



**Weather- and  
disease-related  
shocks in agriculture  
using data from the Rural  
Livelihoods Information  
System (RuLIS)**

## HIGHLIGHTS

- The detrimental effects of weather and crop/livestock disease-related shocks are not evenly distributed. A significantly larger share of rural households experience weather and disease-related shocks than urban households.
- When affected by a shock, households in rural areas face a higher decline in income and assets than urban households.
- In most of the countries analyzed, a higher share of rural households adopt coping strategies to deal with shock-related losses than urban households.

## Rural Livelihood Information System (RuLIS)

RuLIS is a tool to support policies for reducing rural poverty, jointly developed by the Food and Agriculture Organization of the United Nations (FAO) Statistics Division, the World Bank and the International Fund for Agricultural Development (IFAD).

RuLIS brings together harmonized indicators and comparable data across countries and over time on rural incomes, livelihoods and rural development.

Using the RuLIS data, this brief focuses on weather and geophysical shocks, and crop or livestock disease-related shocks, along with the coping strategies used by the affected households. Weather shocks include droughts, floods, irregular rains, landslides, erosion and earthquakes. Unfortunately, surveys only present aggregated variables for crop and livestock disease, and do not provide information on the loss of different types of crops or livestock. Such information would be a valuable input in the assessment of damage and loss in agriculture from extreme events.<sup>1</sup>

The analysis covers 26 surveys from 11 countries spread across East and West Africa.<sup>2</sup> Although the indicators across surveys are harmonized, some data limitations are linked to the varying recall periods of the questions on shocks that are used during data collection. The recall periods may differ between countries or even within a country, if the country has been analysed for more than one year.<sup>3</sup>

As a result, in Sections 1 and 2 of the brief, which represent the share of households experiencing weather, and disease-related shocks, it is not feasible to make cross-country or over-the-years comparisons for all surveys in the analysis. The comparisons made in Sections 1 and 2 are carefully targetted at surveys with similar recall periods. However, the main result in both the Sections i.e “A significantly larger share of rural households face weather and disease-related shocks than urban households”, holds true for most surveys, and it is irrespective of the recall period used in any survey. Similarly, the results presented in the rest of the Sections are consistent across surveys, regardless of the recall period.

## 1. Weather and geophysical shock

Nigeria (2013, 2016, and 2019) experiences the lowest incidence of weather/geophysical shocks (Figure 1). The share of households experiencing weather-related shocks in Ethiopia increased from 12.7 percent in 2014 to 26.1 percent in 2016. The twofold increase can be attributed to the worst drought faced by the country in 2015 (AKLDP, 2016), which affected nearly 10 million people – approximately 81 percent of the households facing weather shocks reported being affected by a drought in the past 12 months.<sup>4</sup> Similarly, the increase in Malawi from 40.1 percent in 2011 to 58.4 percent in 2013 and 72.6 percent in 2017 can be associated to an extreme drought in 2012 (CERF, United Nations and European Union, 2012), devastating floods in 2014–2015 and dry spells between 2015 and 2016 (World Bank Group, 2016).

Any household affected by weather/geophysical shocks is both exposed to the shock, as well as it incurs an actual negative damage as a result of such shocks. Figure 1 shows that across most of the countries considered, the weather/geophysical shocks affect the rural households more than urban households. This implies that rural households are both more exposed to these shocks, and are also negatively impacted by such shocks. One of the possible reasons for such difference of exposure to shocks between rural and urban households is that many households in rural areas lack education and basic services, which could otherwise help them in improving their preparedness to face weather shocks (UNDP, United Nations and European

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For more information please refer to <http://www.fao.org/3/ca6990en/CA6990EN.pdf>

Please refer to Annex A for the list of surveys.

