



منظمة الأغذية
والزراعة
للأمم المتحدة

联合国
粮食及
农业组织

Food
and
Agriculture
Organization
of
the
United
Nations

Organisation
des
Nations
Unies
pour
l'alimentation
et
l'agriculture

Organización
de las
Naciones
Unidas
para la
Agricultura
y la
Alimentación

Measurement of Food Consumption and Food Deprivation

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July 2003

First section

- METHODOLOGICAL FRAMEWORK
- ESTIMATION PROCEDURES
- MEANING AND SIGNIFICANCE OF THE RESULTING ESTIMATES

Second section

- CONCEPTUAL, METHODOLOGICAL AND DATA ISSUES REQUIRING IMPROVEMENT OR FURTHER RESEARCH

Development Targets between 1990 and 2015

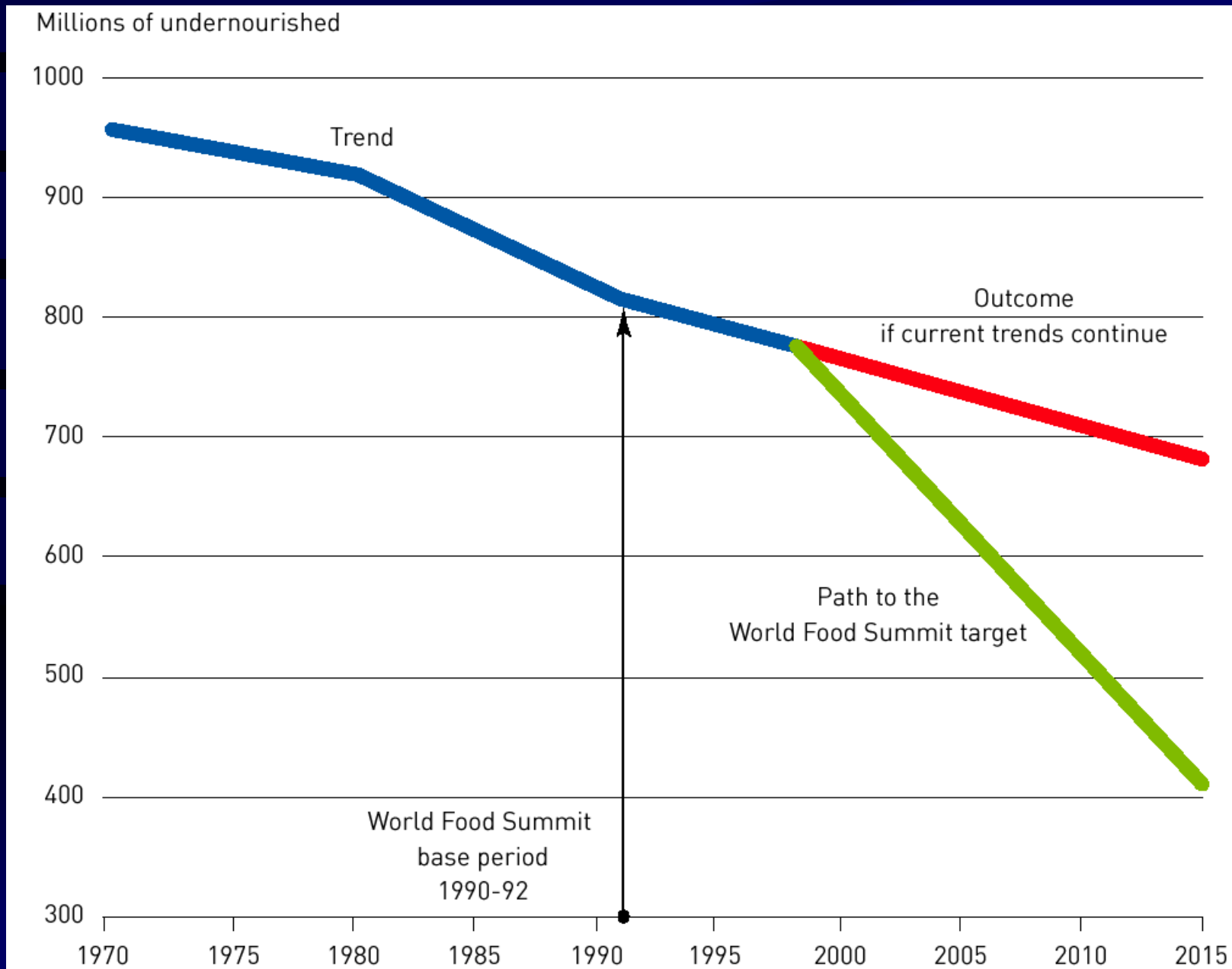
**World Food Summit
(1996)**

