

# Assessing Food and Nutrition situations

# Assessment of FNS

- Important questions
  - Who is food-insecure or at nutritional risk?
  - Why are they food and nutrition insecure?
  - What interventions will have maximal impact on improving the security situation?

# FNS Indicators

- FNS concepts are elusive and difficult to follow up with targeted actions
- there is a possibility to identify populations or individuals who are in an insecure food and nutritional state.
- an indicator reflect a given situation or an underlying reality which is difficult to quantify directly
- usually gives an order of magnitude on a given scale.

# FNS Indicators 2

- a single indicator cannot summarize the complexity of FNS
- a set of indicators (whether compiled into an index or not) must be built in order to capture all the dimensions of FNS.
- each indicator reflects a specific aspect of FNS.
- indicator should be chosen in such a way that they meet a range of desirable properties.
- some of the properties are based on the policy relevance of the indicators
- there are numerous indicators of FNS at global, national, household and individual level

# FNS Indicators 3

- Existing FNS indicators are:
  - The FAO Indicator of Undernourishment (FAOIU);
  - The Global Hunger Index (GHI);
  - The Global Food Security Index (GFSI);
  - The Poverty and Hunger Index (PHI); The
  - Hunger Reduction Commitment Index (HRCI);
  - Anthropometric indicators (AI);
  - The Diet Diversity Score (DDS);
  - Medical and biomarker indicators (MBI)

# The FAO Indicator of Undernourishment (FAOIU)

- considers mean dietary energy supply as a proxy for food energy consumption.
  - comprises three parameters
    - the mean quantity of calories available for human consumption,
    - the inequality in access to those calories among the population,
    - the mean minimum amount of calories required by the population
- de Haen et al. 2011.

# Global Hunger Index (GHI)

- GHI combines three indicators:
  - undernourishment,
  - child underweight, and
  - child mortality.
- GHI is calculated as follows:
  - $GHI = (PUN + CUW + CM) / 3$

# GHI

- rank developing countries
- five categories:
  - low ( $\leq 4.9$ ),
  - moderate (5.0-9.9),
  - serious (10.0-19.9),
  - alarming (20.0-29.9),
  - extremely alarming ( $\geq 30$ )

– Masset 2011.



# Global Food Security Index (GFSI)

- assesses food security across three dimensions:
  - affordability ---accessibility FAO FNS definition
  - availability
  - utilization.
- high and low income countries

# GFSI

Table 1. Indicators of GFSI

<b>Affordability</b>	<b>Availability</b>	<b>Quality and safety</b>
Food consumption as a proportion of total household expenditure	Average food supply in kcal/capita/day	Diet diversification
Proportion of population living under the global poverty line	Dependency on chronic food aid	National dietary guidelines
GDP per capita (at PPP)	Public expenditures on agriculture research and development	National nutrition plan or strategy
Agricultural import tariffs	Existence of adequate storage facilities	Nutrition monitoring and surveillance
Presence of food safety net programs	Road infrastructure	Dietary availability of vitamin A, animal iron, and vegetal iron
Access to financing for farmers	Port infrastructure	Protein quality
	Volatility of agricultural production	Agency to ensure the safety and health of food
	Political stability risk	Percent of population with access to potable water
		Presence of formal grocery sector

Source: Economist Intelligence Unit 2012

# Poverty and Hunger Index (PHI)

- a multidimensional indicator of poverty and hunger
  - the proportion of the population living on less than a dollar per day,
  - the poverty gap,
  - the share of the poorest quintile in national income or consumption,
  - the prevalence of children underweight,
  - the proportion of undernourished population
    - Gentilini and Webb, 2008

# Hunger Reduction Commitment Index (HRCI)

- assess the governance and political commitment to reduce undernutrition
  - are evaluated through the dimensions of FNS:
    - availability,
    - access,
    - utilization

# HRCI

- In addition, there are three themes identified in governmental action against undernutrition:
  - policies and programs,
  - legal frameworks,
  - public expenditures
- These three themes cover four sectors:
  - food and agriculture,
  - women's empowerment,
  - social protection
  - health environment

# Anthropometric indicators (AI)

- measure nutritional outcomes at the individual level
- measure directly the point of policy interest as they reflect undernutrition and how it might affect health and well-being
  - they directly reflect the imbalances between energy intakes and expenditures.
  - Poor anthropometric outcomes are also associated with higher morbidity and mortality

# Diet Diversity Scores (DDS)

- represents the number of different foods or food groups consumed over a given reference period
- meaningful indicators of FNS for four reasons:
  - correlate with measures of food consumption and are a good measure of household food access and caloric availability
  - a varied diet is a worthy outcome in itself
  - more diet variety is associated with a number of improved health outcomes,
  - data collection is straightforward

# Medical and biomarker indicators (MBI)

Table 2. Biomarker Indicators of Micronutrients

<b>Group</b>	<b>Indicator</b>	<b>Definition</b>
Children	Hb<11 g/dL at sea level	Iron deficiency
	Blood concentrations of retinol in plasma or serum less than 0.70 µmol/l	Vitamin A deficiency
	Thyroglobulin <sup>25</sup>	Iodine deficiency
Adults	Non-pregnant women (age 15+ years) as Hb<12g/dL at sea level	Iron deficiency
	Pregnant women with Hb<11g/dL at sea level	Iron deficiency
	Urinary iodine excretion	