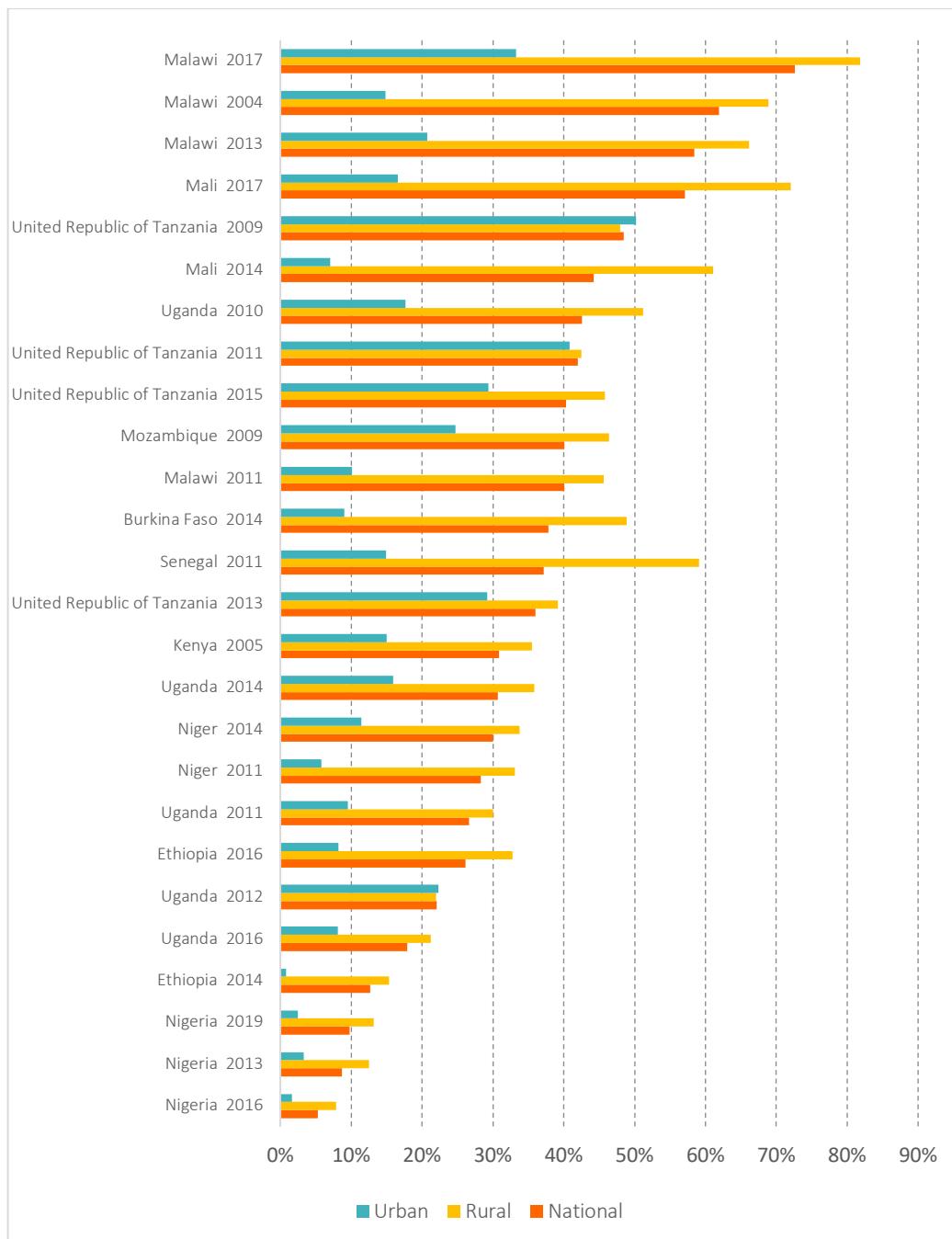
Please refer to Annex B for detailed information on the recall periods of each survey.

Please refer to Annex C that summarizes the most prominent weather/geophysical shock specific to each survey, along with the share of total households affected by that shock.

Union, 2004). Information on disaster warnings and the associated actions to avoid harm may be slow to reach rural households, especially those in isolated areas.

Urban households, on the other hand, have easier access to information, which helps them mitigate the risk of shocks and cope with the negative impact of shocks faster so that they have completely recovered before the next shock.

