Provisioning in Agricultural Communities: Local, Regional and Global Cereal Prices and Local Production on three continents

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Food Price Indices

- Through the Famine Early Warning Systems Network, USAID's Food for Peace monitors food prices to understand:
  - Impact on food access and food security
  - To plan for appropriate food purchasing during an emergency
  - To anticipate further rises in regions experiencing crises
- Research on linking local growing conditions using remote sensing to food price dynamics is key to answering questions such as:
  - How do global commodity price rises impact local food prices?
  - How do different regions behave? Where are the local production dynamics most important?
  - How do local droughts that cause local production declines affect local food prices?
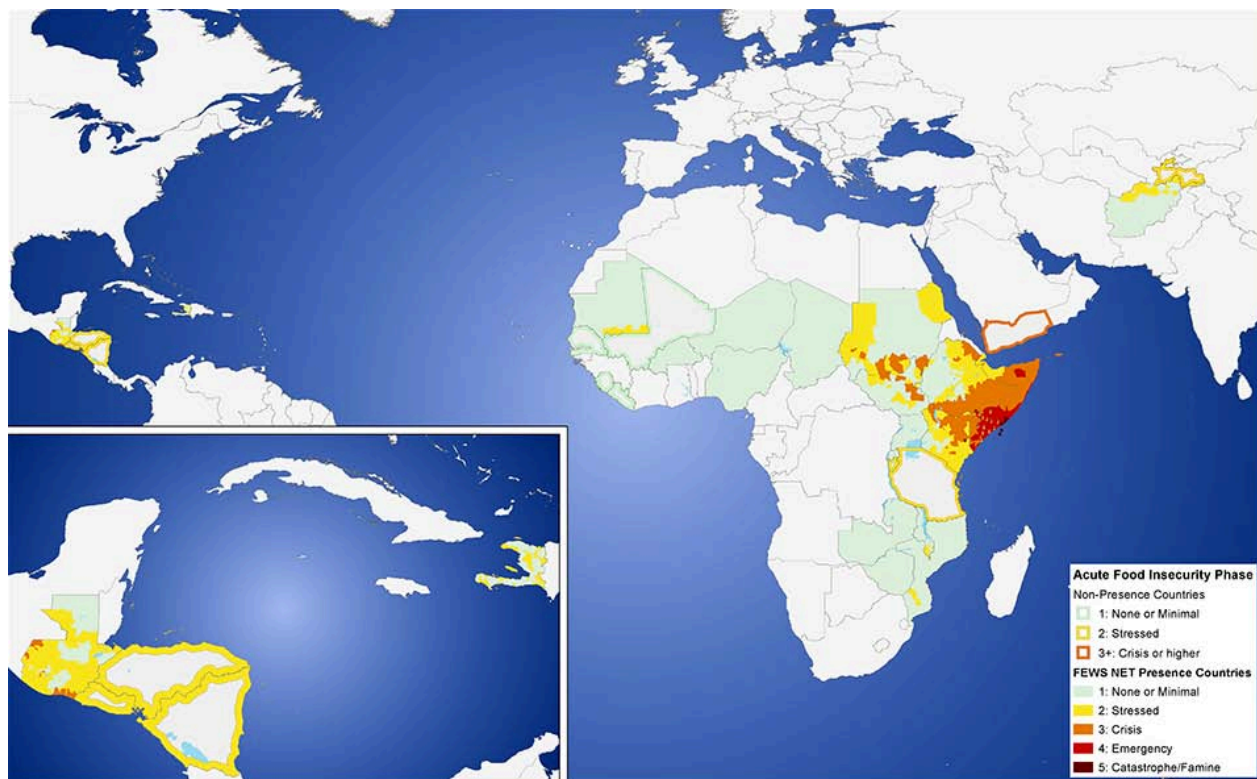- Econometric models can help answer these questions

The Context:
Famine Early Warning Systems Network

FEWS NET is a USAID-funded activity that works to strengthen the abilities of countries and regional organizations to manage risk of food insecurity through the provision of timely and analytical early warning and vulnerability information.

Food security situation Oct-Dec 2011

None or minimal
Stressed
Crisis
Emergency
Catastrophe/Famine
No Data

Geographic Extent of FEWS NET's 23 countries

Acute Food Insecurity Phase
Non-Presence Countries
1: None or Minimal
2: Stressed
3+: Crisis or higher
FEWS NET Presence Countries
1: None or Minimal
2: Stressed
3: Crisis
4: Emergency
5: Catastrophe/Famine

IPC Acute Food Insecurity Reference Table for Household Groups: Read Descriptions

Food Security is Achieved...

