IFPRI Food Security Portal Small Grants Research Agenda Using DIEM Data for African Countries

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DRAFT

April 3, 2025

1. Context and problem statement

The proposed research seeks to address a critical and increasingly urgent challenge across the African continent: the growing prevalence of multiple, overlapping shocks that undermine household food security and resilience. These shocks—ranging from droughts and floods to food price inflation, health crises, and conflict—are seldom experienced in isolation. Rather, they tend to cluster in ways that create compound vulnerabilities, intensifying their overall impact and accelerating the descent of affected households into chronic food insecurity and poverty. Despite the increasing recognition of this multidimensional risk landscape, the prevailing tools used for food security monitoring and social protection targeting remain narrowly focused. Most systems rely on either single-shock indicators or national-level aggregates that fail to capture the complex interplay of risks at the household level, particularly among marginalized populations.

The research agenda outlined here proposes to fill this critical gap by replicating and scaling the Multi-Shock Index (MSI) methodology across multiple African countries included in the FAO's Data in Emergencies Monitoring (DIEM) initiative. The MSI offers a groundbreaking framework for quantifying compound vulnerability by integrating both observed shock incidence (non-parametric index) and predicted probabilities of shock exposure (parametric index) using household-level data on livelihoods, coping strategies, gender, education, and geography. This dual-index approach enables the construction of empirically validated, normalized indicators that are both sensitive to acute crises and robust for longer-term resilience planning.

What distinguishes this research is not only its methodological sophistication, but also its strong policy alignment with the goals of the IFPRI Food Security Portal. The insights generated will have direct applications for national governments, humanitarian organizations, and research institutions working to mitigate food insecurity and design more responsive social protection systems. The MSI framework enables the identification

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of households most at risk—those experiencing compound shocks such as food price inflation coupled with illness or death—who are often overlooked in conventional targeting approaches. By capturing these interactions and their effects on food security outcomes like the Food Consumption Score (FCS), the research provides a powerful tool for more precise and effective intervention.

Moreover, the agenda explicitly integrates gender into its analytical lens, recognizing that female-headed households often face disproportionately higher exposure to shocks and reduced coping capacity. Through gender-disaggregated analysis of the MSI and associated food security outcomes, the research will offer clear, evidence-based recommendations for designing gender-sensitive resilience programs. This aligns with global priorities for equity in food systems and contributes to a more inclusive understanding of vulnerability.

The proposed work is timely and cost-effective, building on existing high-quality data from the DIEM platform and leveraging a proven methodological approach. Its outputs—country-level MSI datasets, technical briefs, policy dashboards, and comparative reports—are designed for immediate uptake by decision-makers. These deliverables will enable actors across the humanitarian-development nexus to anticipate and mitigate food crises, enhance the effectiveness of safety nets, improve gender-responsive programming, and inform the design of adaptive, compound-shock-sensitive policy tools.

In sum, this research responds to both an empirical and policy vacuum at a moment when African countries are grappling with unprecedented shocks and escalating food insecurity. It combines analytical rigor with practical relevance, offering a scalable solution to the complex problem of compound vulnerability. With its strong methodological backbone, actionable outputs, and alignment with the strategic objectives of IFPRI and its partners, the proposed agenda represents a critical step forward in building resilient food systems in fragile contexts.

Objective

To replicate and adapt the Multi-Shock Index (MSI) methodology across African countries in the DIEM dataset to assess household vulnerability to compounded shocks and food insecurity. This will generate comparative, evidence-based insights to inform adaptive social protection and early warning systems.

Policy relevance for IFPRI

The agenda aligns with IFPRI's core mandates:

- Evidence-based resilience analytics
- Shock-responsive social protection

- Food systems under stress
- Gender-sensitive programming
- Data-driven policy innovation

It directly supports IFPRI's Food Security Portal goals by:

- Generating granular data products and insights.
- Supporting local governments and partners with subnational diagnostics.
- Building tools that enhance the effectiveness of emergency response and poverty alleviation efforts.

2. Core research themes

Theme	Description
Compound shock vulnerability index (MSI)	Construct non-parametric and parametric MSIs by country, capturing the incidence and predicted likelihood of shocks affecting food security outcomes (e.g., FCS, HDDS).
Gender disaggregation of vulnerability	Investigate how exposure to shocks and food insecurity differs between male- and female-headed households.
Shock bundling effects	Analyze the marginal impact of compound shocks (e.g., drought + food price inflation + sickness) on food security.
Coping strategy gradient	Explore how household income and socioeconomic status influence the adoption of coping strategies and their efficacy.
Subnational inequities	Examine how compound vulnerability varies across districts or livelihood zones, using administrative identifiers.

3. Priority research questions

- How does the frequency and type of shocks affect household Food Consumption Scores (FCS) in different African countries?
- Which combinations of shocks (economic, agricultural, natural, conflict, health) most significantly reduce food security?

- What is the differential impact of these shocks across gendered household heads?
- How do coping strategies differ across income quintiles and what are their long-term implications?
- Can the parametric MSI be used to forecast vulnerability and improve early warning targeting?

4. Methodological framework

Step	Description
a. Shock filtering	Identify and retain only those shocks negatively correlated with FCS using ΔFCS impact analysis.
b. Coping strategy screening	Retain variables with <10% missing data for use in predictive modeling.
c. Construct non-parametric MSI	Binary aggregation of shock categories (economic, agricultural, etc.), normalized and population-weighted.
d. Construct parametric MSI	Logistic regressions predicting the likelihood of shock exposure based on livelihoods, gender, education, etc.
e. Index validation	Correlation and regression analysis between MSIs and FCS/HDDS/RCSI to assess sensitivity.
f. Cross-country comparisons	Benchmark and contrast MSI statistics and vulnerabilities across countries.

5. Suggested country focus

From the DIEM dataset (upon review), proposed target countries include:

- Ethiopia
- Burkina Faso
- Somalia
- Mozambique
- Chad

- DR Congo
- Malawi

These countries are selected based on data completeness and relevance to IFPRI's strategic food security interests.

6. **Example mini-proposals for small grants**

- **Proposal 1:** ***Compound vulnerability and food security in Ethiopia***
  - Objective: Construct MSIs and identify dominant compound shocks (e.g., drought + inflation) affecting FCS.
  - Deliverable: Comparative index dashboard and policy brief.
- **Proposal 2:** ***Gendered vulnerability to shocks in Malawi***
  - Objective: Disaggregate MSI by gender of household head and assess food security impact.
  - Deliverable: Gender vulnerability report and data visualizations.
- **Proposal 3:** ***Coping strategy efficacy in post-shock resilience (Burkina Faso)***
  - Objective: Rank coping strategies by income quintile and their correlation with FCS recovery.
  - Deliverable: Policy memo on adaptive safety net design.

7. **Outputs & deliverables**
   - Interactive country dashboards with MSI visualizations.
   - Technical paper per country (or regional synthesis).
   - Policy briefs for local governments and humanitarian agencies.
   - Open-access replication code & STATA/R do-files.
   - Integration-ready data products for the IFPRI Food Security Portal.
8. **Potential policy applications**
   - Shock-responsive social protection systems tailored to high-risk groups.
   - Early warning and predictive targeting using parametric MSI.
   - Gender-sensitive food security strategies.

- Localized response protocols based on subnational MSI mapping.