

# Food Security Indicators

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# Outline

- Data Required
- Type of Indicators
- Analysis of dietary diversity and food frequency
- Conclusion

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# Broad Definitions?



## Food security:

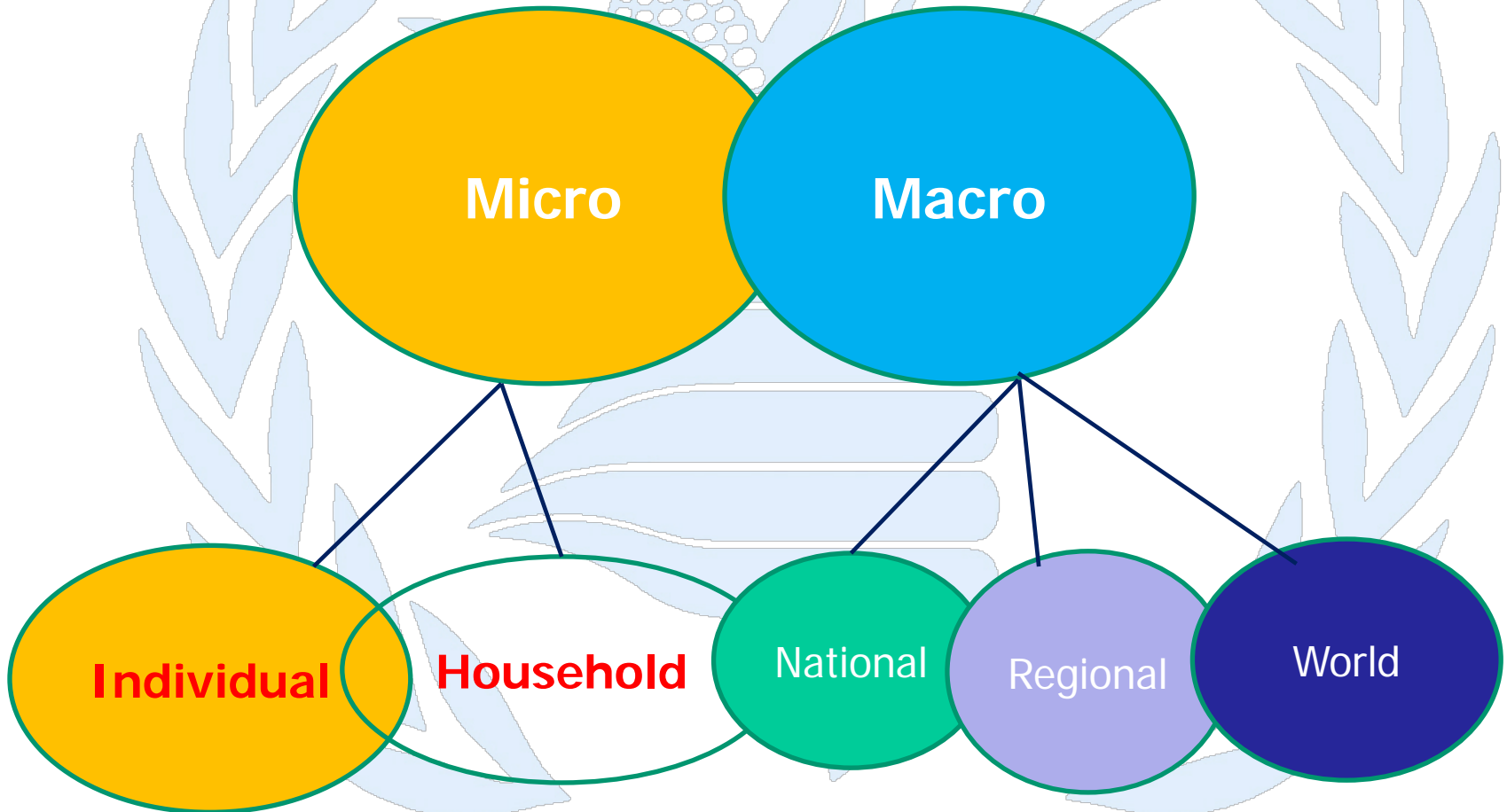
- Exists when all people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (*FAO 2000*).
- This definition has widely established the four pillars of food security: **availability, accessibility, utilization and stability**.

