

Prevalence  
of  
Undernourishment  
(PoU)

SDG target indicator  
2.1.1



# Training Workshop on: PoU

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Virtually - [ESCWA](#)

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# Introduction to the Prevalence of Undernourishment (PoU)

Sustainable Development Indicator 2.1.1



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# Objectives

- ❑ Defining the prevalence of undernourishment, highlight on its benefits and origins
- ❑ Understanding the main characteristics of the PoU
- ❑ Describing what the PoU measures and what it does not measure



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# The PoU indicator:

PoU is an estimate of the **proportion** of the population whose **habitual food consumption** is **insufficient** to provide the **dietary energy (Kcal)** levels that are required to maintain a **normal, active and healthy life**.

- It is expressed as a percentage (%).
- It measures progress towards **SDG Target 2.1**.



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# The PoU indicator:

## Under SDG Target 2.1

By 2030, **end hunger and ensure access by all people**, in particular the poor and people in vulnerable situations, including infants, **to safe, nutritious and sufficient food** all year round



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# The benefits of the PoU

Provides useful information about **food (in)security's general trends over time** as estimates have been published by FAO for:

1. **global and regional** monitoring since **1974**, and
2. **countries** since **1999**.



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# The origins of the PoU

P.V. **Sukhatme** in **1961** for the first time proposed to monitor food security by estimating the prevalence of undernourishment in the population

Based on two revolutionary ideas:

1. Part of the variability observed in food consumption is not linked to food insecurity, **BUT** it reflects the normal variability due to **differences in food requirements,**
2. Food Security is not just a matter of **availability BUT** also of **access to food.**

Application of Sukhatme method become possible for most countries where **household surveys** including **food consumption module** are available.



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# The origins of the PoU

Then...

- The **FAO World Food Survey (1977, 1987, 1996)** published estimates of the PoU at **global and regional** level
- The **1996 World Food Summit**, suggested **reducing by half** the **number** of undernourished people in the world **by 2015**

Taking as the **baseline** the FAO latest available estimates of the number of undernourished people in the world in **1990-92** (published with the sixth edition of the World Food Survey)



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# The origins of the PoU

- Since **1999**, FAO publishes estimates of the PoU in ***The State of Food Insecurity in the World*** (14 editions) for most of the **countries** in the world and for all the **regions**
- in **2000**, a similar less ambitious target, to **reduce by half the proportion** of people suffering from hunger by **2015**, was set with the **Millennium Development Goals**, as part of MDG 1:  
*“eradicate extreme poverty and hunger.”*



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# The origins of the PoU

- ... PoU has been always debated and discussed
  - FAO International Symposium **2002**
  - Committee on Food Security (CFS) Round Table **2011**
  - Another FAO International Symposium **2012**
- In **2015**, the PoU is chosen as one of the **SDG monitoring indicators for Goal 2 – Target 2.1**
- Last, in **2017, 2018, 2019 and 2020**, national, regional and global estimates are published in the new publication ***The State of Food Security and Nutrition in the World***



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# PoU's Dietary Energy Approach

An individual is considered to be **undernourished** if the level of her/his **habitual** dietary energy **intake** is below the minimum dietary energy **requirement** that assumed to be appropriated by nutritionists

1. Dietary energy intakes
2. Dietary energy requirements

Steady state: intakes = requirements



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# Dietary Energy Intake (DEI)

- Humans **require energy** for a **long-term, active and healthy life**,
- The energy is taken by **consuming food**. When people ingest food, the body's biological processes transform it into **energy** and **nutrients**,
- The amount of energy (**kilocalories**) the body gets from the food is called **Dietary Energy Intake**.