To halve the number of people suffering from hunger

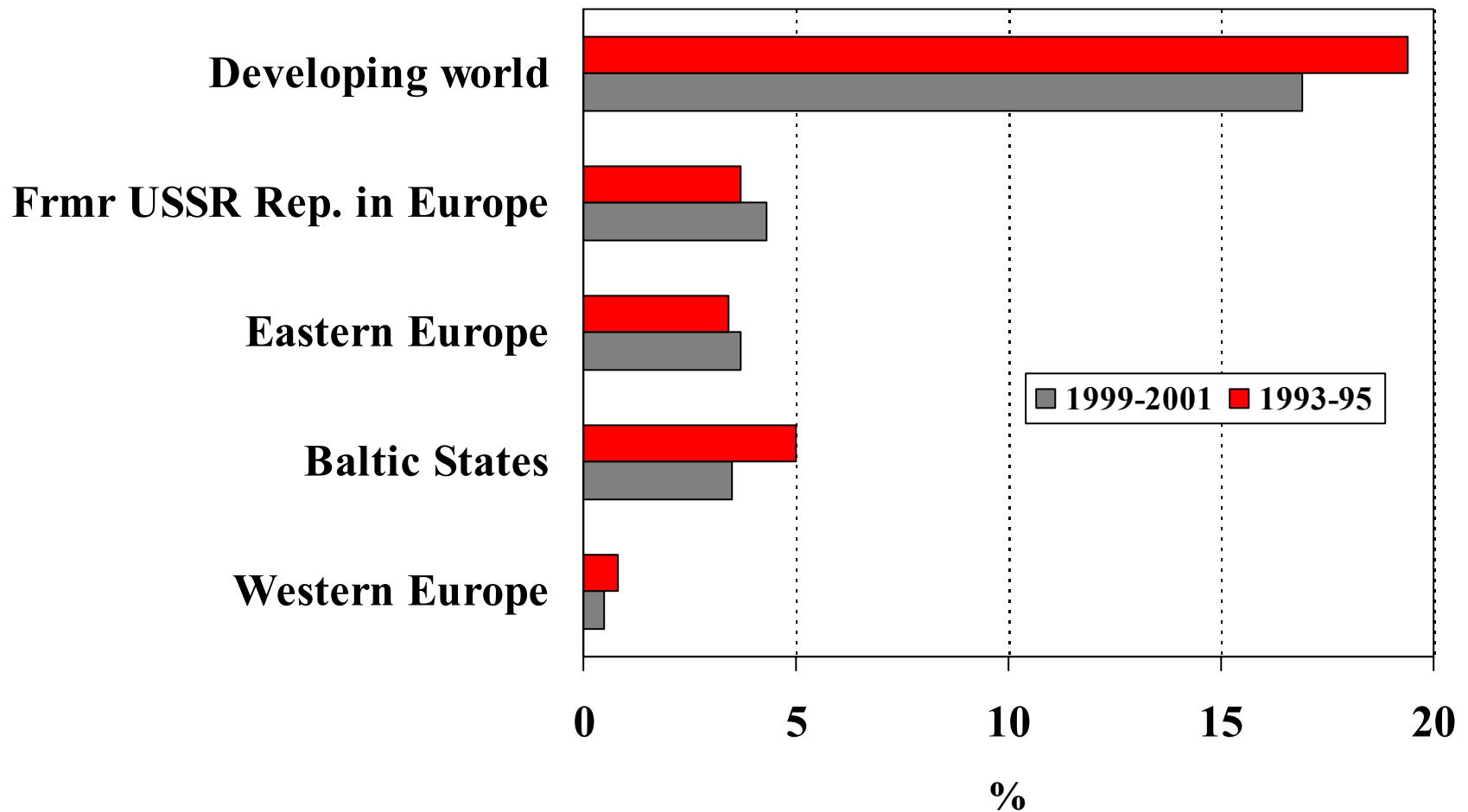
**UN Millennium Summit
(2000)**

To halve the proportion of people
→ in extreme poverty
→ suffering from hunger

WFS Target is unlikely to be met



Prevalence of undernourishment



Coverage of FAO estimates on undernourishment

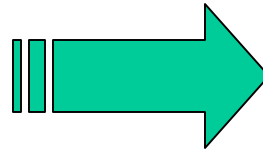
	Number of countries	% of population	Periods
Developing countries	99	99.4	1969-71 1979-81 1990-92 1999-2001
Asia and the Pacific	19	99.7	
Latin America & the Caribbean	24	98.7	
Near East and North Africa	16	98.1	
Sub-Saharan Africa	40	99.2	
Transition countries	27	100	1993-95 1999-2001
Eastern Europe	12	100	
CIS	12	100	
Baltic States	3	100	