## Nutrition secure

- “a person is considered nutrition secure when she or he has a nutritionally adequate diet and the food consumed is biologically utilized such that adequate performance is maintained in growth, resisting or recovering from disease, pregnancy, lactation and physical work”... (*Frankenberger et al. 1997, p.1*).

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# Food nutrition levels of analysis



# Combining Food & Nutrition - Modules

## Indicators for Food Security to collect at HH

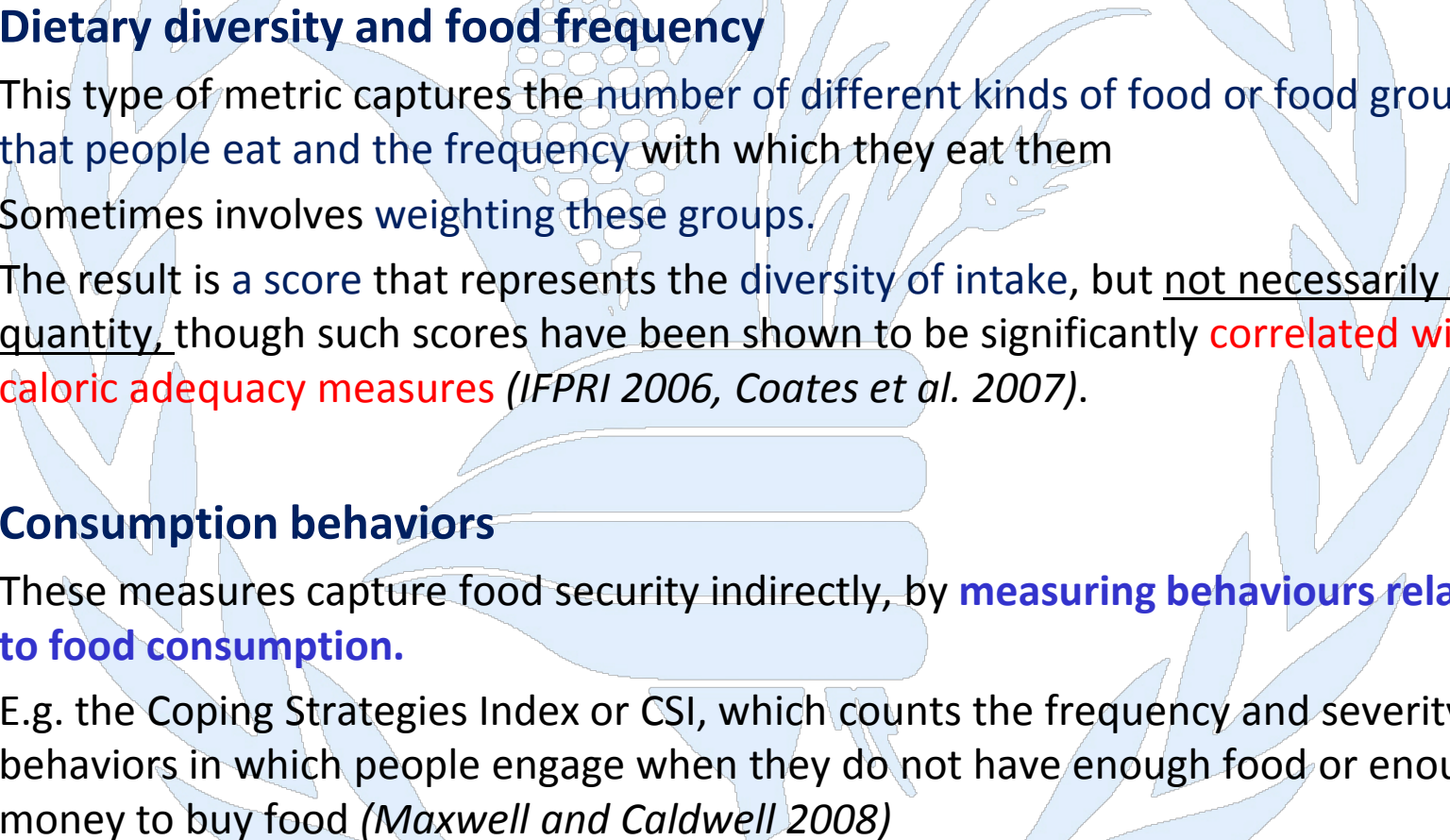
- **Demographics** – for Gender disaggregation
- **Income/Livelihoods** - for livelihoods classification
- **Assets** – for asset score, wealth ranking
- **Expenditure** - 30 day recall for food and 6 mnths non food – for % share of food
- **Food Consumption and Coping** – for FCS, CSI, IDDS, HDDS for overall food security classification
- **Water Sources, Sanitation and Access** – for food utilization
- **Health** – diseases and access to facilities; treatment, etc. – for utilization

