

Examining effect of climate variability on under-five children's nutrition status

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Outline

- Introduction
- Literature
 - Definition, causes and effects of climate change
 - World, regional and local picture
- Study Objectives
- Study Design
 - Methods and Data Sources
 - Analysis
- Preliminary analysis
- Conclusion
- Next steps

Introduction

- Climate Change - Change in the state of Climate identified by changes in variability of its properties over extended period (decades or longer) (IPCC, 2001).
- Caused simultaneously by natural and human-induced factors (Oreskes, 2004; IPCC, 2007)
 - Natural :Variations in solar output and earth's orbit orientation on its axis
 - Human: Industrialization (Piling greenhouse gas emissions due to burning fossil fuel)
: Changes in land use

Effects of Climate Change and Variability

- Intensified and more frequent weather events

Heat waves, none-normal precipitation, floods, droughts, hurricanes, avalanches, windstorm



- Water shortages
- Diseases :expanded geographic distribution of infectious diseases- Malaria, Cholera (IPCC 2001)

Regional Picture: Africa

- Developing regions (countries) experiencing more adverse effects , yet have little counter abilities (Malberg Dyg et al, 2011)
- Agricultural production and food security under climate variability and change induced stress (FAO 2007, 2010)
- Predictions about food security bleak
 - Grains, roots and tubers must increase by 40% and meat products by 58% by 2020 to meet demand (Pinstrup-Andersen et al. 1999).

Climate variability in Malawi

- As an agro-based economy, : Climatic Parameters play critical role in Country's economic productivity (MERP, 2012)
- Prolonged dry spells, droughts, floods and erratic rains, (Lower Shire, Lakeshore areas)
(Mkwambisi,2008; Pangapanga – Phiri, 2012)
- Socio-economic and economic survival vulnerable to climate change (MGDS 11, 2009).

Study Objectives

- Examine effect of climate variability on under-five Children's nutrition in Malawi.
- Key research question;
 - How has Children's nutrition status been impacted upon by Climatic variability in Malawi in past 5 years?

Specific questions/objectives

- What have been the trends of climatic parameters key to food production (rainfall) in Malawi over the last 5 years?
- How have the trends affected production of food crops in selected livelihood zones?
- What have been the household food consumption patterns in the zones during the period of study ?
- What is the resultant effect on nutrition status of under-five children?

Rationale

- Reported Climate variability provide impetus on the need to examine impact of climatic parameters on food availability and possible nutritional outcomes (WHO,2009).
- Poorly nourished children pose future productive challenges
 - Huge disease burden and health costs
 - Poor cognitive form
 - Poor contribution to productive labour (WHO, 2009)