**Figure 1.** Share of total households that experienced weather and geophysical shocks, by rural/urban areas (%)



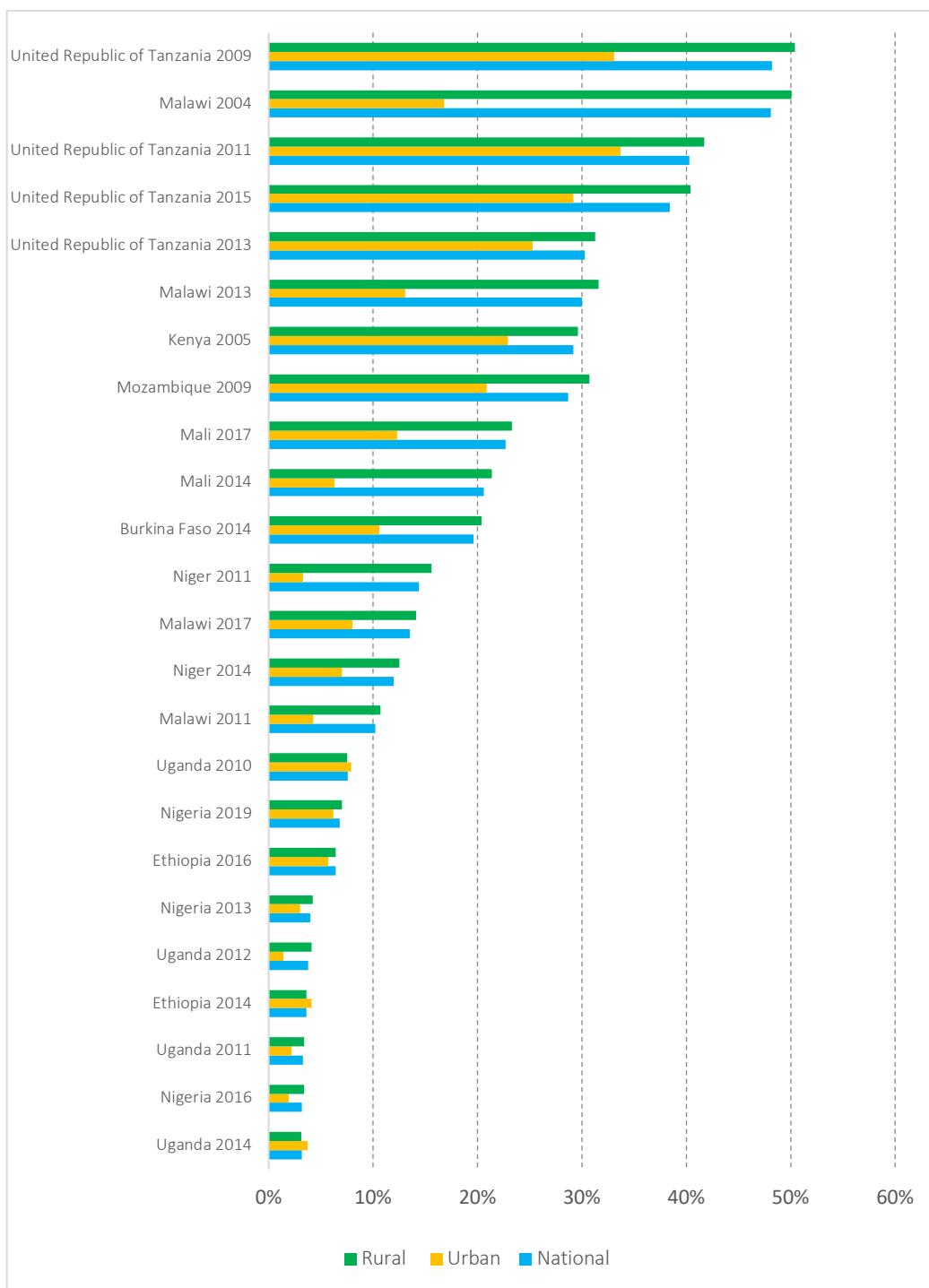
Source: Rural Livelihood Information System (RuLIS), 2021.

## 2. Crop and livestock disease-related shocks

Figure 2 shows that among the 12 countries with available data, Ethiopia, Nigeria and Uganda are the countries where households experience the lowest incidence of crop or livestock disease-related shocks. The share of households facing crop or livestock disease-related shocks was the highest in the United Republic of Tanzania in 2009, reaching 48.2 percent, followed by 48.1 percent in Malawi in 2004. Small increases took place in Ethiopia (from 3.6 percent in 2014 to 6.4 percent in 2016) and Mali (from 20.6 percent in 2014 to 22.7 percent in 2017), while declines occurred in Malawi, Uganda, and the United Republic of Tanzania. In general, the countries with available data for this study encounter lower levels of disease-related shocks than weather and geophysical shocks.

