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Unique datasets on shocks, food security, and household coping strategies

Creating new analytical playgrounds to study coping behavior in the multi-shock environments of Mali, Chad, Niger, and Burkina Faso (2018-2023)

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Compilation of four unique datasets

To inform the *Cadre Harmonisé* process in West Africa, large-scale national household surveys are usually implemented twice a year to capture data on household food security and several forms of consumption- and livelihood-based coping strategies. These cross-sectional surveys typically take place around February-March (before the start of the lean season) and September-October (at the end of the lean season or beginning of the harvesting period), and they are generally representative at the second-tier administrative level. Despite their different names (that is, ENSAN in Mali, ENSA in Chad, EVIAM in Niger, and ENISAN in Burkina Faso)[1] and the methodological revisions introduced over the years, these surveys have a large common set of variables that were pooled together by standardizing the modalities of all common variables found across the multiple survey waves between 2018 and 2023. Apart from reconsolidation and reprocessing of initial data files, this process also involved the re-computation of several key indicators on food security and household coping as to assure maximum methodological consistency over time.[2]

Table 1 presents an overview of the integrated household datasets compiled for Mali, Chad, Niger, and Burkina Faso. In total, the four datasets cover almost half a million observations (that is, 424,182 households), spread across eleven waves in Mali and Chad, seven waves in Niger, and nine waves in Burkina Faso, covering a total of 232 second-level administrative areas.

[1] In French, these acronyms stand for: *Enquête Nationale sur la Sécurité Alimentaire et Nutritionnelle* (ENSAN), *Enquête Nationale sur la Sécurité Alimentaire* (ENSA), *Enquête conjointe sur la Vulnérabilité à l'Insécurité Alimentaire des Ménages* (EVIAM), *Enquête Nationale Intégrée de Sécurité Alimentaire et de Nutrition* (ENISAN).

[2] Consequently, it is important to highlight that results obtained from the newly integrated datasets do not necessarily correspond with those presented in the original survey reports.

Table 1: Sample overview of integrated household datasets

Country	Survey name	Level of representativeness*	Number of waves	Number of households
Mali	ENSAN	50 cercles	11 waves Feb-Mar (2018/19/20/21/23) Sep-Oct (2018/19/20/21/22/23)	123,382
Chad	ENSA	70 departments	11 waves Feb-Mar (2019/20/21/22/23) Sep-Oct (2018/19/20/21/22/23)	145,381
Niger	EVIAM	67 departments	7 waves Feb-Mar (2020/21) Sep-Oct (2018/20/21/22/23)	90,074
Burkina Faso	ENISAN	45 provinces	9 waves Feb-Mar (2019/20/21/22/23) Sep-Oct (2019/21/22/23)	65,345
TOTAL		**232 adm2 areas**	**38 waves**	**424,182**

Note: * While representation at the second-tier administrative level is pursued in each country, this objective is not always guaranteed given the lack of reliable and recent demographic data.
Source: Compilation based on ENSAN, ENSA, EVIAM, and ENISAN surveys.

To study food security and household coping behavior in multi-shock environments, we enhanced the integrated datasets with multiple shock indicators pertaining to five distinct domains: (i) political violence, (ii) food price anomalies, (iii) long-term climate change hazards, (iv) rainy seasonal performance, and (v) extreme weather events. To reflect the complex and multifaceted nature of shocks, the selected indicators capture several distinct dimensions, ranging from counting fatalities (deadliness) and civilian-targeting events (danger) to geographical dispersion (diffusion) and the number of rebel group and militias (fragmentation) in the case of political violence. Likewise, food price anomalies are captured on average (intensity) as well as by their frequency and maximum spell of higher-than-usual anomalies. For shocks related to climate change and seasonal performance, each time three distinct dimensions and their composite index are considered, covering drought, flooding, and heat stress (for climate hazards) and rainfall, soil moisture, and potential evapotranspiration (for seasonal performance). Finally, extreme weather events are captured by frequencies and maximum spells of dry, heavy rainfall, hot and cold days.

Table 2 presents an overview of the data captured by the integrated and enhanced household datasets. In addition to the shock data, there are four key food security indicators (FCS, HDDS, HHS, and CARI) as well as several consumption- and livelihood-based coping strategies, which reflect the multiple ways in which people have tried to cope with food insecurity. The latter strategies range from lighter forms of coping, such as selling household assets and borrowing money to cover food needs, to more severe and often irreversible strategies, like withdrawing children from school or selling the last female animals. While the food security and household coping data directly stem from the household surveys implemented between 2018 and 2023, the shock indicators were constructed from secondary data sources and aggregated by each second-level administrative area and by sequential periods of five and seven months, which roughly align with the inter-survey intervals of the integrated household datasets. The general assumption of this time and location assignment is that households engage in particular coping strategies at the time of the survey depending on the combination of covariate shocks faced in each administrative area in the preceding period.[3]

[3] Depending on the nature of the shock data, the time assignment may follow a slightly different logic. For more details, see: Marivoet and Hema (2024).