What are we measuring ?

usual food consumption

below

requirement level



undernourishment

prevalence of
undernourishment

=

proportion of undernourished
in total population

FAO
measure

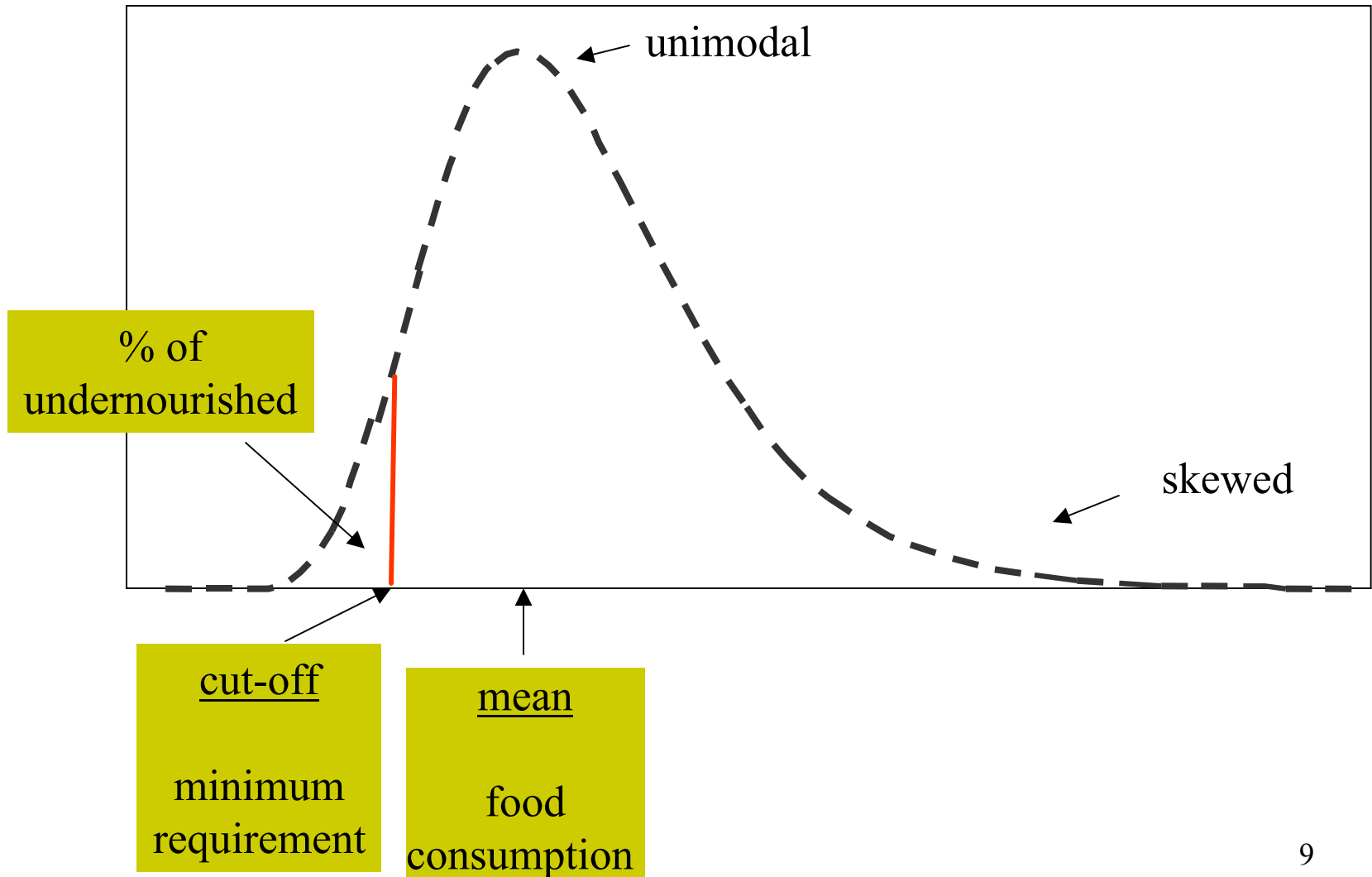


refers to those whose
dietary *energy* consumption
is insufficient for

body weight
maintenance /
child growth

work
performance

Theoretical distribution



Cut-off point formulation:

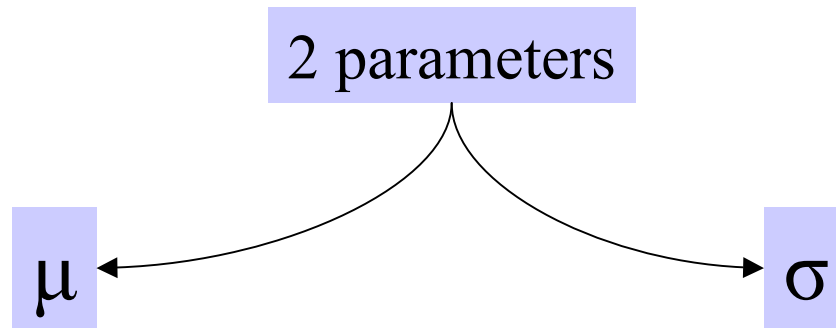
lower limit of range

density function

$$P(U) = P(x < r_L) = \int_{x < r_L} f(x) dx = F_x(r_L)$$

cumulative function

Estimating parameters of lognormal distribution



$$\mu = \log_e \bar{x} - \sigma^2 / 2$$

average per caput
food consumption

$$\sigma^2 = \log_e (\text{CV}^2(x) + 1)$$

inequality in
distribution

how to estimate $f(x)$



survey collecting
food consumption data
referring to a year
in representative sample of households

Characteristics of Existing survey data

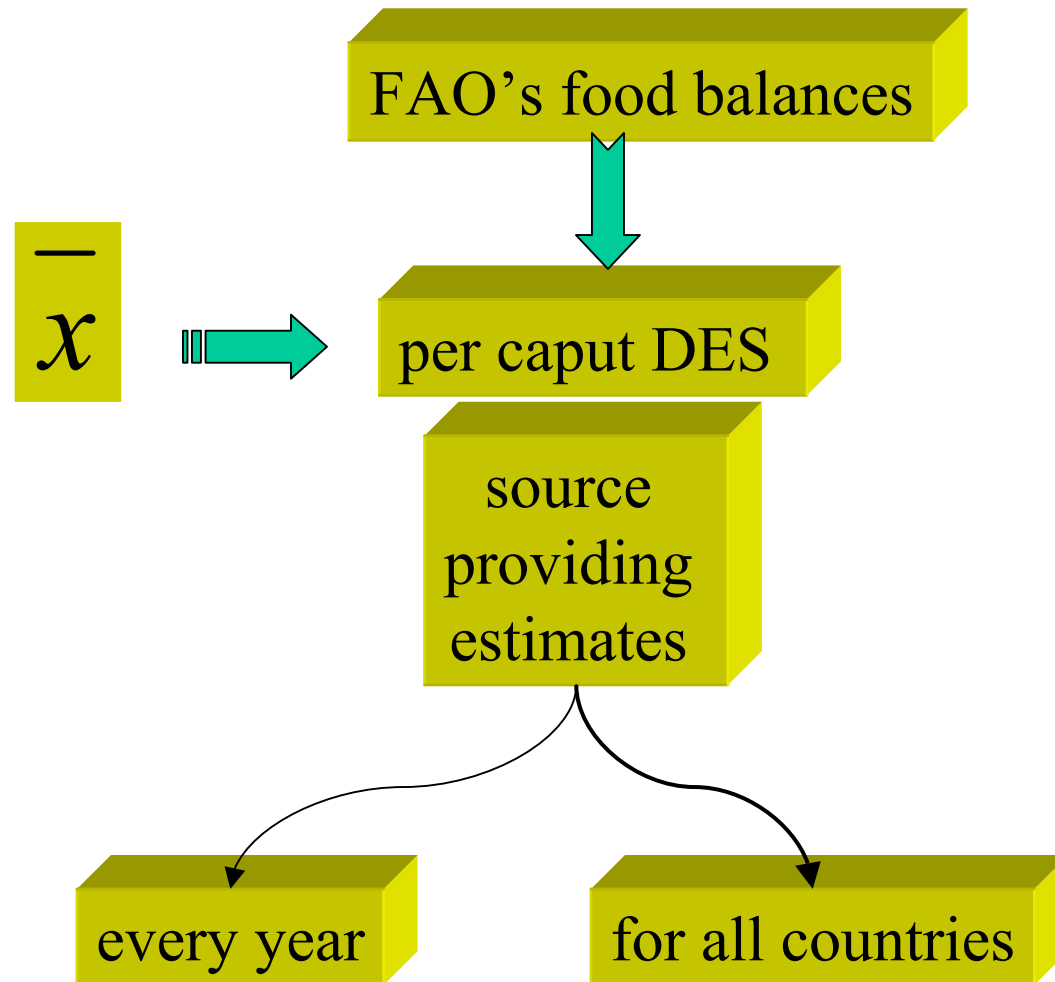
Dietary surveys

- close approximation of food eaten **at home**
- small sample size
- few countries
- not conducted regularly

