



FAO-OEA/CIE-IICA WORKING GROUP ON AGRICULTURAL AND  
LIVESTOCK STATISTICS FOR LATIN AMERICA AND THE CARIBBEAN  
Twenty-sixth Session

# New approaches to the measurement of the state of food insecurity

FAO Statistics Division



# Outline of the presentation

- The suite of food security indicators



# The suite of indicators



Port of Spain, Trinidad and Tobago, 5-7 June 2013



# Dimensions of food insecurity

- **Determinants**

- Availability
- Physical Access
- Economic Access
- Utilization

- **Outcomes**

- Insufficient food access
- Inadequate food utilization

- **Stability/Vulnerability**

- Exposure to risk
- Past variability



# Determinants – Availability

- **Average Dietary Energy Supply Adequacy**  
(source: FAOSTAT)
  - Dietary Energy Supply as a percentage of the Average Dietary Energy Requirement (ADER) of the country.
    - Measures adequacy of the national food supply in terms of calories
    - Helps understanding whether undernourishment is mainly due to insufficient food supply or to bad distribution
- **Average Value of Food Production**  
(source: FAOSTAT)
  - The total value of Annual Food Production (as estimated by FAO) expressed in International Dollars per caput.
    - A cross-country comparable measure of the relative economic size of the food production sector in the country.



# Determinants – Availability

- Share of dietary energy supply derived from cereals, roots and tubers  
(source: FAOSTAT)
  - Energy supply provided by cereals, roots and tubers divided by total Dietary Energy Supply (DES) (in kcal/caput/day)
- Average protein supply  
(source: FAOSTAT)
  - National average protein supply (expressed in grams per caput per day)
- Average supply of protein of animal origin  
(source: FAOSTAT)
  - National average protein supply (expressed in grams per caput per day)
    - All three are indicators of the diversity of food supply.



# Determinants – Physical Access

- **Transport infrastructures**

(source: World Bank, Transport Division)

- Percent of paved roads over total roads
  - An index of the quality of roads
- Rail-lines density
  - Total length of rail lines routes in km per 100 sq. km of land area
- Road density
  - Total length of roads in km per 100 sq. km of land area



# Determinants – Economic Access

- **Domestic Food Price Level Index**

(source: FAO elaboration on ILO data)

- Price of food in the country relative to the price of the generic consumption basket
  - It allows comparison of the relative price of food across countries and over time





# Determinants – Utilization

- **Access to improved water sources**

(source: UNICEF/WHO)

- percentage of the population with access to an adequate amount of water from an improved source

- **Access to improved sanitation facilities**

(source: UNICEF/WHO)

- percentage of the population with at least adequate access to excreta disposal facilities that can effectively prevent human, animal, and insect contact with excreta
  - Both water and sanitation are crucial to ensure hygiene, proper food preservation and preparation and therefore effective utilization of food



# Outcomes – Access

- **Prevalence of undernourishment**

(source: FAO)

- Proportion of population estimated to be at risk of caloric inadequacy
  - One of the official MDG indicators to monitor the “hunger” target

- **Share of food expenditure of the poor**

(source: FAO elaboration on Household survey data)

- Ratio of food expenditure to total consumption expenditure for the lowest income class in the country
  - It gives an indication of the economic burden imposed by the need to maintain food consumption



# Outcomes – Access

- **Depth of the food deficit**  
(source: FAO)

- Average food consumption of the undernourished, multiplied by the number of undernourished, and divided by the total population
  - It indicates how many calories would be needed to lift the undernourished from their status, everything else being constant

- **Prevalence of food inadequacy**  
(source: FAO)

- Proportion of population at risk of not covering the food requirements associated with normal physical activity
  - It includes also people who, even though cannot be considered chronically undernourished, are likely being conditioned in their economic activity by insufficient access to food



# Outcomes – Utilization

- Indices of anthropometric failures  
(source: WHO / UNICEF)

- Percentage of children under 5 years of age who are stunted
  - Proportion below 2 standard deviations from the median height-for-age of the reference population
- Percentage of children under 5 years of age affected by wasting
  - Proportion below 2 standard deviations from the median weight-for-height of the reference population
- Percentage of children under 5 years of age who are underweight
  - Proportion below 2 standard deviations from the median weight-for-age of the reference population
- Percent of adults who are underweight
  - Percentage of adults with a Body Mass Index (BMI) below the international reference standard



