5	34.3	30.0 ^b	29.0 ^c	39.4 ^{bc}
Index of women's empowerment	44.45	42.89^c	47.57^c	45.87	42.77	44.84	43.64^b	42.96^c	49.73^{bc}

a,b,c Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

The qualitative results are generally supportive of these findings. When asked about changes in the role of women, the livelihood aspect was most commonly mentioned, creating opportunities that empowered women economically and allowing them to help cover household expenses. However, as for the quantitative results the qualitative results in the Burkina Faso initiative area were less clear. The highlights are summarized below.

7.2.1. Household Gender Relations

The role of women has evolved towards greater autonomy and independence, and this effect was clearer in Niger where qualitative respondents in 9 of the 12 villages mentioned a RISE impact in terms of increasing women's economic self-reliance and helping to pay household expenses. Maradi respondents explained that RISE helped women to become economic participants, acquire some autonomy, and participate in decision-making. Previously women would be called “*mange-mil*,” i.e., someone who eats millet, a homemaker with no income) (see quote, left).

A respondent in Zinder stated: “Before, women had no activity, they were content only with domestic activities. But now they have become self-reliant, they know how to manage money, they have learned to make small IGAs. Men used to be unable to provide for food, but now they are being assisted in the care of the family. ... Women are able to buy clothes, children have recovered their health and malnutrition has been reduced.”

There was some evidence of a similar effect in the Est and Sahel regions of Burkina Faso, where RISE supported women's involvement particularly through animal husbandry (*habbanaye*) and market gardening. In Sahel, women's role changed from care of the family to supporting livelihoods when they received funding for livestock and training on good breeding practices. Access to land and resources is important for women's equality, and four (4) villages had provisions for

women to have their own land to cultivate. An agriculture advisor in Est stated that households are better able to cope with shocks, because women are active in agriculture and animal husbandry, such as growing off-season vegetables and watermelon, and raising a few sheep, goats and chickens. This effect was not pronounced in Centre-Nord (all RISE intervention villages), however; though a few Centre-Nord respondents spoke of women's empowerment through agriculture, still there was no evidence of *habbanaye*, market gardening, or provision of land for women. Some male respondents in Centre-Nord thought of RISE agriculture interventions as being for men, while they saw women's involvement only in terms of health, hygiene and nutrition.

In both countries, some respondents' comments on household livelihood roles show an improvement of women's status within existing roles and power relations (gender-responsive), while other comments show a movement towards changed gender relations and roles towards fundamental equality (gender-transformative). Illustrating what could be considered a gender responsive approach, a woman respondent in Zinder states: “For me, the impact is mainly the

participation of women in the household expenses instead of waiting for the husband at any time, she can also help him with those expenses. The village has progressed a lot as women grow their sesame and peanuts, and their livestock have made *life easier for men*.” A more gender-transformative impact is apparent in many of the respondents’ statements (see quote, below). This is often associated with changing social constructs impeding women from going to the market, or acting as the household head for example when men were absent due to migration.

Gender equality was also promoted through activities other than agriculture and livelihoods. As mentioned above, while RISE in Centre-Nord had a less developed agriculture and livelihood intervention for women (particularly as perceived by many male respondents), gender equality was still promoted through the overall capacity-building. An agriculture advisor articulated his understanding of women’s role expanding from household chores to the important areas of community hygiene and health. Women have learned a lot and are sharing their points of view and their lived experiences to contribute to decision-making in their families and communities. This approach could be said to be gender-responsive, i.e., helping women in the role they already have and helping them build capacities and be more appreciated for that role. It is a significant step towards equality, in a process which can often take years.

A respondent in Zinder stated: *“The change found is that women have gained significant economic power in contrast to previous years when they are exclusively dependent on men... There is the acquisition of a certain freedom, the acquisition of new knowledge...”*

7.2.2. Community Gender Relations

RISE strengthened gender equality and women’s empowerment at the community level. This arose as an outcome of women’s household economic empowerment and increasing participation in decision-making around health, hygiene and nutrition (see next quote).

A chief in Centre-Nord said: *“VIM’s activities revolve around training, with new hygiene practices, improving sanitation practice through awareness. And it’s in terms of household life and even community life. The VIM project mainly carried out its activities with pregnant women, new mothers and children aged 0–5 years. Beyond its training and capacity building, PROJECT VIM gave women food and food oil... The role of women in management has changed through better private initiatives they have in their households and also in the community... they are more involved in the working life. In addition, they are more health-oriented and child care. And it’s true that they were involved in household decision-making but within the community it has changed because now they ask questions and they bring their opinions.”*

One Centre-Nord respondent acknowledged how the role of women has changed, through more involvement in the activities of men, an upsurge in their entrepreneurial initiatives, and their contribution in the major issues of community life. This contribution to community life could include participating in discussions with chief and councilors about community problems and possible solutions, from hygiene and child health, to water access difficulties, to conflicts between agriculturalists and pastoralists.

It is a significant advance towards the transformation of gender relations, when women become independent, entering spaces and participating in roles traditionally reserved for men. One respondent from Maradi explained the status quo, in which: “Women participate in rural work, farm but do not have access to markets. “In some cases, this is still the case, even with diversified livelihoods such as peanut oil extraction. Other examples show that women have control of the marketing process (see quote, right).

A respondent in Maradi stated: “Before this change was made, there were only old women (soubala saleswomen) who frequented the markets. Basically, women had to rely on asking a man to go to the market for them. And even when it came to selling an animal belonging to the woman, she could only do so through her husband. This often runs the risk of squandering the money, returning only half to the woman. But today, many women participate in fairs of (small ruminants, poultry). This is tantamount to considering that they are the managers of their own assets.”

The initiative promoted women as leaders, such as a Zinder respondent who was a savings groups agent for 10 groups, a “relais” (community health worker), a member of the COGES [school management committee], and she was running for municipal office. Women’s voice and participation in community life is also increasing with the support of RISE, as respondents discussed how they ask questions in general assemblies and express their own opinions. It’s clear that some women leaders and representatives of women’s associations are more actively participating, often this may be a step towards broader equality and participation.

Some interesting feedback was shared from a control (i.e., non-RISE) community, regarding the lack of advancement of women during this period. An acting Councilor in Est stated: “...the role of women has not completely changed as they become less involved in community activities and their poverty situations persist.” A male agriculture agent stated that the role of women had not fundamentally changed because they were not united. The women’s group president stated that: “The role of women has not changed, as they do not participate in community activities, nor do GSOs and initiative interventions.” This suggests that in the absence of initiative interventions specifically promoting GEWE, the situation may not fundamentally change, and more examples of this were provided in Chapter 5 of this report.

7.2.3. Partnership for Gender Equality

One of the most important features of resilience is the sustainability of gender equality efforts, and in the potential for a collaborative relationship between women and men to promote development and respond to changing conditions. A number of respondents in Niger and Burkina Faso mentioned a result of an enhanced partnership and communication between women and men⁶⁶. It's beneficial that RISE involves both men and women in the aspects of agriculture and animal husbandry that are appropriate for them, and paves the way for positive attitudes of men towards gender equality. The overall impression from respondents is that there has been significant advancement in equality as a collaboration between women and men. As one respondent in Zinder stated, "We are satisfied with the RISE Initiative...men and women work together, which was not the case before."

Male household members have recognized the contribution of women, as a respondent in Zinder stated: "...there is some relief from the task of men in the care of households. Women make a significant contribution to the care of households both financially and in work efforts." This recognition is important for the initiative, to head off a potential backlash which can at times result from women's empowerment. A Centre-Nord respondent underlined how he has seen that women have their own fields to increase agricultural production, they are now very involved in decision-making, and men have "...a certain openness to see that this is a good thing."

As stated above, some respondents say that women are providing income to help the husband, but in others the respondents emphasize that women have a greater role in household decision-making, and the relationship becomes one of interdependence rather than dependence. This more gender-transformative result was exemplified by a respondent from Zinder who stated: "In a word men and women are in a relationship of partnership, not a relationship of *dominant-dominated*." Exactly how and why this more transformative result has been achieved at times was not specifically explored in this IE but it would be valuable to do so in future monitoring, discussion and research.

This core GEWE work of RISE could naturally be extended to the promotion of education for girls (see quote, right).

⁶⁶ Though we must reiterate that this doesn't mean it wasn't present in other communities, rather it was not mentioned when asked the more generic questions regarding the changes and project impacts and it was likely more prevalent but wasn't mentioned because it was not specifically asked

While the outcome here was partly due to an enlightened chief, the initiative served to reinforce his efforts. This could be the type of unintended positive impact that RISE II would do well to capture.

The husbands' school is a specific intervention of RISE that is intended to engage men and build male-female partnership. A Maradi respondent explained that these schools emphasize the importance of family planning, the education of the girl and shared decision-making in the household. This kind of intervention was only mentioned in a few communities of Niger, but according to lessons learned from years of gender and development experience, this would seem to be a worthwhile component to reinforce this in future initiatives.

A chief in Centre-Nord stated: “Even long before the project... I do everything to get the girls enrolled in school because it is for her well-being but also, she is even going to help parents better tomorrow than the young boy. For this the population understood it. This project has enabled even more emancipation of our women in our village.”

7.3. Summary: Poverty and Women's Empowerment

Poverty and women's empowerment are both important aspects of household well-being in the RISE Initiative area. Understanding the levels and changes in them over the initiative's operational period help to put the resilience analysis of this report into context. At baseline, and throughout the RISE Initiative's operational period, the prevalence of poverty was much higher in the Niger initiative area than the Burkina Faso area. The Niger area started out at a very high prevalence of 78.8 at baseline and the Burkina Faso area started out at 49.0 percent. While the poverty prevalence stayed steady in Niger, it increased precipitously in the Burkina Faso area, from 49.0 to 57.0 between the baseline and endline, an eight percentage-point rise.

Women's empowerment is measured in this report using five indicators of women's involvement in decision making and ownership of assets relative to men. When combined into an index, they indicate that women's empowerment saw significant improvements in the Niger area, especially between the midline and endline. The results are less clear for the Burkina Faso area, with some aspects of empowerment improving (especially regarding asset ownership) and others seeing little change. The qualitative data are generally consistent with these findings from the quantitative data. They highlight changes in the role of women due to economic empowerment that allow them to help cover household expenses.

8. ENGAGEMENT IN RESILIENCE-STRENGTHENING INTERVENTIONS AND RECEIPTS OF HUMANITARIAN ASSISTANCE

In addition to their resilience capacities, households' ability to recover from the shocks they faced over the RISE Initiative's operational period was influenced by two factors. The first is the interventions they were engaged in, which are hypothesized to have strengthened their resilience. The second is the humanitarian assistance they received as part of the government and NGO response. In preparation for the impact evaluation presented in Chapter 9, this chapter looks at how widespread these interventions and assistance were and compares their prevalence across the Burkina Faso and Niger initiative areas.

The RISE Initiative had wide coverage among its target population, reaching an estimated 1.9 million people. However, other development actors, including the Burkina Faso and Niger governments and NGOs not associated with RISE, were also operating in the initiative area during its implementation period. The data collected from households and communities on their engagement (exposure to and participation) in resilience-strengthening interventions do not allow us to distinguish between RISE's and these other actors' interventions. While the indicators of engagement in interventions for which data are presented below are for the specific types of interventions implemented by RISE, they are thus referred to more broadly as "resilience-strengthening interventions" and not RISE interventions.

Note that in Chapter 9, data collected as part of the RISE Endline village survey specifically regarding RISE interventions will be used to help discern attribution to the initiative.

8.1. Measurement of Exposure to and Participation in Resilience-Strengthening Interventions

As noted in Chapter 2, to conduct the impact evaluation, a distinction is made between households' *exposure* to interventions and their direct *participation* in them. A household is considered to have been exposed to an intervention if it is located in a village where the intervention was implemented. Even if household members, the ultimate intended beneficiaries of the initiative, did not directly participate in such interventions, they may have benefitted indirectly through induced price changes, employment opportunities, environmental changes, information made available, etc. For example, even if a household did not actually attend a cowpea or livestock trade fair, it may have received information on sales opportunities from someone who did. In the long run the trade fair may have improved producer prices and market competitiveness in nearby areas. Another example is that of savings groups, which can benefit even those who do not join them, being a source of indirect support through the bonds of social capital for those in need.

On the other hand, households could have chosen to directly take advantage of an intervention by personally participating in it—they may actually attend the trade fair or join a savings group. As found in a previous impact evaluation,⁶⁷ this direct participation may have had a stronger impact on the household-level outcomes of interest here, such as their resilience.

For the purposes of this impact evaluation, households' overall “engagement” in resilience-strengthening interventions is thus measured using separate indicators of their exposure to interventions and their participation in interventions.

The data on exposure to and participation in interventions are collected from household and community survey respondents using retrospective recall. The recall period for data collection is 5 years. While this period does not match that of the RISE impact evaluation, which extends from the midline to the endline (3.5 years), it was felt that a 5-year recall window would yield more accurate data as respondents would be able to fix the “last 5 years” in their memory with greater mental clarity than the “last 3.5 years.”

8.1.1. Measurement of Exposure to Interventions

Based on the data collected in the endline survey, household exposure to resilience-strengthening interventions implemented between the baseline and endline surveys is measured following three steps.

Step 1. First the initiative's interventions were divided into eight categories. These “intervention sets,” along with a description of the main interventions implemented in each, are:

(1) Improved technologies and management practices: Agricultural production

Promotion of improved technologies and management practices in the areas of improved seeds, fertilizers, irrigation techniques and post-harvest storage techniques. Promotion of home gardens. Training in conservation farming techniques.

(2) Improved technologies and management practices: Livestock rearing

Establishment of veterinary facilities and of services from *Auxiliaires d'Élevage*, vaccination initiatives, and *Habbanaye*⁶⁸ initiatives. New and improved water sources for animals. Training in how to raise small ruminants and fowl. Improved shelters for small ruminants and fowl.

(3) Community natural resource management (CNRM)

Assistance to communities in mapping their natural resources, establishment of land registration commissions. Assistance with water point conflict mitigation and clear marking of livestock corridors.

⁶⁷ Smith et al. 2019

⁶⁸ In habbanayé, sheep or goats are provided to women in vulnerable households. These women then raise them for their needs (milk and potential sale when necessary), while passing on the first offspring to another vulnerable woman.

(4) Markets and business development

Promotion of cowpea and livestock trade fairs, complementary training in how to grow and sell cowpeas and in how to raise livestock. Establishment of producer associations for cowpeas and livestock.

(5) Financial services

Establishment of savings and loan groups, MFIs, and warrantage⁶⁹ initiatives.

(6) Human capital

Literacy and numeracy training. Initiatives to promote youth employment. Health and nutrition: distribution of mosquito nets, information dissemination, and promotion of safe water and sanitation facilities.

(7) Disaster preparedness and mitigation

Establishment of village early warning systems and disaster rescue teams. Information dissemination on climate conditions.

(8) Governance

Establishment of Village Development Committees.

Step 2. Next, an index of exposure to each intervention set was calculated based on multiple indicators of the presence of the interventions in the 88 sample villages at some time over the previous 5 years (measured as 0–1 dummy variables). The indicators, listed in the left-hand column of Table 29 and Table 30 (i.e., Table 29 continued) are calculated using data collected in the community surveys and supplemented by village-level measures derived from aggregated household-level data. They were chosen based on a comprehensive inventory of the initiative’s resilience-strengthening activities provided by initiative staff. The indexes are calculated by adding up the total number of interventions each household was exposed to.

It is important to note that, because the number of indicators used to measure each index differs, the levels of the indexes are not comparable. For example, the index of exposure to CNRM interventions (4 indicators) cannot be compared to that of exposure to livestock rearing interventions (10 indicators).

⁶⁹ Warrantage is seasonal crop storage that can be used to obtain credit for immediate expenses while holding the crop for future marketing at a better price.

Table 29. Indicators of exposure to resilience-building interventions in the last 5 years, by initiative area (percentage of households)

Indicator	All	Project area	
		Burkina Faso	Niger
Improved technologies and management practices: Agricultural production			
HHs in village started to use improved seeds in last 5 yrs	86.6	83.1	90.6
HHs in village started to use improved fertilizers in last 5 yrs	86.6	90.5	81.9
HHs in village started to use improved irrigation techniques in last 5 yrs	36.1	41.0	30.3
HHs in village started to use improved post-harvest storage techniques in last 5 yrs	71.7	71.4	72.1
HHs in village started up new home gardens in last 5 years	32.2	29.5	35.4
HHs in village had training in >= 4 of 9 conservat'n farming techniques in last 5 yrs	52.5	57.2	47.1
Index	3.7	3.7	3.6
Improved technologies and management practices: Livestock rearing			
Veterinary facility started up in the last 5 yrs	23.8	18.4	30.2
Auxiliaire d'El evage started serving village in the last 5 yrs	62.6	47.6	80.2
Vaccination program for animals in the last 5 yrs	94.6	90.0	100.0
Habbanaye program in the last 5 yrs	46.0	38.9	54.4
HHs in village got new water sources for animals in the last 5 yrs	51.3	59.3	41.9
HHs in village got improved water sources for animals in the last 5 yrs	47.8	45.1	51.1
HHs in village received training in how to raise sheeps/goats in the last 5 yrs	22.9	32.2	12.0
HHs in village received training in how to raise chickens/guin hens in last 5 yrs	27.8	48.1	4.1
HHs in village got improved shelters for sheeps/goats in the last 5 yrs	23.6	35.7	9.4
HHs in village got improved shelters for chickens/guinea hens in the last 5 yrs	22.9	38.6	4.6
Index	4.2	4.5	3.9
Community natural resource management			
Village did community natural resource mapping in the last 5 yrs	63.5	70.0	55.8
Land Commission (COFO) established to register people's land in the last 5 yrs	59.5	61.7	56.8
Water point conflict mitigation measure taken in village in the last 5 yrs	78.2	79.8	76.5
Livestock corridors in village started to be clearly marked in last 5 yrs	86.2	83.6	89.3
Index	2.9	3.0	2.8
Markets and business development			
HHs in village attended cowpea trade fair in last 5 yrs	12.2	22.6	0.0
HHs in village attended training in how to grow and sell cowpeas	30.0	44.4	13.3
Producer association for cowpeas started up in the last 5 yrs	24.1	40.3	5.1
HHs in village attended livestock trade fair in last 5 yrs (fowl, small ruminants)	11.7	21.7	0.0
HHs in village attended training in how to raise livestock	24.3	37.4	9.0
Producer association for livestock started up in the last 5 yrs	23.5	40.7	3.3
Index	1.3	2.1	0.31

Note: Unless otherwise specified, indicators are the percent of households exposed to the intervention.

(Continued...)

Table 30. (Table 29 continued) Indicators of exposure to resilience-building interventions in the last 5 years, by initiative area (percentage of households)

Indicator	All	Project area	
		Burkina Faso	Niger
Financial services			
Whether a new savings and loan group started up in the village in last 5 yrs	52.5	59.1	44.6
Whether a MFI started up in the village in last 5 yrs	11.4	3.9	20.1
Whether a warrantage program started up in the village in last 5 yrs	15.7	15.7	15.8
Index	0.80	0.79	0.81
Human capital			
Literacy training took place in village in last 5 yrs	81.7	94.2	67.0
Numeracy training took place in village in last 5 yrs	61.2	67.6	53.7
Program to help youth get new jobs or start their own business in last 5 yrs	21.0	15.1	27.8
HHs started to use mosquito nets in last 5 yrs	100	100	100
HHs received info from NGOs or gov't about health practices in last 5 yrs b/	78.4	81.9	74.2
HHs received info about healthy eating in last 5 yrs	96.4	100.0	92.1
HHs started to get cleaner drinking water in last 5 yrs	95.8	97.5	93.8
HHs got improved latrines in last 5 yrs	80.8	91.8	67.9
Index	6.2	6.5	5.8
Disaster preparation and mitigation			
Village early warning system established in last 5 yrs	26.7	23.5	30.4
Disaster rescue teams trained in last 5 yrs	17.8	5.6	32.0
Disaster practice drills held in last 5 yrs	16.7	1.1	34.9
Plan to warn local authorities and government services in case of disaster established in last 5 yrs	55.1	64.9	43.6
HHs got information on climate conditions from NGOs or the gov't in last 5 yrs			
Rainfall forecasts	87.2	90.3	83.6
Pasture conditions	53.7	52.9	54.7
Water availability	59.6	61.6	57.4
Insect invasions	43.5	24.2	66.2
Bird invasions	22.2	3.6	44.0
Bush fires	17.3	13.3	21.9
Index	4.0	3.4	4.7
Governance			
Village Development Committee started up in last 5 yrs	59.4	62.7	55.6
Index	0.6	0.6	0.6

Note: Unless otherwise specified, indicators are the percent of households exposed to the intervention.

b/ Values given are the percent of villages for which information was received about at least 4 of 6 practices (drinking water treatment, safe storage of drinking water, handwashing with soap or ash, safe feces disposal, proper storage and handling of food, and family planning).

Application of the Propensity Score Matching method on which the impact evaluation of Chapter 9 is based to evaluate the impact of the eight intervention sets individually requires that (1) “treatment” variables be dichotomous and (2) the treatment group contain as close to

one-third of households as possible.⁷⁰ Thus indicators (dummy variables) identifying the set of households who were most highly exposed to each intervention set are calculated based on the top tercile of households on each index.

Step 3. Finally, an overall summary indicator of households' exposure to resilience-strengthening interventions was calculated based on the concept of Comprehensive Resilience Programming (CRP), which characterizes the RISE comprehensive, cross-sectoral approach to strengthening resilience. Resilience related systems, such as those embodied in the eight intervention sets measured here, are hypothesized to act in synergy rather than isolation—indeed, strengthening multiple systems or sectors simultaneously has been found in other settings to lead to greater resilience than focusing on each separately (Smith et al. 2019, Smith and Frankenberger 2017). To capture the cross-sectoral nature of RISE Programming, exposure to CRP is defined as having had moderate exposure to at least seven of the eight intervention sets.⁷¹ This results in a treatment group of 35.4 percent of households, leaving adequate numbers of households for the matching process in PSM. The left-hand side of Figure 20 lays out the method for measuring exposure to CRP.

