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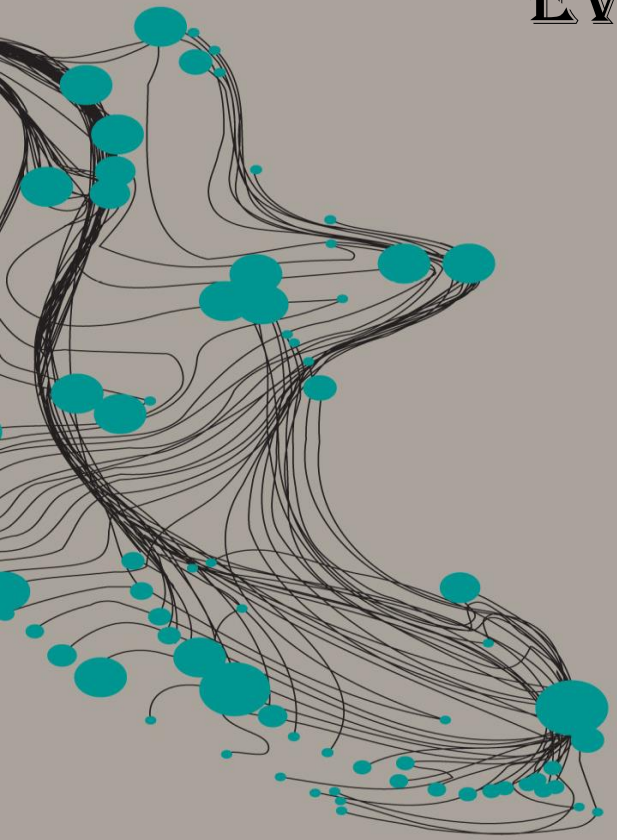
EVALUATE THE LEVEL AND DYNAMICS OF FOOD INSECURITY



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Outline

- Introduction
- Problem and research gaps
- Research objective
- Conceptual framework
- Methodology
- Expected outcomes

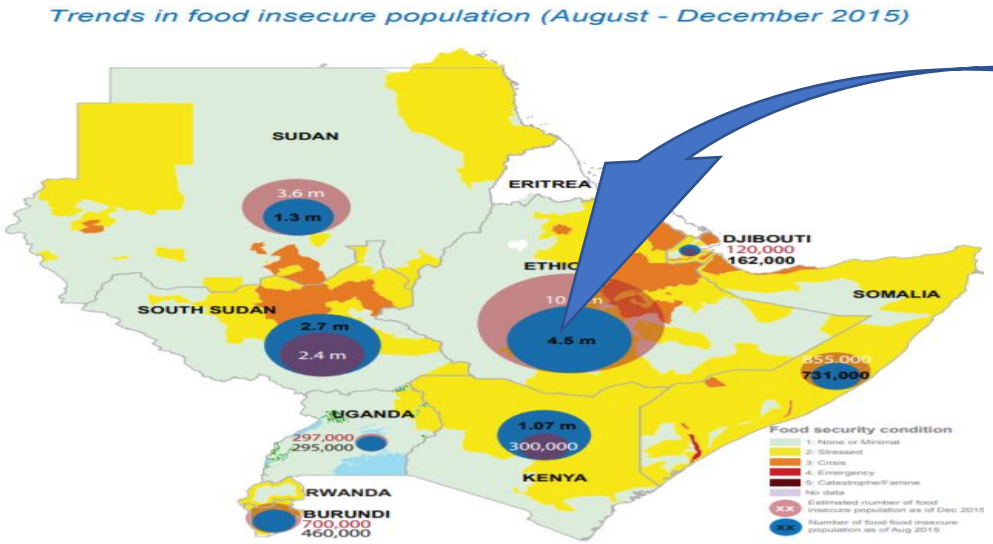
Introduction

Food security

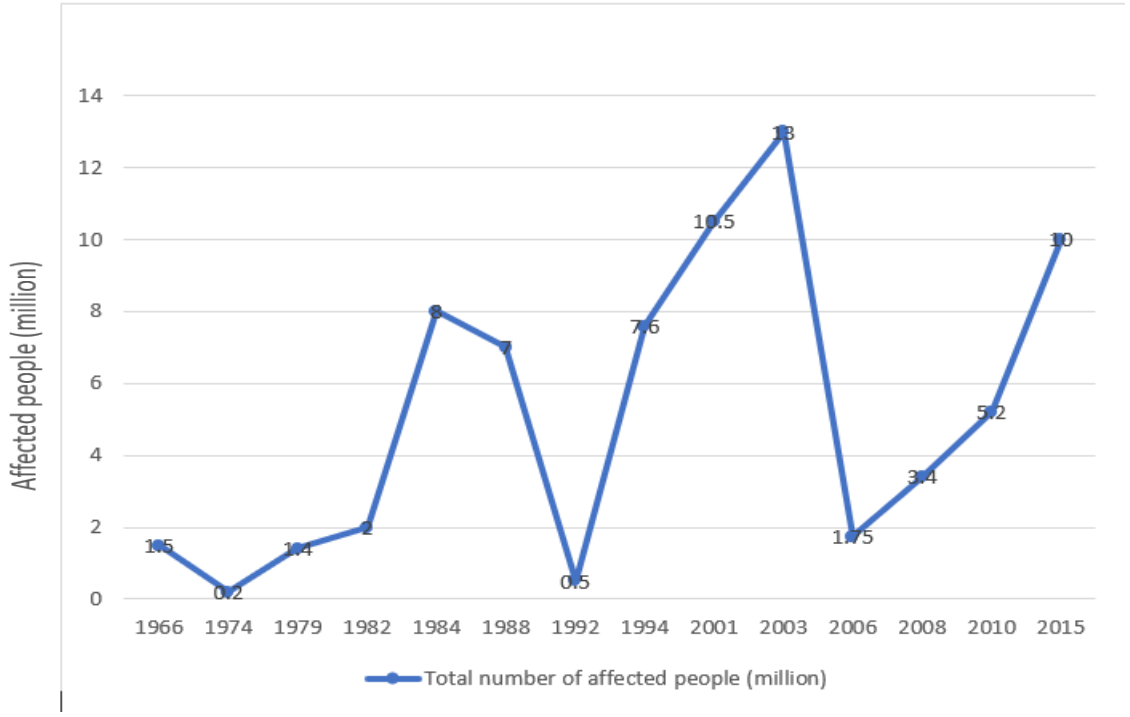
- Physical and economic access
- Nutritious food for healthy and productive life