# Vulnerability/Stability

- Domestic food price level index volatility  
(source: FAO elaboration on ILO data)
  - Variability of the Domestic Food Price Index across countries and time
- Per Capita food production variability  
(source: FAO)
  - Variability of the net food production value
- Per Capita food supply variability  
(source: FAO)
  - Variability of the total food supply

(All indexes are obtained as standard deviations measured on the de-trended series over the past five years)



# Vulnerability/Stability

- Value of food imports over total merchandise exports (source: UNCTAD)
  - % of imports of food over total exports of merchandise. Indicator of exposure of the country to changes in international trade conditions
- Percent of arable land equipped for irrigation (source: FAO)
  - Share of land irrigated over total land area
  - Proxy to measure the potential impact of drought in a country
- Cereal import dependency ratio (source: FAO)
  - Proxy to measure the cereal self sufficiency of a country and the potential impact of shocks in the international trade market



# Vulnerability/Stability

- **Political stability/absence of violence/terrorism**  
(source: Brookings Inst./WB)
  - Political stability and absence of violence measures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism



# <http://http://www.fao.org/economic/ess/ess-fs/ess-fadata/en/>

Excel interface showing the 'FAO - FOOD SECURITY INDICATORS' table structure.

FAO - FOOD SECURITY INDICATORS	DATA	DESCRIPTION AND METADATA
<a href="#">(home)</a>		
<b>DETERMINANTS (INPUTS)</b>		
<b>AVAILABILITY</b>		
Average Dietary Energy Supply Adequacy	<a href="#">V01</a>	<a href="#">V01 METADATA</a>
Average Value of Food Production	<a href="#">V02</a>	<a href="#">V02 METADATA</a>
Share of dietary energy supply derived from cereals, roots and tubers	<a href="#">V03</a>	<a href="#">V03 METADATA</a>
Average protein supply	<a href="#">V04</a>	<a href="#">V04 METADATA</a>
Average supply of protein of animal origin	<a href="#">V05</a>	<a href="#">V05 METADATA</a>
<b>PHYSICAL ACCESS</b>		
Percent of paved roads over total roads	<a href="#">V06</a>	<a href="#">V06 METADATA</a>
Rail-lines density	<a href="#">V07</a>	<a href="#">V07 METADATA</a>
Road density	<a href="#">V08</a>	<a href="#">V08 METADATA</a>

Excel spreadsheet showing the 'V12 - Prevalence of undernourishment' data table.

	1990-92	1991-93	1992-94	1993-95	1994-96	1995-97	1996-98	1997-99	1998-00	1999-01	2000-02	2001-03	2002-04	2003-05	2004-06	2005-07	2006-08	2007-09	2008-10	2009-11	2010-12
World	18,6	18,1	17,7	17,2	16,6	16,1	15,7	15,4	15,1	15,0	14,9	14,7	14,4	14,2	13,8	13,5	13,1	12,9	12,8	12,6	12,5
Developing countries	23,2	22,6	22,0	21,2	20,4	19,7	19,1	18,8	18,4	18,3	18,2	17,9	17,6	17,2	16,8	16,3	15,8	15,5	15,3	15,1	14,9
Africa	27,3	26,6	26,4	26,2	26,0	25,8	25,7	25,6	25,5	25,3	25,1	24,6	24,1	23,6	23,1	22,8	22,7	22,6	22,6	22,7	22,9
North Africa	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Algeria	5,2	5,2	5,5	6,0	6,4	6,5	6,5	6,3	6,1	5,8	5,5	5,2	5,0	<5	<5	<5	<5	<5	<5	<5	<5
Egypt	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Libya	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Morocco	7,1	7,9	7,7	7,2	6,5	6,1	6,0	6,2	6,3	6,2	5,8	5,5	5,3	5,2	5,2	5,1	5,1	5,2	5,3	5,4	5,5
Tunisia	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Western Sahara																					
Sub Saharan Africa	32,8	31,8	31,5	31,2	31,0	30,8	30,6	30,4	30,2	30,0	29,7	29,1	28,5	27,8	27,2	26,8	26,6	26,5	26,5	26,6	26,8
Angola	63,9	64,1	61,8	59,1	56,4	54,5	52,6	50,8	49,1	47,5	45,6	43,4	40,6	37,6	35,1	33,3	32,1	30,7	29,2	28,0	27,4
Benin	22,4	21,5	20,7	19,9	18,7	18,2	17,9	17,8	17,4	16,4	15,2	14,2	13,8	13,4	13,1	12,6	11,8	10,8	9,6	8,7	8,1
Botswana	27,4	29,3	29,1	28,8	29,3	31,5	33,9	34,9	35,1	34,5	34,2	33,4	32,7	32,6	32,9	33,2	32,8	31,9	30,3	29,0	27,9
Burkina Faso	22,9	20,6	19,2	18,4	18,6	19,3	20,8	22,8	24,9	26,4	27,0	27,2	26,9	26,4	25,8	25,3	24,9	24,4	24,2	24,5	25,9
Burundi	49,0	52,7	56,2	57,9	58,4	58,8	60,2	61,8	62,8	63,0	63,2	63,8	64,9	66,3	67,9	69,6	71,4	72,4	72,9	73,1	73,4