Study design

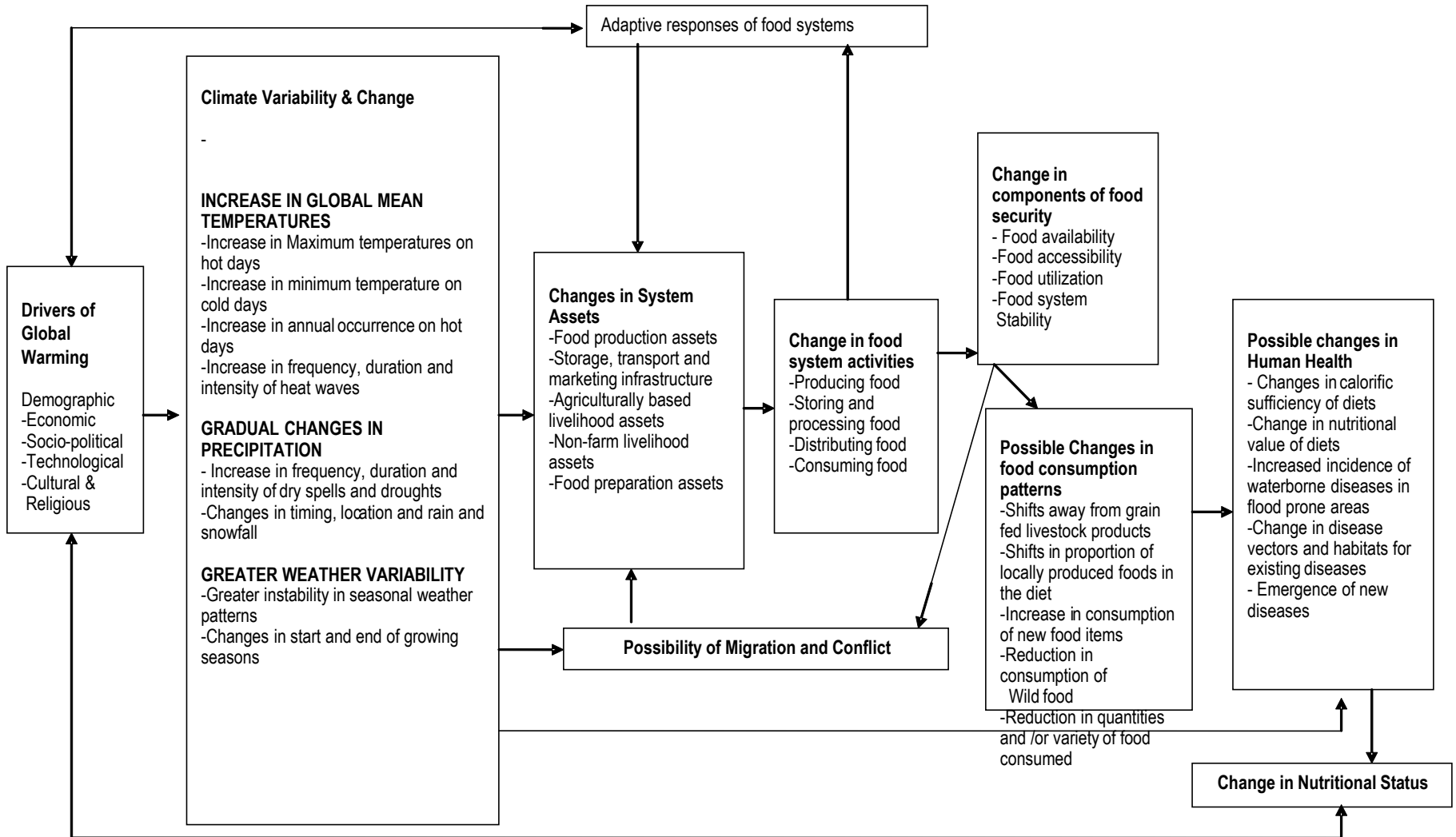
- Quantitative secondary data
- Uses cross-sectional panel survey data
- Data and Sources : Welfare Monitoring Survey (2007-2011)
 - Household Demographics
 - Food Consumption
 - Anthropometric measurements
 - Household wealth status
- Other data and Sources :
 - Climate parameter data (Rainfall)- Dept. of Met. Services
 - Staple food crop production (Maize) – MoAFS

Methodology

- Identify livelihood Zone (Districts) reported to experience adverse climatic conditions in last 5 + years
- Generate evidence for Climate variability in the zone in the 5 reference years (Key to food production)
- Assess food crop production in the zone
- Examine households economic profile
- Analyze household food consumption patterns and coping mechanisms to food shortages
- Examine nutritional situations among under-five Children
- Conduct a panel data modeling of nutrition based on above variables