Source: Moron and Viteri 2009



# Classification of indicators for assessing FNS

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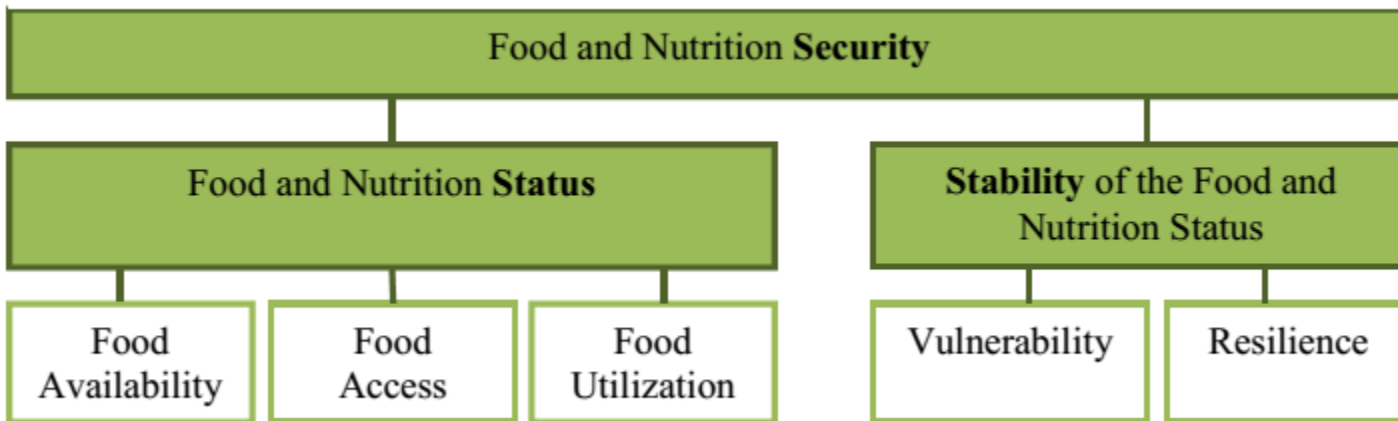
- differentiate FNS indicators based on:
  - the four dimensions of the FNS definition
    - availability, access, utilization, stability/vulnerability
  - The three type of FNS indicators
    - status/outcomes; drivers and risks; process/interventions
  - the temporal scale of the FNS impacts and risks
    - long term versus short term
  - the level at which the indicator can be measured
    - Individual, household, macro

# Classification of indicators for assessing FNS 2

- The type of FNS indicators can be classified into three major categories, each fulfilling a specific purpose
  - Indicators to measure FNS outcomes
  - Indicators to measure FNS drivers and risks
  - Indicators to measure FNS interventions
- FIVIMS 2002, Maire and Delpuech 2005