History of drought

- Goes back to 253BC
- The 1984 and 2015 were the worst



Source: Office for the Coordination of Humanitarian Affairs, 2015



Source: Environmental Protection Authority (1998); OXFAM (2012)

El Niño

- 10.2 million people were threatened
- Cause for late and erratic rainfall
- Serious crop failures

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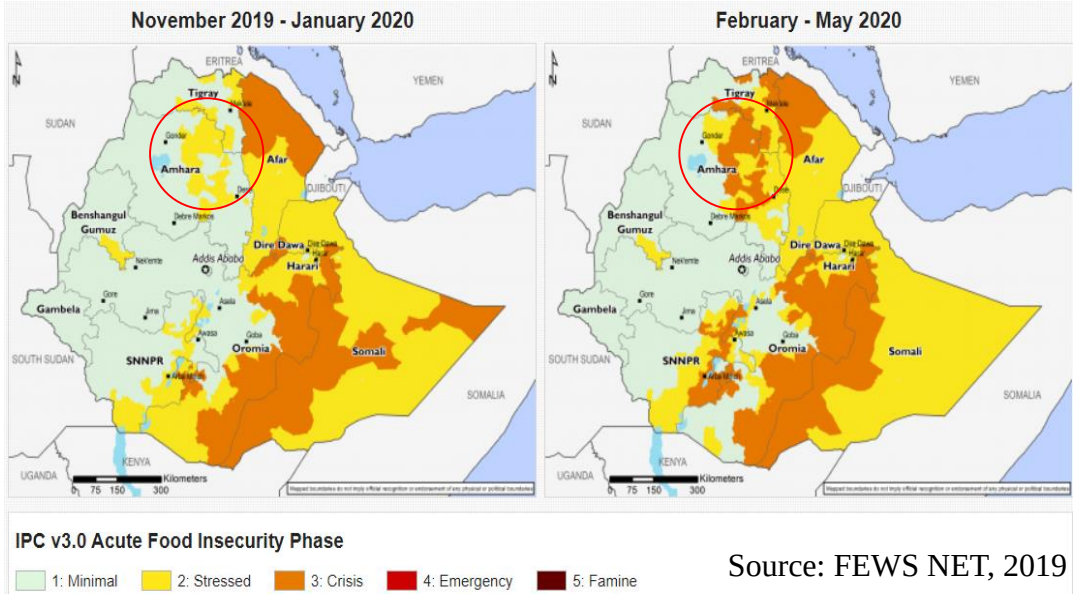
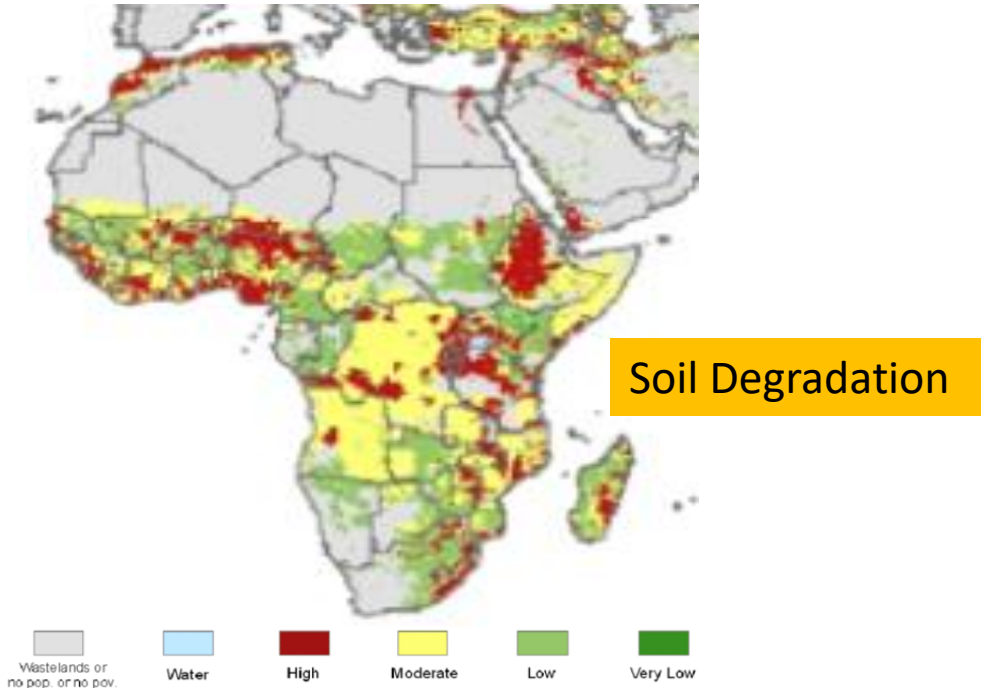
Recently, 2019