8.1.2. Measurement of Participation in Interventions

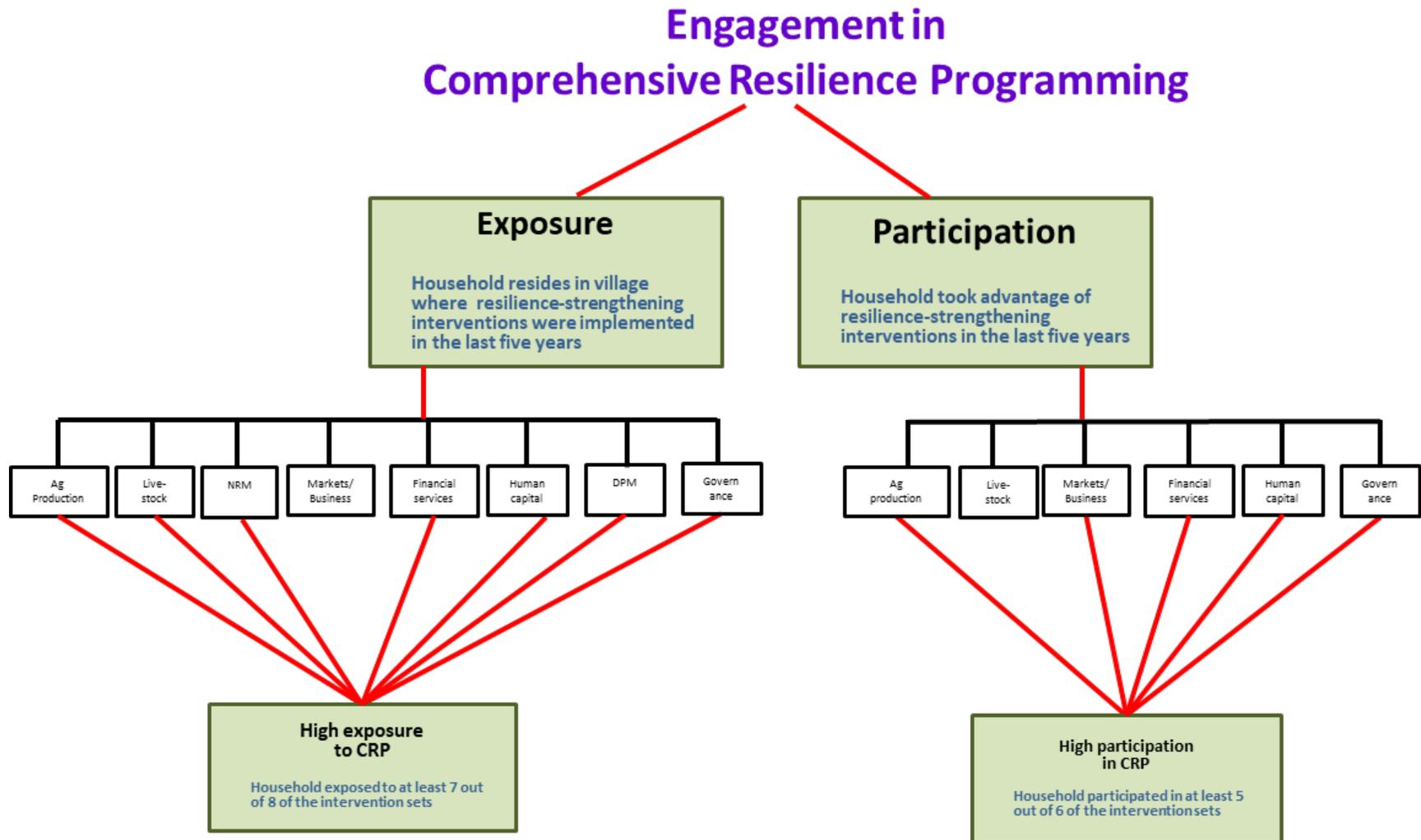
Data on households' participation in interventions were not collected for two of the intervention sets: CNRM and Disaster Preparedness and Mitigation (DPM).⁷² Indexes of participation in each of the remaining six intervention sets are built from indicators of household's actual reported activity patterns in the previous 5 years. The indicators are listed in the left-hand column of Table 31 and Table 32 (i.e., Table 31 continued). The indicators of high participation in intervention sets as well as participation in CRP are calculated similarly to those for exposure. The right-hand side of Figure 20 lays out the method for measuring participation in CRP.

⁷⁰ This ratio ensures that there will be sufficient control group households to match with treatment group households.

⁷¹ Moderate engagement is itself defined as having an index value as close as possible to 1/3 of the interventions listed in Table 29 and Table 30.

⁷² Data were not collected for these intervention sets because most of the activities implemented under them are inherently community-level activities and were not extended to all individuals in a community. For example, mapping of natural resources (under CNRM) and establishment of village early warning systems (under DPM) would have been done by village leaders or select community members. Further, participation in the DPM activities, such as an early warning system, would only pertain to households in villages where there was a disaster, rendering an indicator of such participation non-comparable across households in the sample.

Figure 20. Measurement of exposure to and participation in Comprehensive Resilience Programming



Note: The particular intervention sets selected to represent high exposure/participation are examples of possible combinations.

Table 31. Indicators of participation in resilience-building interventions in the last 5 years, by initiative area (percentage of households)

Indicator	All	Project area	
		Burkina Faso	Niger
Improved technologies and management practices: Agricultural production			
HH started to use improved seeds in the last 5 yrs	43.2	38.2	49.1
HH started to use improved fertilizers in the last 5 yrs	39.9	41.2	38.5
HH started to use improved irrigation techniques in the last 5 yrs	16.8	16.4	17.3
HH started to use improved post-harvest storage techniques in the last 5 yrs	33.2	31.4	35.3
HH started up new home gardens in the last 5 years	10.8	10.0	11.7
HH had training in at least 4 of 9 conservation farming techniques in last 5 yrs	15.3	14.4	16.3
Index	1.6	1.5	1.7
Improved technologies and management practices: Livestock rearing			
Received services of veterinary services facility in the last 5 years	44.3	45.8	42.4
Received services of an Auxiliaire d'Elevage in the last 5 years	64.8	66.5	62.8
Animals received vaccinations during a vaccination campaign in last 5 years	69.8	67.1	72.9
Participated in a habbanaye program in the last 5 years	16.0	9.3	23.8
Used new water sources for animals in the last 5 years	23.4	23.0	23.9
Improvement in water sources for animals in the last 5 years	22.1	19.7	24.9
Sheep/goats: training in animal rearing in the last 5 years	7.5	9.1	5.6
Sheep/goats: assistance with improved shelter in the last 5 years	3.7	4.8	2.3
Chickens/guinea fowl: training in animal rearing in the last 5 years	7.7	12.0	2.7
Chickens/guinea fowl: assistance with improved shelter in the last 5 years	4.2	6.5	1.5
Index	2.6	2.6	2.6
Markets and business development			
HH member attended cowpea trade fair in last 5 years	6.2	7.0	5.2
HH member had training in how to grow and sell cowpeas	8.7	10.9	6.2
HH member is a member of a cowpea producer's association	6.1	8.5	3.3
HH member attended livestock trade fair in last 5 years	6.5	9.5	3.1
HH member had training in how to raise livestock	6.6	9.8	3.0
HH member is a member of a livestock producer's association	5.8	8.0	3.3
Index	0.4	0.5	0.2

Note: Unless otherwise specified, indicators are the percent of households that participated in the intervention.

(Continued...)

Table 32. (continued) Indicators of participation in resilience-building interventions in the last 5 years, by initiative area (percentage of households)

Indicator	All	Project area	
		Burkina Faso	Niger
Financial services			
HH held savings or took out a loan with a savings and loan group that started in last 5 yrs	15.2	12.6	18.1
HH got credit with MFI that started in last 5 yrs	3.7	4.7	2.5
HH participated in warrantage program that started in last 5 yrs	4.3	3.7	5.0
Index	0.23	0.21	0.30
Human capital			
HH took part in literacy training in last 5 yrs	38.1	43.8	31.3
HH took part in numeracy training in last 5 yrs	29.3	30.0	28.5
Program to help youth get new jobs or start their own business in last 5 yrs	11.1	9.0	13.6
HH started to use mosquito nets in last 5 yrs	97.0	95.5	98.9
Received info about at least 4 (out of 6) health practices	40.9	33.6	49.4
HH received info about healthy eating in last 5 yrs	66.6	63.1	70.8
HH got cleaner drinking water in last 5 yrs	71.5	71.5	71.5
HH got improved latrine in last 5 yrs	39.1	40.5	37.5
Index	3.9	3.9	4.0
Governance			
HH member has attended a meeting of a Village Development Committee that started in last 5 yrs	48.3	59.5	35.2
Index	0.5	0.6	0.4

Note: Unless otherwise specified, indicators are the percent of households that participated in the intervention.

8.2. Descriptive Analysis: Comparison of Exposure to and Participation in Interventions across the Initiative Areas

The percentage of households exposed to CRP, along with those having high exposure to the eight intervention sets, is reported in Table 33 and illustrated in Figure 21. The three intervention sets to which households were most highly exposed are Agricultural Production, CNRM, and Governance. Burkina Faso households had somewhat higher exposure to CRP, marked by greater exposure to Livestock interventions and Markets and Business Development interventions. For the latter, about a quarter of Burkina Faso households were highly exposed while zero were highly exposed in the Niger area. Intervention sets with substantially greater exposure in Niger are Financial Services, Human Capital and, especially DPM, to which about one-third of households were exposed (only 4.4 percent in Burkina Faso).

Table 33. Percent of households exposed to and participating in the Comprehensive Resilience Programming, by initiative area

Indicator	All	Project area	
		Burkina Faso	Niger
	(Percent of households)		
Exposure to Comprehensive Resilience Programming	42.8	46.6	38.5
High exposure to interventions			
Improved technologies and management practices: Agricultural production	33.9	32.1	36.0
Improved technologies and management practices: Livestock rearing	12.6	15.3	9.4
Community natural resource management	44.8	47.1	42.1
Markets and business development	13.8	25.6 ^a	0.0 ^a
Financial services	17.4	14.0	21.4
Human capital	17.8	9.9	27.0
Disaster preparation and mitigation	17.5	4.4 ^a	32.9 ^a
Governance	59.4	62.7	55.6
Participation in Comprehensive Resilience Programming	11.9	13.3	10.2
High participation in interventions			
Improved technologies and management practices: Agricultural production	13.5	10.5	17.0
Improved technologies and management practices: Livestock rearing	8.5	8.1	8.9
Markets and business development	10.6	14.2 ^a	6.3 ^a
Financial services	19.8	17.5	22.4
Human capital	9.7	8.0	11.7
Governance	48.3	59.5 ^a	35.2 ^a

Note: Reported values for subgroups with the same superscript are significantly different at least at the 0.05 level.

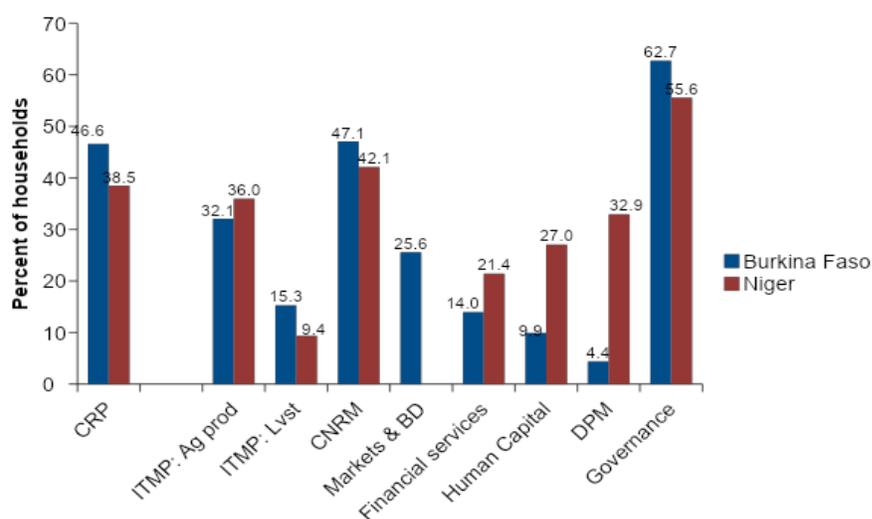
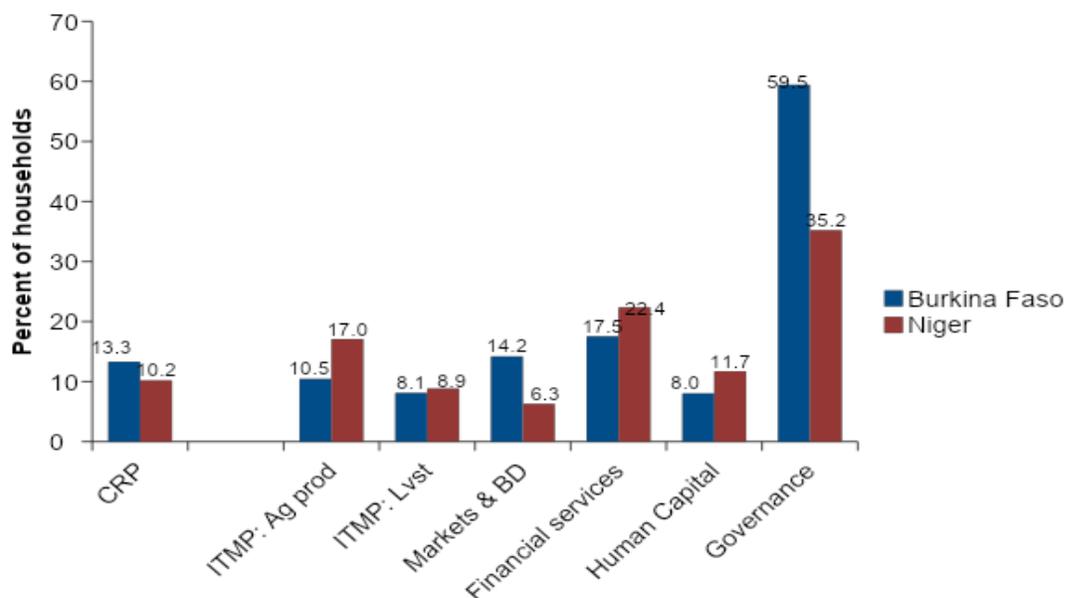
Figure 21. High exposure to resilience-strengthening interventions, by initiative area


Figure 22. High participation in resilience-strengthening inventions, by initiative area



Turning to *participation* in interventions, we can see that households' participation in CRP was far lower than exposure—households were much more likely to be exposed to interventions implemented in their communities than to have directly participated in them. The pattern of higher exposure than participation holds for all interventions but two, Markets and Business Development (for Niger households) and Financial Services (both areas). For these latter, some households participated in interventions that began implementation *before* the RISE Initiative started and were thus not picked up in the exposure data (which was limited to interventions after the start of the initiative).

As for exposure, the intervention set with the highest participation is Governance, that is, Village Development Committees (VDCs). Burkina Faso households were more likely to participate in these VDCs and in the Markets and Business Development interventions. In contrast, Niger households were more likely to participate in Agricultural Production interventions.

8.3. Humanitarian Assistance Received

In Chapter 3 we saw that very few households reported relying on food assistance (about 5 percent by endline) or food-for-work/cash-for-work (1.5 percent) as a way of coping with the shocks they faced. In Chapter 5 (on resilience capacities) we saw that while about 50 percent of households had access to food assistance at baseline, the percentage declined to 20 percent by endline. This decline is at least partly due to the inability of humanitarian actors to access areas with high insecurity and COVID-19 mobility restrictions (see Section 3.3 above). That is, while

the shock situation called for *more* assistance, that shock situation itself prevented humanitarian actors from providing it.

The low numbers of households receiving humanitarian assistance is born out in data collected from households at endline asking them to report on whether and for how many years they received four types of assistance: food aid, cash assistance, food-for-work, and cash-for-work (see Table 34). Only one-quarter of households received food assistance over the 5-year period, and just over 10 percent received cash assistance. Food/cash-for-work assistance was even lower. Those households that did receive humanitarian assistance received it, on average, in 2 of the last 5 years.

Burkina Faso households were more likely to receive food or cash assistance than Niger households, while Niger households were more likely to participate in food/cash-for-work.

Table 34. Humanitarian assistance received since the baseline, by initiative area

Indicator	All	Project area	
		Burkina Faso	Niger
Assistance received in the last five years			
Percent of households that received ...			
Food	25.0	31.2 ^a	17.6 ^a
Cash	11.1	13.9 ^a	7.7 ^a
Food-for-work	4.3	1.4 ^a	7.7 ^a
Cash-for-work	8.0	3.9 ^a	12.9 ^a
Any humanitarian assistance	33.4	35.7 ^a	30.8 ^a
Number of years (mean)			
Food	1.90	1.87	2.00
Cash	1.90	1.75	2.22
Food-for-work	2.11	b/	2.20
Cash-for-work	2.02	2.00	2.03

Note: Reported values for subgroups with the same superscript are significantly different at least at the 0.05 level.
b/ Not enough households for estimation (N=16)

While humanitarian assistance was not a major part of resilience programming over the RISE Initiative, it is nevertheless controlled for in the impact evaluation of the next chapter.

8.4. Summary: Engagement in Resilience-Strengthening Interventions and Receipts of Humanitarian Assistance

In preparation for the impact evaluation in the next chapter, this chapter introduced the measures of household exposure to and participation in resilience-strengthening interventions employed. Separate indicators of exposure and participation are employed as these modes of engagement could have differing impacts.

To construct overall measures of exposure and participation, the initiative's interventions were first divided into eight "interventions sets":

- Improved technologies and management practices: agricultural production;
- Improved technologies and management practices: livestock rearing;
- Community natural resource management;
- Markets and business development;
- Financial services;
- Human capital;
- Disaster preparedness and mitigation; and
- Governance.

Indexes for exposure to and participation in each category were then calculated. Recognizing the comprehensive, cross-sectoral nature of the RISE Initiative approach, a dichotomous measure of Comprehensive Resilience Programming (CRP) was then calculated.

Forty-three percent of the households residing in the RISE Initiative area as a whole were exposed to CRP over the course of the initiative, and 12 percent directly participated in it. Burkina Faso households were more likely to be exposed to and participate in CRP.

With respect to differences in engagement in the eight intervention sets, exposure to Markets and Business Development was higher in Burkina Faso than in Niger (25.6 versus none in Niger). However, exposure to Disaster Preparedness and Mitigation was higher in Niger than Burkina Faso (32.9 versus 4.4 percent). For the other intervention sets, exposure was roughly equal across the two initiative areas.

In terms of participation, households in Burkina Faso were more likely to participate in Market and Business Development interventions than Niger households (14.2 versus 6.3 percent). Households in Burkina Faso were more likely to participate in Governance interventions than households in Niger (59.5 versus 35.4 percent). For the other intervention sets, participation was similar across the two initiative areas.

Similar to the findings in Chapter 3, very few households reported relying on any humanitarian assistance over the RISE Initiative period. Only one-quarter of households received food assistance, and just over 10 percent received cash assistance. Food/cash-for-work assistance was even lower. Further, humanitarian assistance declined over the initiative period despite the

increase shock exposure, partly because of the inability of humanitarian actors to access areas of need.

9. IMPACT OF RISE

This chapter presents the results for four key research questions asked in this report:

1. Did household exposure to and direct participation in resilience-strengthening interventions increase their resilience capacities and resilience to shocks?;
2. Which resilience capacities were strengthened due to households' engagement in the interventions?;
3. Which specific types of interventions enhanced households' resilience capacities and resilience?; and
4. What was the impact of the interventions on poverty and women's empowerment?

After evaluating the impact of Comprehensive Resilience Programming (CRP), it focuses in on the impact of the eight types of resilience-strengthening interventions implemented:

- Agricultural production
- Livestock rearing
- Communal Natural Resource Management
- Markets and Business Development
- Financial services
- Human capital
- Disaster preparedness and mitigation; and
- Governance.

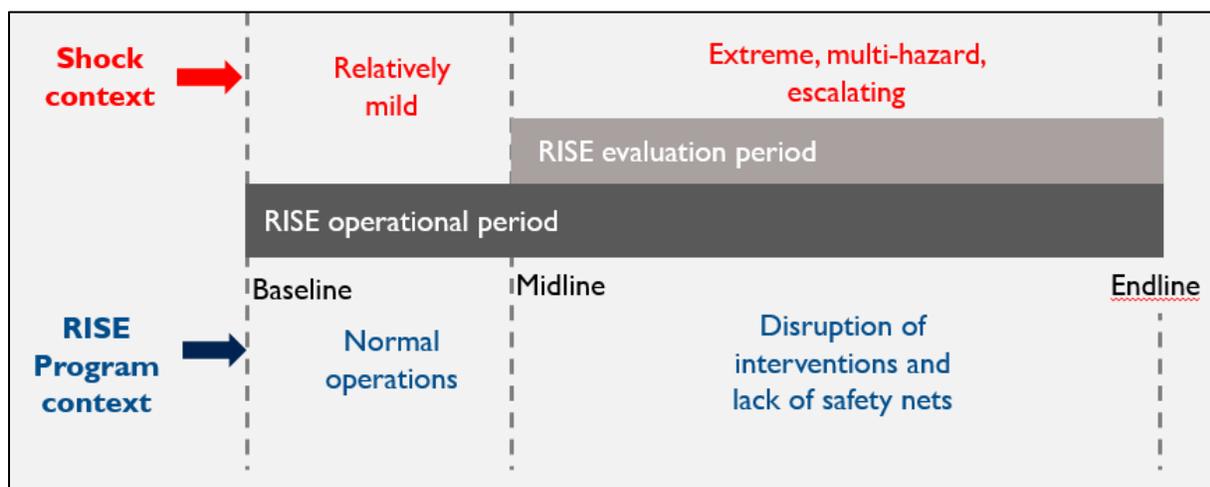
From Chapter 2, the time period of focus for conducting this impact evaluation is that between the midline and endline surveys. The main method employed is Difference-in-differences Propensity Score Matching (DID-PSM). Annex I describes the selection of treatment and control groups for the analysis. The results of statistical tests assessing the conditions for implementing DID-PSM and that ensure the rigor of this impact evaluation are also presented there. All DID-PSM impact estimates reported in the chapter are the Average Treatment Effect on the Treated (ATT).