Similar to the weather-related shocks, rural households experience more crop or livestock disease-related shocks than urban households. Over the years, the uneven distribution of shocks across rural and urban households has decreased for most of the countries. For example, in Uganda, the gap between the two categories was slightly high in 2011 and 2012, however, in 2014 the shares were nearly equal in the rural as well as the urban households – approximately 3.1 percent for rural households and 3.7 percent for urban households. The gap between the rural and urban households is largest in Malawi (2004): almost 50.1 percent of the rural households experienced crop or livestock disease-related shocks, compared with only 16.8 percent of the urban households.

**Figure 2.** Share of total agricultural households that experienced crop or livestock disease-related shocks, by rural/urban areas (%)



Source: RuLIS, 2021.

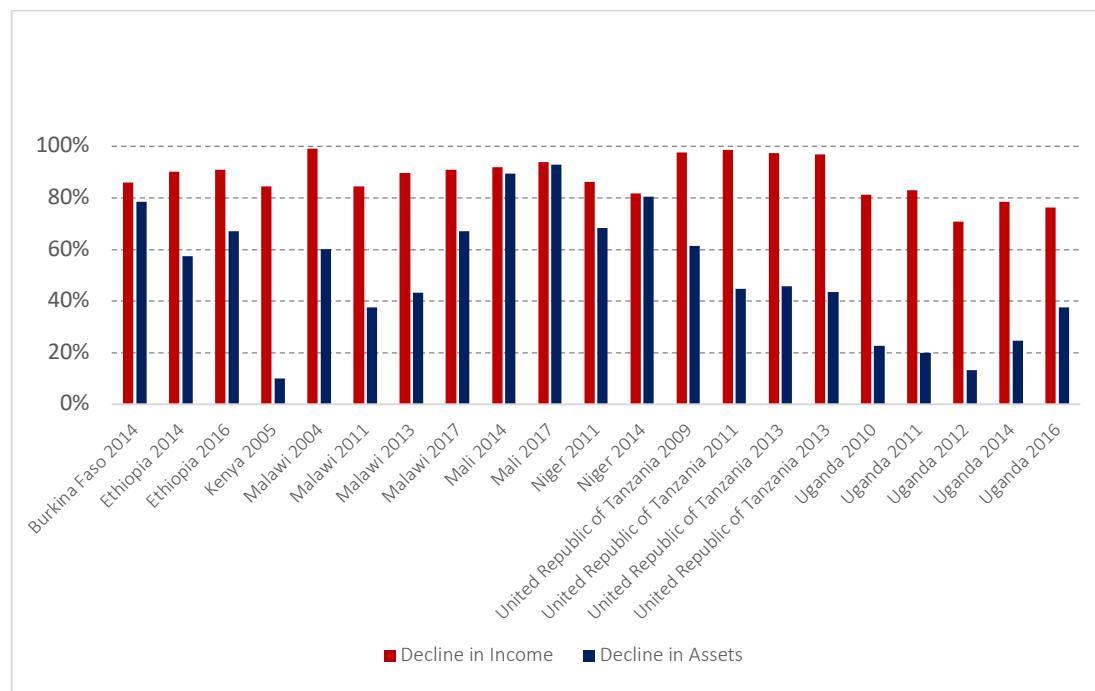
Rural households are relatively poorer and hence lack the affordability to purchase the required input material to maintain their livestock and crops. For example, farmers require strong seeds to ensure high yield, and need fertilizers and pesticides to avoid crop diseases along with a good storage unit for times of extreme temperature variation. To ensure the good health of their livestock, farmers require highly nutritious animal feed, and also need to spend on medicine, vaccinations and veterinary services. Families struggling to make ends meet have difficulties making these purchases, and become more susceptible to disease-related shocks (CNFA, n.d.). Moreover, the lack of knowledge and access to information on methods to protect from crop loss and livestock disease worsens the situation of rural households.

### 3. Decline in income and assets as a result of shocks

Some of the surveys considered in this brief also check whether households exposed to shocks face a decline in income or assets. The question is conditional on whether the households were exposed to a shock in the given recall period. It is only when a household responds positively to the question on being exposed to a shock that it is asked about the consequences it faced due to the shock. In all the surveys, the questionnaire specifically focuses on whether or not the household faced a decline in income or assets as a consequence of the shock.

Figure 3 shows that a higher share of households see a decline in income compared to a decline in assets. More than 70 percent of the households in all the countries face a decline in income. The share of households experiencing a decline in assets ranges from 13 percent (Uganda, 2012) to 92.9 percent (Mali, 2017).