- Unseasonal rainfall and Desert locust
- Affect Summer (*Meher*) dependent area of Amhara region
- Cause some crop seed shelter and rotting

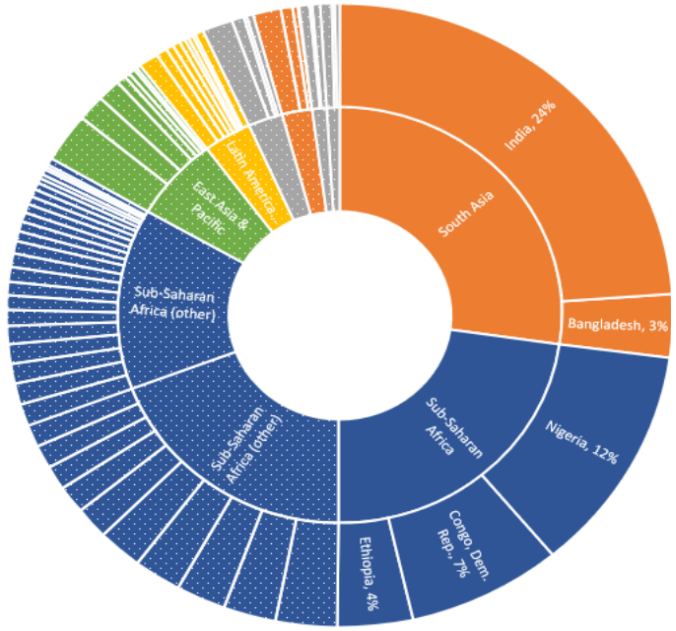


Source: FEWS NET, 2019



Soil Degradation

Source: Nachtergaele et al. (2011)



Business Insider SA (2019)

Half of the world's poor live in five country

- India
- Nigeria
- Congo
- Ethiopia
- Bangladesh

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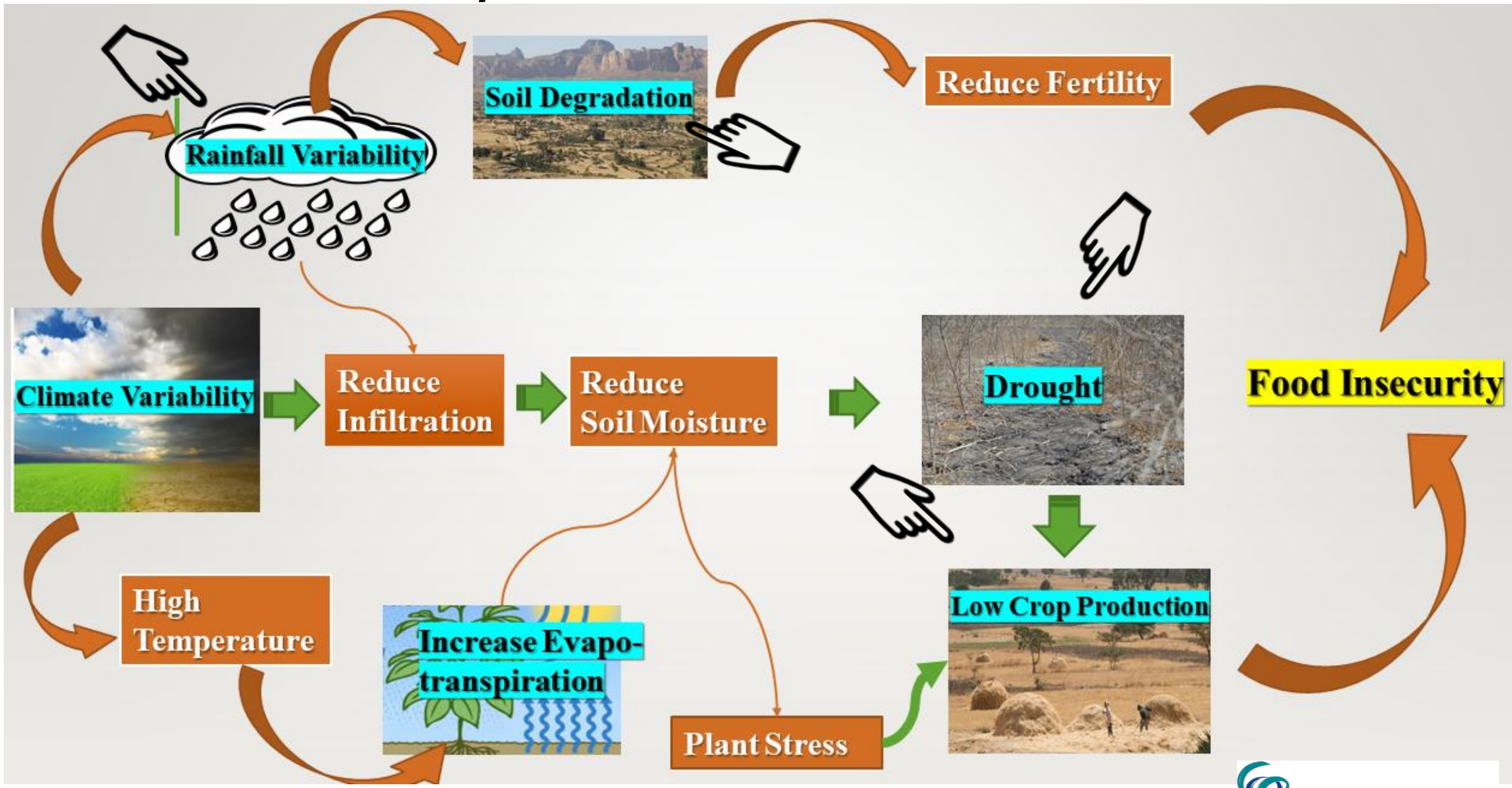
Factors for food insecurity