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# Dietary Energy Requirements (DER)

- The amount of energy that the human body requires to live a long-term active and healthy life is called **Dietary Energy Requirements**,
- For a **group of individuals** there is a **range of energy requirements** that are **compatible with long-term good health**,
- Factors that affect the individual requirements are: **age, physiological status, gender, body weight and lifestyle.**



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# PoU: Probability Distribution Framework

The estimation of the undernourished in a population **CANNOT** be viewed as a **simple accounting exercise** involving:

- I. the comparison of the observed household **Dietary Energy Consumption (DEC)** with the **estimated household Dietary Energy Requirement**, and
- II. counting the individuals in the households with  $DEC < DER$

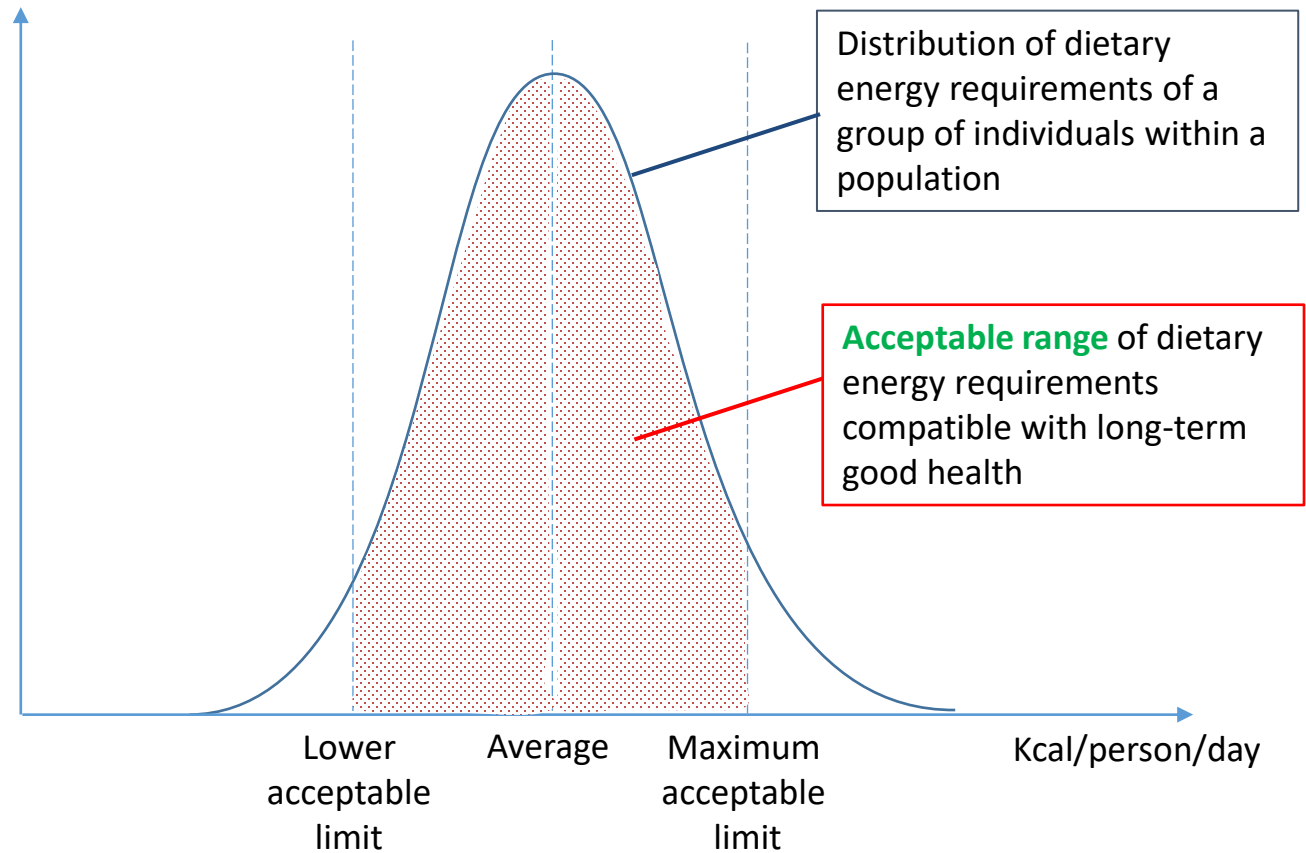
**Instead**, it must be viewed within a **probability distribution framework**





- The energy requirement of individuals are represented by a distribution where **the values of energy requirement have a range of acceptable levels.**
- Each **sex-age group** has its own distribution of dietary energy requirements.