While viewing the results, it is important to keep in mind the highly volatile shock situation that ensued over the course of the evaluation period, between April 2017 (midline) and September 2020 (endline), including simultaneous climate and conflict shocks and a large health shock, the COVID-19 pandemic. These shocks disrupted the implementation of RISE Initiative interventions just as they were disrupting income generating activities and markets on a broader scale country wide.

As will be seen, while CRP had a positive estimated impact on households' resilience and most resilience capacities, the DID-PSM analysis registered negative ATTs for some capacities. Further, some of the eight intervention sets are associated with negative ATTs for many of the resilience capacities.

Figure 23 helps to put these results into the context of the shock exposure situation. It shows that while the measurement period for households' exposure to and participation in interventions is the entire baseline to endline period that for the evaluation of impact is only for the midline to endline (because of the availability of panel data). This latter period was one of extreme and escalating shock exposure, disruption of ongoing interventions, and lack of a safety net to help households cope with shocks. These differences between the exposure periods and evaluation periods can lead to downward biased estimates of ATTs. In this case, positive estimated ATTs are actually positive (although lower than actual impacts). However, it is not possible to determine whether any negative estimated ATTs are actually due to negative impacts of interventions themselves or to the negative bias induced by the dissonance between the exposure and evaluation periods. We will interpret the impact evaluation results in light of this estimation issue, a full explanation of which is given in Annex 4.

Figure 23. RISE Initiative operational period in relation to the evaluation period and shock context



9.1. Impact on Resilience and Resilience Capacities

9.1.1. Impact of Exposure to Comprehensive Resilience Programming

The upper panel of Table 35 reports DID-PSM estimates of the impact of exposure to CRP on resilience, starting with the first indicator of resilience, realized resilience (the change in food security between the midline and endline surveys).

Table 35. Impact of exposure to Comprehensive Resilience Programming on household resilience and resilience capacity: Difference-in-differences Propensity Score Matching estimates

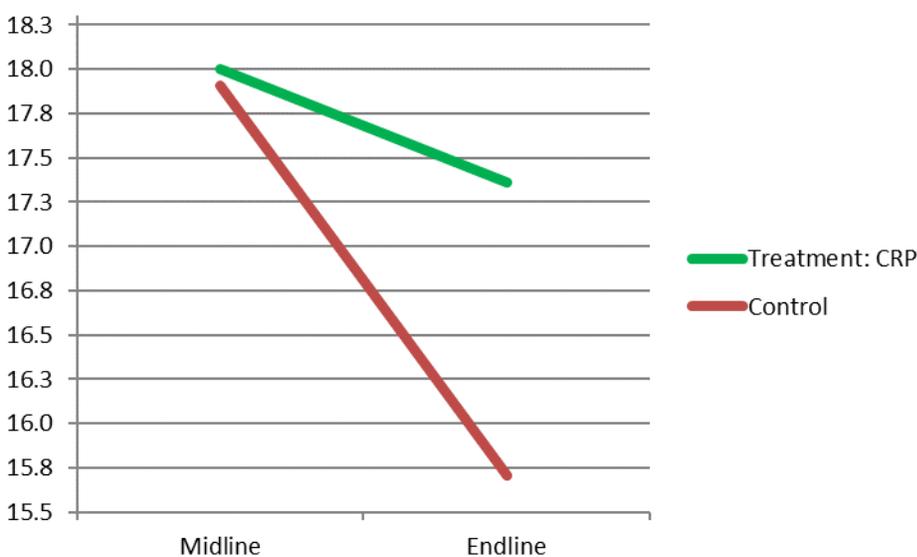
	All		Program areas	
			Burkina Faso	Niger a/
Resilience				
Change in food security	1.56 ***		2.56 ***	--
Perceived ability to recover	0.02		-0.04	--
Resilience capacity				
Overall index of resilience capacity	8.44 ***		7.6 ***	--
Absorptive capacity				
Bonding social capital	1.57		-4.31	--
Cash savings	-0.03		-0.07	--
Access to informal safety nets	0.18 *		0.15	--
Availability of hazard insurance	0.38 ***		0.22 ***	--
Disaster preparedness and mitigation	0.25 ***		-0.02	--
Conflict mitigation support	0.05		0.06	--
Asset ownership	2.97 ***		2.68 ***	--
Index of absorptive capacity	8.83 ***		3.69 ***	--
Adaptive capacity				
Bridging social capital	5.01 **		0.78	--
Linking social capital	-0.63		3.65 **	--
Aspirations/confidence to adapt	-2.51		-1.5	--
Livelihood diversity	0.91 ***		0.89 ***	--
Access to financial resources	0.45 ***		0.2 **	--
Human capital	3.90 *		0.01	--
Exposure to information	1.50 ***		1.78 ***	--
Asset ownership	2.97 ***		2.68 ***	--
Index of adaptive capacity	10.40 ***		9.32 ***	--
Transformative capacity				
Bridging social capital	5.01 **		0.78	--
Linking social capital	-0.63		3.65 **	--
Access to markets	-1.40 ***		-1.71 ***	--
Access to services	-0.08		-0.02	--
Access to infrastructure	0.59 ***		0.83 ***	--
Access to communal natural resources	0.12 *		0.32 ***	--
Access to formal safety nets	0.41 ***		0.3 ***	--
Index of transformative capacity	2.20 **		4.62 ***	--
Number of observations	1,743		951	

Note: Values reported are the Average Treatment Effect on the Treated (ATT). Stars indicate statistical significance at the 10%(*), 5%(**), and 1%(***) levels.
a/ Separate estimates not reported because PSM for Niger did not satisfy common support and matching effectiveness conditions.

The estimate for the preferred matching algorithm, kernel matching, is 1.56 and statistically significant at the one percent level: **households’ exposure to resilience-strengthening interventions spanning multiple sectors did indeed strengthen their resilience**. The estimates for nearest-neighbor matching (1.5) and radius matching are very close, 1.54 and 1.62, respectively,⁷³ which indicates that the kernel matching estimates are robust to choice of matching algorithm.

Figure 24 below illustrates the impact of exposure to CRP on changes in households’ food security and thus their “realized resilience” to the shocks they faced between the midline and endline surveys. Recall that food security declined significantly over the initiative period (see Chapter 6, Table 20). From the evidence presented here, because of their exposure, the decline was *less* for households engaged in CRP (the green line) than those not. Households exposed to CRP experienced a 71 percent lower decline in food security than their unexposed counterparts (the red line).

Figure 24. Impact of exposure to Comprehensive Resilience Programming on resilience (change in food security)

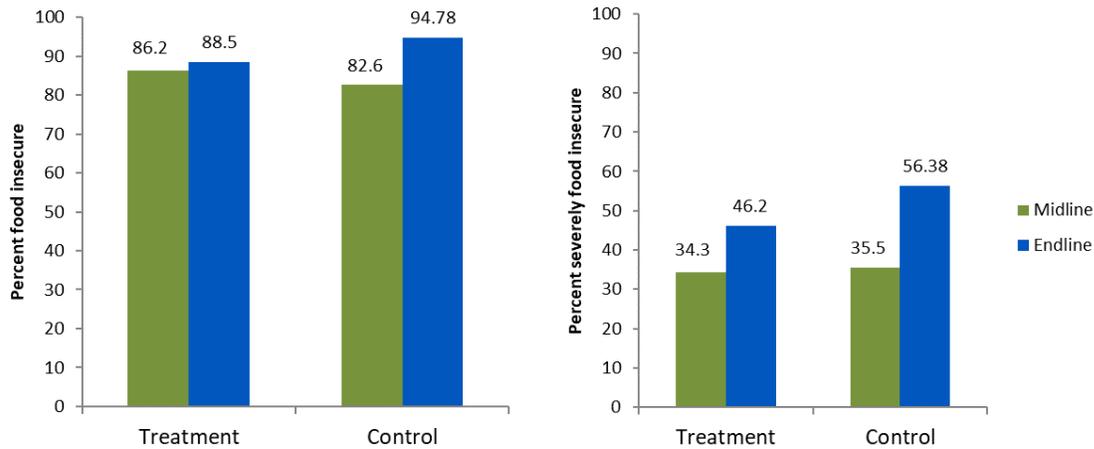


The magnitude of these impact results become clearer when they are translated into population-level terms. The prevalence of food insecurity increased a great deal in the initiative area between the midline and endline surveys, from 82.6 to 90.2 percent (see Table 20). As can be seen from Figure 25, exposure to CRP had a substantial preventative effect on this outcome. The prevalence of food insecurity increased by only 2.3 percentage points for the treatment group. For the control group it increased by 12.2 percentage points. Exposure to CRP thus led to a 9.9 percentage-point smaller increase in food insecurity than would have otherwise taken place between the midline and endline (the difference between these increases or “difference-

⁷³ The z-statistic for the (bootstrapped) Nearest Neighbor Matching estimate is 2.73 and the t-statistic for radius matching is 2.79. Both are significant at the one percent level.

in-differences”). Exposure to CRP also led to a smaller increase in the prevalence of severe food insecurity—which is associated with such behaviors as going to bed without eating and going a whole day and night without eating.

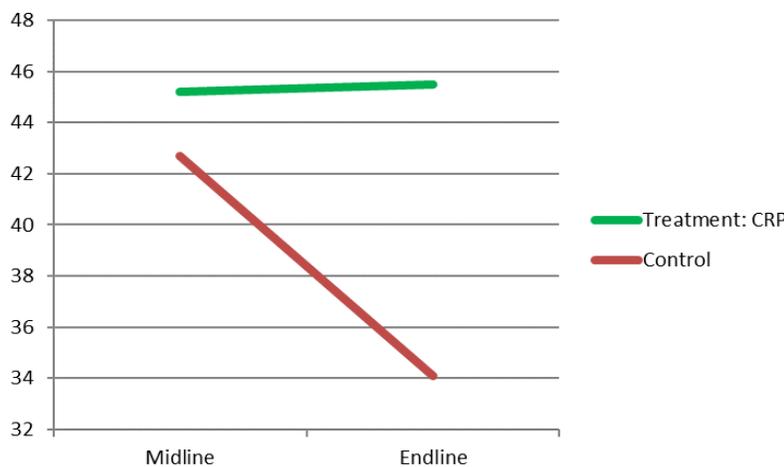
Figure 25. Impact of exposure to Comprehensive Resilience Programming on food insecurity and severe food insecurity



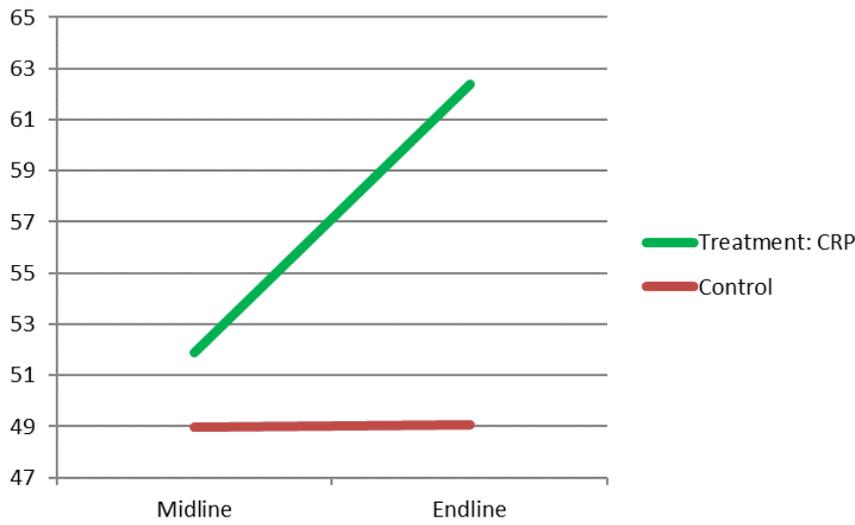
Turning to the impacts on resilience capacity, we find that exposure to CRP had a strong positive impact on households’ overall resilience capacity (Table 35) associated with positive impacts on both absorptive and adaptive capacity, as illustrated in Figure 26. In the case of absorptive capacity, the treatment group’s capacity held steady while the control group’s plummeted. In the case of adaptive capacity, the treatment group’s capacity improved considerably while the control group’s showed no change. In the case of transformative capacity, the treatment and control groups’ capacity both declined at about the same rate.

Figure 26. Impact of exposure to Comprehensive Resilience Programming on resilience capacity

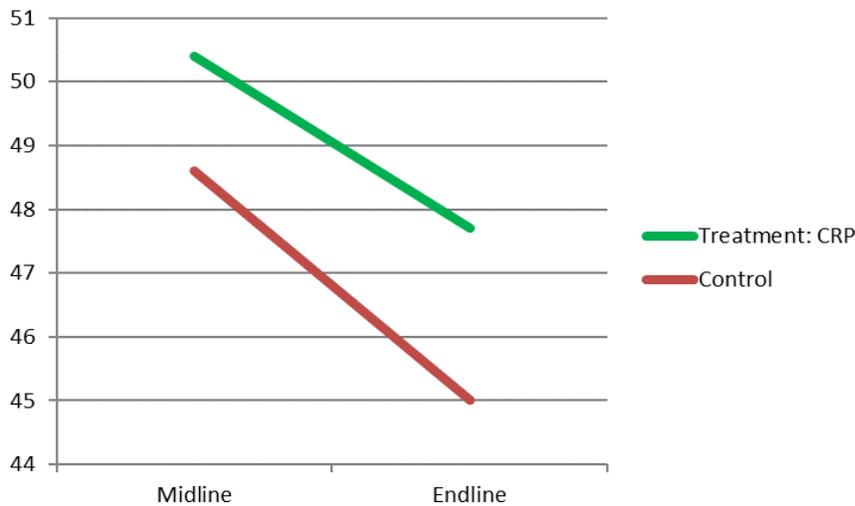
a. Absorptive capacity



b. Adaptive capacity



c. Transformative capacity



Looking next at individual resilience capacities, which are the levers for bringing about improvements in the capacities and thus resilience, those on which exposure to CRP had a positive impact are (see Table 35):

Absorptive capacity

- Availability of hazard insurance
- Disaster preparedness and mitigation
- Asset ownership

Adaptive capacity

- Bridging social capital

- Livelihood diversity
- Access to financial resources
- Exposure to information
- Asset ownership

Transformative capacity

- Bridging social capital
- Access to infrastructure
- Access to formal safety nets.

There is one capacity for which exposure to CRP registers a statistically significant and negative impact: access to markets. It is possible that this is a true negative impact, for instance exposure to CRP may have increased households' access to markets, leaving them exposed to a steeper decline in such access when market closures and other disruptions occurred during the shock period following the midline (see Figure 23). A steeper decline may have also occurred because of the disruption of interventions, such as Market and Business Development Interventions. However, it may also be due to the downward bias in impact estimates mentioned in the introduction to this chapter and explained further in Annex 4.

9.1.1.1. Comparing Impacts across the Initiative Areas

For comparing impact estimates across the initiative areas it was only possible to directly estimate ATTs for the Burkina Faso area. This is because the data for Niger did not satisfy the conditions for common support and matching effectiveness (see Annex I, Table A1.3). However, since there are only two areas, we can gain some general insight into the differences by comparing the signs, magnitudes and statistical significance of the Burkina Faso estimates to those of the RISE area as a whole. Table 35 contains the two sets of estimates.

With respect to resilience itself, the estimate for the impact of CRP on realized resilience is notably higher for the Burkina Faso area than the RISE area as a whole (64.1 percent higher). This difference indicates that CRP had a stronger positive impact in the Burkina Faso area than the Niger area.

With respect to resilience capacity, the impact estimates for the index of overall resilience capacity indicate roughly equal strengths of impact across the initiative areas. The same holds true for adaptive capacity. However, the comparative estimates indicate that CRP had a more positive impact on absorptive capacity in the Niger area, driven partly by a greater positive impact on disaster preparedness and mitigation. On the other hand, they indicate that CRP had a more positive impact on transformative capacity in the Burkina Faso area. This impact is driven by a greater positive impact on both linking social capital and access to communal natural resources (despite a lower impact on bridging social capital).

9.1.2. What Worked? Impact of Exposure to Specific Types of Interventions

The results for exposure, individually, to each of the eight intervention sets implemented as part of the RISE Initiative are summarized in Table 36. The full results can be found in Annex 2. In Table 36, the columns are the eight intervention sets and the rows are resilience and resilience capacity indicators. The values presented are the impact of the intervention set (ATT estimates). Green-shaded cells indicate a positive impact significant at the 5 percent level. Red-shaded cells indicate a negative impact significant at the 5 percent level. Unshaded cells give estimates that are not statistically significant at the 5 percent level. Matching diagnostics for the results presented in this section are in Annex 1, Table AI.3.

In order to isolate the individual impacts of each of the eight intervention sets, exposure to the other intervention sets is controlled for in the matching analysis. In particular, the total number of other intervention sets households were exposed to is included. When estimating the impact of agricultural production interventions, for example, the total number of other intervention sets (livestock rearing, CNRM, etc.) is matched across the treatment and control group households.

It is important to keep in mind that due to the integrative nature of the RISE Initiative, only a minority of households were actually engaged in only one intervention set to the exclusion of the others. Nevertheless, the estimates presented here enable us to get a sense of the relative effectiveness of the intervention sets in strengthening households' resilience and resilience capacities.

Table 36. Impact of exposure to the eight intervention sets on resilience and resilience capacity: Summary

	Agricultural production (N=1,674)	Livestock rearing (N=1,752)	CNRM (N=1,717)	Markets & Business Dev't ^{a/} (N=962)	Financial services (N=1,751)	Human capital (N=1,708)	Disaster preparation & mitigation (N=1,711)	Governance (N=1,758)
Resilience								
Realized resilience	-0.30	-0.71	0.18	-1.55	1.72	-0.98	-0.91	1.16
Perceived ability to recover	0.06	0.03	-0.17	-0.17	-0.09	0.23	0.12	0.14
Resilience capacity								
Index of overall resilience capacity	1.22	-5.30	4.42	-7.66	-0.22	7.10	9.26	7.80
Absorptive capacity								
Bonding social capital	1.43	-6.10	1.11	-7.10	-0.75	0.97	-2.62	5.10
Cash savings	0.00	0.01	0.10	0.30	0.09	-0.04	0.20	0.09
Access to informal safety nets	-0.42	0.14	0.30	-0.33	-0.11	0.92	0.40	0.37
Availability of hazard insurance	0.12	0.23	0.17	-0.06	-0.33	0.17	0.08	0.20
Disaster mitigation and preparedness	-0.02	-0.70	0.27	-0.86	-0.48	0.34	0.08	0.70
Conflict mitigation support	0.10	0.07	0.04	-0.21	-0.03	0.28	0.08	-0.05
Asset ownership	1.52	-3.44	-0.02	-0.53	1.20	-2.64	1.20	4.90
Index	0.28	-3.0	6.61	-10.2	-6.61	9.57	6.00	11.10
Adaptive capacity								
Bridging social capital	13.6	-4.10	-0.68	-26.6	-5.78	-4.87	1.64	8.20
Linking social capital	-3.38	-8.30	4.93	2.10	0.70	2.09	17.0	-0.42
Aspirations/confidence to adapt	4.55	-0.80	-4.96	-0.92	7.19	-2.67	-5.30	-0.55
Livelihood diversity	0.08	0.03	0.70	-0.02	0.30	-0.01	0.66	0.37
Access to financial resources	0.02	0.14	-0.21	-0.43	0.02	0.83	0.13	0.16
Human capital	0.62	-0.57	3.06	-2.10	-2.28	0.46	1.50	3.60
Exposure to information	0.43	-1.30	1.65	0.58	0.13	-0.45	1.20	1.10
Asset ownership	1.52	-3.44	-0.02	-5.30	1.20	-2.64	1.20	4.90
Index	2.69	-5.70	4.01	-7.50	2.53	3.84	10.1	7.70
Transformative capacity								
Bridging social capital	13.6	-4.10	-0.68	-26.6	-5.78	-4.87	1.64	8.20
Linking social capital	-3.38	-8.30	4.93	2.10	0.70	2.09	17.0	-0.42
Access to markets	-0.37	0.30	-0.36	-0.43	-1.01	-0.03	0.4	-0.74
Access to services	-0.02	-0.20	-0.19	-0.18	0.17	1.34	0.17	0.20
Access to infrastructure	0.05	0.16	0.32	0.10	-0.27	0.06	-0.60	0.13
Access to communal natural resources	0.09	-0.15	0.09	-0.19	-0.08	0.73	0.38	-0.08
Access to formal safety nets	-0.26	-0.21	0.34	-0.66	-0.23	-0.11	0.24	0.59
Index	-1.84	-4.70	2.07	-3.50	-1.14	10.41	7.20	2.90

Note: Green-shaded cells indicate a positive impact significant at the 5% level. red-shaded cells indicate a negative impact. Values reported are the Average Treatment Affect on the Treated (ATT).

a/Results only reported for Burkina Faso area because no Niger households were highly exposed to this intervention set.

The intervention set that appears to have had the most positive impact on both resilience and resilience capacity between the midline and endline surveys is Governance, that is, Village Development Committees. This intervention had a positive impact on households' resilience, both in terms of food security recovery and perceived ability to recover—despite all of the disruptions that came with escalating shock exposure. It had positive impacts on all three types of resilience capacity as well and the majority of the individual resilience capacities. The only capacity for which a negative ATT is registered is access to markets. Again, this could be due to the fact that households exposed to this intervention set were better able to improve their access to markets before the market-disrupting shocks hit and thus had more to lose due to the shocks, or due to the negative bias in estimates mentioned above, or both.