Problem and Research Gaps

- Studies are not all inclusive

- Lack of information on linkage between:
  - -Socio-economic,
  - -Meteorological and
  - -Physical factors

  } Food insecurity

- All dimensions of food insecurity are not addressed

- Soil erosion estimation is highly exaggerated

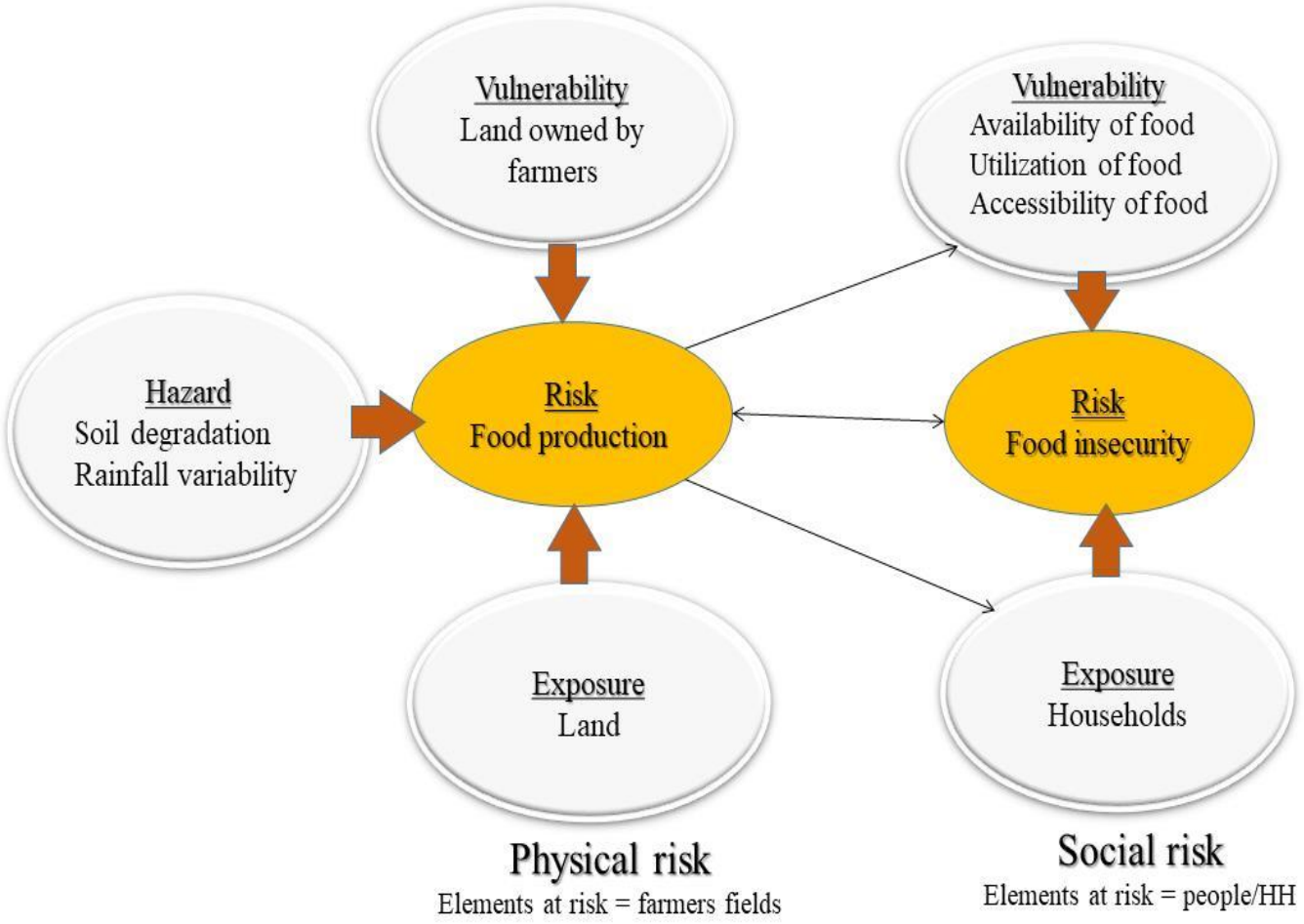
- Satellite derived information are not sufficiently used

Objectives

- To evaluate the level and dynamics of food insecurity in relation to drought and soil erosion in lake Tana sub-basin, North-western, Ethiopia

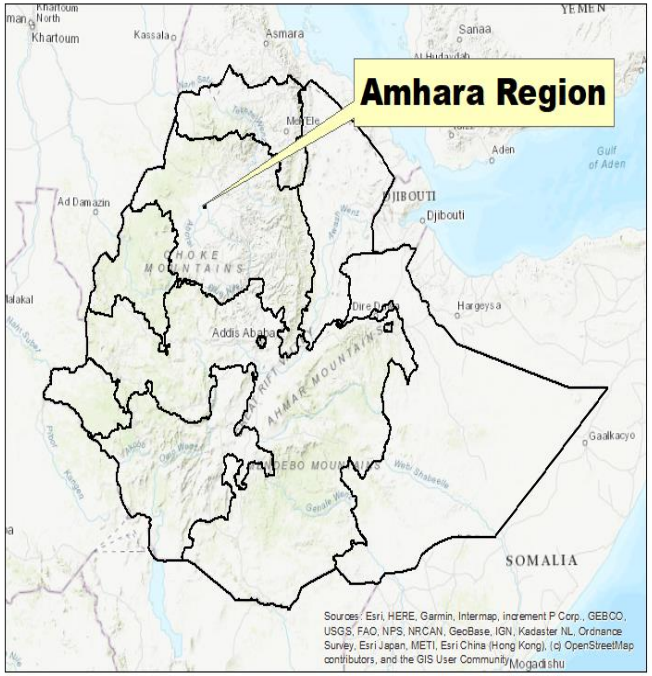
1. To examine the food insecurity status of the farming households in lake Tana sub-basin
2. To assess the spatial and temporal variability of rainfall and its impact on the crop production of household
3. To quantify soil degradation in time and space and its effect crop

