

# Global Hunger Index – A Misnomer

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## 1. Genesis

The Global Hunger Index (GHI) was reported to have been developed as a tool for tracking hunger at Global, Regional and National levels as well as to attract the attention of policy makers in the fight against hunger. GHI is disseminated annually since 2006. It was initially published by International Food Policy Research Institute (IFPRI) and Welt Hunger Hilfe. In 2007, the Irish NGO Concern Worldwide also became a co-publisher. Presently it is released by Concern Worldwide and Welt Hunger Hilfe<sup>1-3</sup>. Based on GHI, the rank of India for last five years is as follows:

Table 1: India's Rank in GHI for Last 5 Years

Year	Rank Of India in GHI
2017	100 Out of 119 countries
2018	103 Out Of 119 countries
2019	102 Out Of 117 countries
2020	94 Out Of 107 countries
2021	101 Out Of 116 countries

Further, India is placed in the category of 'serious hunger'. Astonishingly, India is ranked below its neighboring countries namely Pakistan, Bangladesh and Nepal. Some of the South East Asian Countries such as Cambodia and PDR Lao and many African countries namely Malawi, Kenya, Mali and Rwanda are ranked

higher than India. This is counter intuitive to the fact that India ranks 5<sup>th</sup> in the World Economy and 4<sup>th</sup> among top 10 Agricultural producing countries in the world. Therefore, it is hard to accept this poor ranking of India on a sensitive issue as hunger.

Indian Council of Medical Research (ICMR) constituted an Expert Committee to deliberate on this issue<sup>4</sup>. This paper highlights the inappropriate choice of indicators and methodological flaws in the measurement of hunger.

## 2. Definitions of Hunger

As per Oxford dictionary, Hunger is the state of not having enough food to eat. FAO defines hunger as "... an uncomfortable or painful physical sensation caused by insufficient consumption of dietary energy. The World Food Program (WFP) treats hunger as not having enough to eat to meet energy requirements. In common parlance, hunger is perceived as people eating inadequately due to poor access to food including lack of purchasing power.

## 3. Methodology of Measurement – Global Hunger Index

### 3.1 Choice of Indicators

The GHI is based on the 4 indicators (Table 2).

### 3.2 Standardization of Score

It is observed that the first 3 indicators namely PUN, CWA and CST are measured in percentages whereas CM is expressed per thousand. In view of this, each of the four component indicators is given a standardized score (100

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In the year 2022, Dr. Padam Singh has been conferred upon with Prof. P. V. Sukhatme National Award for life time contribution in the field of statistics, 2022. He has been closely involved in large scale surveys such as National Family Health Survey (NFHS), Annual Health Survey (AHS) and District Level Health Survey (DLHS) and in evaluation of various national programmes/schemes. He has contributed in issues related to statistical methodologies having bearing on National perspective. Importantly, Technical Expert Committee of ICMR under his Chairmanship examined the appropriateness of indicators used in Global Hunger Index (GHI) in measuring hunger. He also chaired the MoHFW Committee for estimation of the annual deaths due to Malaria. Dr. Singh in a WHO funded Pan India study on Primitive Tribes, experimented with a model of community volunteers to act as a link between community and health service providers to effectively improve utilisation of health services. The project led to the evolution of Accredited Social Health Activist (ASHA) under National Rural Health Mission (NRHM).

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point scale) by dividing with the highest observed levels in last two decades and then multiplying by 100. The highest observed levels used in standardizing the score are 80 for PUN, 30 for CWA, 70 for CST and 350 for CM. Based on these, standardized component indicators are calculated as indicated in the Table 3.

**3.3 Weights**

While calculating GHI, the standardized scores of PUN and CM are given weight as one-third each whereas the CWA and CST are given weight of one-sixth each.