Table 2: Data overview of integrated and enhanced household datasets

Type of data	Domain (source)	Dimension/indicator
Shocks	Political violence (ACLED)	Deadliness Danger Diffusion Fragmentation
	Food price anomalies (WFP price data)	Intensity Frequency Maximum spell (each dimension for a maximum of 15 food items)
	Climate change hazards (Craparo et al., forthcoming)	Drought Flooding Heat stress Composite climate hazard index
	Rainy seasonal performance (WFP's Humanitarian Data Cube)	Seasonal rainfall Seasonal soil moisture Seasonal potential evapotranspiration Combined Drought Index (CDI)
	Extreme weather events (CHIRPS & MODIS)	Frequency of dry days Maximum spell of dry days Frequency of heavy rainfall days Maximum spell of heavy rainfall days Frequency of hot days Maximum spell of hot days Frequency of cold days Maximum spell of cold days
Food security	(ENSAN, ENSA, EVIAM, ENISAN)	Food Consumption Score (FCS) Household Dietary Diversity Score (HDDS) Household Hunger Scale (HHS) Consolidated Approach for Reporting Indicators (CARI)
Household coping	Consumption-based strategies (ENSAN, ENSA, EVIAM, ENISAN)	Reduced Coping Strategies Index (rCSI)
	Livelihood-based strategies (ENSAN, ENSA, EVIAM, ENISAN)	Selling household assets or goods Spending savings Sending household members to eat elsewhere Borrowing money to cover food needs Buying food on credit Resorting to casual labor more than usual Selling animals more than usual Selling productive assets or means of transport Reducing essential non-food expenditures Sending one or more household members to live elsewhere Child labor (<15 years) to contribute to household income Withdrawing children from school Reducing health expenditures Harvesting and consumption of immature crops Reducing expenditures on fertilizers, pesticides or fodder Consuming seed stocks reserved for the next season Migrating one or more household members informally/irregularly Mortgaging or selling the house or land where the household lived Begging or asking strangers for money or food Engagement in socially degrading, high-risk or exploitative jobs Selling of last female animals Livelihood Coping Strategies index for Food Security (LCS-FS)

Note: In addition to data on shocks, food security and coping strategies, these datasets also contain information on timing, location, and sampling weights as well as a few socio-demographic variables on the household head.

Source: Based on the integrated and enhanced datasets of Mali, Chad, Niger, and Burkina Faso (2018-2023).

Table 3 provides an overview with permanent links to all datasets and corresponding metadata information, which can be downloaded without restrictions. Given the similarity of the underlying data, one metadata report describes in detail the methodology and output behind the integration and enhancement of the food security surveys implemented in the four Sahel countries between 2018 and 2023. While several operational choices were inevitable, this methodology has tried to maintain a maximum of analytical flexibility to any future research topic.

Table 3: Access to datasets and metadata information

Type	Item	Link
Dataset	Integrated and enhanced dataset on food security and household coping strategies of **Mali** (2018-2023)	https://doi.org/10.7910/DVN/NNAYAM
Dataset	Integrated and enhanced dataset on food security and household coping strategies of **Chad** (2018-2023)	https://doi.org/10.7910/DVN/SQA143
Dataset	Integrated and enhanced dataset on food security and household coping strategies of **Niger** (2018-2023)	https://doi.org/10.7910/DVN/SWJOEN
Dataset	Integrated and enhanced dataset on food security and household coping strategies of **Burkina Faso** (2018-2023)	https://doi.org/10.7910/DVN/IPDCDQ
Metadata report	Integrated and enhanced datasets on food security and household coping Strategies in the **G5 Sahel Countries** (2018-2023)	https://hdl.handle.net/10568/158183

Source: Own compilation.

Conceptual complexities, operational shortcuts, and future research

While providing a unique window to study household coping behavior and food security in the event of multiple overlapping covariate shocks, the newly created datasets do not follow from a dedicated research design to serve this objective. As a matter of fact, all listed coping strategies relate to the multiple ways in which households have tried to deal with food insecurity *without specifying its precise origins*. By enhancing the integrated datasets with shock information, it is basically assumed that households pursue these coping strategies following the occurrence of shocks while being ignorant about their relative importance or their precise impact pathways on food security.

Apart from this conceptual limitation, several operational shortcuts were introduced to help map the covariate shocks to the integrated household data. Indeed, as the exact date and location of each household visit could not be retrieved, the temporal and spatial assignment of covariate shocks was done in a rather generic way. That is, by using fixed inter-survey periods and fixed administrative areas – despite variations in the exact timing of survey implementation, the recall periods linked to several indicators, and the exact location of households within these differently sized areas. In addition, people's coping behavior is not necessarily or exclusively driven by shocks that occur nearby in time and place, given the importance of compounding shocks over time or the impact of physically distant events, such as a coup d'état having potential repercussions on the power balance in remote villages. Furthermore, coping with shocks will vary beyond time and place, as it ultimately also depends on people's coping potential shaped by the assets and resources they have access to. These aspects of time and location elasticity in triggering household responses combined with profound household heterogeneity essentially point to deeper conceptual issues related to the measurement of shocks, vulnerability and resilience.

Despite the conceptual difficulties and shortcuts imposed on the data, the presented integrated and enhanced datasets of Mali, Chad, Niger, and Burkina Faso undoubtedly constitute unique playgrounds to study the relationship between covariate shocks, household coping strategies and their impact on food security. Without attempting to be exhaustive, the following three broad research areas could be easily identified.

First, given the extensive list of indicators combined with the high level of spatial disaggregation, there are plenty of opportunities to develop advanced shock, coping and food security profiles. This could be done by focusing on specific population subgroups; by zooming in on specific locations in a country; or by scrutinizing the dynamic and compounding nature of shocks and their impact on coping behavior and food security.

Second, given the multiple theoretical combinations of shocks and coping strategies, several data mining and econometric techniques could be employed to uncover interesting but hidden associations between shock and coping profiles.

Third, the integrated and enhanced datasets could also help with the empirical estimation of shock thresholds, or be used to revise the ordering of stress, crisis, and emergency strategies based on empirical observations regarding the sequencing of coping behavior when shock levels increase or different types of shocks compound.

Improving our understanding of how households try to cope with covariate shocks will be essential, for both governments and local communities as well as development and humanitarian actors, to help design and implement appropriate policies and interventions to improve food security, secure livelihoods and increase resilience.

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