Conceptual framework



- ✓ Research design: Mixed
- ✓ Sampling: Multistage
- ✓ Two districts: Libokemekem, and Ebinat district, South Gondar Zone
- ✓ Study population: Farming Households
- ✓ Total of 73 households

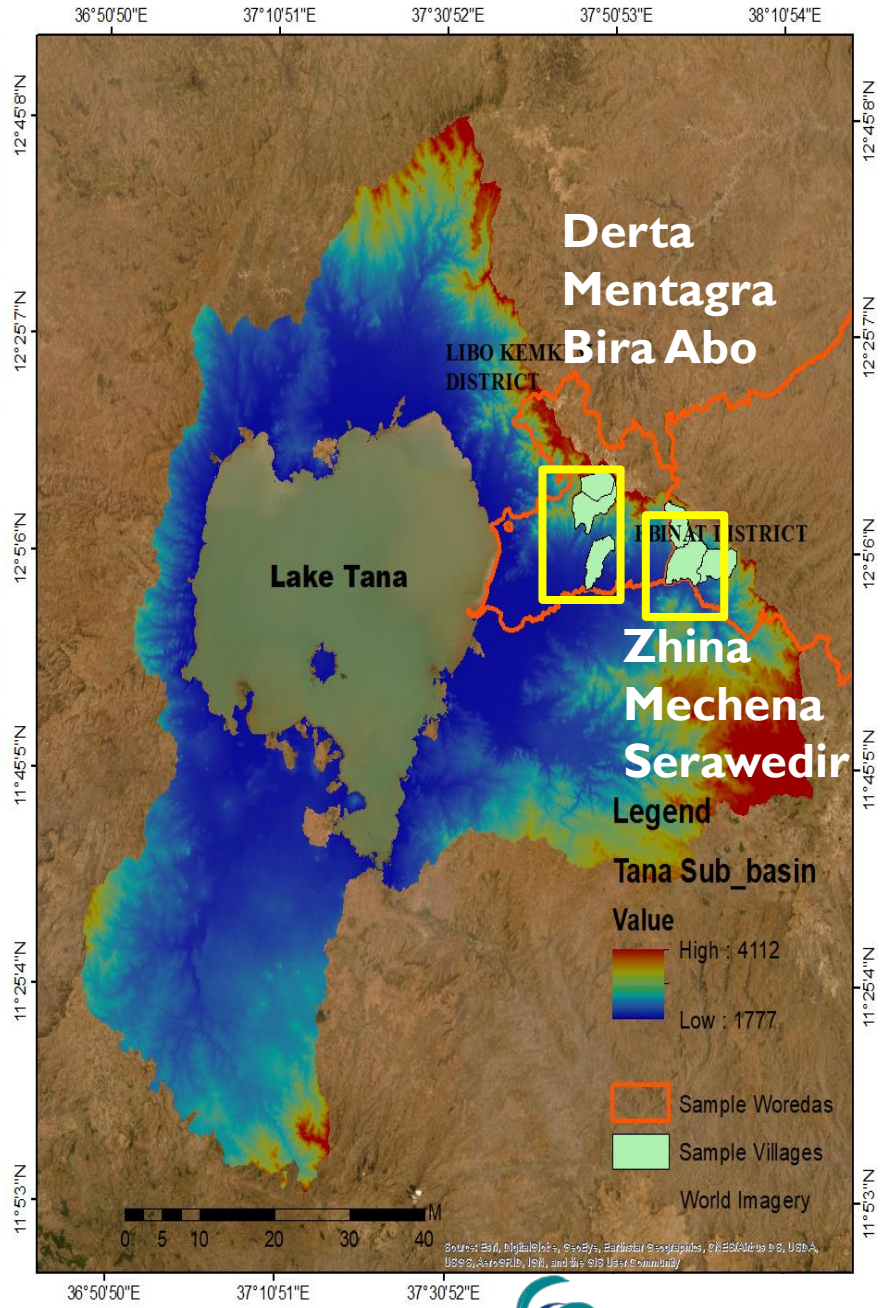
  Kothari (2004)
- ✓ **Household survey, field, Satellite images, Meteorological data, Crop yield,**



Study Area

Lake Tana Sub-basin

- ➢ 80% of population engaged in rainfed agriculture
- ➢ 250 people per square km