## Indicators to collect at Individual Level - Nutrition (children, women)

- **Anthropometric Measurements**
- **Health**
- **Feeding practices**
- **Caring practices**

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# Types of food security measurements

- **Dietary diversity and food frequency**
    - ❖ This type of metric captures the number of different kinds of food or food groups that people eat and the frequency with which they eat them
    - ❖ Sometimes involves weighting these groups.
    - ❖ The result is a score that represents the diversity of intake, but not necessarily the quantity, though such scores have been shown to be significantly **correlated with caloric adequacy measures** (IFPRI 2006, Coates et al. 2007).
  - **Consumption behaviors**
    - ❖ These measures capture food security indirectly, by **measuring behaviours related to food consumption**.
    - ❖ E.g. the Coping Strategies Index or CSI, which counts the frequency and severity of behaviors in which people engage when they do not have enough food or enough money to buy food (Maxwell and Caldwell 2008)
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# Indicators to measure food security

## Dietary diversity and food frequency

- i. **Food Consumption Score (FCS);**
- ii. **Household Dietary Diversity Scale (HDDS);**
- iii. **Spending on food**
- iv. **Undernourishment**

## Consumption behaviors

- i. **Coping Strategy Index (CSI);**
- ii. **Reduced Coping Strategy Index (rCSI);**
- iii. **Household Food Insecurity and Access Scale (HFIAS);**
- iv. **The Household Hunger Scale (HHS);**
- v. **Self-assessed measure of food security (SAFS).**

## Global Hunger Index (GHI)

- **CSI and rCSI** - capture the element of **quantity or sufficiency**.
- **HFIAS** - captures a mix of **sufficiency and psychological** factors.
- **HHS** - captures the most **extreme** manifestations of **insufficiency**.
- **FCS and HDDS** - capture **quality and diversity** (although FCS is calibrated to capture an element of quantity as well).
- **GHI** - uses undernourishment, child underweight, and child mortality to calculate hunger

# Definition of the Indicators (Dietary diversity and food frequency)

## Food Consumption Score (FCS)

- The **frequency weighted diet diversity score** is a score calculated using the frequency of consumption of different **food groups consumed by a household during the 7 days** before the survey.
- An acceptable **proxy indicator** to measure caloric intake and diet quality at household level, giving an indication of food security status of the household if combined with other household access indicators.
- It is a **composite score** based on **dietary diversity, food frequency, and relative nutritional** importance of different food groups.
- used primarily by the World Food Programme

## Household Dietary Diversity Scale (HDDS)

- Dietary diversity represents the **number of different foods or food groups consumed** over a given reference period
- similar to the FCS, **but usually with a 24-hour recall** period without frequency information or weighted categorical cut-offs
- It is a proxy measure for **HH food access**
- Number of **food groups examined: 7-16**
- Target: **individuals** (IDDS), **household** (HDDS), or **women** (WDDS)
- widely promoted by the UN Food and Agriculture Organization and USAID (FANTA).



# Definition of the Indicators (Dietary diversity and food frequency)

## Under-nourishment

- measure of **food deprivation**, is based on a comparison of usual food consumption expressed in terms of **dietary energy (kcal)** with certain energy requirement norms.
- considers mean dietary energy supply as **a proxy for food energy consumption**.
- The part of the population with food consumption **below the energy requirement norm is considered undernourished** ("underfed").
- Used by FAO

## Spending on food

- Estimating the **proportion of expenditure on food** of the total household income
- Considers the propensity of people closer to the edge of poverty, spend a greater and greater proportion of their income on food
- Can also look at the **proportion spent on different food groups**