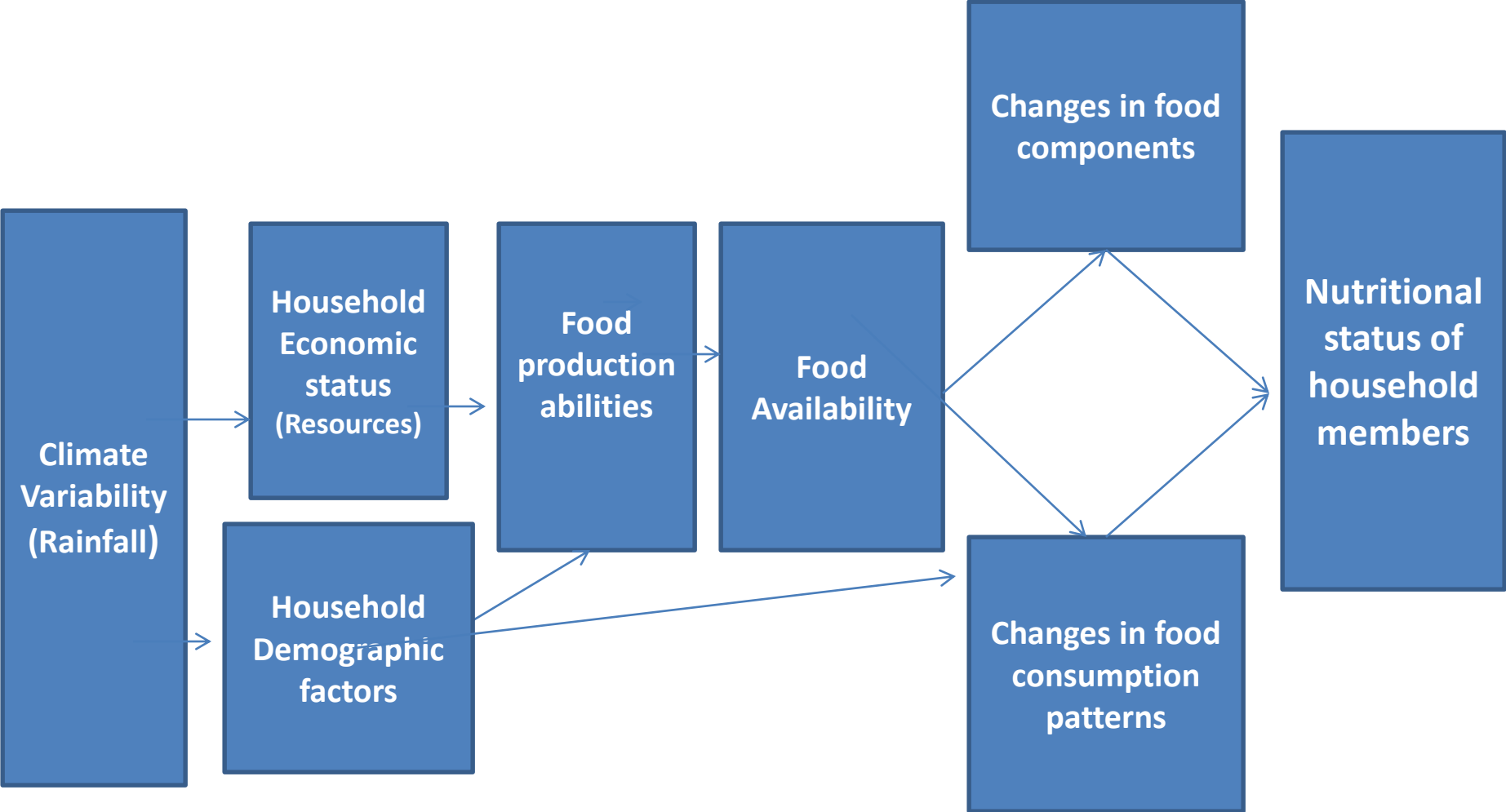
Conceptual framework

CONCEPTUAL FRAMEWORK FOR CLIMATE VARIABILITY/CHANGE AND FOOD SECURITY



Conceptual Framework (Adapted from FAO livelihood Climate Change)

Climate Variability and Household members nutritional status



Variables and Indicators

- **Climate variability:**
 - Mean deviations from normal ranges rainfall
- **Economic Status:**
 - Household Wealth quintiles
- **Food Availability**
 - Total quantity of food crops produced in a farming season / farming year
- **Food Consumption patterns:**
 - Number of meals and food items consumed per time interval (days).
- **Nutritional Status:**
 - Proportion of malnourished under-five children

Model Parameters

- Independent Variables
 - Climate variability
 - Summarized mean deviations of rainfall
 - Food (food availability)
 - Total production of staple food crop (maize)
 - Food consumption patterns
 - Household demographics(Size)
 - Economic status
 - Wealth quintile
- Dependent Variable
 - Children's nutrition status

**Preliminary analysis:
Lower Shire Livelihood Zone
(Chikwawa & Nsanje districts)**

Rainfall Performance and Maize Production (Lower Shire Livelihood Zone 2007-2011)

Total Annual Rainfall 2005-2011 (mm)					
Year	2006-7	2007-8	2008-9	2009-10	2010-2011
Chikwawa	2461.9	2180.1	1143.6	1120.7	1321.3
Nsanje	1013.9	954	875	802	712.1