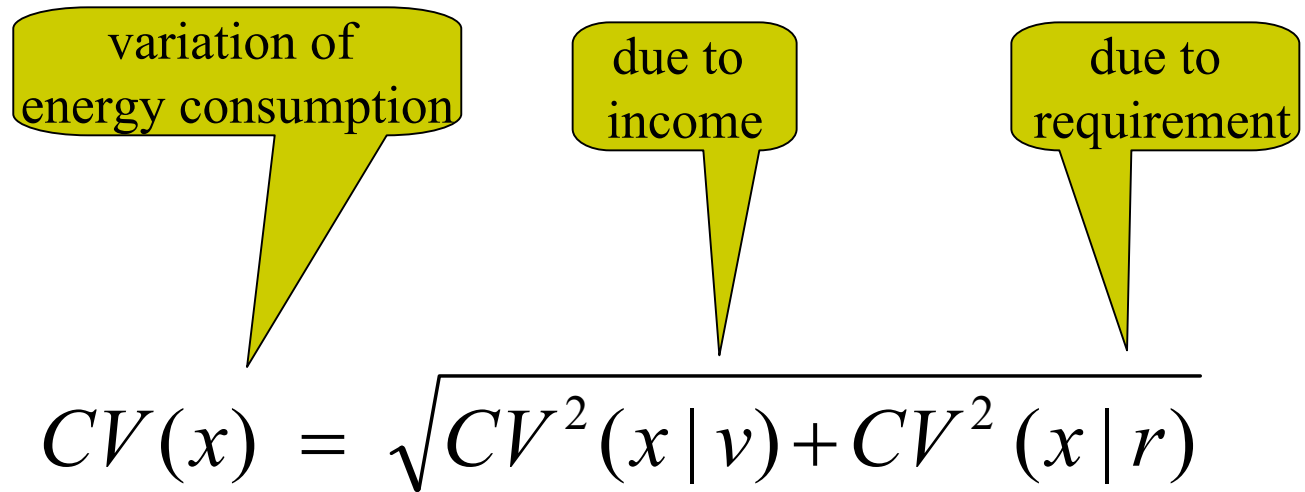
Income-Expenditure surveys

- food **purchased or acquired** (including food eaten away from home)
- bigger sample size
- wider country coverage
- part of regular national statistical programme