Mathematically,

$$GHI = (Standardized PUN + Standardized CM) / 3 + (Standardized CWA + Standardized CST) / 6$$

Based on this, the GHI for India works out as 30.3 as under:

$$GHI = (18.1 + 11.1) / 3 + (69.3 + 54.1) / 6$$

$$GHI = 29.2 / 3 + 133.4 / 6$$

$$GHI = 9.7 + 20.6 = 30.3$$

**3.4 GHI Severity Grading**

This three-step process results in GHI scores on a 100-point scale, where 0 is the best score (no hunger) and 100 is the worst.

Table 2: Indicators and their Description

Indicator	Description of Indicator	Measurements	Source of Data	Value for India - Year 2019
PUN	Proportion of undernourished population	Percent of the population that has an energy intake less than the FAO Minimum Dietary Energy Requirement (MDER) of 1800 calories/capita/day	2016–2018, FAO	14.5%
CWA	Prevalence of wasting in children under five years old, who have low weight for their height	Percentage of children aged 0 -59 months, whose weight for height is below minus two standard deviations (-2SD) from the median of the WHO Child Growth Standards	UNICEF/WHO / World Bank 2019 (National Family Health Survey (NFHS-4), 2015-16: India. Mumbai: IIPS. 2017 (and additional analysis)	20.8%
CST	Prevalence of stunting in children under five years old who have low height for their age	Percentage of children, aged 0 -59 months, whose height for age is below -2SD from the median of the WHO Child Growth Standards		37.9%
CM	Mortality rate of children under five years, partly reflecting the fatal mix of inadequate nutrition and unhealthy environments	Proportion of child deaths between birth and five years of age, generally expressed per 1000 live births	UN IGME 2018	39 per thousand

Table 3: Standardization of Indicators

Standardized Indicator	Formula	Computed Value for India - Year 2019
Standardized PUN	$\frac{PUN \times 100}{80}$	$\frac{14.5 \times 100}{80} = 18.1$
Standardized CWA	$\frac{CWA \times 100}{30}$	$\frac{20.8 \times 100}{30} = 69.3$
Standardized CST	$\frac{CST \times 100}{70}$	$\frac{37.9 \times 100}{70} = 54.1$
Standardized CM	$\frac{CM \times 100}{350}$	$\frac{39 \times 100}{350} = 11.1$

A GHI Severity Scale has been developed for categorizing the countries based on the range of GHI scores indicating the corresponding Severity of Hunger – from low to extremely alarming.

Table 4: GHI Severity Scale

Severity Level	GHI Range
Low	<10
Moderate	10-19.9
Serious	20-34.9
Alarming	35-49.9
Extremely Alarming	>50

India is placed in the 'serious category' under the above categorization.

### 3.5 Source of Data

The data for India and neighboring countries used for GHI 2019 are given in Table 5.

It is observed that the level of under nourishment for Nepal is surprisingly about half of that of India which is unbelievable. Further, the data for last five years showed sudden drops or hikes which could be due to change in methodology of data collection during those years in different countries.

Importantly, the source of data used in Global Hunger Index is outdated.

For example,

- The latest data on under nourishment relates to National Sample Survey Organization (NSSO) for 2012. Further, there is no authentic data on dietary intake since the last National Nutrition Monitoring Bureau (NNMB) diet survey was conducted during 2012<sup>5,6</sup>.
- The data on stunting, wasting and child mortality relates to National Family Health Surveys (NFHS) - 4 (2015 – 16)<sup>7</sup>.

- The data from NSSO and NFHS are not available annually.
- The limitations of Food and Agriculture Organisation (FAO)<sup>8</sup>, Gallup survey data used in Global Hunger Index 2021 for undernourished population, has apparent methodological limitations that need to be recognised.

Therefore these data lack credibility and use of such data for computation of Index and ranking of country raises serious concerns.