# The Distribution of DER





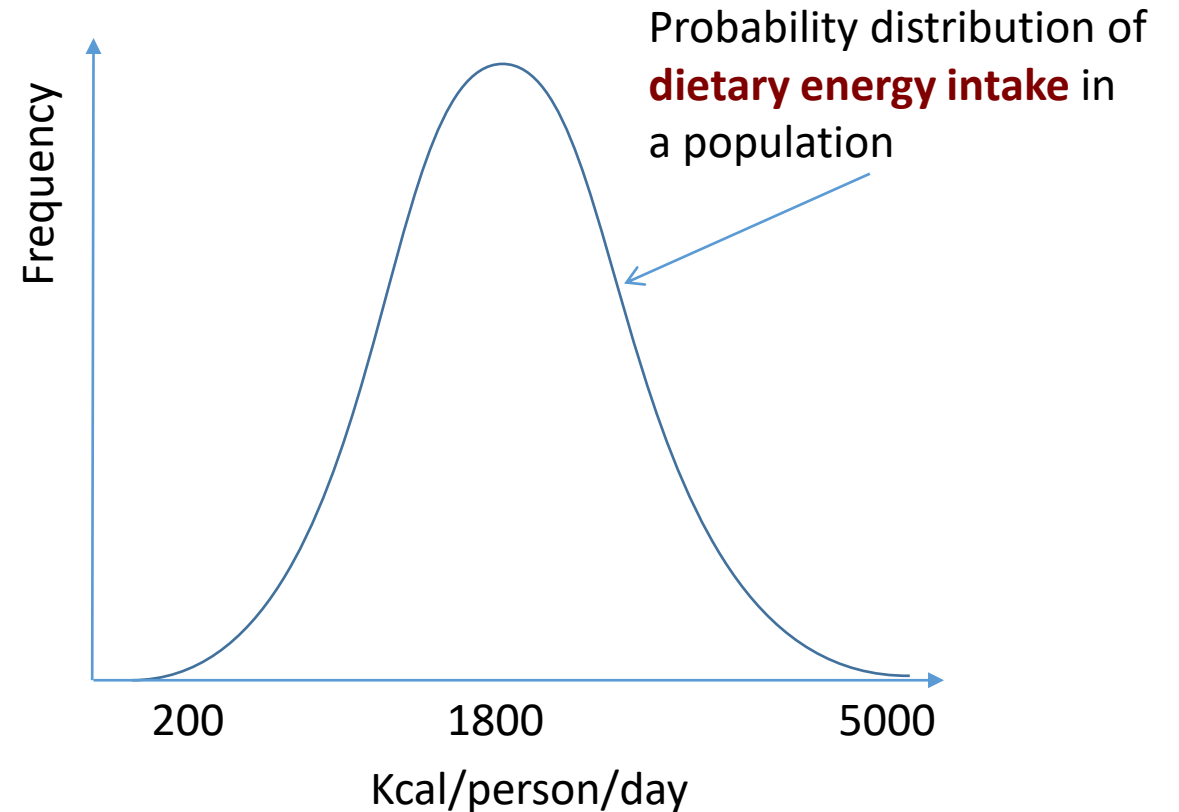
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# Probability Distribution of DEI

- The dietary energy intake of **individuals** are distributed within a population and represented by a probability distribution where **the values of dietary energy intake are associated to a probability of occurrence**.
- Each **population group** has its own probability distribution of dietary energy intake.