Two additional intervention sets appear to have had largely positive impacts on resilience and resilience capacity: Human Capital and DPM. Both showed positive and (at least nearly) statistically significant⁷⁴ impacts on households' perceived ability to recover, although not realized resilience, and on all three dimensions of resilience capacity.

The estimated ATT for the impact of Human Capital interventions (such as literacy and numeracy training and health/sanitation interventions) on asset ownership is negative. Those for the impact of DPM interventions on access to infrastructure and households' aspirations and confidence to adapt are also negative. With regard to the latter, the negative impact estimates are found in particular for two aspects of aspirations: absence of fatalism and exposure to alternatives. The DPM interventions may have had a positive impact on these important features of aspirations prior to the extreme shock period, raising them above the norm, and then when the shocks hit—especially the conflict shock that affected so many people's psychological well-being—the improvements were erased. On the contrary, households not exposed to DPM interventions would have seen no change in their aspirations in the pre-midline period.

Three intervention sets give a “mixed bag” of positive and negative impacts, the latter due either to true negative impacts or the methodological issue of negative bias.

Agricultural Production interventions show no positive impact on resilience and the overall index of resilience capacity. They had a positive impact on adaptive capacity, including bridging social capital and asset ownership. Other positive impacts were on the availability of hazard insurance and support for conflict mitigation as well as aspirations and confidence to adapt. The Agricultural Production interventions register negative impact estimates for access to information, safety nets, linking social capital, access to markets, and access to formal safety nets.

The CNRM interventions had a positive impact on households' absorptive and adaptive capacities, including a full nine of the individual capacities. These positive impacts did not extend, however, to households' resilience to shocks itself.

⁷⁴ The z-statistic on the DPM interventions is nearly significant at the 10% level.

The Financial Services interventions had the most strong, positive impact on households' realized resilience, increasing the realized resilience measure by 1.72 points overall. They also appear to have had positive impacts on two resilience capacities: asset ownership and aspirations/confidence to adapt. They register negative estimated impacts for absorptive capacity and three transformative capacities.

The last two intervention sets—Livestock Rearing and Markets and Business Development—are both closely tied to markets. The link between these interventions and households' resilience and resilience capacities is thus the most likely to have been affected by the market disruptions that came with the upsurge in conflict shock and the COVID 19 pandemic over the evaluation period. The DID-PSM analysis finds that they had no measurable impact on households' resilience to shocks. Negative ATTs are registered for all three dimensions of resilience capacity and many individual capacities.

9.1.3. Impact of Exposure versus Direct Participation in Interventions

Table 37 compares the impacts of exposure to Comprehensive Resilience Programming versus direct participation. This analysis defines CRP with respect only to the six intervention sets for which data were collected on household participation (see Chapter 8). The impact estimate for participation in CRP is 41 percent higher than that for exposure to CRP (0.86 versus 1.21). Both are statistically significant at the 5 percent level. The results are illustrated in Figure 27.

Consistent with these findings are the somewhat higher estimates of the impact of participation on resilience capacity, with the impact for the overall index of resilience capacity being 26 percent higher. While the estimates for absorptive and adaptive capacity follow this same pattern, those for transformative capacity are very close for exposure and participation.

These results confirm that households' direct participation in resilience-strengthening interventions of the type implemented by the RISE Initiative had a more positive impact on their resilience and resilience capacity when they directly participated in interventions than if they were just exposed to them. Note that this same result was found in a recent impact evaluation of the PRIME initiative in the lowlands of Ethiopia.⁷⁵

⁷⁵ Smith et al. 2019

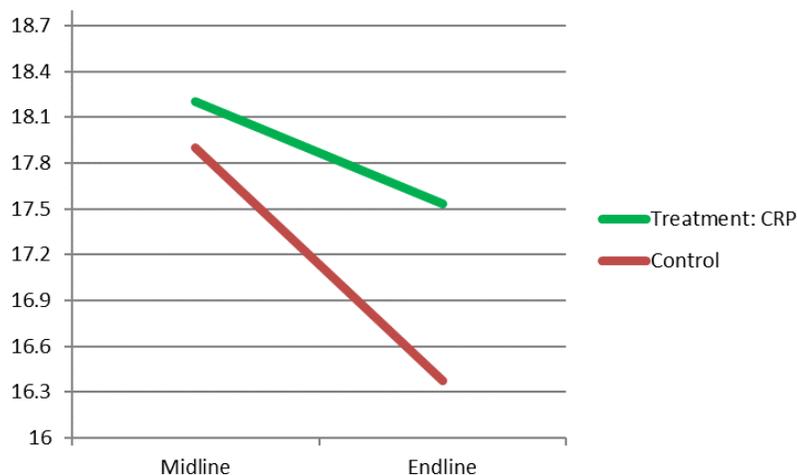
Table 37. Impact of exposure versus participation in Comprehensive Resilience Programming on household resilience and resilience capacity: Difference-in-differences Propensity Score Matching estimates

	Exposure	Participation
Resilience		
Change in food security	0.86 **	1.21 **
Perceived ability to recover	0.01	0.03
Resilience capacity		
Overall index of resilience capacity	7.16 ***	9.0 ***
Absorptive capacity		
Bonding social capital	4.20 **	6.90 ***
Cash savings	-0.20 ***	0.26 ***
Access to informal safety nets	-0.38 ***	0.01
Availability of hazard insurance	0.45 ***	0.00
Disaster preparedness and mitigation	0.06	0.09
Conflict mitigation support	-0.03	-0.02
Asset ownership	3.72 ***	4.47 ***
Index of absorptive capacity	4.10 ***	5.63 ***
Adaptive capacity		
Bridging social capital	11.40 ***	10.50 ***
Linking social capital	0.40	6.92 ***
Aspirations/confidence to adapt	0.15	2.64 **
Livelihood diversity	0.42 ***	0.63 ***
Access to financial resources	0.29 ***	-0.05
Human capital	4.90 **	9.80 ***
Exposure to information	1.33 ***	2.06 ***
Asset ownership	3.72 ***	4.47 ***
Index of adaptive capacity	9.20 ***	11.80 ***
Transformative capacity		
Bridging social capital	11.40 ***	10.50 ***
Linking social capital	0.40	6.92 ***
Access to markets	-0.93 ***	-0.25 ***
Access to services	0.09	-0.11
Access to infrastructure	0.27 **	0.09
Access to communal natural resources	0.08	0.27 ***
Access to formal safety nets	0.60 ***	0.02
Index of transformative capacity	2.80 ***	2.40 **

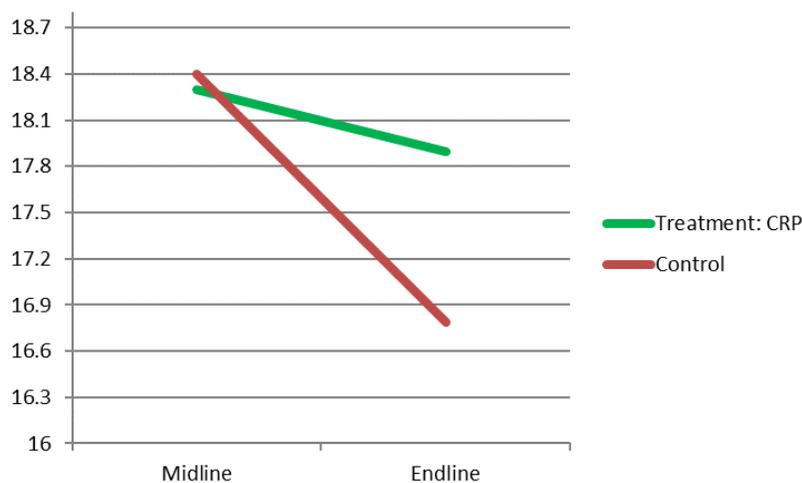
Stars indicate statistical significance at the 10%(*), 5%(**), and 1%(***) levels.

Figure 27. Impact of exposure versus participation in Comprehensive Resilience Programming on resilience

Exposure



Participation



9.1.4. Did Resilience-Strengthening Interventions Reduce the Negative Impact of Climate Shocks on Food Security?

Despite some possible negative impacts of individual intervention sets, in Section 9.1.2 we found that households' exposure to the resilience-strengthening interventions implemented in the RISE Initiative area as a whole had a positive impact on households' ability to maintain their food security. Resilience marks the ability of households to recover from, specifically, *shocks*. In this section, we evaluate the evidence on whether the positive impact was achieved through reducing the negative impact of climate shocks on households' food security. As detailed in Chapter 2, panel growth regression is employed.

Table 38 contains the panel growth regression results for four measures of shock exposure: the total rainfall deficit between the midline and endline, the number of months of drought, the total rainfall surplus, and the number of months of flooding. The key reported value of interest is the coefficient on the interaction term between the PSM treatment group indicator and shock exposure. A positive and statistically significant coefficient on this term indicates that exposure to CRP reduces the negative impact of shocks on households' food security. The results are presented for treatment group indicators based on both kernel matching and Nearest Neighbor matching (1:5) (NN5).⁷⁶

Table 38. Has exposure to Comprehensive Resilience Programming reduced the negative impact of climate shocks on food security? Panel growth regression results

Shock exposure measure	Kernel matching			Nearest Neighbor Matching (1:5)		
	Coefficient	t-stat		Coefficient	t-stat	
Total rainfall deficit						
CRP	0.46	0.40		-1.90	-1.27	
Shock exposure	0.00	0.23		-0.01	-1.40	
CRP*Shock exposure	0.01	1.04		0.02	2.52 **	
Number of months of drought						
CRP	0.84	1.19		-0.39	-0.46	
Shock exposure	-0.13	-0.45		-0.78	-2.44 **	
CRP*Shock exposure	0.34	1.36		0.88	3.10 ***	
Total rainfall surplus						
CRP	-2.24	-1.14		-1.35	-0.60	
Shock exposure	0.00	-0.70		0.00	0.10	
CRP*Shock exposure	0.01	2.05	**	0.01	1.37	
Number of months of flooding						
CRP	-2.72	-1.99	**	-1.36	-0.89	
Shock exposure	-0.26	-1.68	*	0.02	0.10	
CRP*Shock exposure	0.95	3.32	***	0.69	2.12 **	
Number of observations	1,743			1,221		

Note: The dependent variable is the change in food security between the midline and endline surveys. Stars indicate statistical significance at the 10%(*), 5%(**), and 1%(***) levels.

⁷⁶ We include both Kernel matching and Nearest Neighbor (NN) matching treatment group indicators in this analysis due to their differing advantages. NN matching allows us to use only the treatment group households and their matched controls, excluding any initial control households that were not matched to a treatment group household. Note, however, that after doing so, the number of households is reduced to 1,221 (see Table 9.4). Kernel matching, on the other hand, retains all households in the treatment group and all households in the initial control group except for the small number who are not on the common support. A weighting system is used to give greater weight to control group households that are better matched with the treatment group. While these weights are not used in this regression analysis, the number of households is higher than for NN matching, at 1,743, thus allowing for a larger analysis sample.

The interaction term coefficients are positive for all measures of shock exposure and the two matching methods and statistically significant at least at the 5 percent level for at least one of the matching methods. These findings indicate that households' engagement in resilience-strengthening interventions did indeed reduce the negative impact of climate shocks on their food security. It is additional evidence that resilience-strengthening interventions of the type implemented by RISE did in fact build resilience to shocks.

Delving further into the findings for the number of months of drought, the NN5 regression results imply the following relationship between CRP, shock exposure (SE), and households' resilience (R):

$$R = -0.386 * CRP - 0.777 * SE + 0.881 * SE * CRP.$$

The estimated impact of SE on our measure of resilience is thus:

$$\frac{\partial R}{\partial SE} = -0.777 + 0.881 * CRP.$$

Drought exposure reduces resilience for households in the non-exposed group (when CRP=0), but not for households exposed to CRP (CRP = 1). The relationship is illustrated in Figure 28(a), which shows the simulated trajectory of food security as the number of months of drought increases. With intensified shock exposure, the households exposed to multiple types of resilience-strengthening interventions maintained their food security while those not exposed experienced a steep decline—they were *not* resilient to the shocks they faced.

The findings for the number of months of flooding imply the following relationship between CRP, shock exposure and households' resilience:

$$R = -1.36 * CRP + 0.022 * SE + 0.694 * SE * CRP.$$

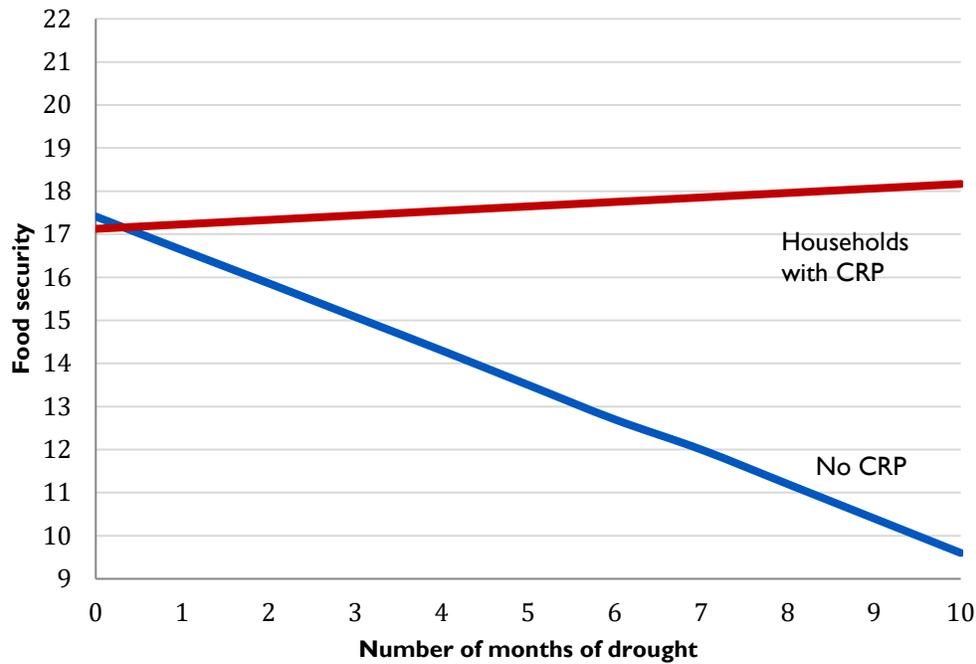
The estimated impact of SE on our measure of resilience is thus:

$$\frac{\partial R}{\partial SE} = 0.022 + 0.694 * CRP.$$

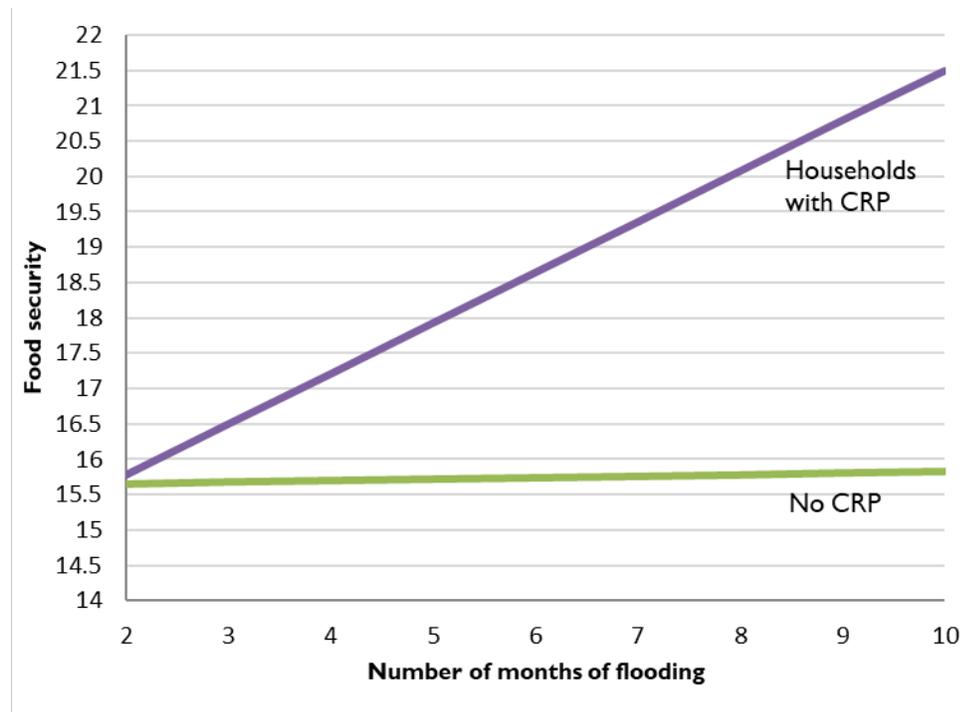
In this case, flood exposure has very little impact on resilience for households in the non-exposed group (when CRP = 0), but a *positive* impact on households exposed to CRP (CRP = 1). Somehow they are able to take advantage of resilience-strengthening interventions to the betterment of their food security even in the face of flooding. The relationship is illustrated in Figure 28(b).

Figure 28. Estimated endline food security as number of months of climate shock increases for households with exposure to Comprehensive Resilience Programming versus control groups

(a) Drought



(b) Flooding



9.1.5. Evidence on Attribution to the RISE Initiative

As noted in Chapter 8, it was not possible to directly measure the engagement of households in the interventions implemented specifically by the RISE Initiative. The impact evidence presented so far represents that of resilience-strengthening activities regardless of the implementing agency. In this section, two sources of data are employed to provide some evidence on whether the impacts found can be attributed distinctively to the RISE Initiative.

The first source is data on the number of RISE interventions implemented in each endline survey village, as reported by community survey respondents. The percent of villages exposed to each of seven core RISE Initiatives and nine additional initiatives over the life of RISE is given in Table 39. For evaluating the impact of exposure to these initiatives, a score representing the total number implemented in each village was calculated. The score ranges from 0 to 11. Then villages were classified into “high exposure” and “low exposure” categories, with high exposure defined by implementation of at least three initiatives. The percent with such high exposure to RISE interventions is 41.6 and roughly the same for the initiative areas.

Note that data are not available for 15 villages, mostly in Niger, due to village survey non-response, leaving 82.6 percent of the original sample for this analysis. Households in the villages for which data are available (N = 1,452) do not differ substantially from those for which data are not (N=306) in terms of socio-demographic characteristics.⁷⁷ However, they had slightly higher socio-economic status and food security, and considerably higher resilience capacity, at midline.⁷⁸ The results presented here thus refer to a majority group of RISE Initiative area households that started out somewhat better off.

⁷⁷ The socio-demographic characteristics include livelihood group, household size, percent of female-headed households and educational achievement.

⁷⁸ The group of households with data available have a midline asset index value 15.6 percent greater than those for which data are not available; The resilience capacity index differs by 28.7 percent and the food security scale by 11.1 percent.

Table 39. Percent of villages reporting exposure to RISE Initiatives in the last 5 years

Project	Full title	Percent of villages exposed	
		Burkina Faso (N=47)	Niger (N=27)
CORE RISE projects			
REGIS-ER	Resilience and Economic Growth in the Sahel-Enhanced Resilience	29.8	11.1
REGIS-AG	Resilience and Economic Growth in the Sahel-Accelerated Growth	14.9	14.8
FASO	Families Achieving Sustainable Outcomes	14.9	0.0
VIM	Project Victoire sur la Malnutrition	17.0	0.0
PASAM-TAI	Programme d'Appui a la Securite Alimentaire des Menages-Tanadin Abincin Iyali	0.0	22.2
LAHIA	Livelihoods, Agriculture and Health Interventions in Action	0.0	14.8
SAWKI	"Life is Improving" in Haoussa	0.0	7.4
Additional projects			
PDEV	Peace Through Development	19.1	3.7
WA-WASH	West Africa Water Supply, Sanitation, and Hygiene Program	27.7	18.5
AGIR-PF	Agir pour la Planification Familiale	38.3	14.8
FAMILY PLANNING	FAMILY PLANNING	0.0	63.0
YAWWA	Youth, Advocacy, Women Work and Alliances	0.0	3.7
SPRING	Strengthening Partnerships, Results, and Innovations in Nutrition Globally	0.0	18.5
Projet de Clinique Mobile	Projet de Clinique Mobile	14.9	0.0
Caisses Populaires (loans)	Faitiere des Caisses Populaires du Burkina	46.8	0.0
Loans from ECOBANK	ECOBANK	2.1	0.0
	Percent of sample households with reported high exposure to RISE interventions	42.3	40.3
	Percent of sample households with projected high exposure to RISE interventions	31.4	50.7
		(N=929)	(N=523)

The second source of information on the extent to which households were exposed to RISE interventions is the original projected intervention groups established by initiative staff before the initiative's inception and used for baseline survey household sampling. The percentage of households with projected high exposure is 38.4; it is substantially higher for the group of Niger households included in this section's analysis (see bottom of Table 39).

Note that each of these data sources has shortcomings: the projected data because we cannot verify whether the projections became a reality, and the data from the village survey because we cannot be sure that respondents were familiar with the names of each individual initiative that was implemented in their village.

For background, Table 40 shows the overlap between the two sources of information on RISE exposure. The majority of households that were originally classified into the low exposure group are in that group using the village survey classification (71 percent). Similarly, the majority of households originally classified into the high exposure group are in that group using the village survey classification (62 percent). Nevertheless, there remains a substantial group of differently-classified households, about one-third of the total.

Table 40. Overlap of projected and reported RISE high exposure groups

		Reported	
		Low	High
Projected	Low	635 (Percent of original low exposure group actually low exposure: 70.9)	260
	High	213	344 (Percent of original high exposure group actually high exposure: 61.8)

Table 41 presents DID-PSM results using the two high-exposure groups as treatment groups. The village-survey-reported exposure data indicate that while the RISE Initiative had no impact on households' resilience, it had a strong, positive impact on their resilience capacities, including all three dimensions of resilience capacity.