Estimation of the mean



Estimation of the CV



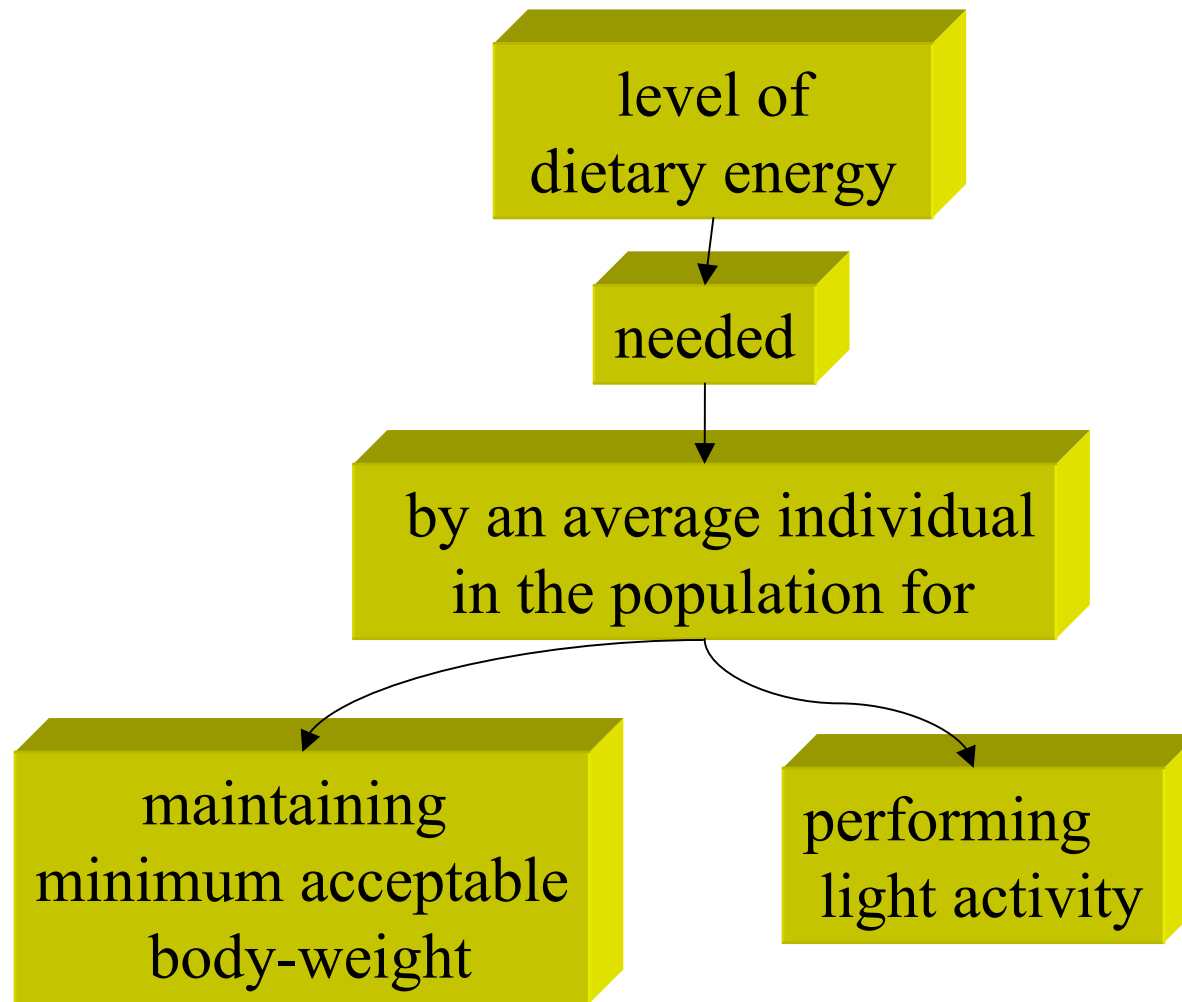
variation of energy consumption

due to income

due to requirement

$$CV(x) = \sqrt{CV^2(x|v) + CV^2(x|r)}$$

Definition of cut-off point



Derivation of the cut-off point

minimum energy requirement

national average

proportion in total population

minimum acceptable body weight

requirement per kg of body weight

$$= \sum p_i (b_i * r_i)$$

$i = \text{sex / age group}$

Implementation of the basic methodological framework

*combining information
from food balance sheets
and household surveys*

or

*relying totally on
household survey data*



**should take into consideration
survey design bias and