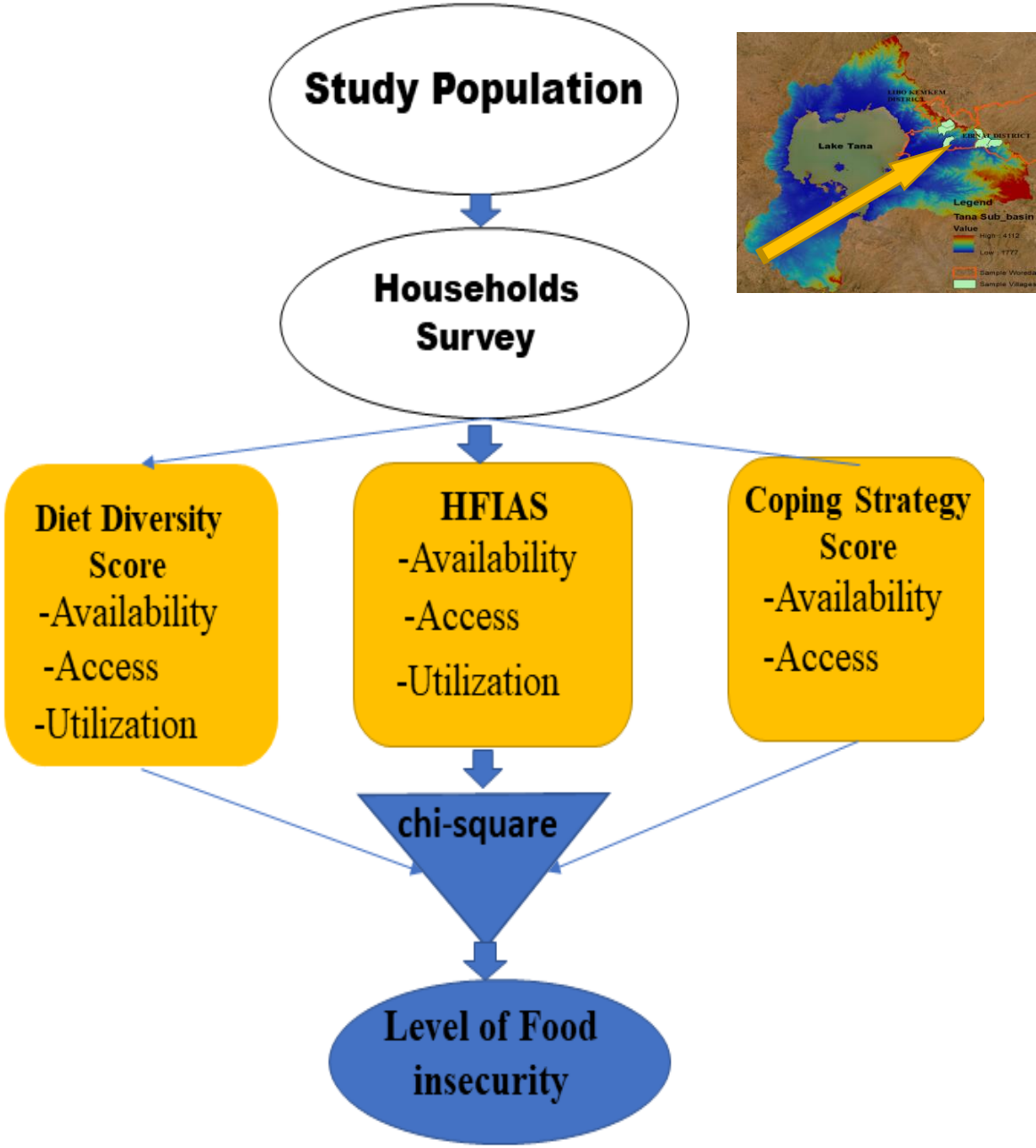
Methodology per specific Objectifies

Specific Objective: One

☛ Examine the food insecurity status of the farming households

✓ Household Dietary diversity score

- Classifying the food item
- 7 days recall
- Twice time (pre and post harvesting)



✓ Coping Strategy Index

- Depend on the question "What do you do when you don't have enough money to buy food"(Maxwell, Caldwell, & Langworthy, 2008)
- 7 day recall
- Score for each coping strategy (Focus group discussion)

✓ Household Food Insecurity Access Score

- Used to understand households behavioral and psychological manifestations
- Measured by standardize questionnaires (Nine questions)
- 30 days recall
- Use to measure the access component of food security

Specific Objective: Two

☛ **Assess the impacts of rainfall variability on the production of agricultural crops**

