Modelling Early Risk Indicators to Anticipate Malnutrition (MERIAM)

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BACKGROUND

- **Global challenges of food insecurity**
  - 47 million children are acutely malnourished
  - Nearly half of all deaths in children under the age of five attributed to malnutrition
- **Decision-makers lack timely, evidence-based information on acute malnutrition**
- **Pressing practical need to facilitate action ahead of a crisis, rather than responses during or after peak**

PROJECT GOALS

- **Design, test, and scale up cost-effective means to improve the prediction and monitoring of acute malnutrition**
- **Comparative analysis of several priority countries affected by climate- and conflict-related shocks**
- **Modeling using open access secondary data**
- **Identification of leading indicators**
- **Enhance capabilities of stakeholders in humanitarian community to be proactive in responding to risks of acute malnutrition**

FINDINGS

- **Open-source data can be used to predict acute malnutrition in difficult, volatile contexts with real-world utility**
- **Strong, consistent performance of both modelling approaches**
  - High accuracy when mapped onto IPC-equivalent scale
  - Out-of-sample tests indicate utility in forecasting applications
  - Further analysis and validation remains ongoing
- **Model-based tools currently under development have potential to advance early warning in a manner that enables effective responses to manage and mitigate nutritional risk**

METHODOLOGY

- **Novel approach using multiple types of modelling**
  - Complementary analysis
  - Different points of emphasis
  - Varying levels of granularity
  - Greater generalizability and robustness of results
- **Two workstreams of spatio-temporal econometric modelling**
  - Subnational regional
    - Covers 29 countries in sub-Saharan Africa from 2000-2018
    - Predicting regional prevalence rate of acute malnutrition
  - Multi-level
    - Analysis by region within Kenya, Uganda, Nigeria, Mali, and Somalia at select time points between 2003 and 2016
    - Predicting measures of wasting at individual level, nested in units from household to regional level
  - Models ascertain where acute malnutrition is expected and which children/households are likely to experience
- **Workstream of evidence-driven computational modelling**
  - Prototypes focus on sub-national regions in three countries
    - Uganda: Karamoja
    - Kenya: West Pokot + Turkana
    - Somalia: Hawd
  - Purpose is to understand effects of household-level decisions on acute malnutrition
  - Accounts for sources of variation: household characteristics; local, contextual factors; macro-level covariates

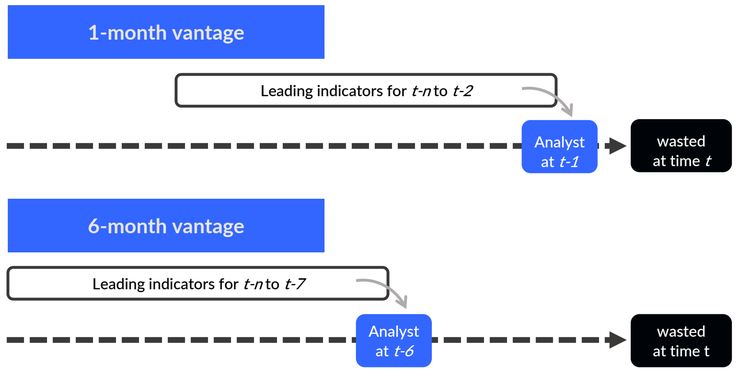

Figure 1: Econometric vantage point analysis at 1- and 6-month lead times

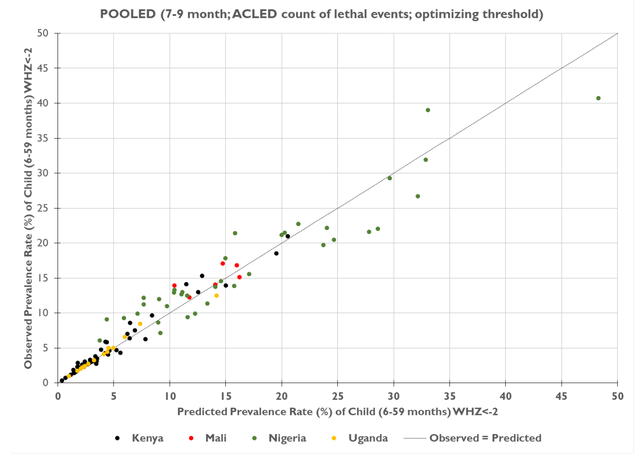

Figure 3: Observed prevalence rate vs. predicted prevalence rate for subnational regions n Kenya, Mali, Nigeria, and Uganda

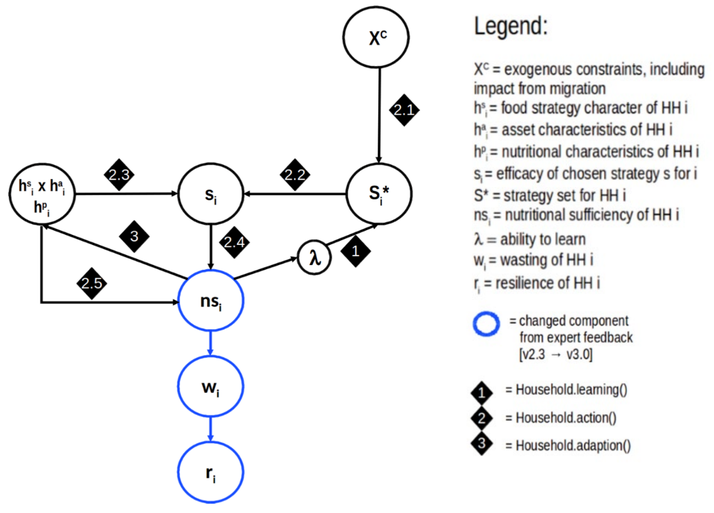

Figure 2: Framework of computational model

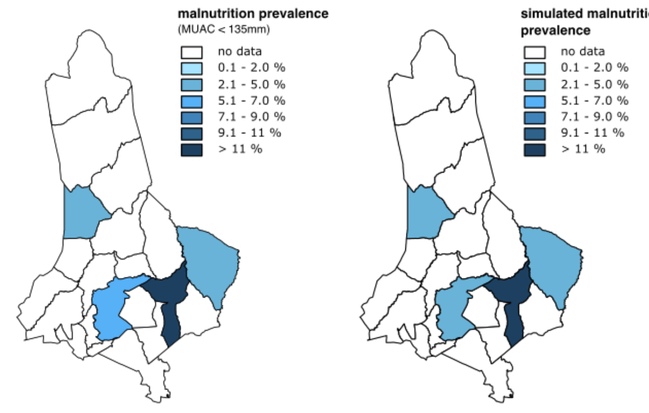

Figure 4: Observed prevalence rate vs. predicted prevalence rate for wards of West Pokot, Kenya

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