Food security is the ability of all people to attain sufficient food for an active and healthy life.

Individual: *Prevalent diseases, malnutrition, care of infants, feeding and food preparation practices, presence of health & sanitation facilities, water supply characteristics, etc...*
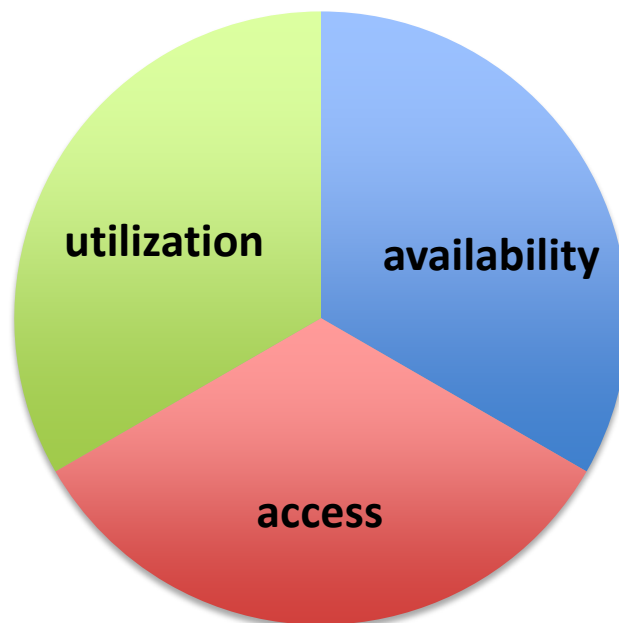
An area: *Crop planting date, vegetation or crop condition, amount & timing of rain, drought, market availability of food, food prices, imports, exports, public stocks, household stocks, wild food availability, etc...*
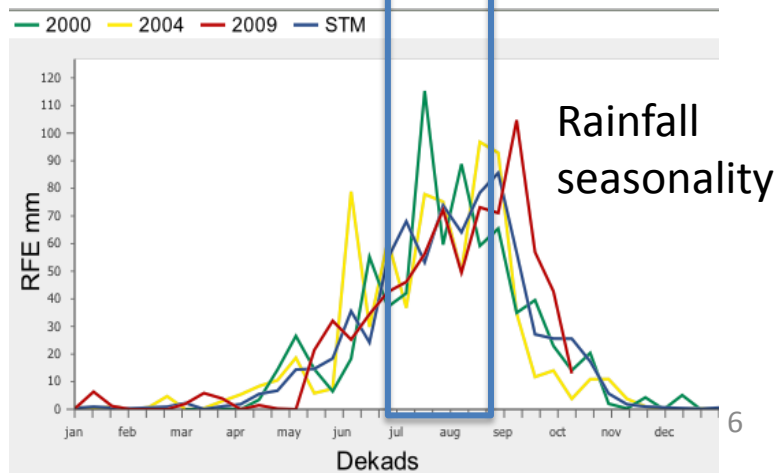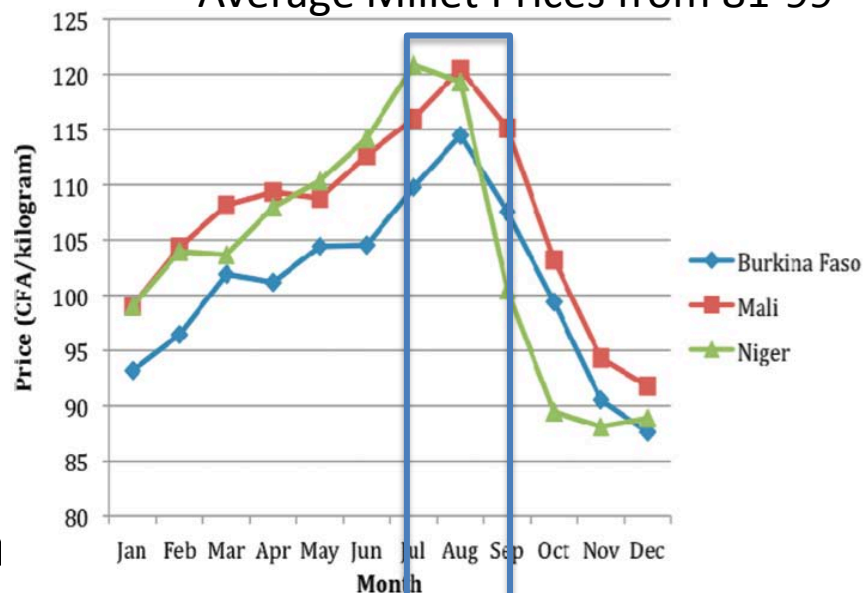
utilization

availability

access

Household/community: *Local household food crop & animal production, household sales of goods & services, conditions of other income sources, labor wage rates, food aid, assets, etc...*