### 3.6 Methodological Issues

Following are methodological issues in the computation of GHI:

- While calculating the standardized score for each of the 4 indicators, the indicator values are divided by the respective thresholds which are the highest observed levels for the indicator on a global scale in the last two decades i. e., for 1980s. The threshold values taken are very much on higher side PUN (80%), CWA (30%), CST (70%) and CM (350 per 1,000). There seems to be no rational for picking these threshold values. These threshold values should be based on highest observed in last 5 years and not for last two decades.
- The standardized scores of PUN and CM are given weight as one-third each whereas the CWA and CST are given weight of one-sixth each. There is no rational for assigning these weights and could have been estimated using established statistical principles. In fact, the implicit weight is affected by the threshold values also.
- Categorization of countries as Low (< 10.0), Moderate (10.0 – 19.9), Serious (20.0 – 34.9), Alarming (35.0 – 49.9) and extremely Alarming (> 50.0) hunger levels according to GHI severity grading is arbitrary. Here again, no rational is indicated.

Thus, there is no scientific backup for threshold values, weights and severity grading. The computation of GHI and

Table 5: Indicators of GHI for South-Asian Countries – 2019

Indicator	India	Nepal	Pakistan	Bangladesh	Sri Lanka
Proportion of Undernourishment in Population (%) (PUN)	14.5	8.7	20.3	14.7	9.0
Prevalence of Wasting in Children under five years (%) (CWA)	20.8	9.6	7.1	14.4	15.1
Prevalence of Stunting in Children under five years (%) (CST)	37.9	36.0	37.6	36.2	17.3
Under-Five Mortality Rate (%) (CM)	3.9	3.4	7.5	3.2	0.9

Ranking as well as Categorization of Countries on GHI severity is sensitive to all these assumptions.

In view of these, the computation of GHI to measure hunger using these child related indicators is flawed.

**4. Appropriateness of Indicators in Measuring Hunger**

The ICMR Expert Committee on Global Hunger Index examined whether the indicators used in the GHI namely undernourished, stunting, wasting and child mortality actually measure hunger<sup>4</sup>. If these indicators are manifestations/ consequences of hunger, then among those who are relatively rich having sufficient purchasing power and with no problem of access to food, the proportion of these conditions should be negligible.

In this context, the top 40 percent of population according to wealth quintiles could be considered as relatively rich who will have sufficient purchasing power and access to food to meet their nutrition requirements.

Following table presents the values of GHI indicators for top 40 percent of population i.e. top two wealth quintiles:

Table 6: Indicators for top two wealth Quintiles

S. No.	Indicator	Value
1	Percentage of undernourishment (NSSO: 2012) <sup>5</sup>	11.25
2	Percentage of stunted children (NFHS - 4: 2015-16) <sup>7</sup>	25.7
3	Percentage of wasted children (NFHS - 4: 2015-16) <sup>7</sup>	18.6
4	Under-five mortality per 1000 live births (NFHS- 4: 2015-16) <sup>7</sup>	26.8

Evidently, among those who are rich (top 40%) a highly significant proportion are observed having the conditions assumed to be manifested by hunger. As the indicators of undernourishment, stunting, wasting and child mortality are seen among relatively rich as well, these manifestations cannot be assumed as the consequences of hunger alone. Therefore, the indicators of undernourishment, stunting, wasting and child mortality are not appropriate for Hunger Index.

**5. Is everybody consuming less than 1800kCal/capita/day (MDER) hungry?**

As per FAO, those consuming less than MDER (minimum dietary energy requirement) of 1800 kCal/capita/day are categorised as Under-nourished<sup>8</sup>. As per the study by National Nutrition Monitoring Bureau (NNMB) of National Institute of Nutrition(NIN),Hyderabad, the proportion of overweight, obesity, Hypertension and Diabetes among those consuming less than 1800 calories/capita/day are presented in Table 7<sup>6</sup>.

A significantly sizable proportion of symptoms of over nutrition among those consuming less than 1800 calorie indicate that all of them are not undernourished or hungry.

It could be that those who are overweight/obese, diabetic and hypertensive might be consuming less by choice under doctor's advice.

Thus in measuring undernourishment out of those consuming less than 1800 calorie, one has to discount for those who consume less by choice under doctor's advice.