The projected exposure data indicate that the initiatives' interventions had a positive impact on households' resilience when the perceived ability to recover measure of resilience is employed, but not when the realized resilience measure is employed. It also finds a positive impact on households' overall resilience capacity and on two resilience capacities: absorptive and adaptive capacity.

Taking these results together, and keeping in mind that the analysis sample refers to a somewhat better-off population group within the RISE Initiative area, we can say that the RISE Initiative's own interventions likely contributed to the positive impacts on households' resilience capacity and possibly on their resilience as well.

Table 41. Impact of high exposure to RISE Initiatives on resilience and resilience capacity: Difference-in-differences Propensity Score Matching estimates

	Exposure data from the village survey (A)			Exposure data from original intervention groups (B)		
	Average treatment effect on the treated	z-stat		Average treatment effect on the treated	z-stat	
Resilience						
Change in food security	-0.61	1.28		-0.60	1.44	
Perceived ability to recover	0.01	0.14		0.28	4.99 ***	
Resilience capacity						
Absorptive capacity	7.01	6.07 ***		4.21	3.82 ***	
Adaptive capacity	4.63	3.44 ***		5.27	4.42 ***	
Transformative capacity	6.50	6.48 ***		-0.62	0.66	
Resilience capacity	6.00	6.44 ***		3.87	3.62 ***	

Stars indicate statistical significance at the 10%(*), 5%(**), and 1%(***) levels.
Note: For analysis A the mean percent bias is 7.4; the percent of treated households on the common support is 92.2. The respective numbers for analysis B are 5.2 and 90.4.

9.2. Impact on Poverty and Women's Empowerment

9.2.1. Impact of Exposure to Comprehensive Resilience Programming

9.2.1.1. Poverty

Exposure to CRP registers no statistically significant impact on poverty for the RISE Initiative area as a whole (Table 42). However, it did lead to improvements in some aspects of household economic well-being, including ownership of farming implements, livestock and land.

Table 42. Impact of exposure to Comprehensive Resilience Programming on poverty and women's empowerment: Difference-in-differences Propensity Score Matching estimates

	All	Program areas	
		Burkina Faso	Niger a/
Poverty			
Index of consumer durables owned	0.33	-0.19	--
Index of farming implements owned	0.71 ***	0.89 ***	--
Animals owned (Tropical Livestock units)	0.55 **	0.45	--
Land owned (ha)	0.96 ***	0.91 ***	--
Housing index	0.03	0.04	--
Prevalence of poverty	-4.80	-6.29	--
Women's empowerment			
Decision making over household life	-10.70 ***	-15.30 ***	--
Decision making over livelihood activities	-0.09	-0.18	--
Decision making about livelihood revenues	-0.03	-0.16	--
Women's asset ownership	-0.55	3.04	--
Decision making over buy/sell assets	-1.43	2.63	--
Index of women's empowerment	-1.03	-1.93	--

Stars indicate statistical significance at the 10%(*), 5%(**), and 1%(***) levels.

a/ Separate estimates not reported because PSM for Niger did not satisfy common support and matching effectiveness conditions.

9.2.1.2. Women's Empowerment

As seen in Chapter 7, women's empowerment increased between the midline and endline, by 4.7 points on the empowerment scale (11 percent). The impact results for women's empowerment (bottom panel of Table 42) show no positive impact of resilience interventions. This could be a reflection of losses among women exposed to interventions of the gains achieved before the midline survey, particularly since much of the improvement came from improvements in women's ability to make decisions regarding assets and their asset ownership relative to men. Some assets, especially livestock, were seriously depleted as a result of the multiple shocks households faced.

Notably, CRP registered a negative impact on one indicator of empowerment, the proportion of decisions where a woman was involved. Further analysis shows that the negative impact on decision making was for four types of decisions involving agricultural production and livestock rearing: obtaining inputs for agricultural production, the types of crops grown, taking crops to

the market, and livestock-related decisions. Unfortunately it is not possible to determine whether these are true negative impacts or due to negative bias in impact estimates.

9.2.1.3. Comparing Impacts across the Initiative Areas

As noted in Section 9.1.1 above, it was only possible to directly estimate ATTs for the Burkina Faso area. We are still able to gain insight into initiative area differences in impact, however, by comparing the signs, magnitudes and statistical significance of the Burkina Faso estimates to those of the RISE area as a whole. Table 42 contains the two sets of estimates.

With respect to both poverty and women's empowerment, the impact estimates for Burkina Faso and the RISE area as a whole do not show strong differences, indicating that there was likely little difference in the impact of CRP across the initiative areas.

9.2.2. Impact of Exposure to Specific Types of Interventions

9.2.2.1. Poverty

From Table 43, the impact analysis confirms that two intervention sets have helped mitigate poverty in the RISE area: financial Services and DPM. None of the other intervention sets is associated with poverty mitigation.

9.2.2.2. Women's Empowerment

In the case of women's empowerment, the results show that the overall finding of no impact is due to some interventions registering a positive impact and some registering a negative impact, impacts that statistically cancel each other out. The intervention sets that had a positive impact were Markets and Business Development and Financial Services (Table 43). Markets and Business Development increased women's empowerment by strengthening their decision making over livelihood activities and over the buying and selling of household assets, and by increasing their asset ownership. Financial services interventions empowered women by increasing their asset ownership and strengthening their decision making over the buying and selling of assets. One of the interventions that registered a negative impact was Governance. While the result may be due to negative bias, it is important to ensure that women's involvement in the VDCs is equal to men's.

Table 43. Impact of exposure to the eight intervention sets on poverty and women's empowerment: Summary

	Agricultural production	Livestock rearing	CNRM	Markets & Business Dev't a/	Financial services	Human capital	Disaster prep & mitigation	Governance
Poverty								
Prevalence of poverty	-3.8	8.0	0.1	-4.8	-12.4 **	8.6	-18.3 ***	0.1
Women's empowerment								
Decision making over household life	-2.90	8.30 *	-6.70 **	5.70	-3.70	5.00	2.40	-11.80 ***
Decision making: livelihood activities	0.06	-0.24	-0.13	0.41 **	0.02	-0.13	-0.04	-0.12
Decision making: livelihood revenues	0.00	-0.31 **	-0.10	0.30	0.06	0.01	-0.10	-0.04
Women's asset ownership	10.00 ***	-1.50	-1.60	12.60 ***	5.60 **	4.40	5.20	-6.30 ***
Decision making over buy/sell assets	8.00 **	1.90	-4.10 *	15.00 **	6.70 **	3.20	-2.50	-8.90 ***
Index of women's empowerment	0.19	-3.2	-3.00 **	8.0 **	6.90 ***	0.26	0.90	-3.50 ***

Note: Green-shaded cells indicate a positive impact significant at the 5% level, red-shaded cells indicate a negative impact. Values reported are the Average Treatment Effect on the Treated (ATT).

a/Results only reported for Burkina Faso area because no Niger households were highly exposed to this intervention set.

9.2.3. Impact of Exposure versus Direct Participation in Interventions

9.2.3.1. Poverty

Recall that estimates of the impact of participation in CRP are based only on six of the intervention sets, with CNRM and DPM being left out. When measurement of both exposure and participation in CRP is based only on the remaining six intervention sets, we find that participation in CRP likely led to a greater drop in poverty than did exposure to it, but the impact estimates for neither are statistically significant (Table 44). Nevertheless, this relative difference follows the pattern seen with the resilience impact estimates (Section 9.1.3).

Table 44. Impact of exposure versus participation in Comprehensive Resilience Programming on poverty and women's empowerment: Difference-in-differences Propensity Score Matching estimates

	Exposure	Participation
Poverty		
Prevalence of poverty	-2.6	-6.6
Women's empowerment		
Decision making over household life	-14.9 ***	-13.6 ***
Decision making over livelihood	-0.18 *	0.16
Decision making about livelihood	-0.11	0.07
Women's asset ownership	-2.61	0.68
Decision making over buy/sell assets	-4.90 **	-1.14
Index of women's empowerment	-4.05 ***	0.28

Stars indicate statistical significance at the 10%(*), 5%(**), and 1%(***) levels.

9.2.3.2. Women's Empowerment

When CRP exposure measurement is based only on the six interventions rather than the full eight, it registers a negative impact on women's empowerment (bottom of Table 44). By contrast, the impact of participation is near zero. This finding indicates that participation in CRP

likely had a more positive impact on women’s empowerment (or less negative) than only indirect exposure.

9.3. Summary: Impact of RISE

This chapter started out by presenting the main results of the impact evaluation examining whether households’ exposure to and direct participation in resilience interventions implemented in the RISE Initiative area actually strengthened their resilience and resilience capacities. The evaluation period of focus is that between the midline and endline surveys, the period for which panel data are available. After estimating the impact of CRP, which is the measure of overall initiative impact, it evaluated the impact of the eight intervention sets implemented by RISE and other development actors in the initiative area.

The analysis finds that household exposure to CRP did indeed strengthen households’ resilience, both their realized resilience and perceived ability to recover, despite the extreme and escalating shock exposure over the evaluation period. Translating that gain into real terms, exposure to CRP lowered the prevalence of food insecurity by 9.9 percentage points. It also made a substantial dent in the prevalence of severe food insecurity, which is associated with such behaviors as going a whole day and night without eating, of 9.0 percentage points. In terms of resilience capacity, the analysis finds that exposure to CRP had strong, positive impacts on households’ absorptive and adaptive capacities, but no impact on transformative capacity overall.

Looking at individual resilience capacities—which are the levers for bringing about improvements in the capacities and thus resilience—exposure to CRP had a positive impact on the following nine capacities:

- Availability of hazard insurance
- Disaster preparedness and mitigation
- Asset ownership
- Bridging social capital
- Livelihood diversity
- Access to financial resources
- Exposure to information
- Access to infrastructure
- Access to formal safety nets.

Other findings regarding the impact of CRP are:

- (1) Direct participation of households in CRP benefited households more in terms of resilience and resilience capacity than if they were only indirectly exposed to them.
- (2) Households’ engagement in CRP served to reduce the negative impact of climate shocks, including both drought and flooding, on their food security. This is additional evidence that the interventions of the type implemented by RISE did in fact build resilience.

(3) The impact of exposure to CRP on resilience was stronger for the Burkina Faso area than the Niger area. Other initiative area differences found were that the impact of CRP on absorptive capacity was stronger for the Niger area and the impact of CRP on transformative capacity was stronger in the Burkina Faso area.

Looking individually at the contributions of the eight intervention sets, we find that their impacts fall into three categories. First are those that had clear positive impacts on both resilience and most resilience capacities. These are Governance, Human Capital, and Disaster Preparedness and Mitigation (DPM) interventions. The second category is interventions that registered positive impacts on some capacities and negative impacts on others. These are the Agricultural Production, Community Natural Resource Management (CNRM), and Financial Services interventions. With respect to resilience itself, the Financial Services interventions in fact had the strongest positive impact on resilience of all intervention sets, while the agricultural production and CNRM interventions registered no positive impact.

Note that it is not possible to discern whether any registered negative impact estimates are due to true negative impacts of interventions or to negative bias inherent in the DID-PSM impact estimates due to matching at midline rather than baseline.

The third category is interventions that registered no positive impact on resilience and negative impacts on the majority of resilience capacities. These are Livestock Rearing and Markets and Business Development, both of which are closely tied to markets, which experienced major disruptions over the evaluation period.

The chapter ends by examining the impact of resilience-strengthening interventions on poverty and women's empowerment. While household exposure to CRP registered no statistically significant impact on poverty, it did boost households' ownership of farming implements, livestock, and land. Two intervention sets helped to mitigate poverty in the RISE area: financial Services and DPM. While exposure to CRP registered no impact on women's empowerment in the post-midline period overall, the Markets and Business Development and Financial Services interventions both appear to have strengthened women's decision making over and ownership of assets relative to men's.

10. CONCLUSIONS AND INITIATIVE IMPLICATIONS

This chapter lays out implications for programming gained from the findings of this report. To recap the many changes that took place in the RISE area over its operational period, households experienced increasing shock exposure, with an especially sharp escalation in the initiative's final years. Both the Burkina Faso and Niger initiative areas were subjected to great rainfall volatility leading to multiple droughts and floods that at times dipped into extreme territory. The incidence of conflict shocks related to civil insecurity also saw a large increase. Increasing acts of violence and thefts by armed terrorist groups led to large populations of displaced peoples and had widespread impacts on markets, agricultural production, off-farm income generating activities and, subsequently, on people's livelihoods and health. By April 2020, just as the security situation deteriorated further, COVID-19 restrictions were imposed, including border closures, market restrictions, and restrictions on travel.

The combination of climate shocks, civil insecurity, and COVID-19 restrictions is associated with a sharply increasing incidence of economic shocks, including food price inflation, unemployment, inability to access assistance, exceptional health expenses, and adverse price changes and availability disruptions to agricultural and livestock rearing inputs and products sold by households. There was also a strong increase in the percentage of households reporting serious illnesses and deaths, particularly in the Burkina Faso area. This disturbing trend is a clear indication that the multiple shocks of this time period were taking a serious toll on households' well-being.

As households struggled to deal with increasing shock exposure, they intensified and shifted their coping strategies in response. The most commonly-employed strategy was to sell livestock. Others were borrowing or receiving gifts of money from friends or relatives, reducing food consumption or changing a source of food, drawing down on savings, migrating, and/or borrowing from a money lender. A large number of households were diversifying their livelihoods into low return activities such as work on other people's fields, charcoal production, wild food sales, and petty trade. Many coping strategies were used increasingly over time as shock exposure grew, including some particularly negative coping strategies such as taking children out of school and sending them to work for money, selling productive assets, and reducing food consumption.

People's resilience capacities also eroded through time. In Burkina Faso, there was a reduction in absorptive capacity, itself rooted in drops in bonding social capital, reductions in household savings, availability of informal safety nets, and the availability of hazard insurance. Access to financial resources also declined, including the availability of credit and saving institutions. The consequence is that households were losing their ability to absorb and adapt to shocks.

For the Niger area, although adaptive capacity improved, it was due to (1) diversifying livelihoods into low-return livelihood activities and (2) changes in human capital due to the

absorption of literate adults into households—most likely due to displacement resulting from conflict or COVID-19 containment measures. Some key resilience capacities have also declined: access to basic services and access to formal safety nets.

Transformative capacity did not improve over the life of the initiative despite efforts to strengthen local governance and service delivery. Access to services were negatively affected by the spread of conflict and the containment measures in response to COVID-19. Formal safety nets were not expanded in the initiative area despite the worsening risk environment.

In summary, the RISE risk environment got significantly worse over the course of the initiative. Many households were not able to absorb and adapt to these shocks, and a formal safety net was not put in place to help them cope. Resilience capacities eroded, and food insecurity and poverty increased significantly. The humanitarian/development nexus is a crucial part of resilience programming, and shock-responsive safety nets are a critical component of resilience investments. In this instance, they did not get the attention they deserved at the time they were needed in order to prevent the deterioration in resilience capacities, food insecurity and poverty.

10.1. Enhancing Resilience Impacts

The qualitative findings highlight the many benefits that were derived from the RISE Initiative prior to the deterioration in the risk environment in its last 2 years. Respondents stressed many improvements, such as increased production and income, changed health and hygiene practices, strengthened the role of women, developed of local governance mechanisms, and improved access to financial services. Unfortunately, many of these gains were negatively impacted by the severe and escalating shocks that hit the initiative area. It is difficult to make much progress combating poverty and food insecurity and dealing with other shocks when violence, fear, movement restrictions, and market closures undermine all efforts. Climate shocks, combined with increasing conflict and a pandemic have increased the vulnerability of these households and made it difficult to recover.

Despite this worsening risk environment and declining poverty and food insecurity, **households' exposure to resilience-strengthening interventions spanning multiple sectors did indeed strengthen their resilience.** What is striking about these results regarding “Comprehensive Resilience Programming” (CRP) is the implication that greater impact can be achieved when interventions from multiple sectors are combined than when they are implemented separately. Although food security declined significantly over the initiative period, because of their exposure to multiple resilience strengthening interventions, the decline was less for households engaged in CRP than those not. Households exposed to CRP experienced a 71 percent lower decline in food security than their unexposed counterparts. CRP exposure is also associated with positive impacts on absorptive and adaptive capacity when compared to the control group.

Direct participation of households in CRP had a greater impact than just being exposed to CRP. The impact estimate for participation in CRP is 41 percent higher than that for exposure to

CRP. Consistent with these results are the somewhat higher estimates of the impact of participation on resilience capacity, with the impact for the overall index of resilience capacity being 26 percent higher.

10.2. Interventions that Strengthen Resilience and Resilience Capacities

For initiatives to leverage the greatest impacts on households' resilience to shocks, focus should be placed on the interventions that have been shown to bolster households' ability to recover from shocks the most.

The impact evaluation conducted here found some resilience-strengthening interventions to have had clear, positive impacts on households' resilience and/or resilience capacities despite the extreme and escalating shock exposure, the deterioration of RISE interventions themselves, and the lack of a safety net to help households cope.

The intervention set that appears to have had the most positive impact on both resilience and resilience capacity is governance that is Village Development Committees (VDCs). These interventions had a positive impact on households' ability to recover from shocks, both in terms of food security recovery and their perceived ability to recover. They had positive impacts on all three types of resilience capacity as well as the majority of the individual resilience capacities. The RISE Initiative made good headway with VDCs in Burkina Faso, enabling communities to raise their issues with local officials. Based on the qualitative findings, several villages stood out in terms of their ability to work with local authorities. These examples demonstrate promising practices regarding community-government linkages that can be scaled up in RISE II.

Other interventions that had largely positive impacts are Human Capital and Disaster Preparedness and Mitigation (DPM). The intervention that had the strongest impact on resilience itself was Financial Services. This intervention, along with two others, Agricultural production and CNRM, had some positive impacts on the resilience capacities as well. However, the final two intervention sets, Livestock Rearing and Markets and Business Development (MBD), which were the most affected by market disruptions, registered negative impacts.

Unfortunately, given the data available for conducting this impact evaluation—especially the lack of panel data from the baseline—it is not possible to tell whether the estimated negative impacts are true negative impacts or due to negative bias in the impact estimates (discussed in Annex 4). True negative impacts may be due to the fact that capacities were built up above the norm for households exposed to interventions during the relatively low-shock pre-midline period, leaving these households subject to greater reductions than the control group during the high-shock evaluation period itself. Beyond shocks, these reductions may have been reinforced by the breakdown of ongoing interventions (especially COVID-19-induced

alterations in programming) and the lack of a safety net to protect the gains households had made.

These findings demonstrate, first, how critical it is to pivot programming to humanitarian support to protect development gains. Unfortunately, a large shock-responsive safety net was not implemented in the case of the RISE Initiative. Second, the findings highlight the critical importance of collecting panel data before and after an initiative's operational period to be able to clearly identify intervention impacts.

10.3. Impacts on Poverty and Women's Empowerment

While household exposure to CRP had no statistically significant impact on poverty as measured here, it nevertheless did appear to have a positive impact on households' economic status, as demonstrated by positive impacts on households' ownership of farming implements, livestock, and land. Two intervention sets helped to mitigate poverty in the RISE area: Financial Services and DPM.

This study found that between the midline and the endline women's empowerment increased by 4.7 points on the empowerment scale (11 percent). Two interventions contributed to this improvement: Financial Services and MBD, the latter despite largely negative registered impacts on the resilience-related indicators. Perhaps these interventions targeted women in their programming. Despite having positive impacts on almost all other measures of resilience and resilience capacity, the governance intervention registered a negative impact on women's empowerment. Could this be because efforts were not made to include women in the VDCs? Gender targeting in governance interventions may be important for garnering positive impacts on women's empowerment.

10.4. Implications for Follow-Up Programming

A key lesson drawn from this impact evaluation is that activities that normally can build resilience and strengthen resilience capacities may no longer be appropriate if the shock environment significantly deteriorates. The combination of climate change, conflict, and COVID-19 created a situation where mobility was restricted, borders were closed, markets were shut down, and alternative livelihood strategies that rely on migration were curtailed. This put a great deal of stress on these households and communities, leading to food insecurity getting worse, poverty stagnating or getting worse, coping strategies getting more desperate, and other development gains being negatively impacted. Such a desperate situation makes it much easier for terrorists to recruit the youth in the area to their ranks. Under such circumstances a shock-responsive safety net was urgently needed. This needs to be taken into consideration in RISE II.

It is encouraging that the key local governance intervention, establishment of VDCs, had such a positive impact on resilience capacities and on resilience. We should build on the better practices that were uncovered in the qualitative survey as part of this endline and try to scale

up these activities. These practices include the ways that communities engage in consultations (e.g., making sure that consultations are gender inclusive), how communities communicate to government departments, the receipt and handling of community input by various government officials, coordination with support agencies, and responses by the government departments. For example, RISE II could work with VDCs to strengthen community capacities to access local government assistance on issues like transport, education and housing (especially housing damaged by floods).

Women’s empowerment improved in the RISE Initiative area, and Financial Services and MBD interventions contributed to that improvement. Gender analysis and learning need to be undertaken to take advantage of the learnings from these initiatives, which may have been targeted to women. The impact evaluation registered a negative impact of governance interventions on women’s empowerment. While it is not possible to determine whether this impact is real or due to negative bias in the impact estimates, it would be useful to understand women’s relative to men’s participation in the VDCs and gain any lessons for future initiatives.

A number of activities need to be put in place to combat violent extremism and its impact. RISE II needs to support peace initiatives and conflict mitigation, as well as early warning and monitoring of potential violent encounters. Some villages have resorted to self-defense groups (*koglweogo* in Burkina Faso) that could turn into vigilante groups that can develop their own power ambitions to settle old scores. These need to be monitored. The breakdown of trust and cohesion in the face of this insecurity is particularly disconcerting, and the psychological dynamics need to be taken into account in follow-up interventions. In addition, with all of the displacement caused by the violence, greater support needs to be provided to host communities that take in displaced people to help meet needs and avoid overburdening the host households.