# Dimensions for FNS

**Figure 1: Dimensions of Food and Nutrition Security at the Micro-Level**



# Relationships and overlaps between FNS indicators

Figure 3. FNS Indicators – overlaps across the type of indicators

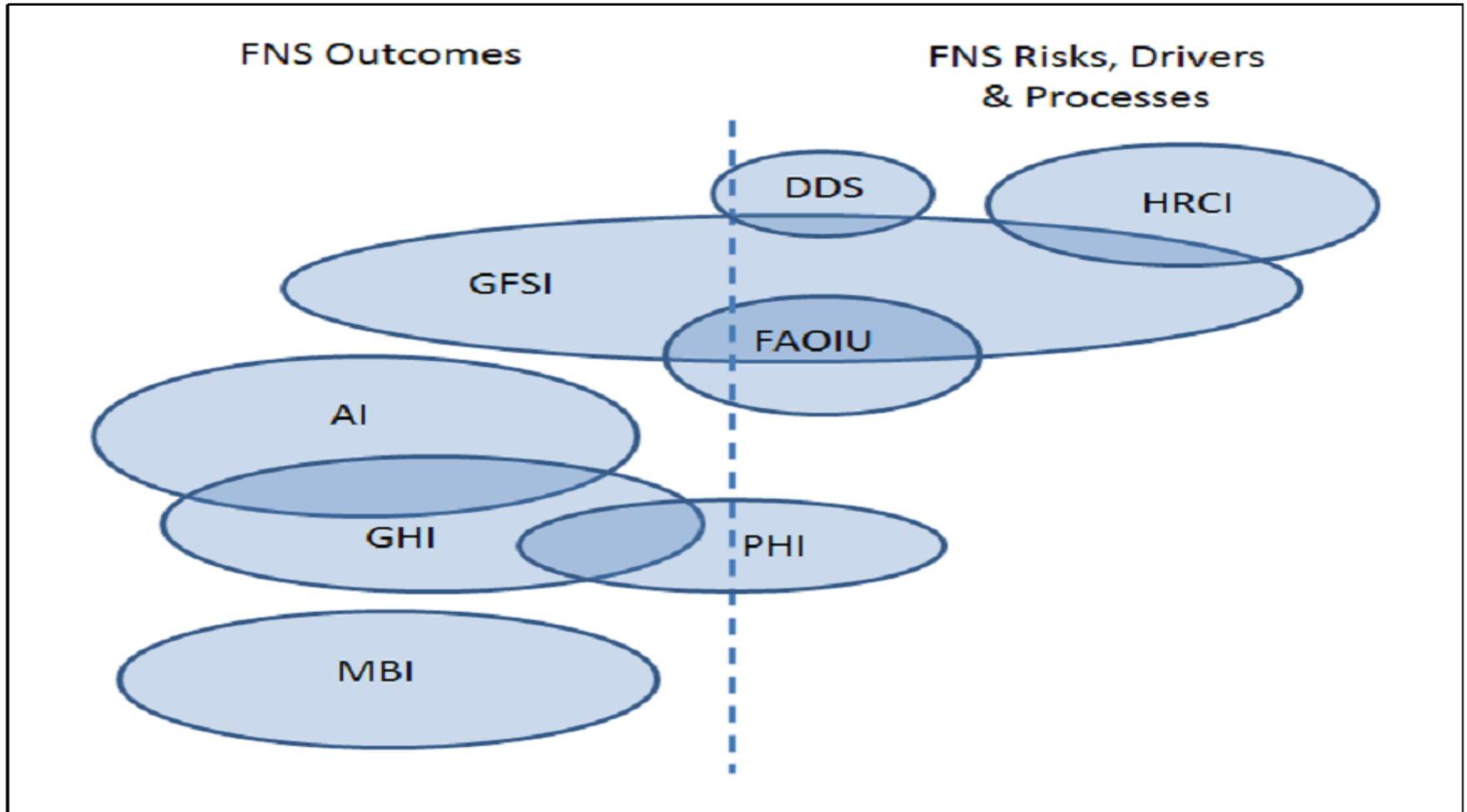


Figure 4. Existing FNS Indicators – overlaps across the FNS dimensions

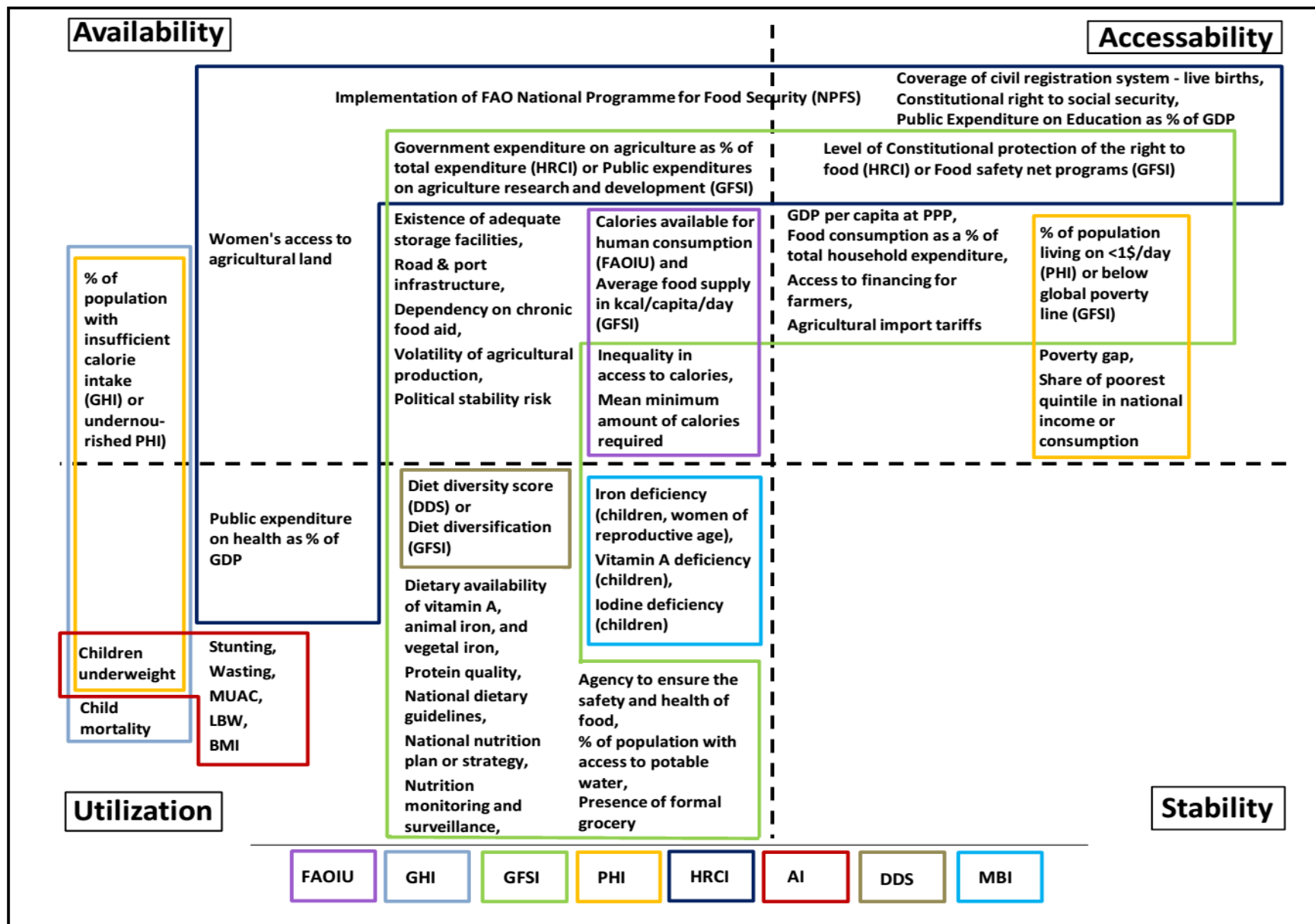


Table 3. Suggested Indicators of FNS Outcomes (and data sources/scale)