From Gary Eilerts, USAID

NDVI and Markets in West Africa

- Intense price seasonality increases the vulnerability of small farm families to short term production declines

- Issues of access to food are central to food security analyses

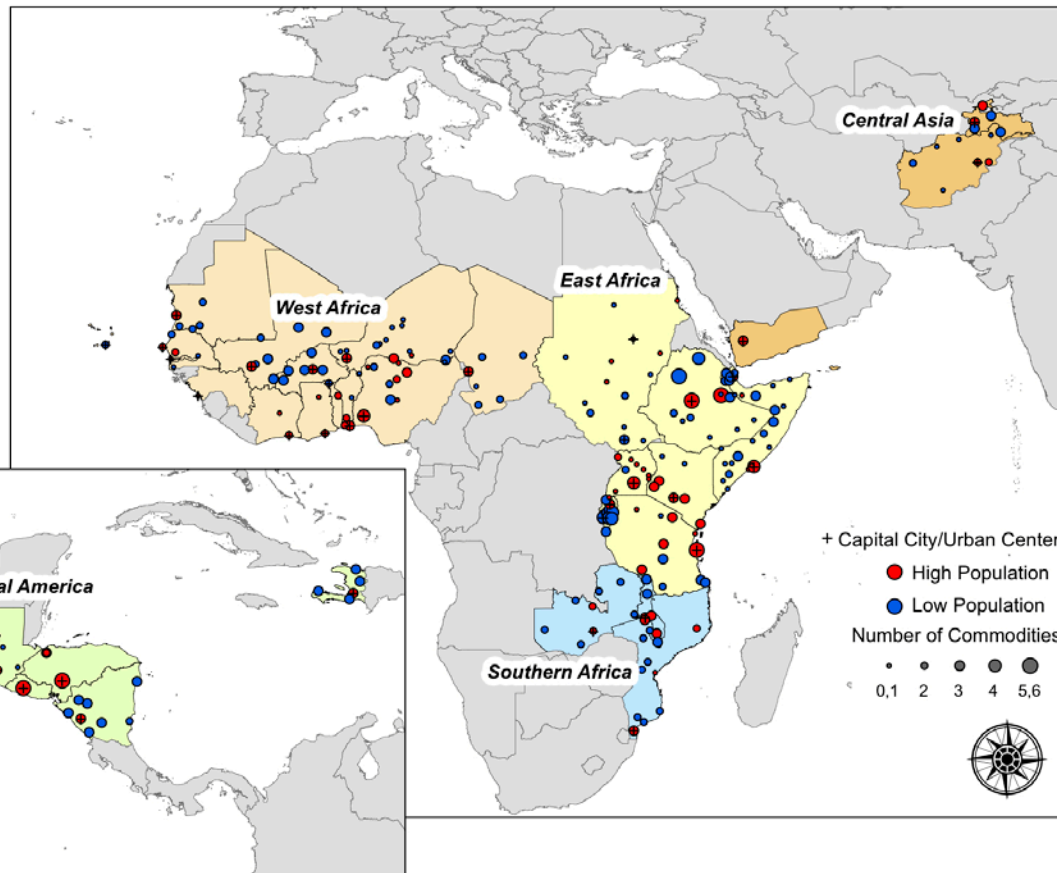- Difficulty of policy makers to know what is happening in local markets

Brown, Hintermann and Higgins 2009 EST

Average Millet Prices from 81-99

Rainfall seasonality

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Price indices for five regions