COVID-19 will continue to be an issue, as vaccines are not yet readily available. Recognizing the negative economic impact that containment strategies had on households, ways should be sought to find workable solutions that do not shut down markets, that do not lead to price hikes, and that enable people to engage in markets and pursue off-farm livelihoods. Positive examples can be found in the 2021 Global Food Policy Report.⁷⁹

Financial services and access to savings groups will continue to be important to building resilience. Unfortunately, there was a significant decline in credit institutions and saving institutions in Burkina Faso, and in saving institutions in Niger since the midline. Access to financial services will enable households to diversify their livelihoods into activities that have higher remuneration. Financial services can be negatively affected by rising violence and the pandemic, and such interventions need to be made more shock proof.⁸⁰ Similarly, savings groups, which are key to building social capital, were also negatively impacted by the shocks and need to be shock responsive.

⁷⁹ IFPRI 2021

⁸⁰ See Gash (2019) for a discussion of what can be done to make financial services more resilient to shocks (Section titled “Defining the System Boundaries: Resilience of What?”).

The RISE Initiative increased aspirations and confidence to adapt in Burkina Faso but not in Niger. Improvements of such psycho-social factors have been found to be extremely important for households to manage shocks and stresses and to invest in future livelihood opportunities. Tracking this capacity will be important if certain shocks (such as conflict and the coronavirus pandemic) prevent households from being able to take advantage of new market or other livelihood opportunities. For this reason, some type of shock-responsive safety net will be critical if such opportunities are blocked due to containment issues.

Investments in disaster risk reduction, including disaster preparedness and mitigation interventions, hazard insurance, and support for conflict mitigation will continue to be important to improve household absorptive capacity to manage shocks. Flooding has become more serious in the initiative area over the years, and more needs to be done to address this shock. Flooding has a tremendous impact on crops, animals, and houses. Mitigating the impact of floods should be a priority in RISE II. Actions that can be taken could include relocating some households out of flood plains, construction of small dams and drainage ditches, crop and livestock protection, and flood-proofing houses, to name a few.

Access to basic services needs to be a high priority for RISE II going forward. For example, access to formal safety nets has not been available, which is a key component of transformative capacity that enables households and communities to manage shocks more effectively. Access to other services will be an important part of strengthening good governance as part of RISE II.

10.5. Summary: Conclusions and Initiative Implications

The risk environment significantly worsened over the course of the RISE Initiative. Many households were not able to absorb and adapt to these shocks. Resilience capacities eroded, and food insecurity and poverty increased significantly. Given this deterioration, a shock-responsive safety net with humanitarian assistance was needed but not operationalized.

The following are the implications for programming based on the findings:

- The humanitarian/development nexus is crucial to resilience programming. In situations where shock escalates into crisis, such as that in the RISE area, initiatives should pivot with a shock-responsive safety net providing humanitarian support in order to protect previous gains and generally prevent deterioration in resilience capacities and household well-being.
- Greater resilience impact is achieved when interventions from multiple sectors are combined than when they are implemented separately. Comprehensive Resilience Programming optimizes resilience impacts.
- Participation of households in interventions had a greater impact than only indirect exposure. Resilience initiatives should encourage direct participation in interventions.
- Governance, Human Capital, DPM, and Financial Services interventions had the most positive impacts on resilience and resilience capacities— despite extreme and

escalating shock exposure. We have solid evidence that these interventions are important for achieving resilience in the face of shocks in the RISE area.

- Some interventions registered negative impacts on resilience outcomes, especially those closely tied to markets (livestock rearing, and MBD). These interventions may have had a positive impact before the shocks hit, but then saw losses due to the escalating conflict, COVID-19 containment measures, the breakdown of ongoing interventions, and lack of a safety net. In cases like this, where risk environments worsen to crisis proportions, initiatives should seek to pivot their intervention mix to include a shock-responsive safety net and protect pre-shock gains.
- Attention to gender targeting and analysis is critical to enhancing the positive impacts (and avoiding negative impacts) of interventions on women's empowerment. In this case, attention to gender targeting and analysis in two interventions is recommended: Governance and MBD.
- Special attention needs to be given to addressing violent extremism, and activities need to be put in place, such as peace initiatives and conflict mitigation measures, as well as early warning and monitoring of potential violent encounters. Greater support needs to be provided to host communities that take on displaced households to help meet needs and avoid overburdening the hosts.
- Investments in disaster preparedness and mitigation should give more attention to floods. Flooding has become more serious in the RISE area over the years, and more actions should be taken regarding relocation of households living in flood plains, construction of small dams and drainage structures, crop and livestock protection, and flood-proofing houses.
- Access to financial services in the Burkina Faso area declined during RISE I. The Financial Services intervention set was found to have a positive impact on households' resilience and needs to be a high priority for RISE II going forward.
- With regard to lessons learned for conducting informative impact evaluations, it is crucial to collect panel data before and after an initiative's operational period in order to clearly identify initiative impacts.

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ANNEX I: DIFFERENCE-IN-DIFFERENCES PROPENSITY SCORE MATCHING: ESTIMATION OF PROPENSITY SCORES AND DIAGNOSTIC TESTING

From Chapter 2, the main method employed for conducting this impact evaluation is Difference-in-differences Propensity Score Matching (DID-PSM). This annex describes the selection of control and treatment groups for the analysis and presents the results of the PSM diagnostic tests.

The first step in selecting the control and treatment groups is to estimate a Probit engagement or “treatment” model in order to compute a propensity score for each household conditional on observed characteristics. Following, treated households are matched with a group of non-treated households based on similarity of propensity scores, and diagnostic tests are undertaken to ensure that there are sufficient control group households to match with treatment households (the common support condition is met) and the groups are sufficiently similar after matching (balancing conditions are met). These processes are described herein, starting with the main treatment of focus, Comprehensive Resilience Programming.

AI.1 Engagement in Comprehensive Resilience Programming (CRP)

AI.1.1 Estimation of propensity scores

Propensity scores are real numbers between 0 and 1 that are estimates of the probability that a household engaged in CRP. These scores are estimated using a probit model. The independent or “matching” variables employed include a wide variety of household and community characteristics that are hypothesized to affect a household's engagement in CRP and/or their resilience to shocks, the ultimate outcome of interest.

The matching variables for estimating the propensity scores for exposure to CRP are listed in Table AI.1. They include midline food security, household's resilience capacities, shock exposure, various household socio-demographic characteristics, economic status, and various village characteristics. Additional matching variables employed for the participation model (listed in Table AI.2) include ownership of a radio and television, variables affecting households' aspirations and confidence to adapt and social capital.

A requirement for implementing PSM is that all matching variables not be affected by the treatment, in this case by households' exposure to or participation in resilience-strengthening interventions between the midline and endline (which is the evaluation period). To satisfy this requirement, all variables are measured at baseline or midline with the exception of the climate shock variables, which are exogenous to the RISE Initiative's interventions.

Table 45. A1.1 Probit model for exposure to Comprehensive Resilience Programming (based on 8 intervention sets) and post-matching balance (Kernel matching)

	Probit exposure model		Balance after matching		
	Coeff- icient	z-stat	Mean Treated	Control	% bias a/
Outcome measures (midline)					
Food security	-0.008	-1.29	18.0	17.9	1.5
Absorptive capacity	0.001	0.23	44.9	46.3	-8.8
Adaptive capacity	0.014	2.68 ***	51.5	51.7	-1.6
Transformative capacity	-0.005	-1.3	50.8	51.5	-3.6
Poverty prevalence	-0.207	-1.9 *	0.6	0.6	0.0
Women's empowerment	-0.003	-1.38	41.7	41.2	2.4
Shock exposure					
Hh shock exposure index (yr before midline)	0.004	0.7	11.9	11.7	2.4
Number of months of drought (ml to el)	0.095	2.2	2.4	2.5	-8.6
Number of months of flooding (ml to el)	-0.421	-12.5 ***	4.2	4.1	7.3
Hh socio-demographic characteristics (Midline)					
Project area: Niger a/					
Burkina Faso	-0.508	-2.74 ***	0.7	0.7	-15.9
Female-adult-only household	0.175	0.84	0.1	0.1	-5
Number of adult equivalents	0.032	1.81 *	5.6	5.6	0.2
Percent males 0-16 a/					
Males 16-30	0.004	1.08	8.8	8.4	3.1
Males 30 plus	0.002	0.58	13.8	13.8	0.1
Females 0-16	0.003	1.01	26.0	25.7	1.8
Females 16-30	0.005	1.33	11.9	11.6	2.1
Females 30 plus	0.004	1.07	14.1	14.8	-5.4
Any member has a formal education	0.300	3.3 ***	0.7	0.7	5.5
Predominant livelihood: Pastoralist a/					
Agriculture	0.104	0.83	0.6	0.6	1.3
Other	-0.079	-0.56	0.2	0.2	0.8
Household economic status (midline)					
Consumption asset index	-0.023	-1.24	8.6	8.7	-2.1
Agricultural productive asset index	-0.031	-1.1	4.4	4.5	-5.6
Tropical Livestock Units	-0.014	-1.92 *	3.3	3.4	-1.9
Land owned (ha)	-0.025	-2.13 **	3.3	3.3	-1.7

(Continued)

Table A.I.I Continued.

Village characteristics (baseline)						
Population	-1E-04	-6.89	***	3580	3380	5.5
Distance from nearest town	-0.001	-0.25		22.6	23.2	-3.5
Number of community organizations	-0.152	-5.53	***	5.1	5.1	-0.5
Food aid institution	0.232	2.64	***	0.5	0.5	-0.4
%Hhs receiving humanitarian assistance	-0.657	-2.53	**	0.2	0.2	0.4
Disaster preparation/mitigation program	1.104	6.68	***	0.2	0.2	7.8
Number of government programs	-0.161	-4.7	***	2.0	2.0	-1.6
Number of NGO programs	0.214	7.32	***	2.4	2.3	5.1
Piped water available	0.399	3.02	***	0.2	0.2	14.7
Electricity available	0.934	8.64	***	0.5	0.6	-7.4
Health center	-0.158	-1.63		0.5	0.5	2.3
Cell service	0.062	0.63		0.8	0.8	-2.8
Credit access	0.729	6.8	***	0.9	0.9	1.2
Number of observations	1,758					
Mean %bias	3.8					
Percent treated hholds on common support	97.6					

Stars indicate statistical significance at the 10%(*), 5%(**), and 1%(***) levels.

Table 46. A1.2 Probit model for participation in Comprehensive Resilience Programming (based on 6 intervention sets) and post-matching balance (Kernel matching)

	Probit exposure model		Balance after matching		
	Coeff- icient	z-stat	Mean		% bias a/
			Treated	Control	
Outcome measures (midline)					
Food security	-0.003	-0.34	18.3	18.4	-1
Absorptive capacity	0.003	0.74	46.2	46.4	-1.5
Adaptive capacity	0.018	2.36 **	53.0	52.9	0.6
Transformative capacity	-0.007	-1.01	49.9	50.0	-0.4
Poverty prevalence	0.071	0.53	0.6	0.6	-0.1
Women's empowerment	-0.005	-1.59	41.1	40.8	1.4
Shock exposure					
Hh shock exposure index (yr before midline)	-0.007	-0.9	12.3	12.0	2.8
Number of months of drought (ml to el)	-0.050	-0.87	2.2	2.2	-1.1
Number of months of flooding (ml to el)	-0.252	-6.74 ***	4.2	4.3	-7.2
Hh socio-demographic characteristics (Midline)					
Project area: Niger a/					
Burkina Faso	-0.078	-0.32	0.6	0.7	-2.5
Female-adult-only household	0.596	2.15 **	0.1	0.1	-1.1
Number of adult equivalents	-0.030	-1.31	5.7	5.7	-0.6
Percent males 0-16 a/					
Males 16-30	0.003	0.71	8.8	8.3	3.3
Males 30 plus	-0.004	-0.64	12.5	12.6	-1.5
Females 0-16	0.000	0.11	26.6	26.7	-0.7
Females 16-30	0.001	0.29	11.5	11.8	-2.9
Females 30 plus	0.004	0.78	14.1	13.9	1.5
Any member has a formal education	-0.016	-0.14	0.7	0.7	2
Predominant livelihood: Pastoralist a/					
Agriculture	0.314	1.99 **	0.6	0.6	-1.3
Other	0.334	1.9 **	0.3	0.3	1.2
Household economic status (midline)					
Consumption asset index	-0.007	-0.29	8.7	8.6	1.4
Agricultural productive asset index	0.085	2.38 **	4.8	4.8	0.2
Tropical Livestock Units	0.000	-0.04	4.2	4.1	1.5
Land owned (ha)	0.005	0.38	3.9	4.0	-3.4

(Continued)

Table 46. AI.2 Continued.

Village characteristics (baseline)						
Population	-0.000	-0.3		3530.2	3539.1	-0.2
Distance from nearest town	0.001	0.28		21.9	21.8	0.5
Primary school	0.192	0.89		1.0	0.9	3.4
Secondary school	-0.377	-2.7	**	0.3	0.3	-0.1
Cell service	0.010	0.07		0.8	0.8	2.8
Number of community organizations	-0.024	-0.79		5.3	5.3	0.3
Food aid institution	0.078	0.73		0.5	0.5	0
% hds receiving humanitarian assistance	0.029	0.1		0.2	0.2	1.9
Number of government programs	-0.064	-2.04	**	1.7	1.6	0.7
Number of NGO programs	0.135	3.82	***	2.5	2.4	2
Disaster preparation/mitigation program	0.737	5.29	***	0.9	0.9	3.2
Household characteristics associated with participation						
Household owns radio	-0.015	-0.14		0.4	0.4	0.6
Household owns phone	0.063	0.48		0.8	0.8	1.3
Absence of fatalism	-0.005	-1.72	*	27.4	28.1	-3.7
Individual power	0.003	1.36		52.6	53.3	-3
Exposure to alternatives	0.004	1.1		27.5	27.3	1
Bonding social capital	0.005	1.81	*	81.0	80.1	3.6
Bridging social capital	-0.003	-1.58		60.0	58.3	4.7
Linking social capital	0.002	0.42		48.9	48.7	0.8
Number of observations	1,758					
Mean %bias				1.7		
Percent treated hholds on common support				99.5		

Stars indicate statistical significance at the 10%(*), 5%(**), and 1%(***) levels.

a/ Highlighted cells indicate values outside of the 20% cut-off for minimum balance

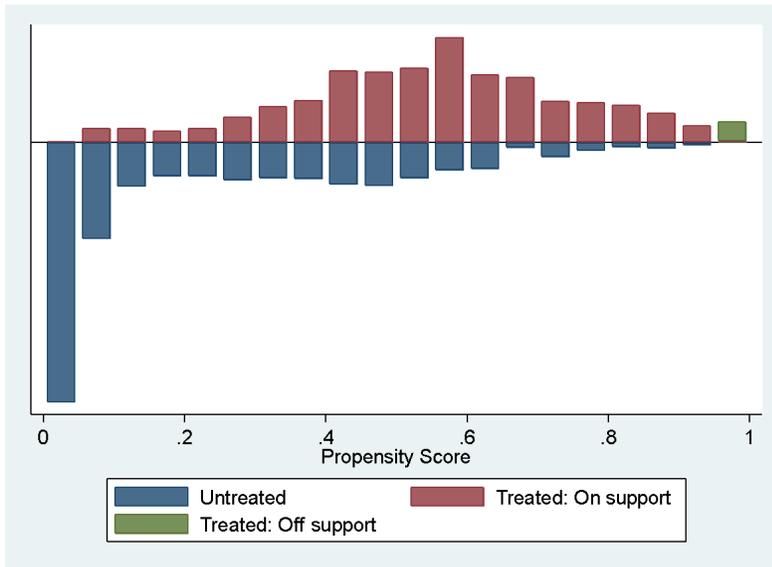
From Table AI.1, numerous matching variables are found to have a statistically significant influence on exposure to CRP. These factors likely affected initiative administrators' intervention targeting decisions. Household participation in CRP would have been influenced not only by initiative administrators' decisions but also by household decisions. The statistically significant matching variables can be found in Table AI.2.

AI.1.2 Matching diagnostics for kernel matching

DID-PSM is initially implemented for three alternative matching methods: kernel matching, nearest-neighbor matching (1:1), and radius matching. The impact results are compared for each to assess their robustness to the choice of matching method. This section assesses common support and balancing for the preferred method, kernel matching.

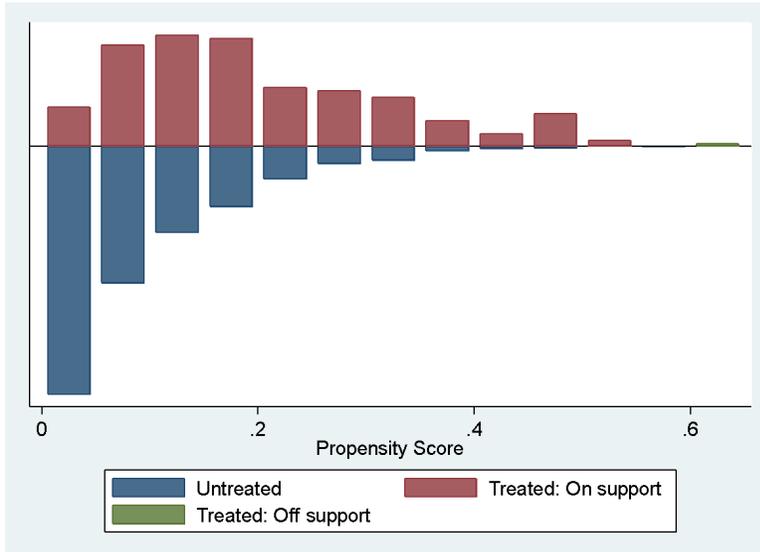
Common support. For PSM to produce impact estimates relevant to the population (here, households residing in the RISE area), non-treated household matches must be available for a sufficient number of treatment households, that is there must be adequate “common support.” Figure A1.1 and Figure A1.2 show the kernel matching treatment and control groups’ propensity score distributions for exposure to and participation in CRP, respectively. For both models the large majority of treated households are on the common support, 97.6 percent for exposure and 99.5 percent for participation (see bottom of Tables A1.1 and A1.2).

Figure 29. A1.1 Common support for Comprehensive Resilience Programming exposure model: Propensity scores of treated and control households



Note: Kernel matching.

Figure 30. A1.2 Common support for Comprehensive Resilience Programming participation model: Propensity scores of treated and control households



Note: Kernel matching.

Balancing tests: The basic requirement for a good estimate of the counterfactual is that the control group must be similar to the treatment group in all relevant characteristics except for the fact that treatment group households are engaged in the interventions and control group households are not. Balancing tests evaluate whether this requirement is met.

The criteria used here for adequate balancing is that the mean standardized percentage bias across all matching variables post matching is less than 10.0 and all matching variables have an individual bias less than 20.0. Here the mean percentage bias for the “All households” exposure model is 3.8; for the participation model it is 1.7 (see Table A1.3).

Figures A1.3 and A1.4 compare the percent biases before and after matching for all of the matching variables. These figures demonstrate that the PSM analysis has greatly reduced the bias and brought it well within the bounds of the balancing criterion. The control group is essentially the same as the treatment group before the resilience-strengthening interventions (specifically, those that took place between the midline and endline) were implemented.

Note that for the Niger exposure model common support is prohibitively low and the standardized bias too high. For this reason separate models were not run for the initiative areas. Initiative area impact estimates are instead based on the “All households” model as applied to each area.

Table 47. AI.3 Exposure to and participation in resilience interventions: Difference-in-differences Propensity Score Matching Diagnostics (Kernel matching)

	Common support		Standardized percent bias		Remaining unbalanced matching variables a/
	# treated hhds	% on common support	Mean	Median	
Exposure to Comprehensive Resilience Programming					
All households	623	97.6	3.8	2.4	None.
Burkina Faso	386	94.8	5.3	4.6	None.
Niger	112	51.9	23.6	10.5	[Twelve variables]
Participation in Comprehensive Resilience Programming					
All households	184	99.5	1.7	1.4	None.
Burkina Faso	116	97.5	1.8	1.9	None.
Niger	62	93.9	4.3	2.9	None.
Exposure to the eight intervention sets					
(All households)					
Agricultural production	444	84.1	7.6	5.0	Absorptive capacity ML (44.6 vs 48.2) Transformative capacity ML (52.7 vs 57.2) Humanitarian assist. (% hhs) BL (24.1 vs 18.1) Number of gov't programs BL (2.09 vs 2.5)
Livestock rearing	271	97.8	7.8	6.1	None.
Communal natural resource management	655	94.1	5.5	3.9	None.
Markets and business development (Burkina Faso)	172	83.5	8.2	8.0	Number of gov't programs BL (0.98 vs 0.5)
Financial services	268	97.5	6.3	4.6	Humanitarian assist. (% hhs) BL (20.0 vs 25.0)
Human capital	248	83.2	9.1	7.1	Transformative capacity ML (60.2 vs 56.5) Village size BL (4112 vs 3260) Vet facility BL (22.6 vs 12.5)
Disaster preparation and mitigation	221	82.5	7.8	6.0	Humanitarian assist. (%hhs)BL (22.3 vs 26.3) Number of other intervent'n sets (2.5 vs 2.2)
Governance	933	100	8.4	5.5	Months of drought (ML-EL) (2.2 vs 2.9) % hhs in Burkina Faso area (62.5 vs 78.7) Number of community orgs. (5.0 vs 5.5) Number of gov't. orgs (5.0 vs 5.5)

a/ Remaining imbalances lists variables with bias greater than 20. Values are treatment vs. control group.