Availability	Accessibility	Utilization	Stability
Per capita total amount of net calories available in a given country (FAO/National) (taking into account the level of import and export in terms of calories)	Average share of food expenditures in total household expenditures (FAO, National Household Surveys, or computed from LSMS expenditure module/National and household)	Prevalence rate of stunting for children under 5 years (WHO, UNICEF/National)	Per capita food supply variability (FAO/National)
Net Share of energy supply (calories) derived from cereals, roots and tubers (FAO/National)	Prevalence rate of undernourished people (FAO/National)	Prevalence rate of underweight among children under 5 years (WHO, UNICEF/National)	Domestic Food Price Volatility (FAO/National)
Average supply of protein derived from animal sources (FAO/National)	Depth of food deficit (FAO/National)	Diet Diversity Score (National Household Surveys, or computed from LSMS expenditure module/Household)	
		Prevalence of overweight and obese adults (Based on BMI measures in DHS – women only/National)	
		Prevalence rate of anemia among women or reproductive age and children under 5 years (WHO, UNICEF/National, FeedThe Future/National);	

Table A5. A Classification of Indicators of Food and Nutrition Security

<b>FNS OUTCOMES</b> <i>Short term</i>	<b>Availability</b> <sup>37</sup>	<b>Accessibility</b> <sup>38</sup>	<b>Utilization</b>	<b>Stability</b>	
<b>Individual Level</b> <sup>1</sup>	Frequency of vegetable consumption	Food expenditure budget share of total household expenditure	Body mass index (chronic energy deficiency, BMI<18.5)	Number of days of permanent or temporary disability	
	Frequency of meat and fish consumption		Height for age (stunting)		
	Frequency of dairy products		Weight for age (underweight)		
	Number of meals eaten a day		Weight for height (wasting)		
	Dietary diversity of 8 major food groups: cereals, milk, meat, sugar, vegetables oils, fruits, vegetables, starchy roots		Mid-upper arm circumference		
			Night blindness		
<b>Household Level</b> <sup>1</sup>	Frequency of vegetable consumption	Food expenditure budget share of total household expenditure		Duration of household food stocks	
	Frequency of meat and fish consumption				
	Frequency of dairy products				
	Number of meals eaten a day				
	Dietary diversity of 8 major food groups: cereals, milk, meat, sugar, vegetables oils, fruits, vegetables, starchy roots				
<b>Macro Level</b>	Cereal yields <sup>2</sup>		Crude death rate of a crisis or disaster <sup>5</sup>	Index of variability of food production <sup>2,5</sup>	
	Food Production Index <sup>2</sup>		% of wasted children age under-five <sup>1,6</sup>	Variability of food prices <sup>2,5</sup>	
	Livestock Production Index <sup>2</sup>		% of thin women at reproductive age <sup>1,6</sup>	Number of storage sites and storage capacity <sup>1,8</sup>	
	Ratio of total exports to food imports <sup>2,3,5</sup>		% of stunted children age under-five <sup>1,6</sup>	Variability of food prices <sup>2,5</sup>	
			% of children age under-five with iron deficiency <sup>1,6</sup>		
			% of children age under-five with vitamin A deficiency <sup>1,6</sup>		
			% of women at reproductive age with iron deficiency <sup>1,6</sup>		
			% of women at reproductive age with vitamin A deficiency <sup>1,6</sup>		

<sup>37</sup> The availability indicators listed in the table are derived from FAO Nutrition Indicators for Development (FAO 2005).

<sup>38</sup> The accessibility dimensions primarily focus on financial accessibility where income and FNS are closely interlinked. The food prices volatility in 2008 has lead to the need of a certain mechanism to mitigate the risk of food insecurity and malnutrition caused by the food price spikes. The accessibility indicators presented here are derived from existing literature and international indices (Maxwell 1996, Timmer 2005, Pinstrup-Andersen 2010)



<b>FNS OUTCOMES</b> <i>Long term</i>	<b>Availability</b>	<b>Accessibility</b>	<b>Utilization</b>	<b>Stability</b>
<b>Individual Level</b> 1			Height for age (stunting)	
			Low birth weight	
			Infant mortality	
			Maternal mortality	
<b>Household Level</b> 1			Height for age (stunting)	
			Low birth weight	
			Infant mortality	
			Maternal mortality	
<b>Macro Level</b>			% of stunted children age under-five <sup>1,6</sup>	
			% of infant mortality <sup>1,6</sup>	
			% of maternal mortality <sup>1,6</sup>	
<b>FNS INTERVENTION</b> <i>Short term</i>	<b>Availability</b>	<b>Accessibility</b>	<b>Utilization</b>	<b>Stability</b>
<b>Individual Level</b> 1	Micronutrient supplements (adult/children)	Access/distance to health care center	Access to piped water	
	Complementary feeding for children		Community nutrition and hygiene program	
	Antenatal micronutrient supplementation			
	Postpartum micronutrient supplementation			
<b>Household Level</b> 1		Access/distance to health care center	Access to piped water	
		Safety net (food assistance, pension)	Main water source for drinking	
			Type of sanitation facility	
			Community nutrition and hygiene program	
<b>Macro Level</b>	Food fortification <sup>8</sup>	Infrastructures (road density) <sup>3</sup>	% of population with access to sanitation facilities <sup>3</sup>	Safety net program <sup>1,8</sup>
		Price regulation <sup>8</sup>	% of population with access to improved water sources <sup>3</sup>	Micronutrient intervention <sup>1,6</sup>
		Political stability and absence of violence/terrorism <sup>2,3</sup>	% of children under 6 months who are exclusively breastfed <sup>6</sup>	
			% of children age under-five receiving micronutrient supplements (vitamin A, iron, and iodized salt) <sup>6</sup>	
			% of pregnant women receiving iron and folic acid supplements <sup>6</sup>	
			% of households having access to iodized salt <sup>6</sup>	
			Existence of national nutrition plan strategy <sup>8</sup>	
			Existence of national dietary guidelines <sup>8</sup>	
Immunization campaign <sup>8</sup>				