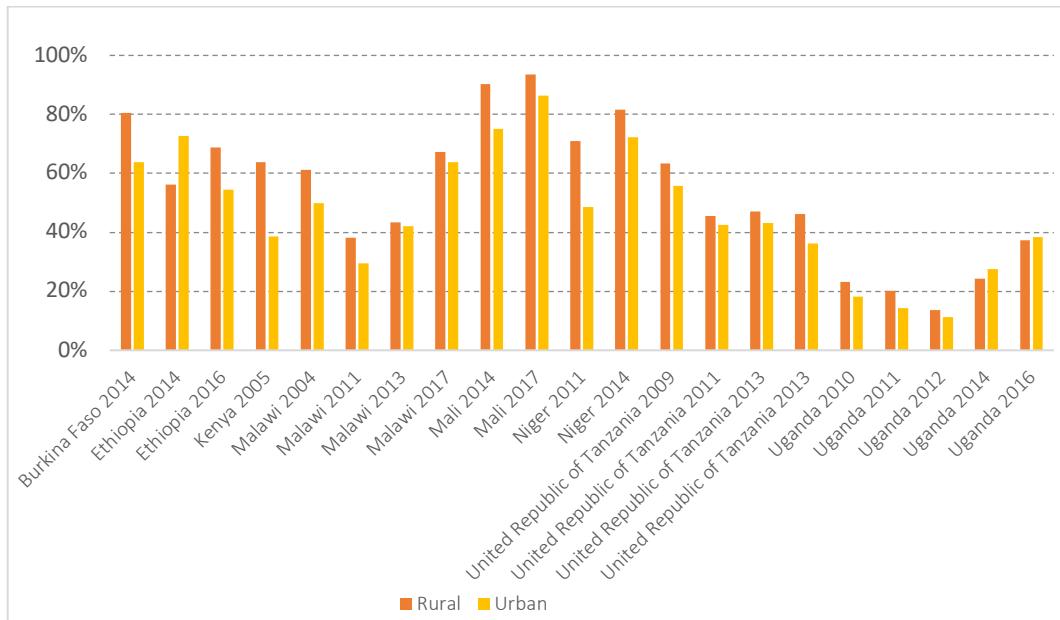
**Figure 3.** Share of households hit by shocks also experiencing a decline in income and assets at the national level (%)



Source: RuLIS, 2021.

The difference between the share of rural and urban households experiencing a decline in income is small. However, the share of households experiencing a decline in assets is distinctly higher for the rural areas in most countries (Figure 4).

**Figure 4.** Share of households hit by shocks also experiencing a decline in assets, by rural/urban areas (%)



Source: RuLIS, 2021.

As some of the assets can be used in productive activities to generate income and provide households with goods and services that increase their wellbeing (including consumption, nutrition and healthcare), asset losses can push people into sudden poverty (UNDP, United Nations and European Union, 2007).

As discussed in Section 1 and Section 2, rural households are poorer and less resourceful compared to urban households. A further decline in their assets leaves them even worse-off, making it difficult for them to cope with shock-related losses and rendering them more vulnerable and susceptible to future shocks.