# Steps ahead

- **Compilation of a Food Security Scorecard and Index**
  - Indexes of various dimensions (determinants, outcomes, stability)
  - Compiling an overall food security dashboard
  - An overall index?

FOOD SECURITY INDICATORS	INDEXES by DIMENSION	INDEXES by COMPONENT	OVERALL INDEX
<b>AVAILABILITY</b> Average Dietary Energy Supply Adequacy Average Value of Food Production Share of dietary energy supply derived from cereals, roots and tubers Average protein supply Average supply of protein of animal origin	<b>DETERMINANTS - AVAILABILITY</b>	<b>DETERMINANTS</b>	<b>FOOD SECURITY INDEX</b>
<b>PHYSICAL ACCESS</b> Percent of paved roads over total roads Road density Rail-lines density	<b>DETERMINANTS- PHYSICAL ACCESS</b>		
<b>ECONOMIC ACCESS</b> Domestic Food Price Level Index	<b>DETERMINANTS - ECONOMIC ACCESS</b>		
<b>UTILIZATION</b> Access to improved water sources Access to improved sanitation facilities	<b>DETERMINANTS - UTILIZATION</b>		
<b>INADEQUATE ACCESS TO FOOD</b> Prevalence of undernourishment Share of food expenditure of the poor Depth of the food deficit Prevalence of food inadequacy	<b>OUTCOME - PREVALENCE OF UNDER NOURISHMENT</b>	<b>OUTCOME</b>	
<b>UTILIZATION</b> Percentage of children under 5 years of age affected by wasting Percentage of children under 5 years of age who are stunted Percentage of children under 5 years of age who are underweight Percent of adults who are underweight	<b>OUTCOME- UTILIZATION</b>		
Cereal import dependency ratio Percent of arable land equipped for irrigation Value of food imports over total merchandise exports	<b>STABILITY - EXPOSURE</b>	<b>STABILITY</b>	
Political stability and absence of violence/terrorism Domestic food price level index volatility Per Capita food production variability Per Capita food supply variability	<b>STABILITY- SHOCKS</b>		



# “Voices of the Hungry”



Port of Spain, Trinidad and Tobago, 5-7 June 2013



# A 3-pronged project

- **A new standard for food security measurement**
  - The Food Insecurity Experience Scale
- A set of indicators to allow **timely** monitoring of the prevalence of food insecurity at various **degree of severity**, for virtually all countries in the world, on an annual basis
  - Deployment of the FIES at national levels, via the Gallup World Poll
- **Capacity development assistance to national food security information systems**
  - How to use the FIES in the regular monitoring of national food security trends and of subnational levels



# The Food Insecurity Experience Scale

- The severity of food insecurity as a latent trait



- Cases (individuals / households) can be placed on the scale depending on the “score” they receive by answering to the FIES Questionnaire
- Scoring is produced using advanced psychometric methods to:
  - Validate the questions, by analysing the distribution of responses across the sample
    - Each question is placed at the right place along the scale
  - Evaluate the answers given to all questions by each respondent
    - Each respondent is assigned as score that allows classifying it into one category