Figure 31. A1.3 Balance for Comprehensive Resilience Programming exposure model: Standardized percent bias across matching variables

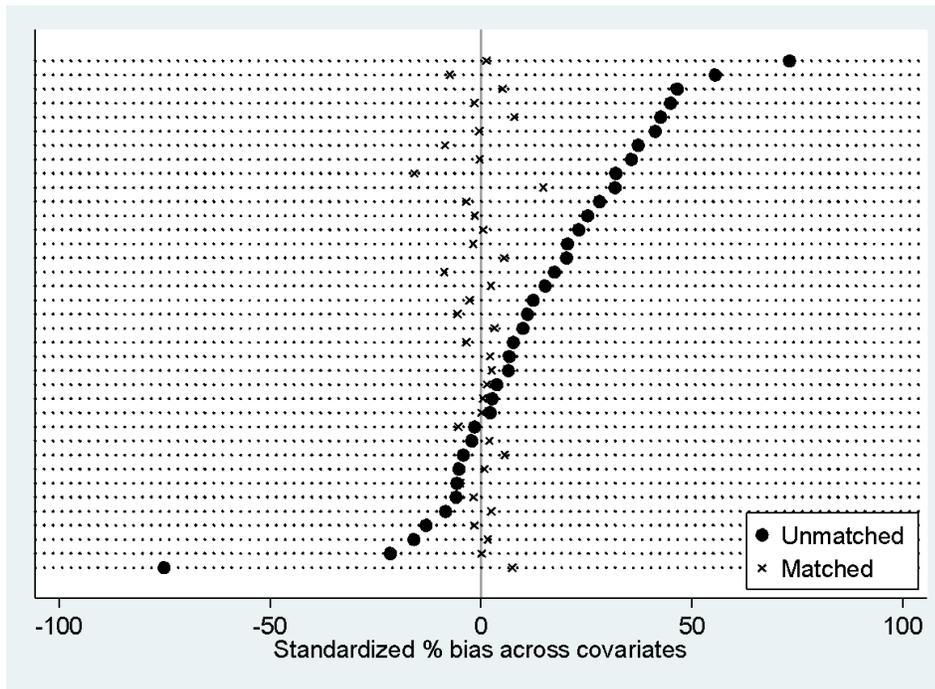
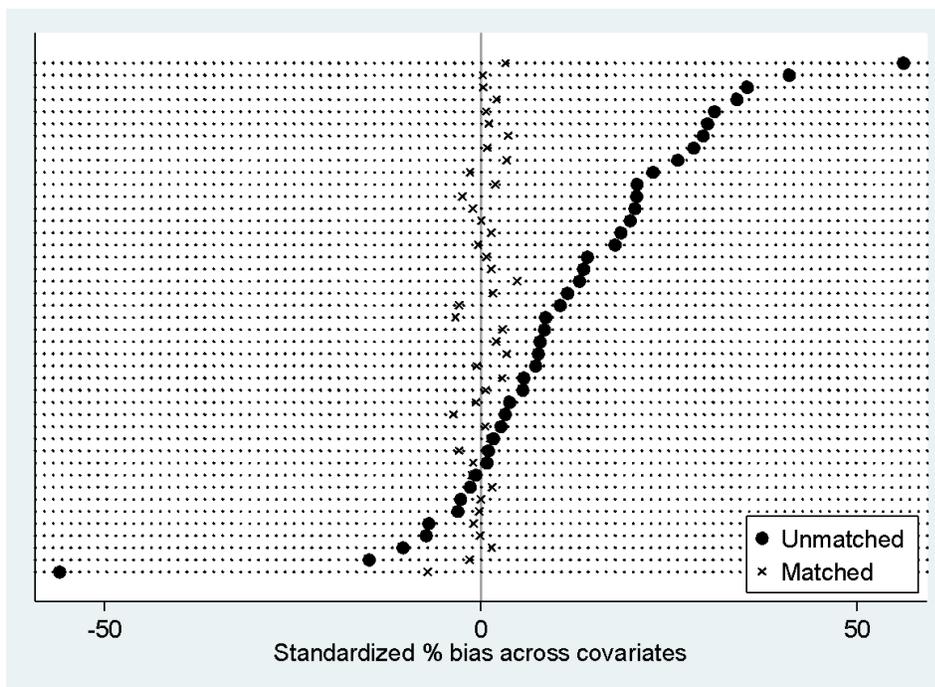


Figure 32. A1.4 Balance for Comprehensive Resilience Programming participation model: Standardized percent bias across matching variables



AI.2 Exposure to the eight intervention sets: Diagnostic tests

As can be seen in the bottom panel of Table AI.3, the percentage of households on the common support for the exposure models for the eight intervention sets run from a low of 82.5 percent to a high of 100 percent, all satisfying the common support condition. The mean standardized percent biases satisfy the balancing condition, all being below 10 percent.

ANNEX 2: CHAPTER 9 SUPPLEMENTARY TABLES

Please see the next page.

Table 48. A2.1 Impact of exposure to the eight intervention sets on resilience and resilience capacity: Difference-in-Difference Propensity Score Matching estimates (kernel matching)

	Agricultural production				Livestock rearing				Communal natural resource management				Markets and business development a/	
	All	Burkina Faso	Niger	Difference	All	Burkina Faso	Niger	Difference	All	Burkina Faso	Niger	Difference	Burkina Faso	Niger
Resilience														
Realized resilience	-0.30	-0.66	0.24	0.91	-0.71	-1.10	0.38	1.48	0.18	0.38	-0.14	-0.52	-1.37	--
Perceived ability to recover	0.06	-0.09	0.30	0.39 ***	0.03	-0.18	0.62	0.80 ***	-0.17 **	-0.31	0.06	0.37 ***	-0.19	--
Resilience capacity														
Index of overall resilience capacity	1.22	2.64	-0.93	-3.57 **	-5.30 ***	-2.50	-13.10	-10.60 ***	4.42 ***	1.20	9.70	8.50 ***	-6.26 ***	--
Absorptive capacity														
Bonding social capital	1.43	0.55	2.75	2.20	-6.10 *	-7.50	-2.10	5.40	1.11	-2.44	6.85	9.29 ***	2.14	--
Cash savings	0.00	-0.04	0.06	0.11 *	0.01	0.00	0.03	0.03	0.10 ***	0.15	0.03	-0.12 **	0.32 ***	--
Access to informal safety nets	-0.42 ***	-0.75	0.08	0.83 ***	0.14	0.27	-0.21	-0.48 **	0.30 ***	-0.20	1.10	1.30 ***	-0.08	--
Availability of hazard insurance	0.12 ***	0.21	-0.02	-0.23 ***	0.23 ***	0.48	-0.48	-0.96 ***	0.17 ***	0.31	-0.05	-0.36 ***	-0.28 ***	--
Disaster mitigation and preparedness	-0.02	-0.33	0.45	0.78 ***	-0.70 ***	-0.70	-0.75	-0.05	0.27 ***	0.13	0.48	0.35 ***	-0.80 ***	--
Conflict mitigation support	0.10 ***	0.27	-0.16	-0.43 ***	0.07	0.21	-0.31	-0.52 ***	0.04	0.10	-0.06	-0.16 ***	-0.16 *	--
Asset ownership	1.52 **	1.89	0.96	-0.93	-3.44 ***	-3.30	-3.80	-0.50	-0.02	0.56	-0.97	-1.54 *	-4.93 ***	--
Index	0.28	-2.00	3.72	5.72 ***	-3.0 **	1.30	-14.90	-16.20 ***	6.61 ***	4.91	9.36	4.45 ***	-9.0 ***	--
Adaptive capacity														
Bridging social capital	13.60 ***	12.30	15.60	3.30	-4.10	-2.60	-8.30	-5.70	-0.68	-2.53	2.31	4.84	-25.74 ***	--
Linking social capital	-3.38 **	4.25	-14.90	-19.15 ***	-8.30 ***	-5.90	-15.0	-9.10 ***	4.93 ***	6.19	2.91	-3.28 *	2.68	--
Aspirations/confidence to adapt	4.55 **	3.13	6.68	3.55 *	-0.80	-1.20	0.35	1.55	-4.96 ***	-3.30	-7.63	-4.33 **	0.52	--
Livelihood diversity	0.08	0.00	0.20	0.21	0.03	0.13	-0.27	-0.40	0.70 ***	0.63	0.82	0.19	-0.17	--
Access to financial resources	0.02	-0.01	0.06	0.07	0.14	0.33	-0.40	-0.73 ***	-0.21 **	-0.68	0.54	1.21 ***	-0.27 ***	--
Human capital	0.62	-0.72	2.65	3.37	-0.57	-4.10	9.11	13.21 **	3.06	1.63	5.38	3.75	-5.18	--
Exposure to information	0.43	0.18	0.82	0.64 *	-1.30 ***	-1.70	-0.21	1.49 ***	1.65 ***	1.41	2.02	0.61 **	0.87 *	--
Asset ownership	1.52 **	1.89	0.96	-0.93	-3.44 ***	-3.30	-3.8	-0.50	-0.02	0.56	-0.97	-1.54 *	-4.93 ***	--
Index	2.69 **	3.90	0.86	-3.04	-5.70 ***	-4.10	-10.20	-6.10 **	4.01 ***	0.66	9.44	8.78 ***	-6.08 **	--
Transformative capacity														
Bridging social capital	13.60 ***	12.30	15.60	3.30	-4.10	-2.60	-8.30	-5.70	-0.68	-2.53	2.31	4.84	-25.74 ***	--
Linking social capital	-3.38 **	4.25	-14.90	-19.15 ***	-8.30 ***	-5.90	-15.0	-9.10 ***	4.93 ***	6.19	2.91	-3.28 *	2.68	--
Access to markets	-0.37 ***	-0.35	-0.40	-0.05	0.30 **	0.27	0.38	0.11	-0.36 ***	-0.36	-0.37	-0.01	-0.30 **	--
Access to services	-0.02	0.21	-0.35	-0.56 ***	-0.20	0.06	-0.91	-0.97 ***	-0.19 *	-0.73	0.69	1.42 ***	0.05	--
Access to infrastructure	0.05	0.07	0.02	-0.05	0.16 **	0.29	-0.22	-0.51 ***	0.32 ***	0.38	0.22	-0.16 **	-0.15 *	--
Access to communal natural resources	0.09	0.14	0.02	-0.12	-0.15	-0.08	-0.35	-0.27 *	0.09	0.12	0.04	-0.08	0.02	--
Access to formal safety nets	-0.26 ***	-0.24	-0.28	-0.04	-0.21 *	-0.13	-0.43	-0.30	0.34 ***	0.37	0.30	-0.07	-0.75 ***	--
Index	-1.84	2.83	-8.90	-11.73 ***	-4.70 **	-1.20	-14.20	-13.00 ***	2.07 *	-1.20	7.30	8.50 ***	-2.30	--

Note: Values reported are the Average Treatment Effect on the Treated (ATT). a/ Results only reported for Burkina Faso area because no Niger households were highly exposed to this intervention. Stars indicate statistical significance at the 10%(*), 5%(**), and 1%(***) levels.

Table 49. A2.1 (continued) Impact of exposure to the eight intervention sets on resilience and resilience capacity: Difference-in-differences Propensity Score Matching estimates (kernel matching)

	Financial services				Human capital				Disaster preparation and mitigation				Governance			
	All	Burkina Faso	Niger	Difference	All	Burkina Faso	Niger	Difference	All	Burkina Faso	Niger	Difference	All	Burkina Faso	Niger	Difference
Resilience																
Realized resilience	1.72***	3.77	0.10	-3.67***	-0.98	0.91	-2.75	-3.65***	-0.55	-1.97	-0.19	1.78	1.16**	1.20	1.20	0.00
Perceived ability to recover	-0.09	-0.40	0.15	0.56***	0.23**	0.24	0.22	-0.02	0.21**	-0.15	0.30	0.45***	0.14**	-0.08	0.43	0.46***
Resilience capacity																
Index of overall resilience capacity	-0.22	8.31	-7.08	-15.33***	7.10***	5.83	8.29	2.47	9.43***	12.74	8.58	-4.16	7.80***	6.60	9.80	3.20**
Absorptive capacity																
Bonding social capital	-0.75	2.62	-3.45	-6.07	0.97	-5.71	7.23	12.94***	-5.43	-0.60	-6.67	-6.06	5.10**	3.90	7.00	3.10
Cash savings	0.09*	-0.16	0.29	0.45***	-0.04	0.09	-0.16	-0.25***	0.17***	0.13	0.17	0.04	0.09***	-0.15	0.00	0.15***
Access to informal safety nets	-0.11	-0.13	-0.09	0.04	0.92***	0.74	1.10	0.35*	0.56***	-0.52	0.84	1.36***	0.37***	0.14	0.76	0.61***
Availability of hazard insurance	-0.33***	-0.07	-0.54	-0.47***	0.17**	0.31	0.04	-0.27**	0.20***	0.18	0.18	0.00	0.20***	0.29	0.06	-0.23***
Disaster mitigation and preparedness	-0.48***	-0.06	-0.82	-0.76***	0.34***	-0.24	0.88	1.12***	0.06	0.48	-0.05	-0.53*	0.70***	0.57	0.93	0.36***
Conflict mitigation support	-0.03	0.07	-0.12	-0.19**	0.28***	0.34	0.23	-0.11	-0.05	0.80	-0.26	-1.06***	-0.05	0.00	-0.15	-0.15***
Asset ownership	1.20*	5.43	-2.19	-7.62***	-2.64***	-2.49	-2.77	-0.28	0.36	4.97	-0.83	-5.80***	4.90***	6.10	2.80	-3.30***
Index	-6.61***	0.00	-11.88	-11.88***	9.57***	6.92	12.05	5.13**	6.61***	10.62	5.58	-5.04	11.10***	10.10	12.70	2.60*
Adaptive capacity																
Bridging social capital	-5.78	-2.49	-8.40	-5.91	-4.87	-17.36	6.83	24.19***	-4.26	23.3	-11.3	-34.6***	8.20***	8.90	7.00	-1.90
Linking social capital	0.70	14.87	-10.62	-25.49***	2.09	5.81	-1.40	-7.20***	13.40***	13.6	13.4	-0.2	-0.42	-0.11	-0.94	-0.83
Aspirations/confidence to adapt	7.19***	9.52	5.33	-4.19	-2.67	2.34	-7.37	-9.72***	-8.99***	3.6	-12.2	-15.8***	-0.55	0.72	-2.66	-3.38**
Livelihood diversity	0.30	0.07	0.48	0.41	-0.01	0.62	-0.61	-1.23***	1.13***	-0.15	1.46	1.61***	0.37**	0.12	0.81	0.69***
Access to financial resources	0.02	-0.06	0.07	0.13	0.83***	0.52	1.11	0.59***	0.28**	0.43	0.24	-0.19	0.16***	0.02	0.40	0.38***
Human capital	-2.28	-2.43	2.17	4.59	0.46	-3.16	3.85	7.00	0.74	-1.22	1.24	2.46	3.60	2.52	5.50	2.98
Exposure to information	0.13	0.17	0.10	-0.07	-0.45	-1.15	0.21	1.35***	1.52***	1.04	1.64	0.60	1.10***	0.68	1.80	1.12***
Asset ownership	1.20*	-2.19	5.43	7.62***	-2.64***	-2.49	-2.77	-0.28	0.36	4.97	-0.83	-5.80***	4.90***	6.10	2.80	-3.30***
Index	2.53	8.73	-2.42	-11.15***	3.84**	3.20	4.45	1.24	10.49***	13.39	9.75	-3.64	7.70***	6.10	10.20	4.10***
Transformative capacity																
Bridging social capital	-5.78	-2.49	-8.40	-5.91	-4.87	-17.36	6.83	24.19***	-4.26	23.27	-11.31	-34.58***	8.20***	8.90	7.00	-1.90
Linking social capital	0.70	14.87	-10.62	-25.49***	2.09	5.81	-1.40	-7.20***	13.40***	13.60	13.35	-0.24	-0.42	-0.11	-0.94	-0.83
Access to markets	-1.01***	-1.37	-0.71	0.66***	-0.03	-0.04	-0.02	0.02	0.43*	0.50	0.41	-0.09	-0.74***	-0.97	-0.36	0.61***
Access to services	0.17	0.95	-0.45	-1.40***	1.34***	1.06	1.60	0.55***	0.17	0.08	0.19	0.12	0.20**	0.14	0.30	0.16
Access to infrastructure	-0.27***	-0.19	-0.34	-0.15	0.06	-0.06	0.17	0.23**	-0.46***	-0.39	-0.48	-0.09	0.13**	0.23	-0.03	-0.26***
Access to communal natural resources	-0.08	-0.24	0.06	0.30*	0.73***	0.85	0.63	-0.22*	0.53***	0.38	0.56	0.19	-0.08	-0.10	-0.05	0.05
Access to formal safety nets	-0.23**	0.45	-0.77	-1.22***	-0.11	-0.03	-0.19	-0.16	0.31***	0.12	1.04	0.92***	0.59***	0.62	0.55	-0.07
Index	-1.14	11.84	-11.51	-23.34***	10.41***	9.24	11.50	2.26	6.33**	8.95	5.66	-3.30	2.90**	2.70	3.10	0.40

Note: Values reported are the Average Treatment Effect on the Treated (ATT). a/Results only reported for Burkina Faso area because no Niger households were highly exposed to this intervention. Stars indicate statistical significance at the 10% (*), 5% (**), and 1% (***) levels.

ANNEX 3: TANGO INTERNATIONAL METHOD FOR CALCULATING AND UPDATING RESILIENCE CAPACITY INDEXES

This section lays out TANGO’s method for calculating resilience capacity indexes that are comparable over time, in this example across a baseline and endline survey. The most important property of such an index is that it represents the concept being measured as closely as possible. To achieve this, the analyst should always start by identifying a comprehensive set of valid indicators. The indicators, referred to here as “index components”, should be correlated with each other and the final index in the expected direction (based on theoretical priors).

In overview, the TANGO method employs factor analysis applied to baseline household data to calculate index weights. These weights are then used to calculate both baseline and endline resilience capacity indexes, as detailed in the following five steps.

Step 1. Calculate index weights and baseline index values

The weights used for calculating both baseline and endline index values, denoted w_i , one for each index component, are computed using factor analysis (the default “principal factors” option) and baseline data.⁸¹

The factor analysis may yield multiple “factors.” Which should be used for the index calculation? The reported loadings for each factor correspond to the signs (positive or negative) of the weights used for constructing the final index. The final factor for constructing the baseline and endline indexes is chosen based on consistency with the meaning of the concept being measured. For example, if the underlying index components should all be positively correlated with the concept, then the weights should all be positive.⁸² If the components have been chosen well from the start, the selected factor is typically the first factor, the one contributing the most to the components’ overall variance.

The baseline index itself is calculated directly in STATA using the “predict” command (assuming the default “regression” option). STATA automatically standardizes the values of the index components to have mean=1 and standard deviation=0 as part of the calculation.

Given five index components Z_1_bl , Z_2_bl , Z_3_bl , Z_4_bl and Z_5_bl , the STATA code for conducting the factor analysis to calculate the baseline index (denoted Y_bl) is:

```
factor Z_1_bl - Z_5_bl
```

⁸¹ Other options are to use the endline data or a combination of both baseline and endline data. These would only be considered if the index weights differ substantially when baseline versus endline data are employed.

⁸² For examples of this approach to interpreting factor analysis output see <https://www.stata.com/manuals/l3/mvfactor.pdf> and <https://www.stata.com/manuals/l3/mvfactorpostestimation.pdf>.

predict Y_bl

The code for saving the index weights for later use (to calculate the endline index) is

```
matrix(W)=r(scoef)
    forvalues x=1/5 {scalar w`x'_=W[`x',1]}
    gen w`x'=w`x'_}
collapse w*
```

Step 2. Conduct KMO test

Next, the Kaiser–Meyer–Olkin (KMO) test of whether the index components have enough in common to warrant a factor analysis is conducted using the following command:⁸³

```
estat kmo
```

Step 3. Calculate means and standard deviations of baseline index components

The index components for the endline must be standardized manually using baseline means and standard deviations before calculating the updated endline index value. The following are the STATA commands for doing so:

```
forvalues x = 1/5 { egen m_Z_`x'_bl=mean(Z_`x'_bl) }
forvalues x = 1/5 { egen sd_Z_`x'_bl=sd(Z_`x'_bl) }
```

Step 4. Calculate standardized values of endline index components⁸⁴

Standardized endline values of the index components are calculated in STATA using the means and SD's calculated in Step 3 as follows.

```
forvalues x = 1/5 { gen Z_`x'_el_std = (Z_`x'_el-m_Z_`x'_bl)/sd_Z_`x'_bl }
```

Step 5. Calculate endline index value

Finally, the endline index values are calculated using (1) the index weights calculated in Step 1; and (2) the standardized endline index components calculated in Step 4, as follows:

```
gen Y_el = Z_1_el_std* w_1 +
    Z_2_el_std* w_2 +
    Z_3_el_std* w_3 +
    Z_4_el_std* w_4 +
```

⁸³ KMO values less than 0.5 are considered to be “unacceptable.” (see <https://www.stata.com/manuals/l3/mvfactorpostestimation.pdf>).

⁸⁴ The procedures for updating indexes follows that in “Measuring equity with nationally representative wealth quintiles”, PSI 2014 (<http://www.psi.org/wp-content/uploads/2014/10/Wealth-Quintile-Guide.pdf>).

Z_5_el_std* w_5.