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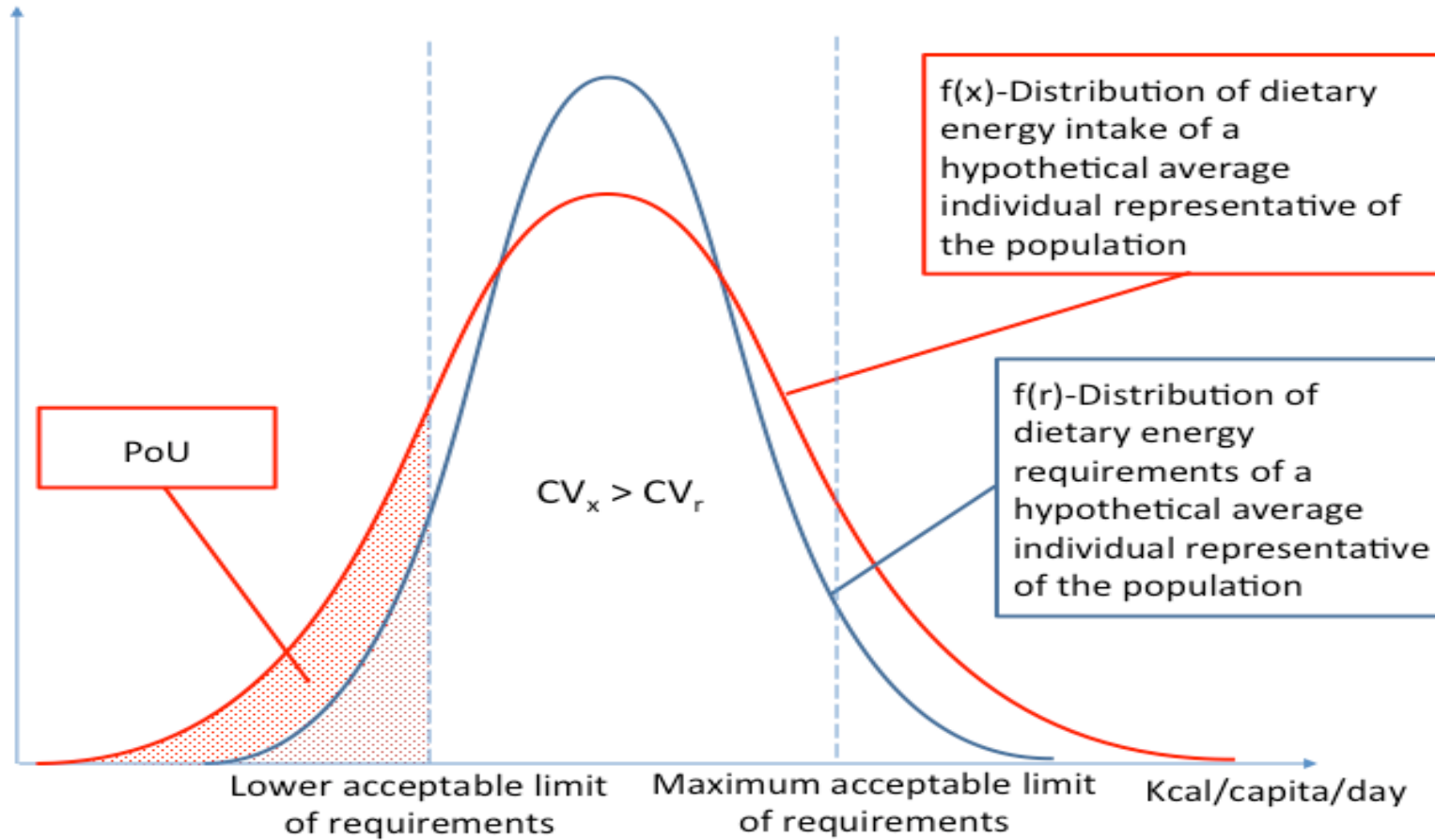


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$$PoU = \int_{x < MDER} f(x|DEC; CV) dx$$



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# PoU Definition

*Within a probability distribution framework, the PoU is the **probability** that a **randomly selected individual** from a **population** has an **habitual access to food** which **does not** provide the **dietary energy necessary to cover her/his normative energy requirements***

- I. It measures the proportion of individuals in a population suffering from **chronic hunger** (a state, lasting for at least one year, of inability to acquire enough food to satisfy the energy requirements)
- II. It is an **estimate NOT a direct** measure.