<b>FNS INTERVENTION</b> <i>Long term</i>	<b>Availability</b>	<b>Accessibility</b>	<b>Utilization</b>	<b>Stability</b>
<b>Individual Level</b> <sup>1</sup>	Legal status of ownership of the farm land	Participation of microfinance	Health insurance	
			Access to piped water	
			Main water source for drinking	
			Type of sanitation facility	
			Community nutrition and hygiene program	
<b>Household Level</b> <sup>1</sup>	Legal status of ownership of the farm land	Participation of microfinance	Health insurance	
			Access to piped water	
			Main water source for drinking	
			Type of sanitation facility	
			Community nutrition and hygiene program	
<b>Macro Level</b>	Public expenditure on education	Land reform <sup>8</sup>	Public expenditure on health <sup>3</sup>	
	Family planning program	Microfinance access <sup>1</sup>	% of population with access to sanitation facilities <sup>3</sup>	
	Public expenditure on agricultural research and development	Constitutional right to social security <sup>2</sup>	% of population with access to improved water source <sup>3</sup>	
		Constitutional protection of the right to food <sup>8</sup>		
		Domestic credit by banking sector <sup>3</sup>		
		Deposit accounts with commercial banks <sup>3</sup>		
<b>FNS DRIVERS</b> <i>Short term</i>	<b>Availability</b>	<b>Accessibility</b>	<b>Utilization</b>	<b>Stability</b>
<b>Individual Level</b> <sup>1</sup>		Employment status	Behavior (smoking and hygiene, e.g. handwashing)	
		Decision making of food eaten at home		
		Sex-ratio of household members		
		Wage rate		
		Type of employment		
<b>Household Level</b> <sup>1</sup>	Yields per hectare for major staples/food crops	Household dependency ratio	Household hygiene practice	
	Household size	Income		
		Distance to nearest market		
		Distance to district capital center		
<b>Macro Level</b>	Average dietary supply <sup>2</sup> adequacy	Food Price Index	Immunization rate <sup>6</sup>	International price transmission <sup>12</sup>
	Average protein supply <sup>2</sup>	Agricultural import tariffs <sup>5</sup>	Estimated number of people living with HVI/AIDS <sup>6</sup>	Food price variability <sup>12</sup>
	Agricultural irrigated land <sup>3</sup>	Inflation rate <sup>3</sup>	HIV prevalence among pregnant women <sup>6</sup>	
	Rainfall amount <sup>4</sup>	Exchange rate <sup>3</sup>		
	% of agricultural import <sup>5</sup>	% of population living on less than 1 dollar/day <sup>3</sup>		
	Coefficient of Variation of length of growing period <sup>10</sup>	Gini coefficient <sup>3</sup>		

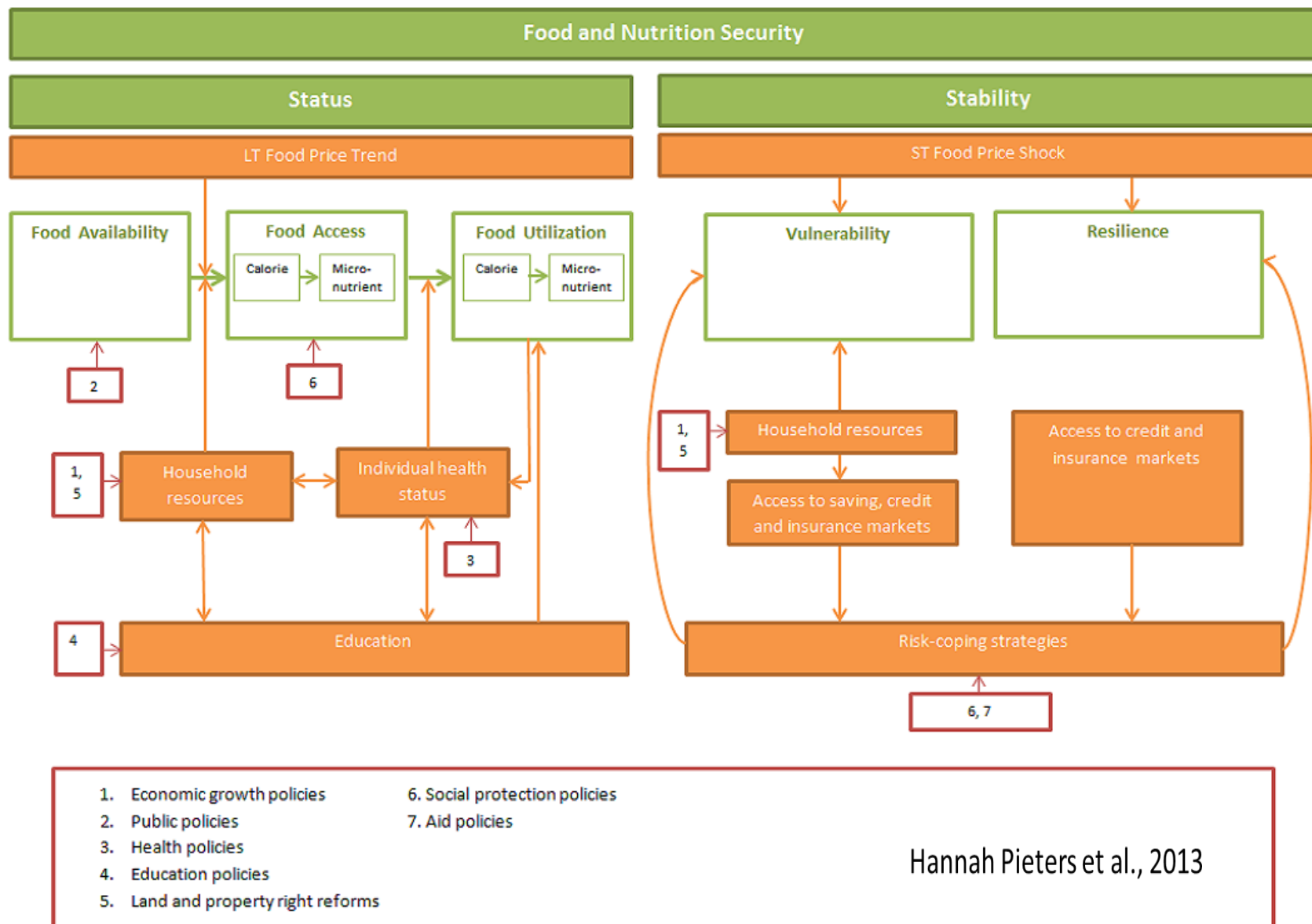
<b>FNS DRIVERS</b> <i>Long term</i>	<b>Availability</b>	<b>Accessibility</b>	<b>Utilization</b>	<b>Stability</b>
<b>Individual Level</b> <sup>1</sup>	Level of education	Women's access to saving and credit	Main water source for drinking	
		Women's access to agricultural land	Type of sanitation facility	
		% of women's asset		
<b>Household Level</b> <sup>1</sup>	Farm land size	Household's access to saving and credit	Main water source for drinking	
		Asset index	Type of sanitation facility	
		Household income per capita		
<b>Macro Level</b>	Population growth <sup>1</sup>	GNP per capita <sup>1</sup>		Political stability and absence of violence / terrorism <sup>11</sup>
	% of population living on degraded land <sup>2</sup>	Economic growth <sup>1</sup>		
	Dependency on food aid <sup>7</sup>			
	Years of crisis (economic and army) <sup>2,3,4</sup>			