# The FIES Questionnaire

*“During the past 12 months, has there been a time when...*

Q1. ... *You were worried you would run out of food because of a lack of money or other resources?*

Q2. ... *You were unable to eat healthy and nutritious food because of a lack of money or other resources?*

Q3. ... *You ate only a few kinds of foods because of a lack of money or other resources?*

Q4. ... *You had to skip a meal because there was not enough money or other resources to get food?*

Q5. ... *You ate less than you thought you should because of a lack of money or other resources?*

Q6. ... *There was no food left in the household because of a lack of money or other resources?*

Q7. ... *You were hungry but did not eat because there was not enough money or other resources for food?*

Q8. ... *You went without eating for a whole day because of a lack of money or other resources?”*

(If there are children of less than five in the household, the following additional 2 questions are asked)

*“During the past 12 months has there been a time when...*

Q9. ... *Children did not eat healthy and nutritious foods because of a lack of money or other resources?*

Q10. ... *Children were not given enough food because of a lack of money or other resources?”*



# Expected results

- **New indicators of food insecurity at national level for more than 140 countries every year**
  - The FAO initiative aims at producing the suggested indicators of the prevalence of food insecurity at various levels of severity for more than 140 countries in the world as a direct output of the project, thanks to inclusion of the FAO-FIES module in the Gallup World Poll. This will provide the basis for a significant expansion of FAO's global food security monitoring system in the immediate future (possibly as early as 2014), thus providing the opportunity to set benchmark levels of food insecurity in all countries of the world in 2015 and to establish the possibility of continuing monitor progress in reduction of food insecurity.
- **Better understanding of determinants and consequences of food insecurity**
  - Inclusion of the FAO-FIES into the Gallup World Poll and access to the large set of data collected on other characteristics of the surveyed households will allow FAO and its research partners to analyze the severity of food insecurity in relation to demographic, social and economic conditions. This will greatly contribute to a better understanding of the conditions that lead to, and those that exacerbate the consequences of, food insecurity.



# Expected results

- Culturally and linguistically adapted versions of the questionnaire in more than 100 languages
  - FAO will make a comprehensive set of country specific, culturally and linguistically adapted versions of the questionnaire publicly available. It shall thus be possible to include the module in virtually any larger scale national survey, already planned or being conducted in specific countries for various purposes.
- Establishment of the FAO-FIES as a new standard for food security measurement
  - Through FAO leadership and adequate capacity development activities, the establishment of the proposed scale as a standard for food security monitoring worldwide with a methodology that can be easily owned by countries will be promoted. When included in large-scale national surveys designed to be representative also at subnational level, the FAO-FIES will allow for differential analysis of the severity of food insecurity also across various areas within a country, or among different socio economic groups. The data collected to inform the indicators will also help to identify who the food insecure are, where they live, and how they struggle to maintain diets sufficient in quality and quantity.



# Expected results

- **Increased ability in food security governance**

- Immediate and important spill-overs in terms of increased monitoring ability and food security governance:
  - The percentage of households experiencing **severe food insecurity** could be used as an indicator to monitor the impact of the growing number of initiatives to eradicate hunger. Particularly attractive is the possibility that the foreseen “zero hunger” goal could be viably operationalized in terms of a “very low proportion of individuals found to be experiencing severe food insecurity”.
  - The extent of **moderate food insecurity** can be used as a leading indicator of potential child and adult malnutrition, of which household food insecurity is arguably a crucial determinant.
  - Finally, the presence of **mild food insecurity** is one of the largely unnoticed consequences of increased food price or reduced incomes on which to focus.
    - Associated with mild food insecurity are: reduced nutritional quality of the diets (with resulting problems of obesity or of micronutrient deficiency, i.e. “hidden hunger”) and other welfare costs due to reduction in other important expenditures, such as on health or education.
    - The proportion of households experiencing mild food insecurity could thus prove useful as an indicator of various other ways in which household struggle to cope with food insecurity and possibly as an indicator of increasing risk of experiencing more severe food insecurity in the future.





# Expected results

- **An indicator for the new, post 2015 development agenda**
  - The percentage of individuals experiencing severe food insecurity could become one of the key indicators of the new monitoring framework of the post-2015 development agenda, to monitor progress towards a “Zero hunger” target



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# Thanks

Questions, comments to:

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