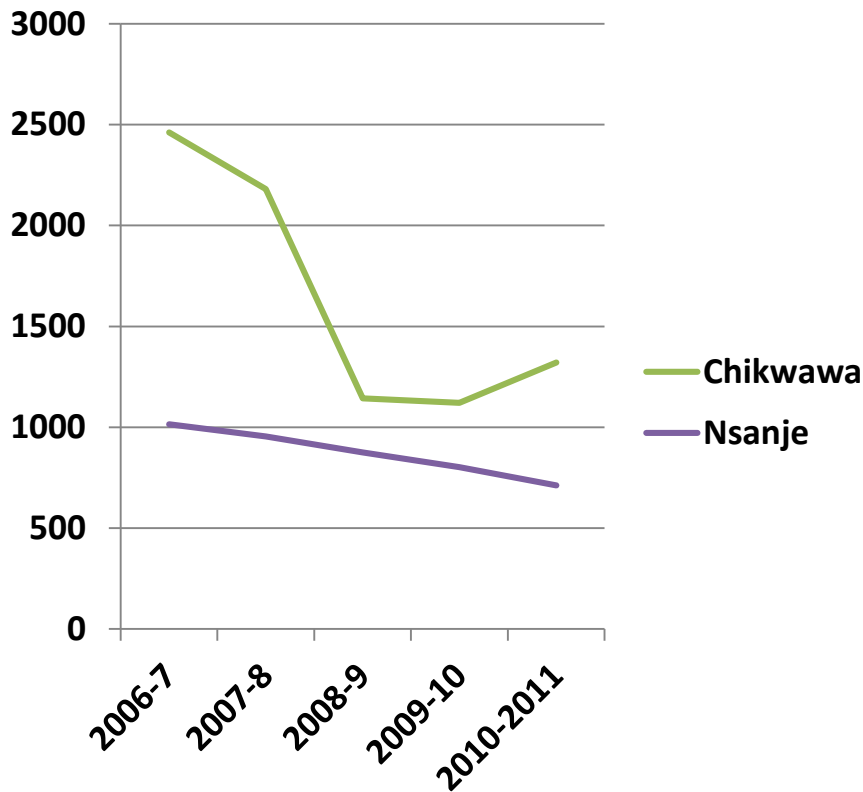
Source: Department of Meteorological Services, Malawi

Total Maize yearly Production				
District	Year			
	2007-8	2008-9	2009-10	2010-2011
Chikwawa	17444	9894	13354	40692
Nsanje	21440	7307	2878	31625

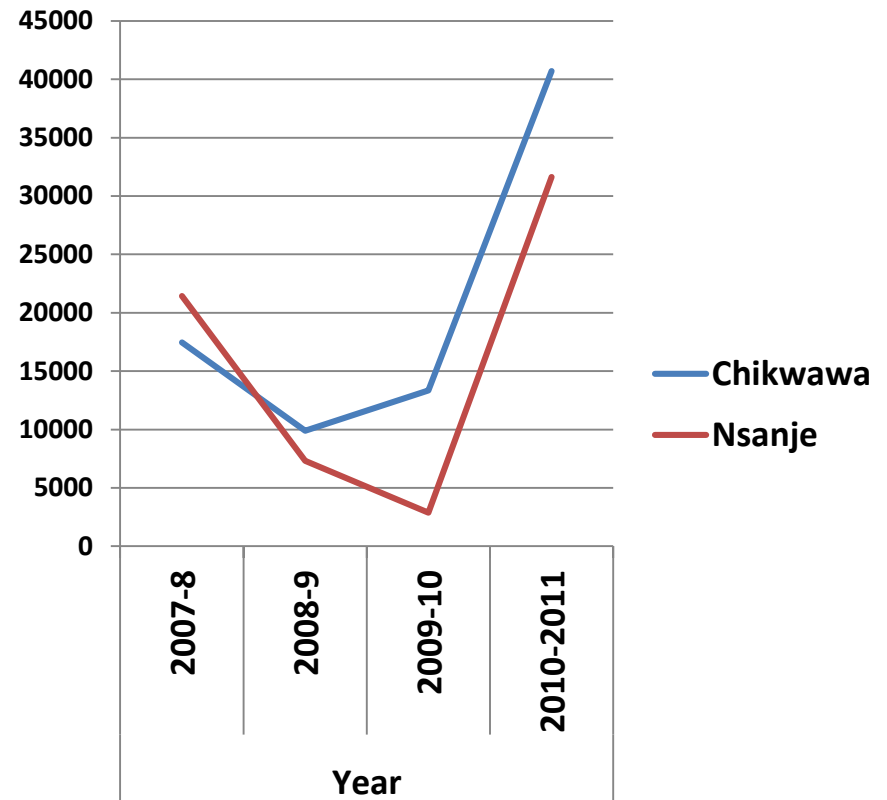
Source: Ministry of Agriculture and Food Security, Statistical Bulletin

Annual rainfall and maize production trends, 2007-2011

Annual Rainfall Trends



Total annual maize production



**Total district Maize production Vs Number of
staple food meals taken by households :
Trends**

Total district Maize production Vs Number of staple food meals taken by households per day in the week before survey 2007,2008,2009 & 2011