Source: Author compilation based on existing indicators

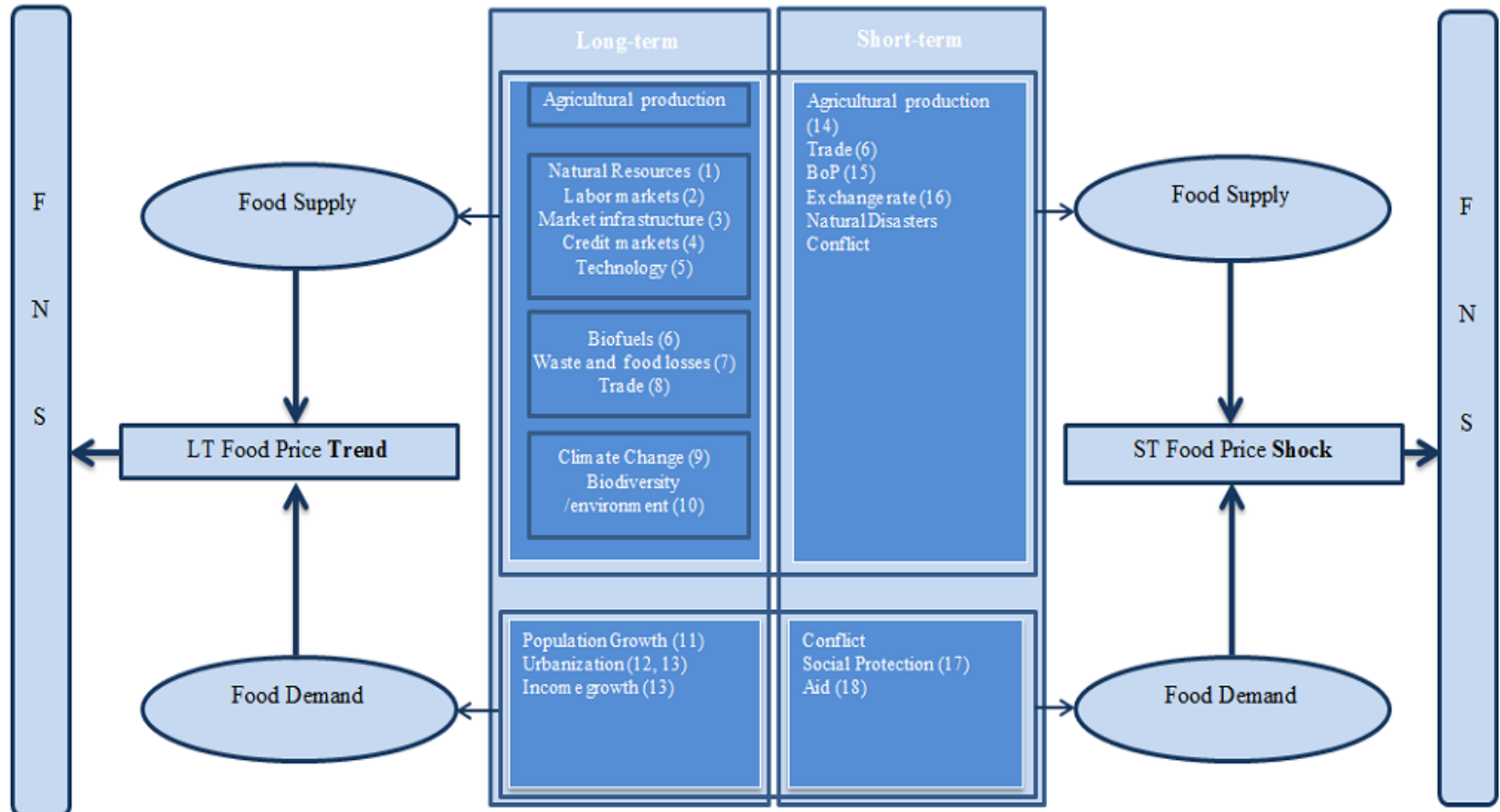
Note: The data sources for these indicators are collected from:

1. Household survey
2. FAO
3. World Bank WDI
4. Center for the Study of Civil War
5. UNCTAD
6. WHO/UNICEF
7. WFP
8. National document
9. IMF Financial Access Data
10. Fischer et al. (2001), cited in Yu et al. (2010)
11. WGI 2010
12. Unpublished work by authors and colleagues

**Figure 3: Linking micro-level policies with the individual and household level**



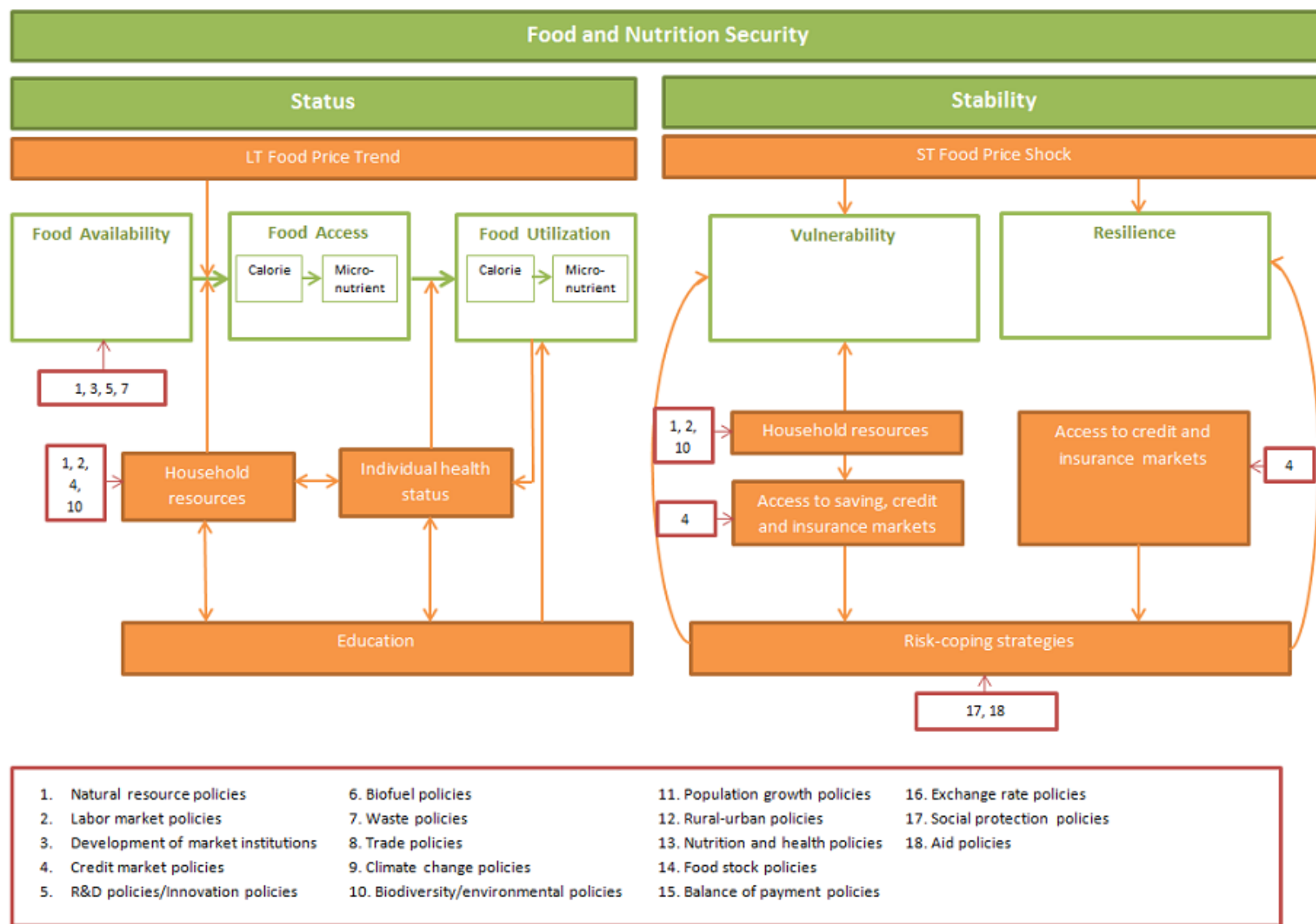
**Figure 4: Macro-level drivers and corresponding policies**