## Definition of the Indicators (Consumption behaviours)

### Coping Strategies Index (CSI/rCSI)

- The CSI **measures behaviour**: the things that people do when they cannot access enough food.
- Measures the adjustments HH make in consumption and livelihoods.
- Coping can be **consumption changes; expenditure reduction; income expansion;**
- adopted by WFP/VAM (World Food Programme/Vulnerability Analysis Mapping unit), FAO/FSNAU (UN Food and Agriculture Organization/Food Security and Nutrition Analysis Unit for Somalia), and the Global IPC (Integrated Phase Classification) team, among others.
- rCSI tend to measure the **less-severe coping behaviours**
- rCSI Uses the five most common strategies with standardized weights

### Household Food Insecurity and Access Scale (HFIAS)

- The HFIAS was designed to capture household **behaviours signifying insufficient quality and quantity**, as well as **anxiety** and uncertainty over household insecure access or food supply.
- Insufficient quality (includes variety and preferences of the type of food):
- Insufficient food intake and its physical consequences:

## Definition of the Indicators (Consumption behaviors)

### The Household Hunger Scale (HHS)

- essentially a **behavioural measure**.
- It tends to capture **more-severe behaviours**; e.g.
  - Was there ever no food to eat of any kind in your house because of lack of resources to get food?
  - Did you or any household member go to sleep at night hungry because there was not enough food?
  - Did you or any household member go a whole day and night without eating anything because there was not enough food?

### Self-assessed measure of food security (SAFS).

- These include self-assessments of current food security status in a recent recall period and the change in livelihood status over a longer period of time
- highly subjective in nature and perhaps too easy to manipulate in programmatic contexts

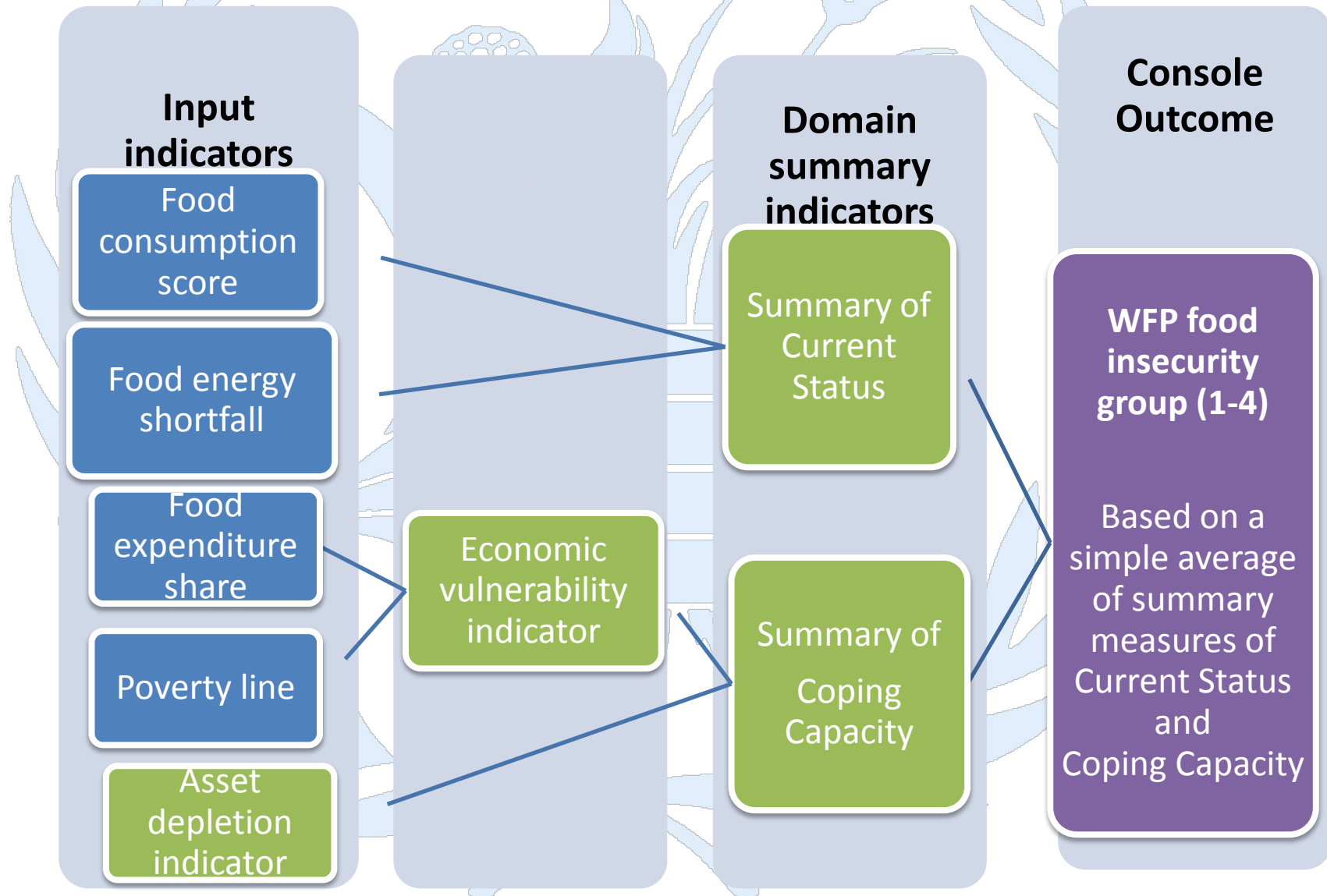
## Spearman's rho correlations between food security measures