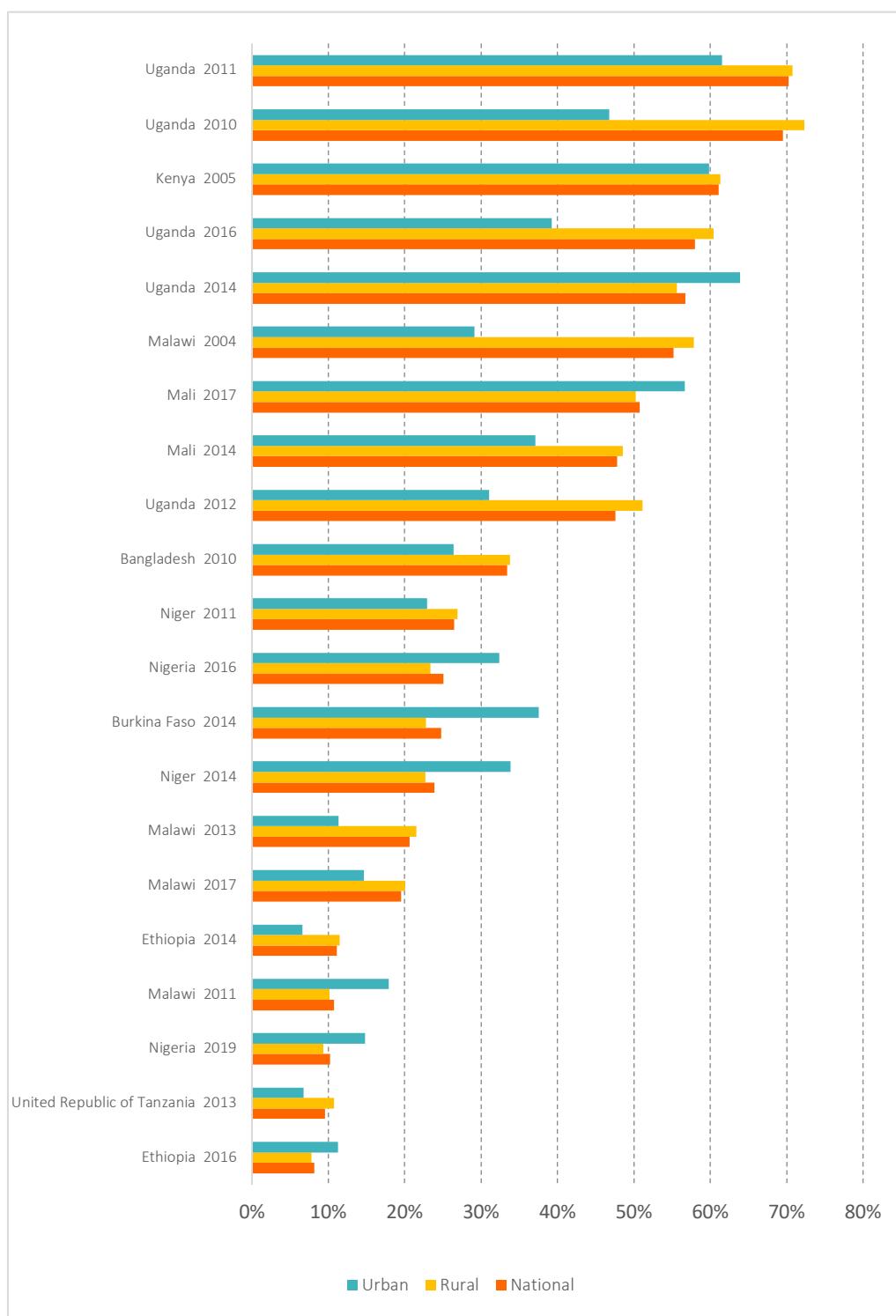
#### 4. Coping strategies adopted by households

RuLIS considers three coping strategies adopted by households in order to cope with losses incurred by shocks: migration, change in dietary patterns, and increase in employment. As households have to depend on coping strategies due to their incapacity to deal with losses due to shocks, all three strategies are inherently negative. Surveys do not provide information on where (different city/village/country) or for how long do the household members migrate if they rely on migrating as a coping strategy. However, data provides information on what all can be expected in a “change in dietary patterns” - relying on less preferred food options, reducing the proportion or number of meals per day, or household members skipping days of eating. The

last coping strategy, that is, “increase in employment” refers to two things- either employed household members work for more hours or unemployed household members find low-paid work.

Figure 5 presents the share of households that use a coping strategy, at the national level, as well as, at the rural and urban level. The share of households using a coping strategy ranges between 8 percent (Ethiopia, 2016) and 70 percent (Uganda, 2011). Approximately, in 70 percent of the surveys considered, the share of households adopting a coping strategy is less than 50 percent. This implies that in most surveys, only half of the households exposed to shocks are inclined to rely on a coping strategy.

**Figure 5. Share of households hit by shocks using a coping strategy to cope with the loss due to shocks, by rural/urban areas (%)**