Rainfall variability

- Mann-Kendal trend test and Sen's Slope Estimation

Analysing drought over a different period

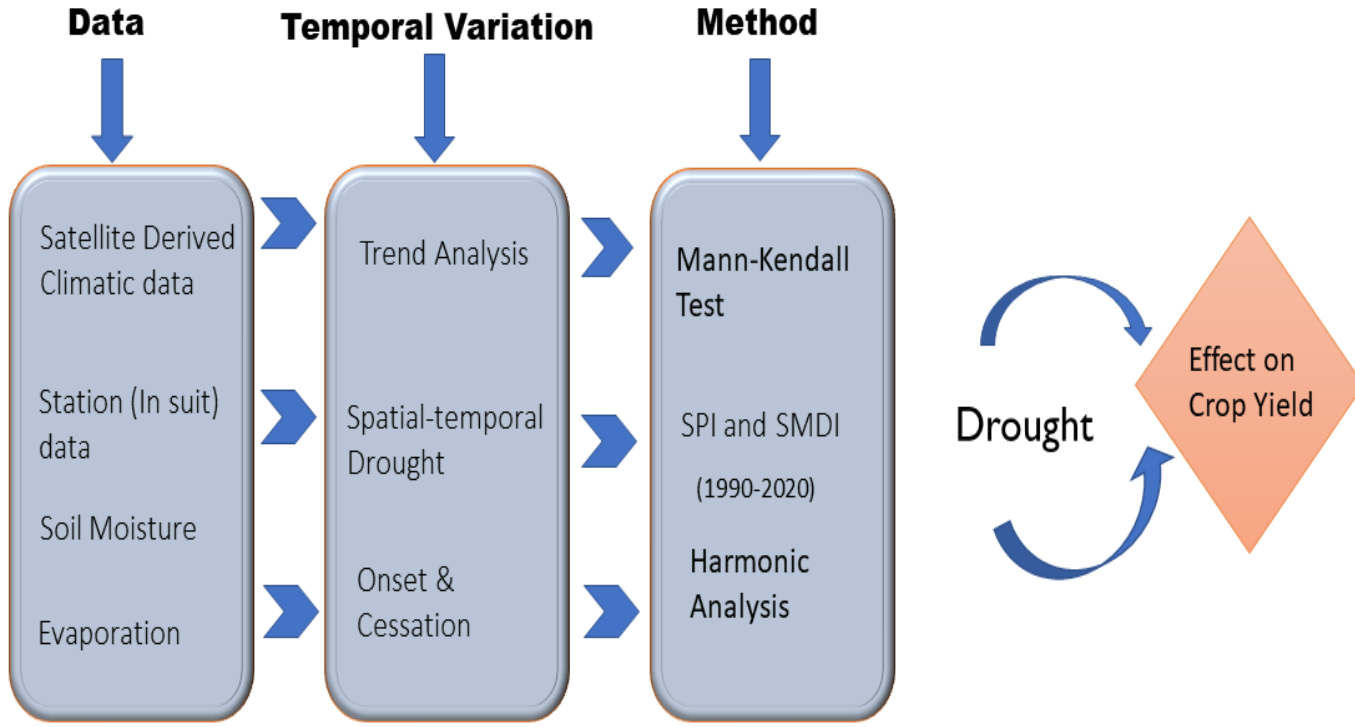
- SPI and SMDI
- Correlation

} **Drought prone area**

Rainfall variability and It's impact on crop yield

- Correlation

Rainfall onset, cessation, and its impact on crop yield



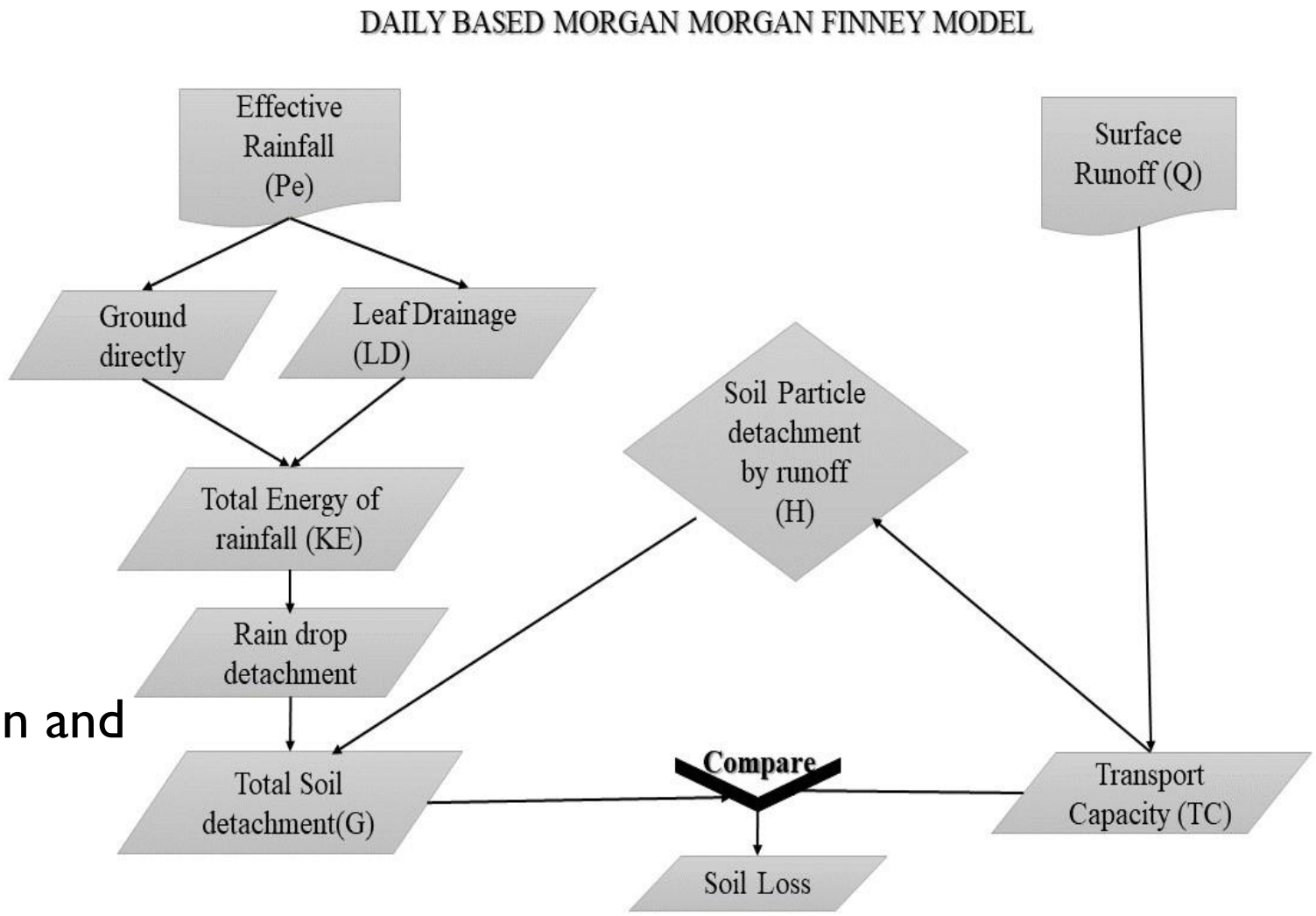
Specific Objective: Three

Quantify soil degradation in time and space and its effect crop production

-Data: MODIS timeseries for vegetation cover, Sentinel, daily rainfall, evaporation soil