	CSI	rCSI	HFIAS	HHS	FCS	HDDS	SAFS
CSI	1	0.95	0.85	0.44	-0.51	-0.56	0.45
rCSI	0.95	1	0.84	0.42	-0.48	-0.53	0.46
HFIAS	0.85	0.84	1	0.48	-0.57	-0.63	0.46
HHS	0.44	0.42	0.48	1	-0.34	-0.34	0.23
FCS	-0.51	-0.48	-0.57	-0.34	1	0.92	-0.24
HDDS	-0.56	-0.53	-0.63	-0.34	0.92	1	-0.29
SAFS	0.45	0.46	0.46	0.23	-0.24	-0.29	1

\* All correlations significant at the  $p < 0.01$  level

**Source:** *How Do Different Indicators of Household Food Security Compare? Empirical Evidence from Tigray; Daniel Maxwell, Jennifer Coates and Babu Vaitla, Tufts University, August 2013*

# Combine Indicators for Overall Food security



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The logo of the Food and Agriculture Organization (FAO) is centered on the page. It features a stylized globe with a grid pattern, surrounded by various agricultural products including a corn cob, a wheat stalk, and a rice stalk. The globe is flanked by two olive branches, symbolizing peace and prosperity. The entire logo is rendered in a light blue color.

# FOOD CONSUMPTION SCORE (FCS)

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# Food groups and weights in FCS and HDDS

Food Group	Food Items belonging to group	Food groups	Weight for FCS
1. Cereals and grain:	Rice, pasta, bread / cake and / or donuts, sorghum, millet, maize,	1. Cereals and Tubers	2
2. Roots and tubers:	potato, yam, cassava, sweet potato, taro and / or other tubers		
3. Legumes/nut:	beans, cowpeas, peanuts, lentils, nut, soy, pigeon pea and / or other nuts	2. Pulses	3
4. Orange vegetables (vegetables rich in Vitamin A):	carrot, red pepper, pumpkin, orange sweet potatoes,	3. Vegetables	1
5. Green leafy vegetables:,	spinach, broccoli, amaranth and / or other dark green leaves, cassava leaves		
6. Other vegetables:	onion, tomatoes, cucumber, radishes, green beans, peas, lettuce, etc.		
7. Orange fruits (Fruits rich in Vitamin A):	mango, papaya, apricot, peach	4. Fruit	1
8. Other Fruits:	banana, apple, lemon, tangerine	5. Meat and fish	4
9. Meat:	goat, beef, chicken, pork (meat in large quantities and not as a condiment)		
10. Liver, kidney, heart and / or other organ meats			
11. Fish / Shellfish:	fish, including canned tuna, escargot, and / or other seafood (fish in large quantities and not as a condiment)		
12. Eggs			
13. Milk and other dairy products:	fresh milk / sour, yogurt, cheese, other dairy products (Exclude margarine / butter or small amounts of milk for tea / coffee)	6. Milk	4
14. Oil / fat / butter:	vegetable oil, palm oil, shea butter, margarine, other fats / oil	7. Oil	0.5
15. Sugar, or sweet:	sugar, honey, jam, cakes, candy, cookies, pastries, cakes and other sweet (sugary drinks)	8. Sugar	0.5
16. Condiments / Spices:	tea, coffee / cocoa, salt, garlic, spices, yeast / baking powder, lanwin, tomato / sauce, meat or fish as a condiment, condiments including small amount of milk / tea, coffee	Condiments	0