Further a significant proportion of population in particular, adolescents presently consume packaged food, fast food, soft drinks etc. Probably these are not properly captured in NSSO and NNMB surveys<sup>5,6</sup>. If these issues are addressed the proportions of populations consuming less than MDER of 1800 calories due to lack of purchasing power will be less than 10% and even be half of the estimated level.

Table 7: Proportion of overweight, obesity, Hypertension and Diabetes among those consuming < 1800 calories per capita per day -NNMB Survey 2012

	Urban		Rural	
	Male	Female	Male	Female
<b>Overweight (25.0 -29.9)</b>	28.1	30.4	8.3	11.2
<b>Obese (≥30.0)</b>	5.7	15.9	0.9	2.5
<b>Hypertension</b>	33.1	22.5	22.2	20.3
<b>Diabetes</b>	14.1	10.5	7.3	6.0

**6. Child Related Indicators**

Global Hunger Index considers stunting, wasting and child mortality as its constituents and these together are assigned a weight of two-third in the Index.

The inclusion of these indicators in GHI has implicit assumption that those who are hungry are likely to be short-statured, lighter as well as will have high child mortality. This can be contested.

As to the stunting among children, the difference in height between individuals is influenced more by genetic, biological and environmental factors rather than nutrition alone.

The issue of thinness/wasting among children has been examined in a recent study from Delhi among school children aged 5 to 18 years, wherein it is observed that 11% boys and 7.9% girls with any cardio-metabolic abnormalities were 'thin'<sup>9-11</sup>.

Hunger as the major cause of child mortality is not supported by the cause of death statistics.

According to United Nations Children's Fund (UNICEF) and Million Death Study, the major causes of child deaths are preterm birth, sepsis, birth asphyxia/intra partum related complications, congenital malformations, pneumonia and diarrhoea<sup>8,12</sup>.

Though hunger might contribute to some extent to stunting, wasting and child mortality, there is no evidence

to support that hunger alone contributes to these manifestations. The index intended to assess the hunger status for entire population is giving undue excessive weightage to under five children.

### 7. Norm of Stunting, Wasting and MDER for Indians

As per study on Indian affluent population, Indians are shorter (stunted) and lighter (wasted) as compared to their European counterparts.

Stunting is estimated as the percentage below minus two standard deviations (SD) from the median of the World Health Organization (WHO) Multicentre Growth Reference Standards (MGRS)<sup>13</sup>. This estimation is very sensitive to the norm of standard deviations (SD). Importantly, based on NFHS data, the SD values for Indian Population are about 40% higher than that of WHO norm<sup>5,10</sup>. If India specific standard deviation values are used, the estimate of stunting for India will be much lower than that is used basing WHO norm. Similar comments could be made about measurement of Wasting.

The Minimum Dietary Energy Requirement (MDER) value of 1800 KCal is high in Indian context. Indians tend to have a lower Basal Metabolic Rate (BMR) and Physical Activity Level (PAL). The corrected MDER value for Indians is suggested to be around 1505 and application of this will bring down the estimate of undernourished population.

In general, the use of global norms results in gross over estimation of the levels of Undernourished, Stunting and Wasting. It is suggested that the norms for all such indicators should be country specific.

### 8. Conclusions and Way Forward

Global Hunger Index (GHI) reminds us of the phrase “Lies, Damned Lies & Statistics”.

Referring GHI as Hunger Index is misnomer, as the indicators of undernourishment, stunting, wasting and child mortality do not measure hunger per se.

Government of India should not accept this ill-conceived, misleading and distorted measure of hunger for Ranking of countries.

India should evolve its own measure based on consensus and its suitability for country's own context.

As per the definition of hunger, we have to use a measure which captures “People eating inadequately due to poor access to food and lack of purchasing power.”

In addition to collecting quantitative information on dietary intake some qualitative information may also be captured using a few questions from FAO-Food Insecurity Experience Scale (FIES) and Food Access Survey Tools (FAST).

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