Year	District	Production	Number of meals		
			1	2	3
2007	Chikwawa	21440	1.8	61.1	37.1
	Nsanje	17444	4.3	57	38.8
2008	Chikwawa	9894	1.8	74.9	46
	Nsanje	7307	2.6	50.7	23.3
2009	Chikwawa	13354	3.6	55.3	41
	Nsanje	2878	1.9	46	52
2011	Chikwawa	40692	4.9	62.5	32.6
	Nsanje	31625	1.0	65.7	33

Total district Maize production Vs Number of staple food meals taken by households per day:

Observations

- There a corresponding decrease pattern in both food crop production in a year and number of food crop meals the households consumed in the year (Nsanje district in 2008,2009)
- A general pattern of high proportion of staple food meals (2 per day per) per household irrespective of whether food crop production increased or decreased
- There is a possibility of other factors at play

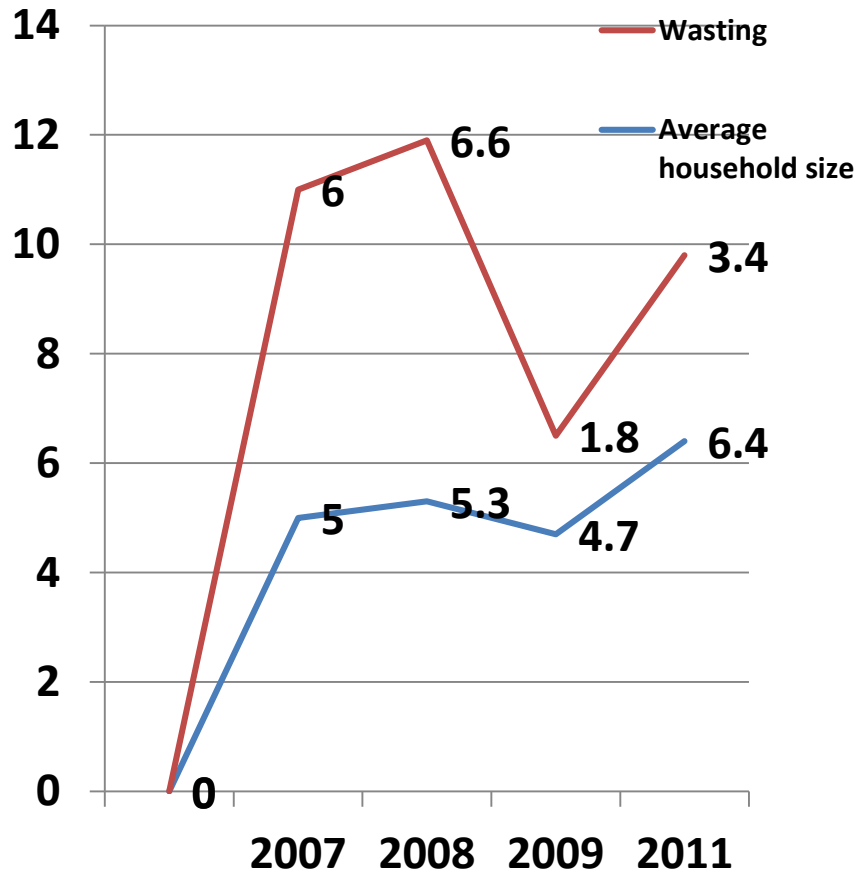
Average household size vs. Under-five nutritional indicators