measurement errors**

Uses of the resulting estimates

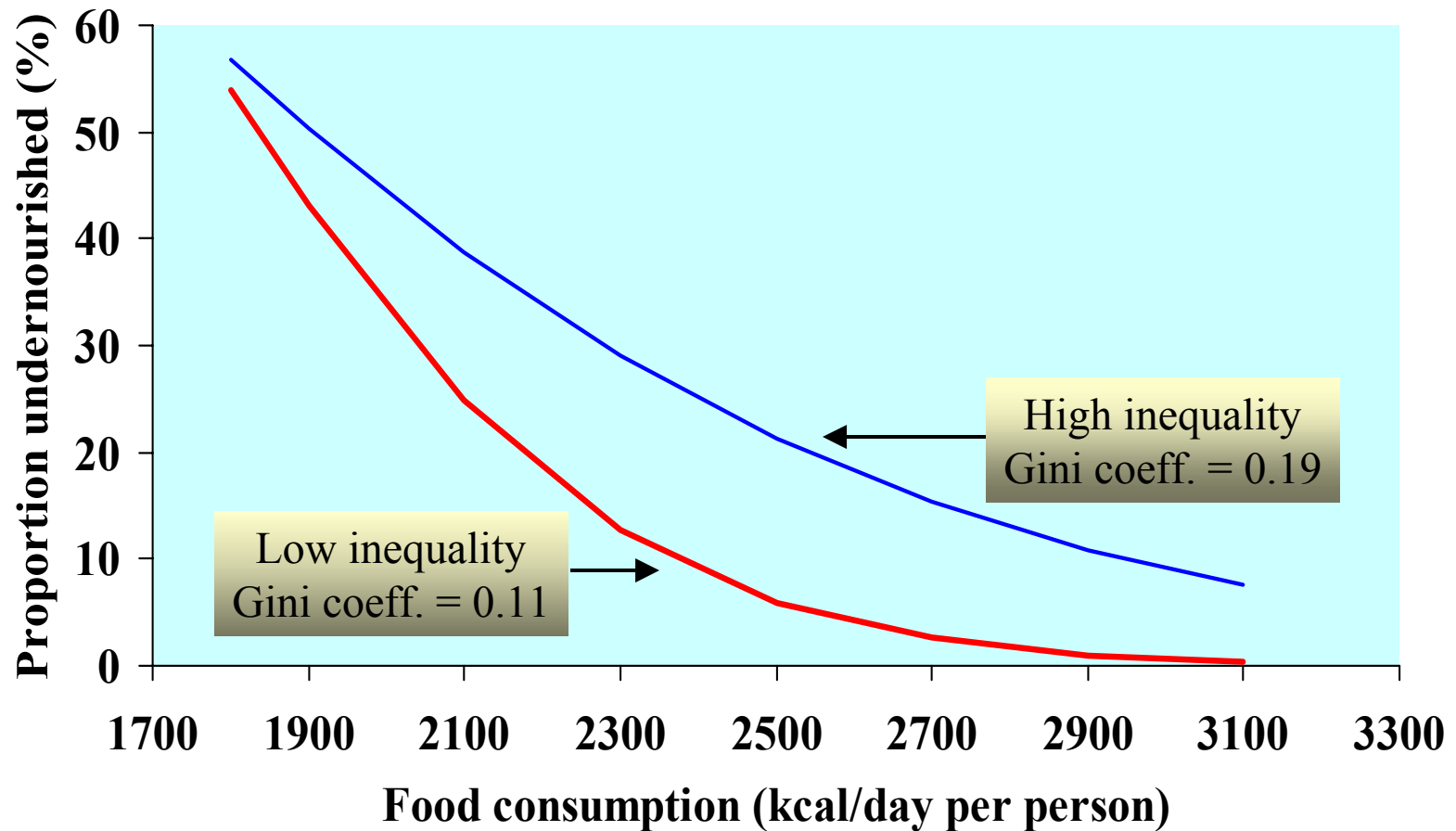
USES

**monitoring at global, regional,
country and sub-national levels**

**assessing the effect of changes of food supply
and related factors (production, trade, population, etc)**

**assessing the combined effect of food supply increase
and inequality reduction policies**

Effects of changes in food consumption compared with those in inequality of distribution



Methodological and data issues

- Cut-off point vs joint distribution approach
- Survey sampling design and data precision
- Improvement in parameter estimation
- Improvement in cut-off point estimation

Bivariate distribution:

consumption

requirement

joint
distribution

$$P(U) = P(x < r) = \iint_{x < r} f(x, r) dx dr$$

consumption-requirement correlation



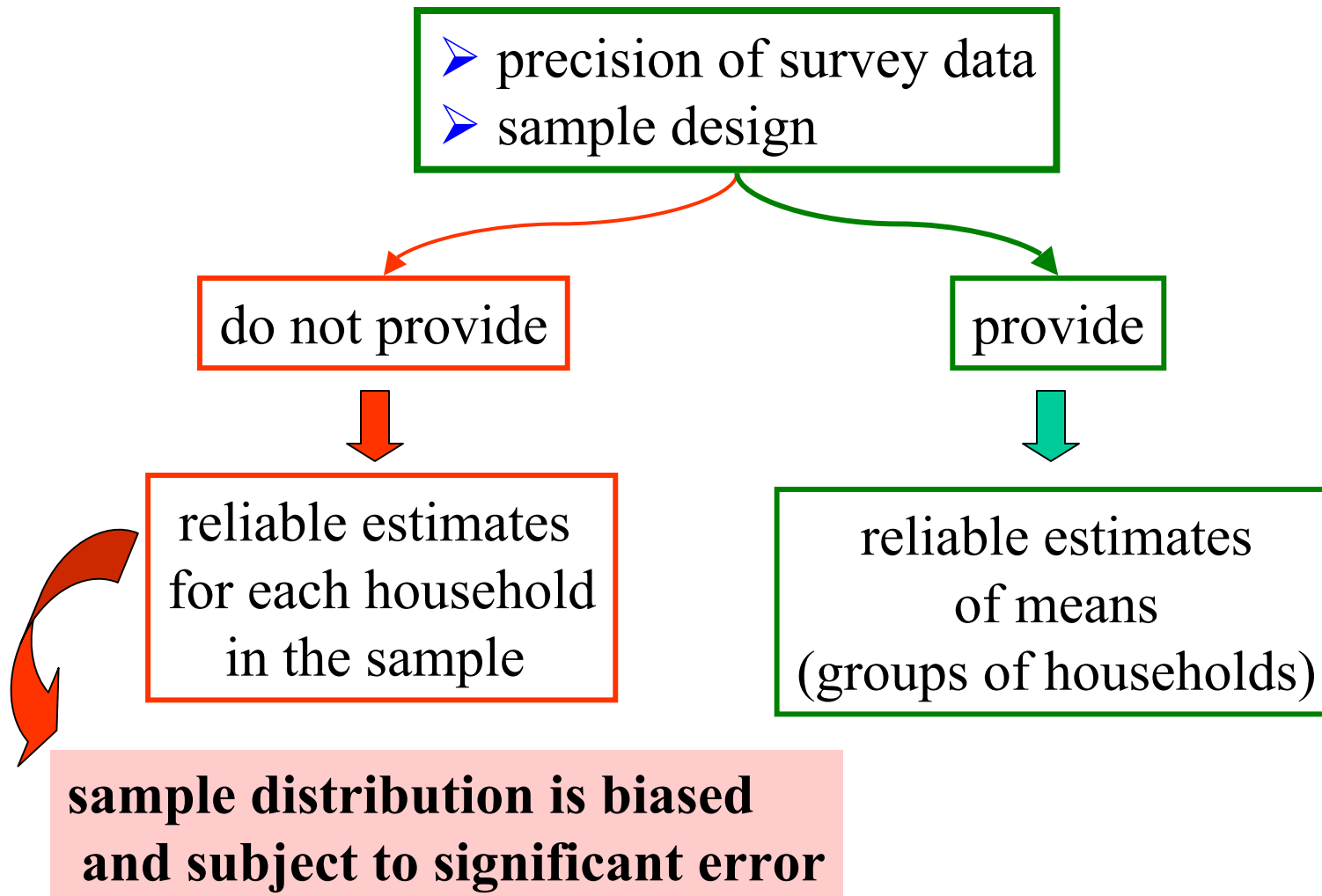
Cut-off point formulation:

lower limit of range

density function

$$P(U) = P(x < r_L) = \int_{x < r_L} f(x) dx = F_x(r_L)$$

Problems related to distribution data from household surveys



Future Actions to improve the Estimates

- **DES estimates:**

through improvement of the underlying basic agricultural statistics and reconciliation with estimates of national consumption from HIES data

- **Estimates of the CV of household per caput dietary energy consumption:**

through further research and analysis

- **Cut-off point estimates:**

taking into account the recommendations of the Expert Consultation on Human Energy Requirements (FAO/WHO, 2001) and updating height data

FAO HIES DATABASE

Europe - Number of countries (surveys)

	By calorie class	By expenditure class	By income class
Income	0	1 (1)	24 (48)
Expenditure	0	9 (20)	27 (51)
Food expenditure	0	9 (20)	27 (54)
Food quantity	0	1 (2)	12 (20)
Nutritive value	0	1 (1)	4 (9)
All	0	9 (20)	29 (61)

HIES in Western Europe

Classified by Income or Expenditure					
Country Name	Income	Expenditure	Food Expenditure	Food Quantities	Nutritive Value
BELGIUM	X	X	X		
DENMARK	X	X	X		
FINLAND	X	X	X		
FRANCE	X	X	X		
GERMANY		X	X	X	
GREECE		X	X		
HUNGARY	X	X	X	X	
IRELAND	X	X	X	X	
ITALY	X	X	X		
LUXEMBOURG		X	X		
NETHERLANDS	X	X	X		
NORWAY		X	X	X	
PORTUGAL	X	X	X	X	
SPAIN	X	X	X	X	X
SWEDEN	X	X	X		
SWITZERLAND		X	X		
UNITED KINGDOM	X	X	X	X	X

HIES in Eastern Europe, Baltic States and Frmr USSR in Europe

Country Name	Classified by Income or Expenditure				
	Income	Expenditure	Food Expenditure	Food Quantities	Nutritive Value
BELARUS	X	X	X		X
BULGARIA	X	X	X	X	X
CROATIA	X	X	X		
CZECH REP	X	X	X	X	
ESTONIA	X	X	X	X	
HUNGARY	X	X	X	X	
LATVIA	X	X	X		
LITHUANIA		X	X		
MACEDONIA	X	X	X	X	
ROMANIA	X	X	X	X	X
SLOVAKIA	X	X	X	X	
YUGOSLAVIA	X	X	X		