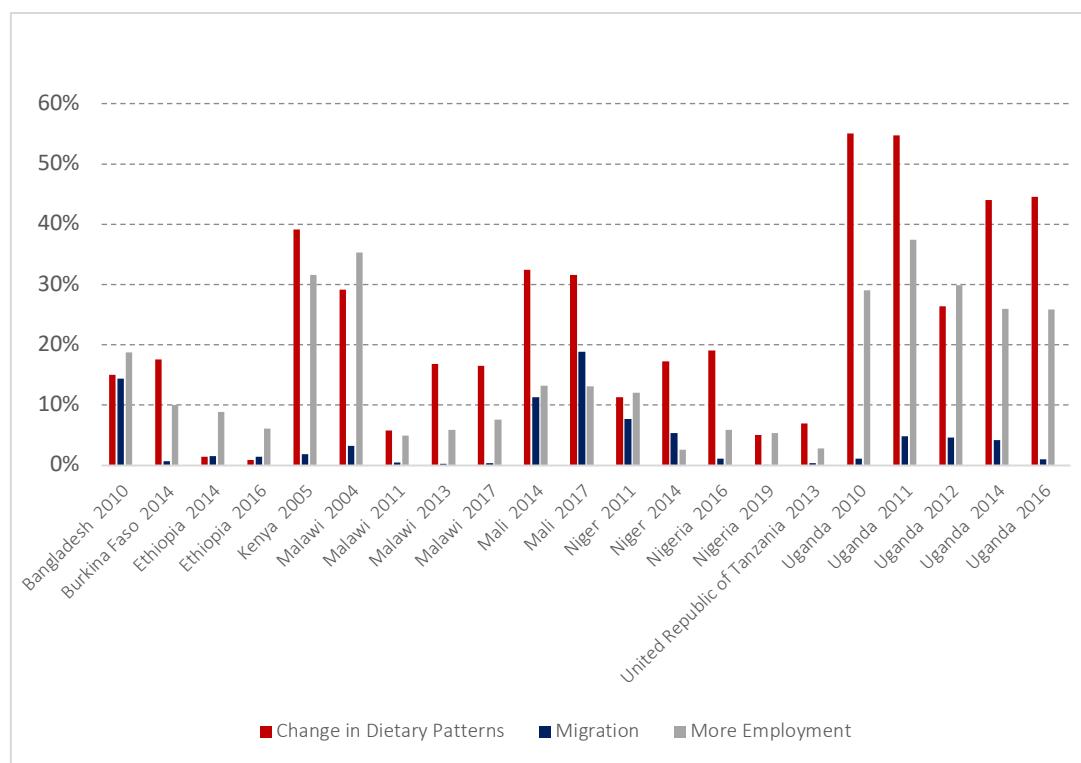
Source: RuLIS, 2021.

RuLIS data also shows that a higher share of rural households adopt coping strategies to overcome their losses as compared to urban households. As seen in Section 3, rural households face a higher decline in assets compared to urban households. This provides rural households a reason to excessively adopt coping strategies to sustain their livelihoods after incurring losses due to shocks.

However, Figure 5 also shows certain exceptions, such as Burkina Faso (2014), the Niger (2014), Nigeria (2016), Mali (2017), and Uganda (2016), where urban households are more reliant on coping strategies as compared to rural households.

Figure 6 shows that the most commonly used coping strategy is the change in dietary patterns. Uganda (2010) has the highest share of households that changed their dietary patterns because of shocks (55 percent). In Ethiopia, a very small share of households adopted this strategy (1.4 percent in 2014, and 0.9 percent in 2016) and instead took on more employment (around 9 percent in 2014 and 6 percent in 2016).

**Figure 6. Coping strategies used as a result of shocks, at the national level (%)**



Source: RuLIS, 2021.

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## ANNEX

### A. List of surveys used for the analysis

Country	Name of the Survey	Year
Burkina Faso	Enquête Multisectorielle Continue	2014/15
Ethiopia	Ethiopia Socioeconomic Survey	2013/14
Ethiopia	Ethiopia Socioeconomic Survey	2014/15
Kenya	Integrated Household Budget Survey	2005
Malawi	Second Integrated Household Survey	2004
Malawi	Second Integrated Household Survey	2011
Malawi	Second Integrated Household Survey	2013
Malawi	Second Integrated Household Survey	2017
Mali	Enquête Agricole de conjoncture intégrée aux Conditions de Vie des Ménages	2014/15
Mali	Enquête Agricole de conjoncture intégrée aux Conditions de Vie des Ménages	2017
Mozambique	Inquérito sobre Orçamento Familiar	2009
Niger	National Survey on Household Living Conditions and Agriculture	2011
Niger	National Survey on Household Living Conditions and Agriculture	2014
Nigeria	General Household Survey	2012/13
Nigeria	General Household Survey	2015/16
Nigeria	General Household Survey	2018/19
Senegal	Enquête de Suivi de la Pauvreté au Sénégal	2011
United Republic of Tanzania	National Panel Survey	2008/09
United Republic of Tanzania	National Panel Survey	2010/11
United Republic of Tanzania	National Panel Survey	2012/13
United Republic of Tanzania	National Panel Survey	2014/15
Uganda	The Uganda National Panel Survey	2009/10
Uganda	The Uganda National Panel Survey	2010/11
Uganda	The Uganda National Panel Survey	2011/12
Uganda	The Uganda National Panel Survey	2013/14
Uganda	The Uganda National Panel Survey	2015/16

Source: RuLIS, 2021.