Average household size vs. Under-five nutritional indicators

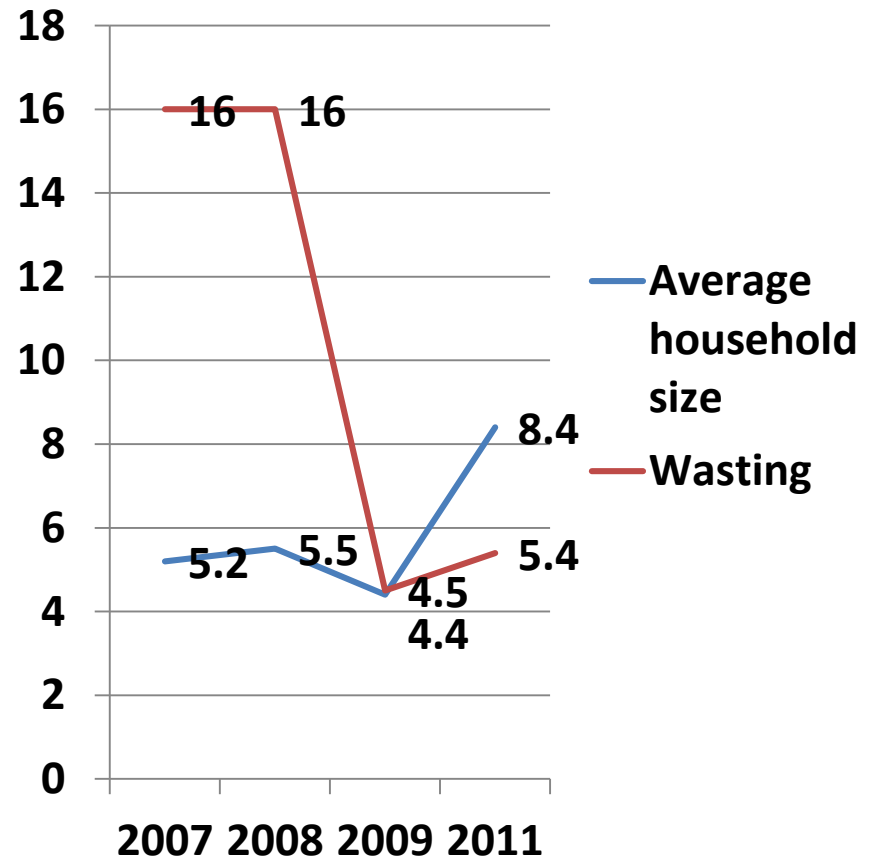
Year	District	Average household size	Nutritional Status		
			Stunting	Wasting	Underweight
2007	Chikwawa	5.0	41.6	6.0	20.7
	Nsanje	5.2	40.5	16.0	25.5
2008	Chikwawa	5.3	41.6	6.6	20.7
	Nsanje	5.5	40.5	16.0	25.5
2009	Chikwawa	4.7	49.6	1.8	20.7
	Nsanje	4.4	44.4	4.5	19.4
2011	Chikwawa	6.4	38.1	3.4	14.9
	Nsanje	8.4	58.3	5.4	24.5