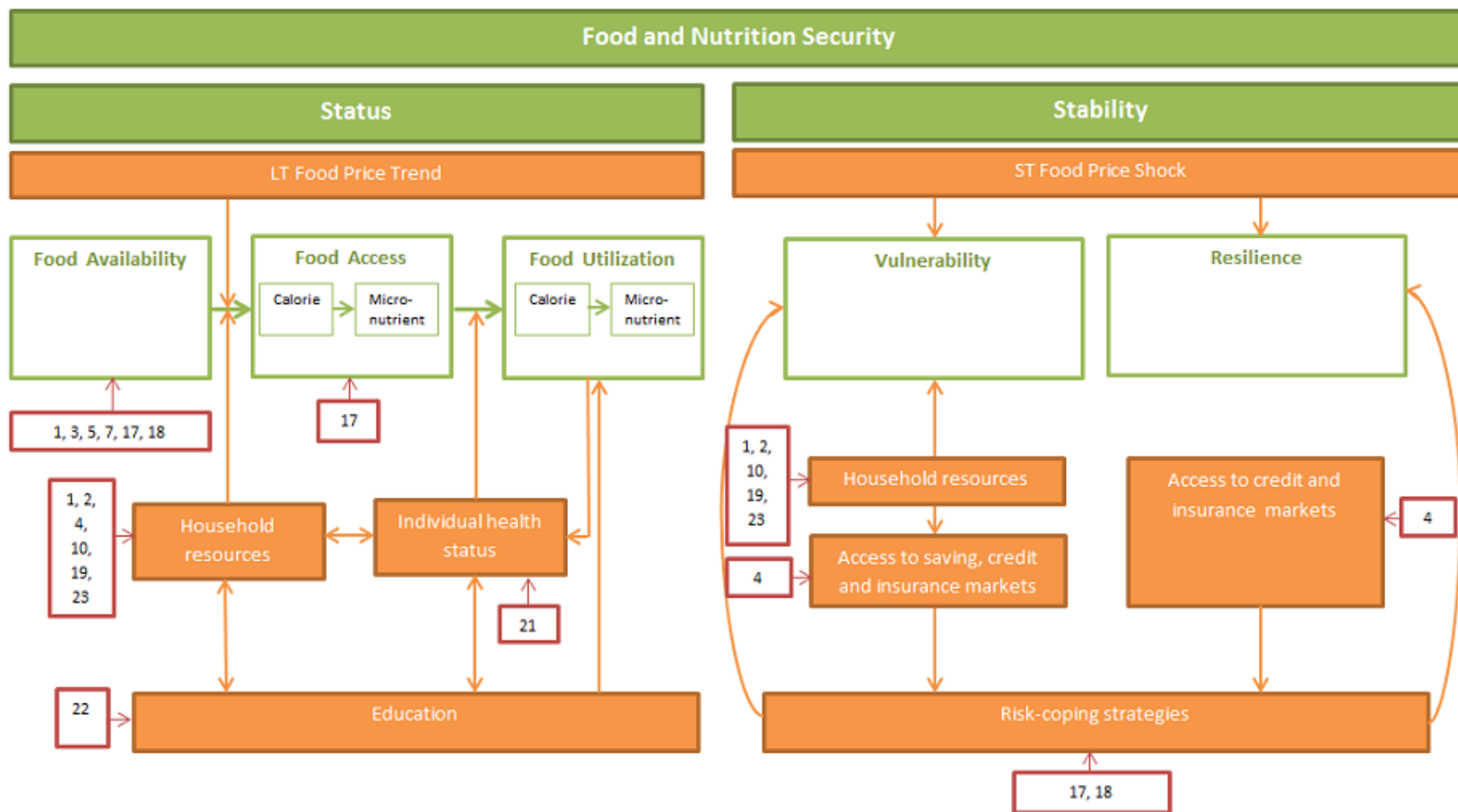
**Figure 5: The long term food supply drivers**



**Figure 6: Linking macro-level policies with the individual and household level**



**Figure 7: Linking micro- and macro-level policies with the individual and household level**



- |                                       |                            |                                   |                                |                                     |
|---------------------------------------|----------------------------|-----------------------------------|--------------------------------|-------------------------------------|
| 1. Natural resource policies          | 6. Biofuel policies        | 11. Population growth policies    | 16. Exchange rate policies     | 21. Health policies                 |
| 2. Labor market policies              | 7. Waste policies          | 12. Rural-urban policies          | 17. Social protection policies | 22. Education policies              |
| 3. Development of market institutions | 8. Trade policies          | 13. Nutrition and health policies | 18. Aid policies               | 23. Land and property right reforms |
| 4. Credit market policies             | 9. Climate change policies | 14. Food stock policies           | 19. Economic growth policies   |                                     |
| 5. R&D policies/Innovation policies   | 10. Biodiversity policies  | 15. Balance of payment policies   | 20. Public policies            |                                     |



# Food security strategy framework of Ethiopia

- Considering several shortfalls to the food security situation in the country , Food Security Strategy Framework was developed in 2002.
- It has set out four objectives:
  1. Improving food availability by increasing crop and animal production
    - Developing irrigation (3% of cultivated land is currently under irrigation) and water points in pastoral areas
    - Soil conservation and fodder plantations in pastoral areas.
    - Diversifying crop and animal production
    - Intensifying cropping through the use of inputs
    - Strengthening extension services.

# Food security strategy framework of Ethiopia 2

2. Improving access to food by increasing farm and off-farm income
  - Developing ‘safety net’ programmes
  - Promoting income diversification.
  - Improving credit and market mechanisms.
  - Improving access to micro-credit mechanisms
3. Improving health services
4. Improving access to land through voluntary relocation out of areas of chronic food insecurity