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# Calculation steps for FCS

- **I.** Using standard 7-day food frequency data, group all the food items into specific food groups (see groups in table above).
  - **II.** Sum all the consumption frequencies of food items of the same group, and recode the value of each group above 7 as 7.
  - **III.** Multiply the value obtained for each food group by its weight (see food group weights in table above) and create new weighted food group scores.
  - **IV.** Sum the weighed food group scores, thus creating the food consumption score (FCS).
  - **V.** Using the appropriate thresholds (see below), recode the variable food consumption score, from a continuous variable to a categorical variable.
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# FCS Thresholds

FCS	FCS ( High Oil /Sugar Diet)	Profiles
0-21	< 28	Poor
21.5-35	28.5 - 42	Borderline
> 35	> 42	Acceptable

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# Limitations of FCS

Is only a snap-shot of one week food consumption

- At risk of micronutrient deficiencies
- Likely to have severe food access issues


## **Does not:**

- *capture seasonal changes*
- *quantify the food gap*
- *capture intra-HH food consumption*
- *show how food consumption has changed as result of crisis, unless previous FCSs for same HHs are available*

**Thus, in an emergency, MORE ANALYSIS IS NEEDED to understand changes in HH food consumption!**

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*Household Dietary Diversity Index  
(HDDS)*

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# Various dietary diversity scores

Organization	Name	Level	Number of food groups	Recall period
FAO	Household dietary diversity score (HDDS)	Household	12 (aggregated from 16 items)	24 hour
FAO	Woman's Dietary Diversity Score (WDDS)	Women	9 (aggregated from 13 items)	24 hour
IFPRI	Dietary diversity score (DDS)	Household	7	Flexible
FANTA	Individual dietary diversity score (IDDS)	Children	8	24 hour

# How is the score calculated?

Food groups used	Food groups used for HDDS
Cereals and grain	1. Cereals, roots, and tubers
Roots and tubers	
Legumes / nuts	2. Pulses and legumes
Orange vegetables (vegetables rich in Vitamin A)	3. Vegetables
Green leafy vegetables	
Other vegetables	
Orange fruits (Fruits rich in Vitamin A)	4. Fruits
Other Fruits	
Meat	5. Meats, fish and seafood, and eggs
Liver, kidney, heart and / or other organ meats	
Fish / Shellfish	
Eggs	
Milk and other dairy products	6. Dairy products
Oil / fat / butter	7. Oils and fats
<i>Sugar, or sweet</i>	<i>Not considered</i>
<i>Condiments / Spices</i>	<i>Not considered</i>

## CALCULATION

1. Regroup the 16 food groups used for FCS in the 7 food groups as per the table , by simply adding frequencies;
2. For each food group create a new binominal variable that has two possible values:
  - **1 – yes:** the household / individual consumed that specific food group
  - **0 – no:** they did not consume that food.
1. Sum all the binominal variables in order to create a HDDS;
2. The new variable will have a range from 0 through the maximum number of food groups collected (7).

# HDSS – Analysis and classification

- The DDS can be disaggregated by sex of HH head, strata and other areas of interest (see example below)

		Diet Diversity Score before intervention		Diet Diversity Score after intervention	
		Average	Median	Average	Median
Sex of Household Head	Female HH	4.4	4.1	6.1	6.0
	Male HH	4.7	4.4	6.8	6.4
Total		4.5	4.2	6.5	6.2

- No established cut-off points indicate adequate or inadequate dietary diversity for the HDSS and Women Dietary Diversity Score (WDDS).
- It is recommended to use the mean score or distribution of scores for analytical purposes and to set Programme targets or goals.
- IFPRI proposes to use the following thresholds:
  - **6+**: high = *good dietary diversity*
  - **4.5 – 6**: *medium dietary diversity*
  - **<4.5**: *low dietary diversity*

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## Practical reasons for using a diversity score