Average household size vs. Under-five nutrition

Chikwawa District

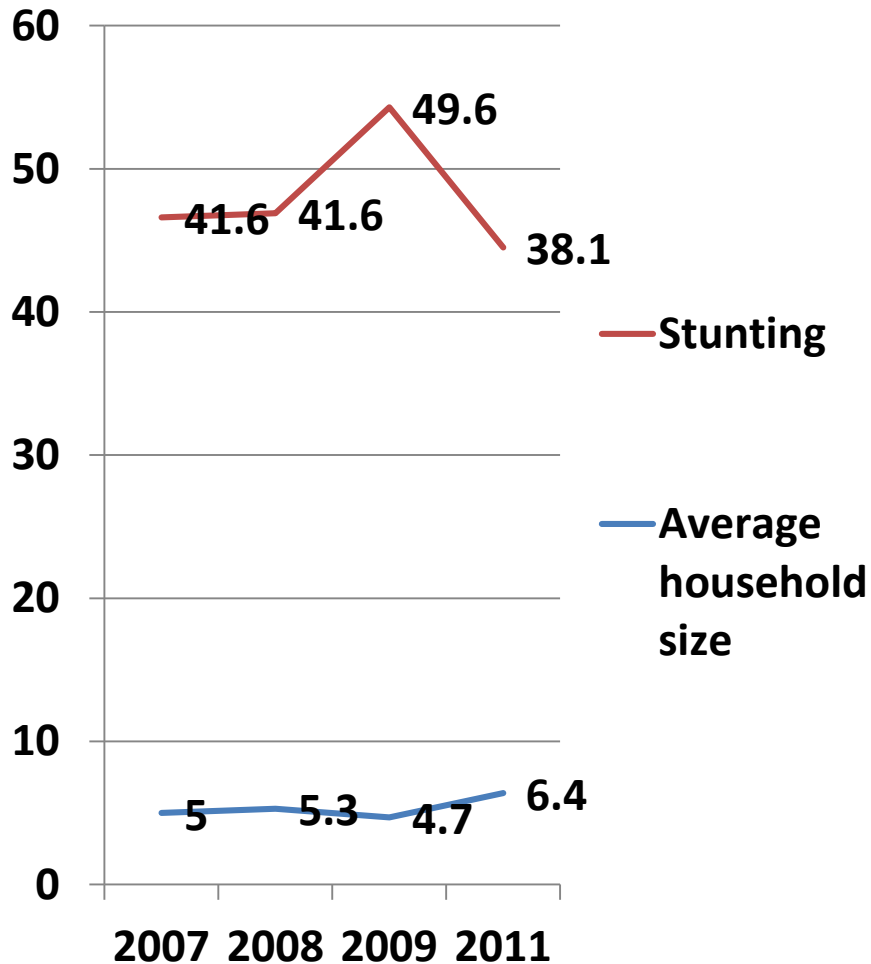


Nsanje District

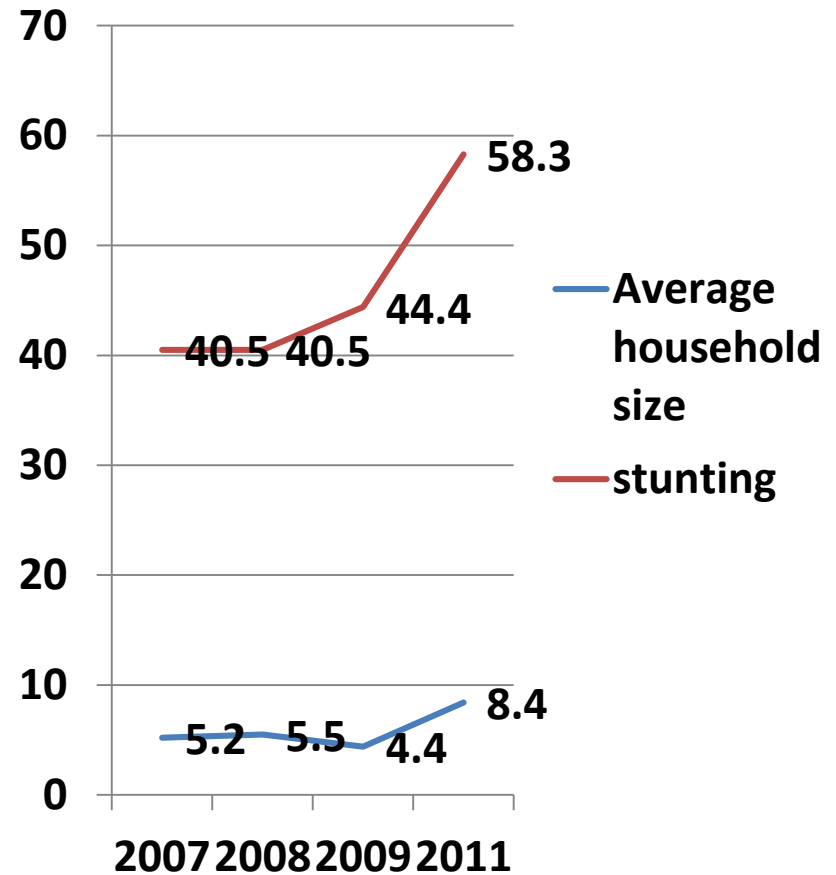


Average household size vs. Under-five nutrition

Chikwawa district

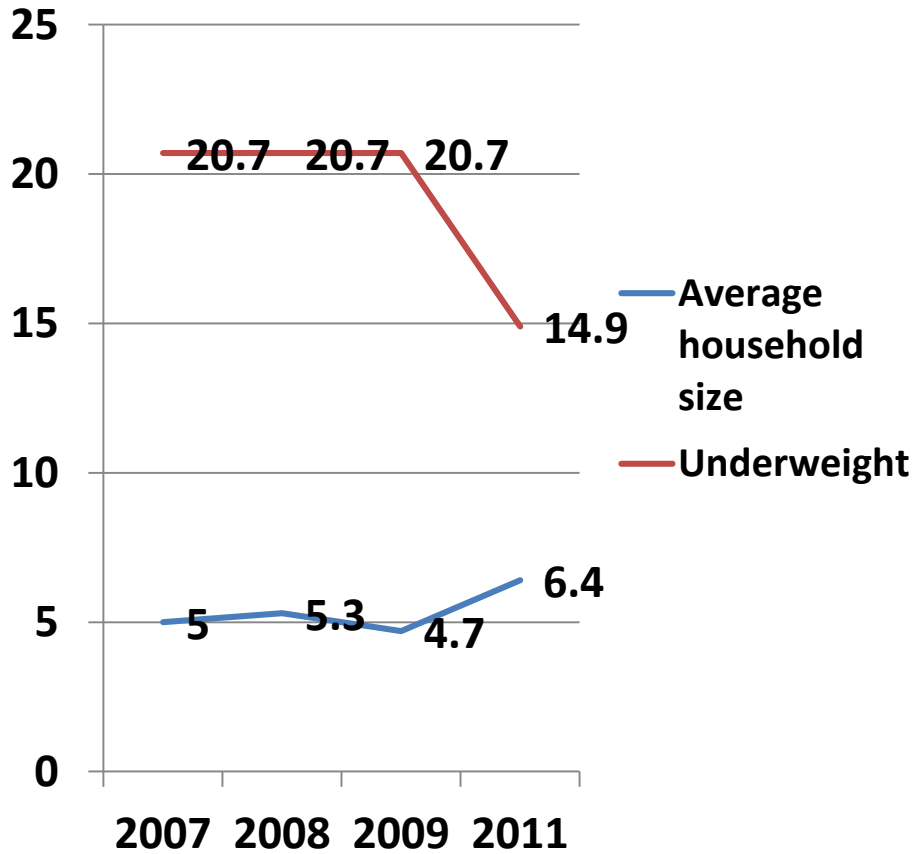


Nsanje District

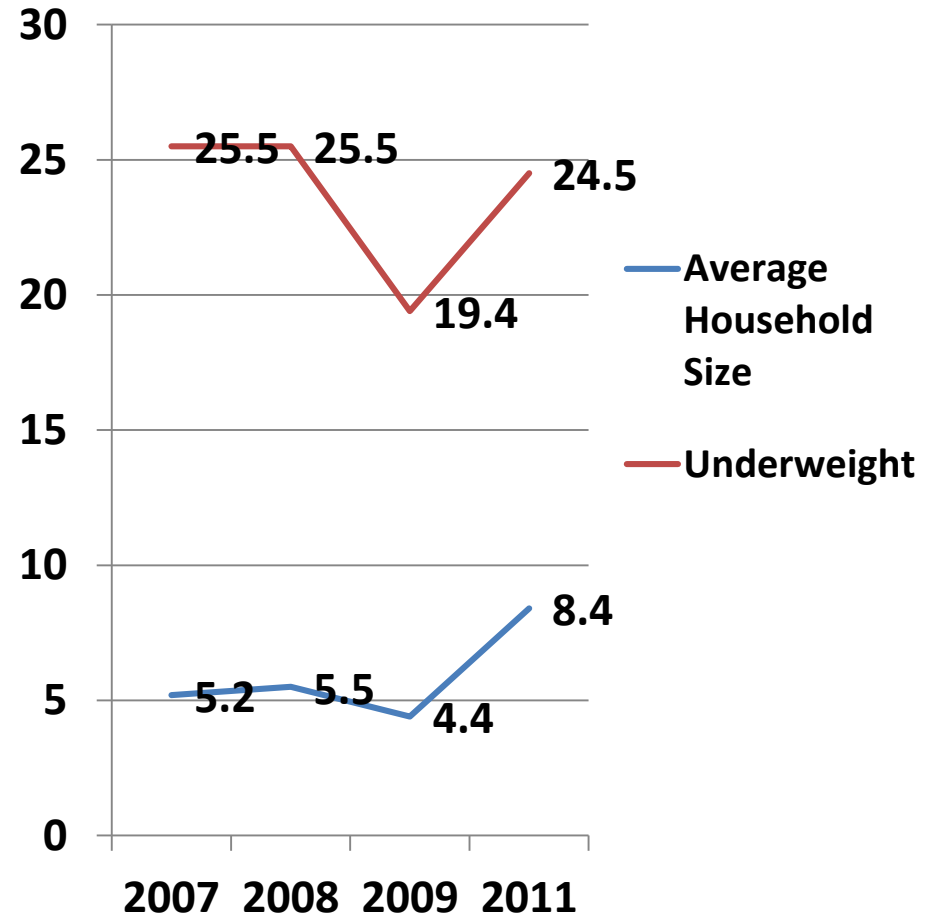


Average household size vs. Under-five nutrition

Chikwawa District



Nsanje District



Average household size vs. Under-five nutrition : Trend observations

- Almost all under-five nutrition indicators for all the years under study showed a pattern of change just like yearly changes in average household sizes
- There could be a very close association between household demographics (Mean size) and under-five nutrition indicators

Preliminary conclusions

- Climatic parameter (rainfall) does not show any similar pattern to nutritional indicators
- Demographic factors (household size) appear to have a bearing in nutritional situation
- Although there seemingly is a similar trend on rainfall quantity and food crop (Maize) production, there could be no statistical relationship, hence an indirect link of climatic variables to nutritional outcomes.
- More rigorous statistical analysis to test relationships of variables

Next steps

- Perform statistical test of associations in order to provide evidence for relationship among parameters in the analysis
- Conduct panel regression analysis to model nutrition based on the selected parameters (Climatic –rainfall) demographic and economic factors
- Scale up analysis to all livelihood zones so as to examine parameters at a more broader scale and allow comparability across zones.

End of Presentation
Thank you for your attention

References

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