B. List of recall periods of each survey, along with the indication of whether or not the survey has information on weather or crop/livestock disease shocks

Country	Recall Period	Year	Weather Shock	Crop/Livestock Disease Shock
Burkina Faso	12 months	2014/15	✓	✓
Ethiopia	12 months	2013/14	✓	✓
Ethiopia	12 months	2014/15	✓	✓
Kenya	5 years	2005	✓	✓
Malawi	5 years	2004	✓	✓
Malawi	12 months	2011	✓	✓
Malawi	12 months	2013	✓	✓
Malawi	12 months	2017	✓	✓
Mali	3 years	2014/15	✓	✓
Mali	3 years	2017	✓	✓
Mozambique	5 years	2009	✓	✓
Niger	12 months	2011	✓	✓
Niger	12 months	2014	✓	✓
Nigeria	5 years	2012/13	✓	✓
Nigeria	3 years	2015/16	✓	✓
Nigeria	3 years	2018/19	✓	✓
Senegal	5 years	2011	✓	✓
United Republic of Tanzania	5 years	2008/09	✓	✓
United Republic of Tanzania	5 years	2010/11	✓	✓
United Republic of Tanzania	5 years	2012/13	✓	✓
United Republic of Tanzania	2 years	2014/15	✓	✓
Uganda	12 months	2009/10	✓	✓
Uganda	12 months	2010/11	✓	✓
Uganda	12 months	2011/12	✓	✓
Uganda	12 months	2013/14	✓	✓
Uganda	12 months	2015/16	✓	✓

Source: RuLIS, 2021.

### C. Most prominent weather/geophysical shock specific to each survey

Survey	Weather/Geophysical Shock	Share of total households affected by the shock (%)
Burkina Faso 2014	Droughts	94.3
Ethiopia 2014	Droughts	57.4
Ethiopia 2016	Droughts	81.4
Kenya 2005	Droughts/Floods	81.7
Malawi 2011	Droughts/Irregular rains	78.9
Malawi 2013	Droughts/Irregular rains	81.7
Malawi 2017	Droughts/Irregular rains	94.3
Mali 2014	Droughts/Irregular rains	95.2
Mali 2017	Droughts/Irregular rains	96.4
Mozambique 2009	Droughts	73.7
Niger 2011	Droughts	84.8
Niger 2014	Droughts	85.4
Nigeria 2013	Floods	76.4
Nigeria 2016	Floods	53.3
Nigeria 2019	Floods	67
Tanzania 2009	Severe water shortage	71.8
Tanzania 2011	Severe water shortage	68.5
Tanzania 2013	Severe water shortage	57.3
Tanzania 2015	Severe water shortage	72.9
Uganda 2010	Droughts	95.6
Uganda 2011	Droughts	90.7
Uganda 2012	Droughts	81.7
Uganda 2014	Droughts	85.7
Uganda 2016	Droughts	83.3

Source: RuLIS, 2021.

The **Rural Livelihoods Information System (RuLIS)** is a set of harmonized household- and individual-level data and indicators on different aspects of livelihoods, including crops and livestock production, off-farm and non-farm income generating activities, households' composition and demographics, agricultural inputs, technology use, access to social protection, time use, shocks and migration. RuLIS currently includes information from 39 countries, with increasing data coverage in time and space as more micro-data becomes available. RuLIS aims to provide critical information for understanding medium- and long- term trends in the structural transformation of agriculture and rural economies; and for the design of policies that promote and accompany social and economic transformation and enhancement. RuLIS provides data on a wide set of indicators, cross-tabulated by rural vs urban areas, gender and other variables; and standardized variables at the household and individual level.<sup>5</sup>

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**Cover photo:** ©FAO/Luis Tato

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**Food and Agriculture Organization of the United Nations**

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