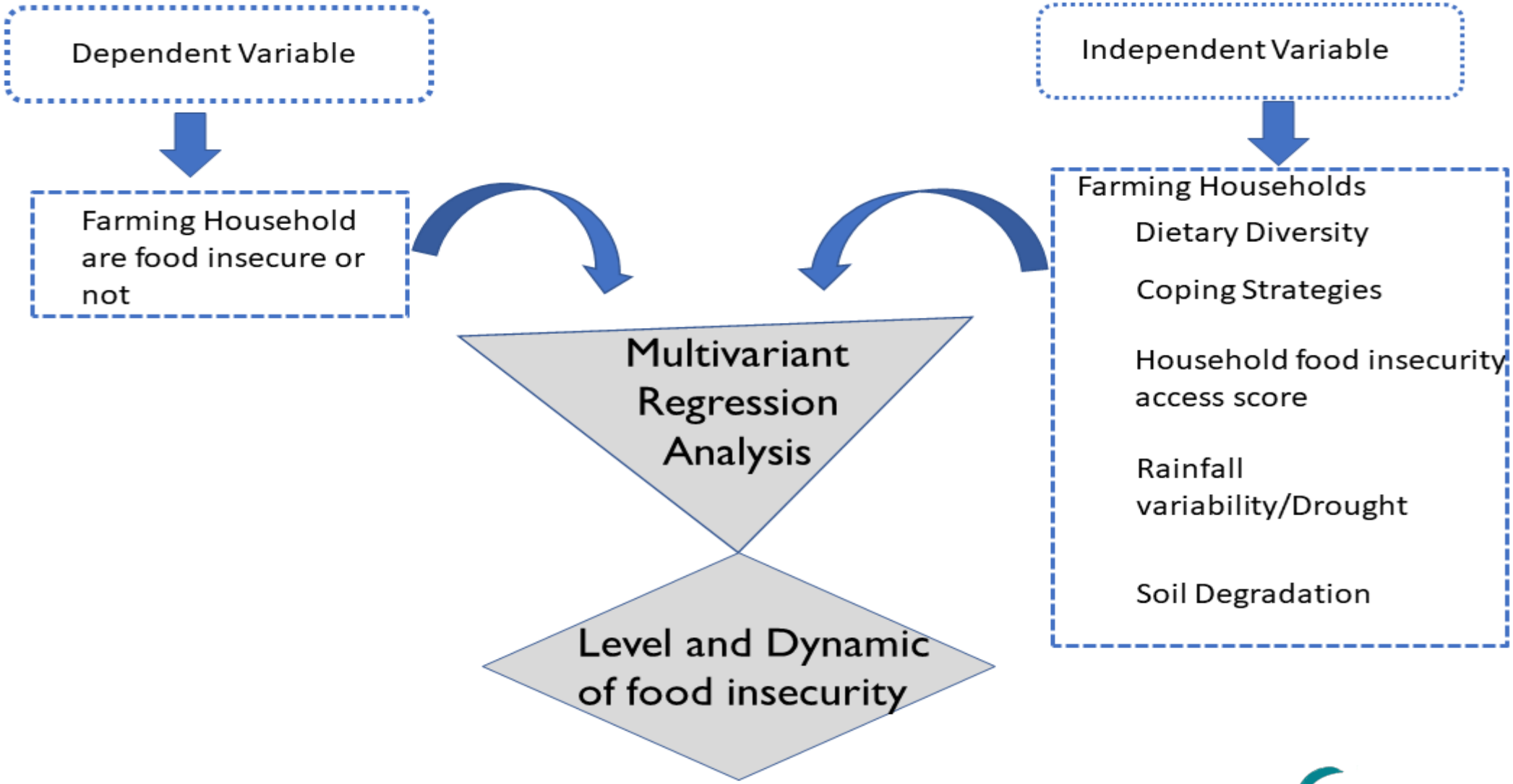
- Daily based Morgan Morgan Finney model

- Temporal change in soil erosion and its relation with drought
  - Correlation
- The relationship between Soil erosion and land cover
  - 2015-2020
  - Ordinal logistic regression



Shrestha and Jetten (2018)

The level and dynamics of food insecurity



Expected Outcome

- Indicate how different drivers are link in the evaluation of food insecurity

- Show how multiple indicators of food security are effective in measuring pillars of food security

- Provide useful information on:

  -Which households are at risk of food insecurity

  -Household experience of food insecurity

  -Which part of the area is highly threated by soil erosion and drought prone

- Enable decision maker to integrate drought characteristics in the policy making to:

  -Formulate priority adaptation

  -Identify priority activities

  -Build capacity

  -Monitor the effectiveness of policy

- Demonstrate how satellite derived observation are useful in evaluating food insecurity

Research Time Table

Activities	2019							2020											2021											2022											2023			
Months	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A
Proposal preparation																																														
Qualifier																																														
Organize Satellite images																																														
Literature Studies																																														
Tools preparation & field data collection for obj-1																																														
Organize data analysis &write up (Obj-1)																																														
Field observation, tool preparation (obj-3)																																														
Pre-test data collection tools																																														
Second round data collection (survey data obj-3)																																														
Organization & analysis																																														
Taking Training and course (ITC)																																														
Write up obj-1																																														
Organize data for obj-2																																														
Data analysis &Writing up (Obj-2)																																														
Thesis writing																																														
Finalize and Submit																																														
Defense																																														

THANK YOU