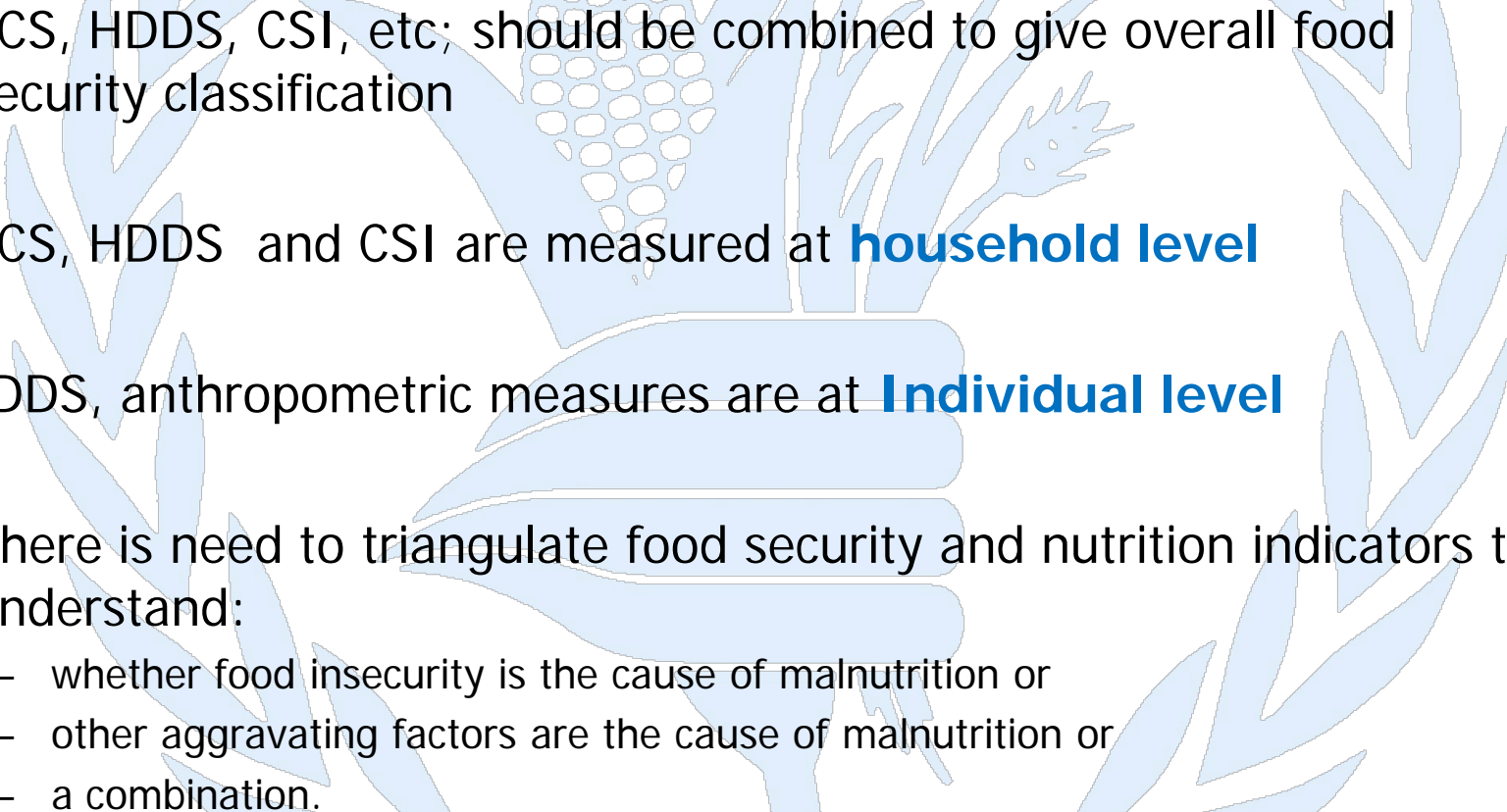
- ✓ DDS works well for monitoring changes (*e.g. Cash intervention's impact on household's dietary habits*)

### Disadvantages:

- DDS does not provide information on quantity used
  - DDS does not provide information on frequency of consumption of food groups
  - DDS does not assign weight to food groups based on nutritional value.
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# Conclusion

- FCS, HDDS, CSI, etc; should be combined to give overall food security classification
  - FCS, HDDS and CSI are measured at **household level**
  - IDDS, anthropometric measures are at **Individual level**
  - There is need to triangulate food security and nutrition indicators to understand:
    - whether food insecurity is the cause of malnutrition or
    - other aggravating factors are the cause of malnutrition or
    - a combination.
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