- Focus here is on five regions:
  - West Africa
  - East Africa
  - Southern Africa
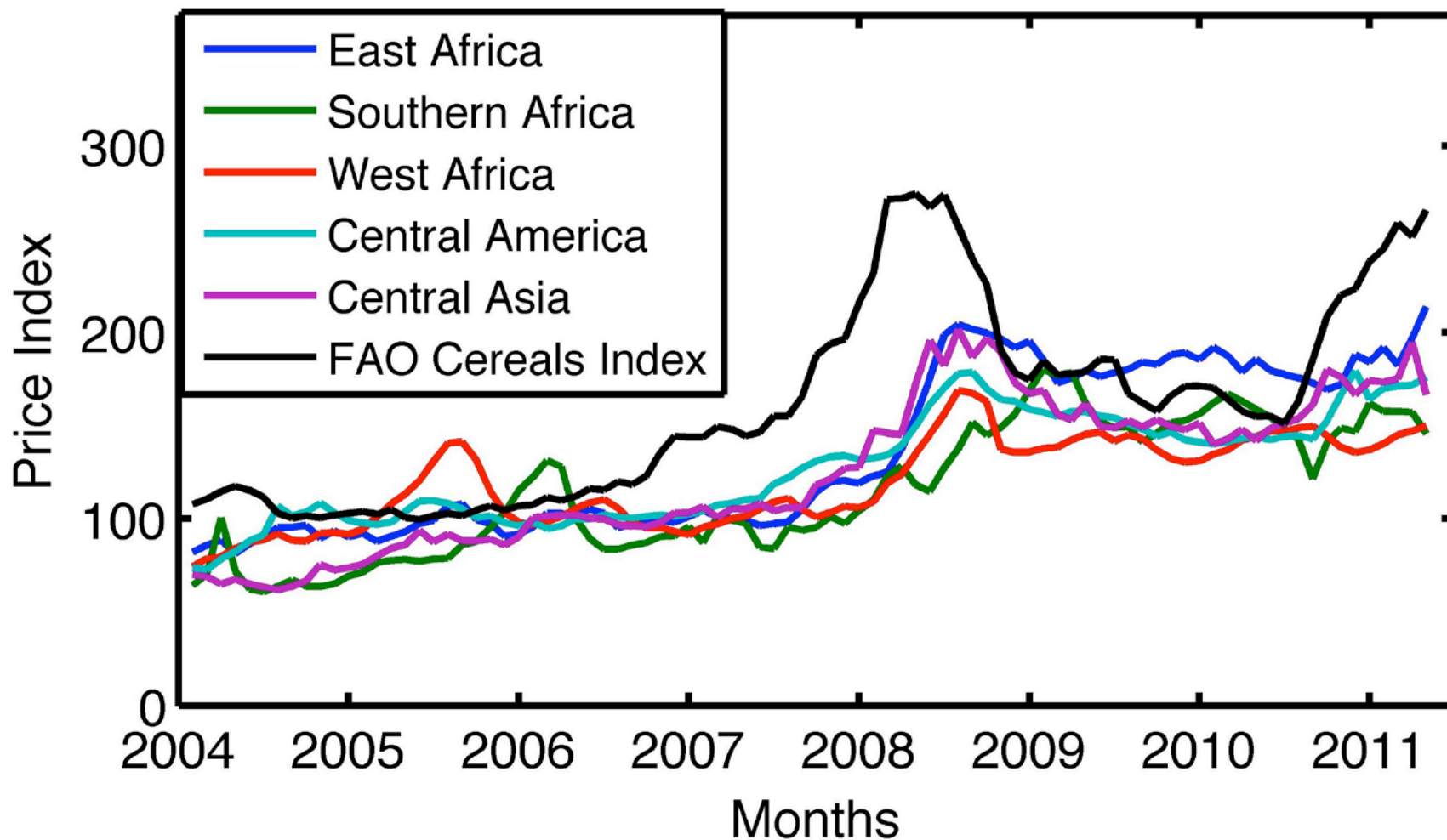 - Central Asia
  - Central America

Data

- Local data:
  - continuously updated price database comprised of food prices from 232 markets in 39 countries
  - 124 different commodities in the database
  - We use the most complete information from 2004 through 2011 to form the price indices
- Global data:
  - FAO Cereals Price index, which includes information on Rice, Wheat and Maize prices traded on the international markets

A. Regional Price Index

How do global commodity price rises impact local food prices?

| Region	Cereals		Non-Cereals		All	
	Granger-Caused by FAO Index	Granger-Causes FAO Index	Granger-Caused by FAO Index	Granger-Causes FAO Index	Granger-Caused by FAO Index	Granger-Causes FAO Index
	Prob > F	Prob > F	Prob > F	Prob > F	Prob > F	Prob > F
East Africa	0.0000	0.2315	0.1512	0.0556	0.0009	0.1395
Southern Africa	0.6836	0.6400	0.0273	0.4985	0.6158	0.6147
West Africa	0.1294	0.1898	0.6521	0.4986	0.2971	0.4735
Central America	0.0115	0.4476	0.0020	0.9730	0.0008	0.5596
Central Asia	0.0005	0.3129	0.5477	0.2181	0.0010	0.1858

How do different regions behave?
- FAO Index should be useful in forecasting dynamics of local prices in East Africa, Central America and Central Asia
- There appears to be no relationship between FAO Cereals Index and prices in West Africa and Southern Africa (*excluding South Africa*)

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How do local droughts that cause local production declines affect local food prices?