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# The fundamental elements of the PoU

1. The average **Dietary Energy Consumption (DEC)** – kcal/cap/day
2. The inequality in access to food, the **Coefficient of Variation (CV)**
3. The **Minimum Dietary Energy Requirement (MDER)**, the **threshold** – kcal/cap/day



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# The Average Dietary Energy Consumption

The mean can be estimated from:

## 1. The individual dietary intake surveys:

Rarely conducted to a group of population representative at national or subnational levels

## 2. The household consumption and expenditure surveys (HCES):

- There is no information on **intra-household** distribution of food
- They are developed to **inform economic policy** not to capture food consumption

## 3. The Food Balance Sheets (FBS):

Suffers from issues of **coverage** (i.e., non-commercial production, accounting for losses etc.), precision (unreported trade, stocks).



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# The Coefficient of Variation

The CV can be estimated from:

## 1. The **individual dietary intake surveys**:

- Rarely conducted to a group of population representative at national or subnational levels
- There is an excess variability due to day-to-day variation in individual's intake

## 2. The **household consumption and expenditure surveys (HCES)**:

- There is no information on intra-household distribution of food
- They are developed to inform economic policy not to capture food consumption
- There is an **excess variability** due to survey design and the presence of **outliers**.



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# The Minimum Dietary Energy Requirement

The DERs including MDER can be estimated using:

1. Data on population structure by age and gender
2. Median height by age and sex
3. International standards of weight-for-age and BMI
4. Physical activity level in the population
5. Birth Ratio
6. Under 5 Mortality Rate



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# What PoU measures

- ***Undernourishment (hunger)*** terms have been usually interpreted as referring to a food insecurity situation of **continued inability** to obtain **enough food** (quantity of food sufficient to conduct a healthy and active life) by a **person**, ... but their meaning is **narrower**.
- **FAO's undernourishment can be considered as the extreme form of food insecurity**, arising when even the caloric supply is not adequate to **merely** cover the **basic dietary needs**.



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# What PoU measures

FAO monitors the “**enough food**” using the **dietary energy intake**. Accordingly, a human being is considered **undernourished** if the level of her/his **habitual dietary energy intake is below** the **minimum** level that nutritionists would consider appropriate (**MDER**).

FAO monitors the “**continued inability**” using the **year** as reference period, focusing on the **habitual chronic undernourishment**:

- **long enough** for the consequences of low food intake to be **harmful to health**).

Note: *PoU is **NOT** meant to capture **short-term** effects of temporary crisis (acute food insecurity).*



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# Overcoming three persistent misconceptions

1. PoU is **NOT** an indicator of food availability
2. The **Average Dietary Energy Requirement** cannot be used as **cut-off point.. But the Minimum**
3. PoU estimation is **NOT** based on **headcount** of households who report food consumption below a certain threshold



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# Overcoming three persistent misconceptions

*“Why assuming a parametric distribution for food consumption? It imposes ad hoc restrictions and it is not needed for a headcount approach. Why not simply refer to the empirical distribution of a sample?” [examples: Smith 1999; IFPRI, 2006]*

The PoU is **NOT** a headcount approach..

The estimate of PoU in a country is not obtained simply by drawing a sample of the population and counting the cases that are classified as undernourished:

- I. Conceptually, rather simple procedure
- II. Practically unfeasible because we **cannot**:
  - i. Monitor **habitual consumption** of individuals
  - ii. Observe actual **individual requirements**



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*Thank You  
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