Note on index re-scaling

Indexes are often re-scaled for ease of interpretation and presentation. For example, an index may be re-scaled to run from 0 to 100 using the following commands:

```
egen max = max(index_old)
```

```
egen min = min(index_old)
```

```
gen index_new= (index_old-min)*100/(max-min).
```

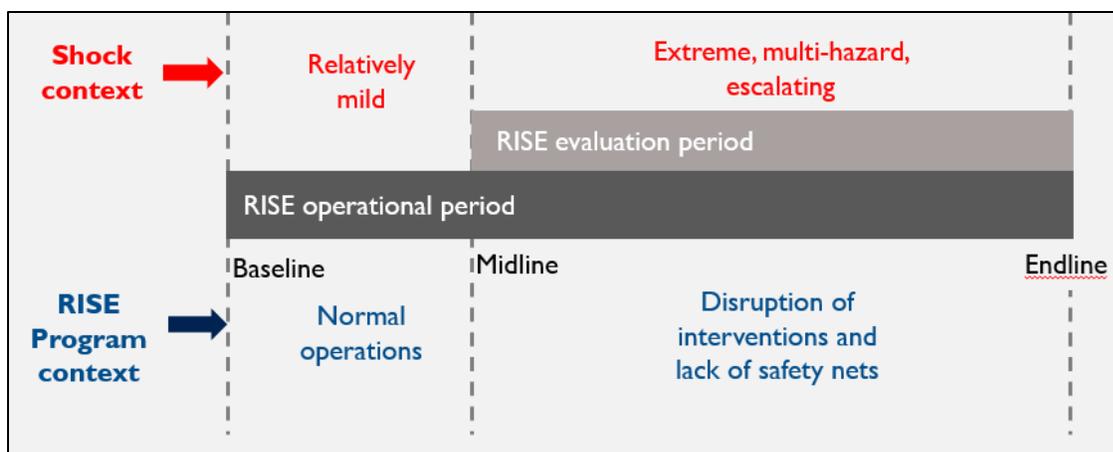
After rescaling the baseline index, in order to ensure comparability, it is very important to also rescale the endline index using the *same maximum and minimum values used for the baseline re-scaling*.

ANNEX 4: EXPLANATION OF NEGATIVE BIAS IN DIFFERENCE-IN-DIFFERENCES PROPENSITY SCORE MATCHING IMPACT ESTIMATES

As noted in the introduction to Chapter 9, the measurement period for households' exposure to and participation in interventions for the DID-PSM impact evaluation (IE) of this report is the entire baseline to endline period. The treatment and control groups are defined for engagement in interventions over this period. However, the period for the evaluation of impact is the midline to endline, for which panel data are available.

As illustrated in Figure A4.1 (from Chapter 9), the baseline to midline period was one of relatively low shock exposure and normal RISE Initiative operations. This is the period where initiative interventions would normally have a positive impact on households. The midline to endline period, by contrast, was one of extreme, multi-hazard and escalating shock exposure—including multiple climate shocks, conflict shock and the COVID-19 pandemic. According to RISE staff, the period was marked by a disruption of initiative interventions themselves.

Figure 33. A4.1 RISE Initiative operational period in relation to the evaluation period and shock context



The main question this IE asks is whether resilience interventions implemented in the RISE area from midline to endline had a positive impact on households' ability to recover from the shocks they faced over this period and on their resilience capacities. To answer the question, matching was conducted at midline.

However, since the measured exposure period is from baseline to endline, DID-PSM impact estimates have the real potential to be downward biased. In this case, positive estimated Average Treatment Effects on the Treated (ATTs) are actually positive (although lower than actual impacts), but negative estimated ATTs may not actually be negative. If a negative impact estimate is calculated it is not possible to distinguish between true negative impact and that

stemming from negative bias. The underlying source of the negative bias is matching at midline rather than baseline, the latter which would identify a “true” control group.

Actual negative impacts are entirely possible. They could result from poor implementation of initiative activities, which in the case of the RISE Initiative post-midline was a real issue as the extreme shock had a direct negative impact on the initiative itself, including on staff delivery of activities and on the state of infrastructure that had been invested in. This situation is a special case in resilience IEs, and raises this question: Can initiative interventions be evaluated for their ability to help households recover from shocks if the shocks interrupt interventions themselves?

True negative impacts could also result from unintended consequences, such as Market and Business Development interventions increasing dependence on risky market-based sources of income, leaving households vulnerable to market disruptions from shocks.

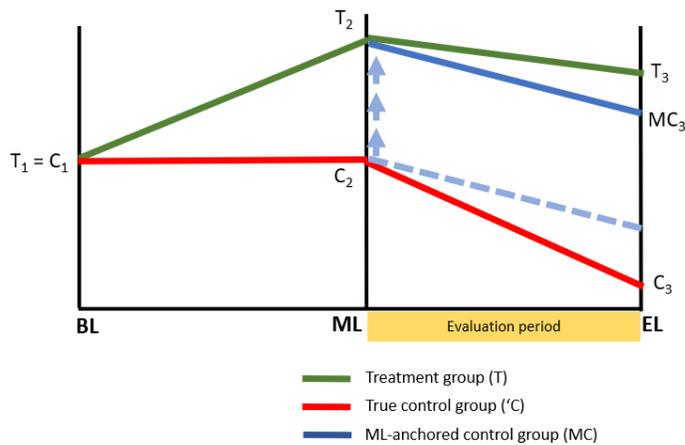
Understanding how matching at midline leads to negative bias

To help understand how matching at midline (ML) rather than baseline (BL) in the context of this IE leads to inherent negative bias in impact estimates, Figure 1 represents a situation in which positive impacts on an outcome (e.g., access to markets) actually occurred and a positive impact is estimated, but with a downward bias. In the period between the BL and ML, due to exposure to interventions the treated households (green line) experience an increase in the outcome, and the control households matched to treated households at baseline (red line, the “true” or baseline-anchored control group) experience no change, so $(T_2 - T_1) > (C_2 - C_1)$. This is what could be expected and has been found in some other resilience initiatives implemented under relatively normal shock conditions (e.g., Smith et al. 2022 for the Ethiopia PRIME initiative).

Between the ML and the EL—the period of heightened shock exposure—both the treatment group and the BL-anchored control groups experience a decline in the outcome as they confront the shocks, but the treatment group’s decline is smaller than the control group’s decline, and the true ATT (the difference in the difference) is positive, that is $(T_3 - T_2) > (C_3 - C_2)$.

However, because of the lack of panel data for matching at baseline, this ATT is not what is estimated. Matching is conducted at midline. A midline-anchored control group is identified that includes households similar to those of the treatment group, including for the outcome measures such as resilience capacity (see upward arrows from C_2 to T_2). Being better off, these households (blue line and dotted blue line) will not experience as large a decline in their capacity as the true control group. While the ATT is positive, it is less so than the true ATT.

Figure 34. A4.1 Estimated positive impact when true impact is positive (estimated impact has negative bias due to matching at midline)



Mathematically, this negative bias can be represented as:

$$[(T_3 - T_2) - (C_3 - C_2)] > [(T_3 - T_2) - (MC_3 - T_2)].$$

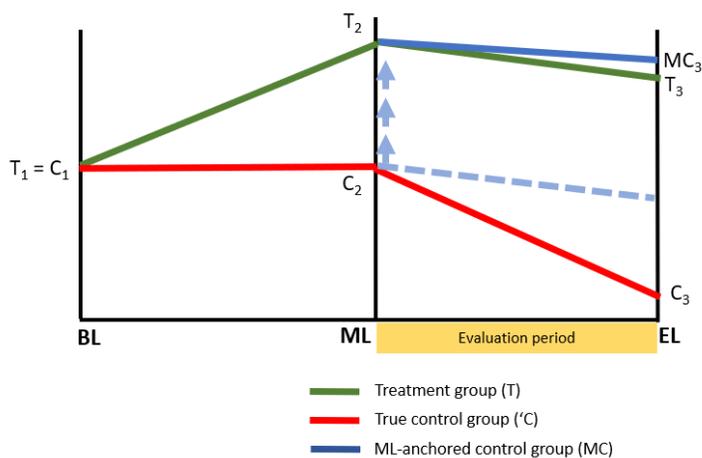
⏟
⏟

Actual impact
Estimated impact

Figure A4.2 shows a situation where the true impact is positive (the decline in the outcome measure between ML and EL is lower for the treatment group), but because of the matching at midline a *negative* ATT is estimated:

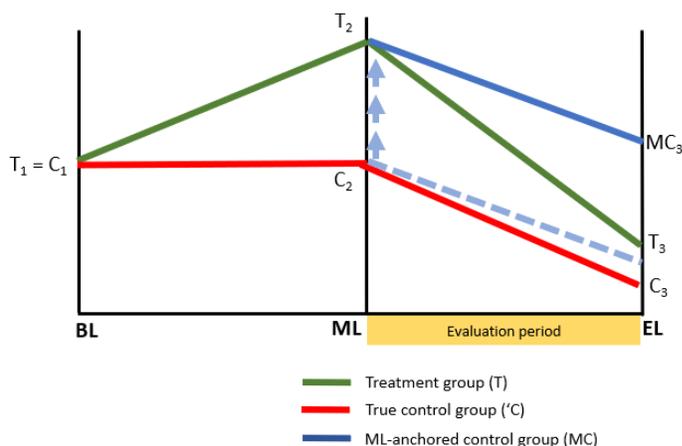
$$(T_3 - T_2) < (MC_3 - T_2).$$

Figure 35. A4.2 Estimated negative impact when true impact is positive due to negative bias from matching at midline



Finally, Figure A4.3 shows a case where a negative impact is estimated, and a portion of it is true negative impact while the rest is due to negative bias.

Figure 36. A4.3 Estimated negative impact when true impact is negative but impact is exaggerated by negative bias

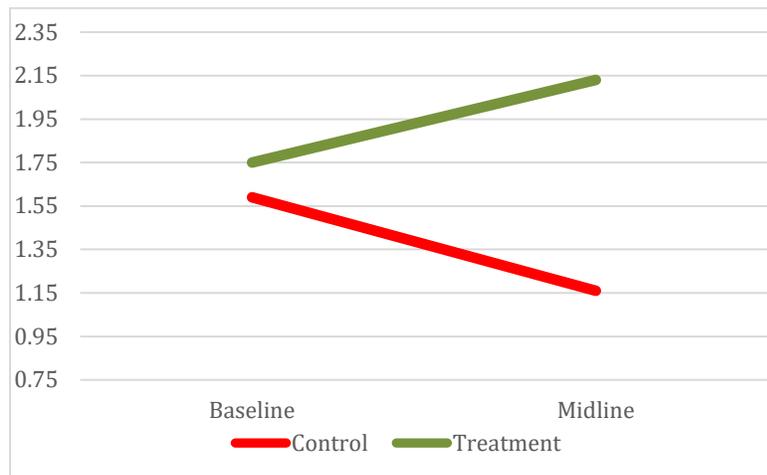


Evidence on positive impacts prior to the midline

The negative bias illustrated above only occurs if there were actually initiative impact gains made prior to the midline. We have two sets of evidence that suggest that resilience interventions may indeed have had a positive impact prior to the midline in the case of households' market access, a key outcome for which a negative impact was estimated (see Chapter 9, Section 9.1).

The first set of evidence is changes in households' access to markets between the *baseline* and *midline* for the Comprehensive Resilience Programming treatment and control exposure groups. These changes are presented in Figure A4.4. The treatment group did much better than the control group: the treatment group's market access increased by 20 percent while the control group's decreased by 17 percent. The reason we were able to calculate these numbers even though there is no household panel for the BL to ML period is because there is a village panel between the periods, and each households' market access is measured at the village level.

Figure 37. A4.4 Baseline to midline changes in access to markets of Comprehensive Resilience Programming exposure treatment and control groups



Note: Access to markets is measured on an index ranging from 0 to 3.

The second set of evidence is a Difference-in-differences Propensity Score Matching conducted using an “incidental” panel of 261 households that are in both the baseline and midline samples. With matching at baseline using this sample, a positive impact on households’ access to markets that is statistically significant at the five percent level ($p\text{-value}=0.046$) is found.⁸⁵

⁸⁵ The impact estimate is 0.685 index points. The percent of households on the common support is 98.5. The mean bias 12.9, which is greater than the cut-off of 10 (median bias is 9.1). One variable is contributing particularly highly to the overall mean bias: the index of consumption assets. The index value for the treatment group is 7.98 versus 9.63 for the control group. This means that the control group starts at baseline better off economically. The impact estimate is thus biased *downward* rather than upward. It would be even higher if a better-matching control group could be found.

ANNEX 5: APPROPRIATENESS OF MATCHING ON PRE-INTERVENTION OUTCOMES IN THE RISE IMPACT EVALUATION DIFFERENCE-IN-DIFFERENCES PROPENSITY SCORE MATCHING ANALYSIS

There is a good reason researchers match on pre-treatment outcomes—as is done in this impact evaluation of the RISE Initiative—when conducting Difference-in-Differences Propensity Score Matching (DID-PSM). Development interventions are often targeted to specific population groups based on the very outcomes that are being evaluated in impact evaluations. Furthermore, sometimes households themselves self-select into interventions based on these outcomes. This selection bias then leads to differences in the pre-treatment outcomes between control and treatment groups. When outcome *trends* differ because of these level differences, then the most fundamental assumption of DID analysis, the Parallel Trends Assumption (PTA), is violated.⁸⁶

In their recent review article “What’s Trending in Difference-in Differences? A Synthesis of the Recent Econometrics Literature,” Roth et al. (2022) stress that conditioning on covariates, as is done in DID-PSM, is one way to meet the PTA and “gives us an extra degree of robustness” (p. 20). They bring attention, however, to the following caveat: that there is some controversy over whether matching on pre-treatment outcomes as part of DID analysis solves PTA violation bias or causes this bias (p. 25). They cite Ryan (2018), who they identify as a proponent of the matching-on-outcomes approach and Daw and Hatfield (2018a) as an opponent. The controversy is over the possibility of bias in impact estimates due to mean reversion effects among the control group over the treatment period, that is, regression to the mean (RTM). It has prompted David McKenzie, Lead Economist of the Development Research Group at the World Bank, to state in his recent blog that researchers should “be a bit cautious matching on pre-treatment outcomes.”^{87,88}

After reemphasizing the importance of such matching on pre-treatment outcomes to address violations of the PTA, Ryan (2018) points out that the Daw and Hatfield (2018a) RTM bias

⁸⁶ The Parallel Trends Assumption is that the change in an outcome over the evaluation period in the treatment group would have been the same as that of the control group in the absence of the intervention, in short “equal trends in the absence of treatment” (Gertler et al. 2016, p. 136).

⁸⁷ McKenzie 2022

⁸⁸ Chabé-Ferret (2017) is another paper showing that there *could*, under certain circumstances, be bias when matching on outcomes in DID analysis. However, like Daw and Hatfield (2018a), this paper (which is an unpublished working paper) does not prove that matching on outcomes is a bias problem under all DID specifications. Furthermore, most outcomes of interest in development projects are time-varying. The draconian conclusion that “we should not combine DID with conditioning on pre-treatment outcomes but rather use DID conditioning on covariates that are fixed over time” rules out corrections of selection bias using time-varying outcomes and other covariates where needed and appropriate.

argument only applies *under certain circumstances*. In response, Daw and Hatfield (2018b) admit that the RTM bias problem is a possibility, not a foregone conclusion. They clarify that whether it affects impact estimates depends on which of two scenarios one is in regarding the distributions the control and treatment groups are drawn from.

Scenario 1 When control and treatment groups are drawn from the *same* population (and thus have the same outcome distribution), matching on pre-treatment outcomes solves an RTM problem. This occurs in cases where, among a single population, the treatment group is purposely targeted based on prior values of the outcomes or households within certain ranges of the outcome self-select into an intervention group.

Scenario 2 When control and treatment groups are drawn from *different* populations with different outcome distributions, matching on pre-treatment outcomes causes an RTM problem. This case arises, for example, when households in a state in the U.S. that has a policy change are the treatment group for the evaluation, and control group households are drawn from a similar neighboring state. Daw and Hatfield (2018a) characterize the quandary researchers face under this scenario in the title of their paper “Matching in Differences-in-Differences: Between a Rock and a Hard Place.” The quandary is faced because it is precisely when there are large outcome differences between control and treatment groups (and thus possible differences in trends), that researchers would like to apply matching on outcomes yet risk RTM bias.

Being in the first scenario, the RISE endline DID-PSM methodology is not plagued by this problem of being “between a rock and a hard place.” Matching on outcomes solves any RTM problem.

The most important outcome for analyzing the impact of RISE interventions on resilience is food security, for which changes over time are used to measure realized resilience (see Chapter 6). For this variable, we can expect that differences in pre-treatment outcomes *will* lead to differences in trends over the initiative period. In particular, households with higher food security can be expected to have lower changes in food security and the opposite for households with lower food security, a form of regression to the mean sometimes referred to as convergence.⁸⁹ Thus it is particularly important to match on pre-treatment outcomes for food security. To avoid violation of the PTA, matching on pre-treatment values of five additional key outcomes is undertaken:

- Absorptive capacity
- Adaptive capacity
- Transformative capacity
- Poverty
- Empowerment.

⁸⁹ Smith et al. 2018 [the RISE Midline Report], Section 7.3

All similarly show strongly statistically significant relationships between pre-treatment values and changes over time.⁹⁰

How does matching on pre-treatment outcomes affect the impact estimates reported in Chapter 9? Following the advice of Lindner and McConnell (2019), Table A5.1 below reports RISE IE impact estimates both with and without matching on outcomes for exposure to Comprehensive Resilience Programming.

Table 50. A5.1 Impact estimates with and without matching on outcomes: Comprehensive Resilience Programming

Outcome	Matching on pre-treatment outcome		Not matching on PT outcome	
Food security (to measure impacts on resilience)	1.56	***	1.85	***
Absorptive capacity	8.80	***	8.71	***
Adaptive capacity	10.34	***	10.13	***
Transformative capacity	2.22	**	2.07	**
Poverty	-4.8	ns	-2.4	ns
Women's empowerment	-1.023	ns	-1.053	ns

Note: Estimates shown are Average Treatment Effects on the Treated (ATTs).

Switching from matching on outcomes to not leads to no sign changes—the positive impacts remain positive, the negative impacts remain negative. There are also no changes in level of statistical significance. The small changes in magnitude for the estimates that are statistically significant are due to the corrections (or the absence thereof) for pre-treatment differences in the outcome. Thus, in the case of exposure to CRP, all the conclusions and programming implications in this report would remain the same regardless of whether matching on outcomes took place or not.

The same comparative results for exposure to the eight intervention sets are shown in Tables A5.2 and A5.3. Of the 48 sets of results shown, none show sign reversals, and only four (8%) show statistical significance differences. These are for the impact of:

- Agricultural production interventions on absorptive capacity
- Livestock rearing interventions on food security (and thus resilience)
- DPM interventions on absorptive capacity
- Governance interventions on women's empowerment.

⁹⁰ In OLS regressions with changes in the outcomes as dependent variables and the initial value as an independent variable (along with all of the other independent variables used in the Probit treatment equations in the RISE I analysis), we find negative coefficients that are all highly statistically significant (absolute values of t-stats >10.0).

Table 51. A5.2 Impact estimates with and without matching on outcomes: The eight intervention sets (first four)

Outcome	Matching on pre-treatment outcome		Not matching on PT outcome	
Agricultural production				
Food security	-0.3	ns	0.64	ns
Absorptive capacity	0.28	ns	9.6	***
Adaptive capacity	2.69	*	1.8	ns
Transformative capacity	-2.54	**	-2.3	**
Poverty	-3.8	ns	0.9	ns
Women's empowerment	0.194	ns	1.33	ns
Livestock rearing				
Food security	-0.71		-2.37	***
Absorptive capacity	-3	**	-6.29	***
Adaptive capacity	-5.74	***	-5.76	***
Transformative capacity	-4.73	**	-7.24	***
Poverty	0.08		0.087	
Women's empowerment	-3.16		-3.69	
CNRM				
Food security	0.18		-0.134	
Absorptive capacity	6.61	***	8.54	***
Adaptive capacity	4.01	***	3.39	***
Transformative capacity	3.8	***	3.92	***
Poverty	-0.012		-0.022	
Women's empowerment	-3.01	*	-1.28	
Markets and Business Development				
Food security	-1.21		1.22	
Absorptive capacity	-11.51	***	-16.1	***
Adaptive capacity	-7.48	***	-5.76	***
Transformative capacity	-6.1	***	-6.14	***
Poverty	0.034		-0.0114	
Women's empowerment	3.18		6.1	*

Table 52. A5.3 Impact estimates with and without matching on outcomes: The eight intervention sets (last four)

Outcome	Matching on pre-treatment outcome		Not matching on PT outcome	
Financial Services				
Food security	1.73	***	3.05	***
Absorptive capacity	-6.61	***	-10	***
Adaptive capacity	2.53		3.09	
Transformative capacity	-3.04	*	-2.62	*
Poverty	-0.07		-0.055	
Women's empowerment	6.92	***	9.35	***
Human capital				
Food security	-0.977		-1.023	
Absorptive capacity	9.57	***	9.97	***
Adaptive capacity	3.84	**	4.11	***
Transformative capacity	8.66	***	6.18	***
Poverty	0.086	*	0.104	*
Women's empowerment	0.261		-4.6	*
Disaster Preparation and Mitigation				
Food security	-0.91		-1.97	*
Absorptive capacity	5.97	***	3.07	
Adaptive capacity	10.1	***	11.5	***
Transformative capacity	7.16	***	5.96	***
Poverty	-0.183	***	-0.2	***
Women's empowerment	0.855		-1.167	
Governance				
Food security	1.16	**	1.36	**
Absorptive capacity	11.1	***	10.32	***
Adaptive capacity	7.66	***	6.26	***
Transformative capacity	3.71	***	4.8	***
Poverty	0.001		0.031	
Women's empowerment	-3.54	**	-0.681	

In all of these cases, the differences with and without controlling for the pre-treatment outcome is due to the fact that the outcomes have a strongly significant coefficient in the Probit treatment equation (indicating the pre-treatment outcome influences who is in the treatment group) in the presence of strong negative relationships between initial values of the outcome and changes over time (indicating RTM of the convergence type).⁹¹

In sum, matching on pre-intervention outcomes is appropriate in the context of the RISE IE. Furthermore, the conclusions and initiative implications would be largely the same with or without matching on outcomes.

⁹¹ Note also that if substantial RTM bias of the kind identified by Daw and Hatfield (2018a) were at play in the control group outcomes, then since these six outcomes are highly correlated, we would expect to see differences in the same direction with and without controlling for the outcomes. This is not the case.