Average Prices and 4-month Predictions for Niger Millet Prices
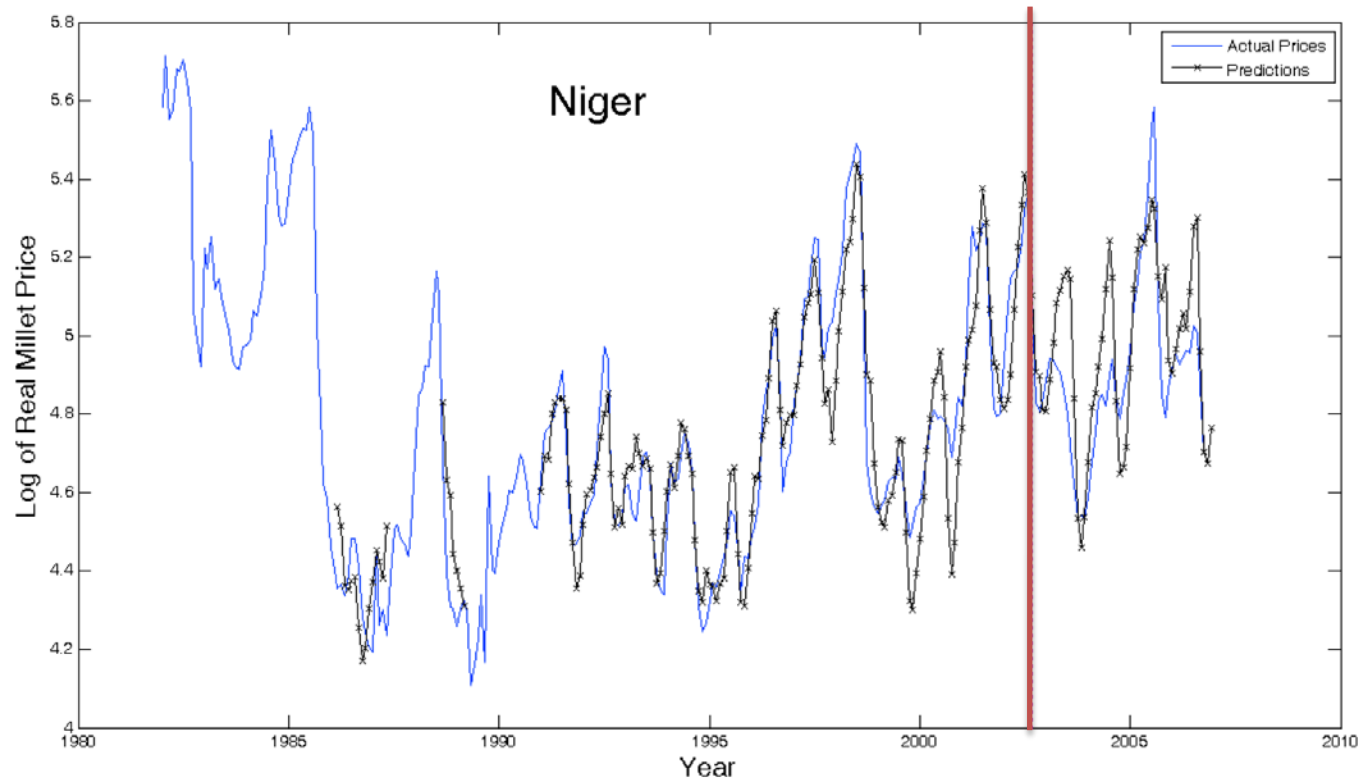
Note: In-sample prediction to the left, out-of-sample predictions to the right of the dashed vertical line

Brown, Hintermann, Higgins – CEPE paper - 2009

Millet Model results

- NDVI model input is significant (p=0.001), but doesn't impact price predictions in a large way

- The average absolute out-of-sample prediction error for 4-month-ahead millet prices is about 20 %

- Model enables the identification of markets that are functioning poorly or are experiencing a constriction of supply or unusual demand – both critical in a food security analysis

Brown, Hintermann, Higgins – CEPE paper - 2009

Conclusions

- Monitoring and incorporating diverse market and staple food information into food price indices is critical for food price analyses

- Satellite remote sensing data and earth science models have an important role to play in improving humanitarian aid timing, delivery and distribution

- Incorporating environmental observations into econometric models will improve food security analysis and understanding of market functioning