



## Global Hunger Index (GHI) Reminds the Phrase “Lies, Damned Lies and Statistics”

**Padam Singh**

*Medanta Institute of Education and Research, Medanta – The Medicity, Gurugram – Haryana*

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### Abstract

Poor ranking of India under Global Hunger Index (GHI) has raised concerns as it is contrary to the fact that India ranks fifth in the World Economy and fourth among leading agriculture producing countries. Researchers, planners, policy makers and government has taken a serious view of this. The indicators used under GHI do not measure hunger *per-se*, and, therefore, refereeing GHI as measure of Hunger is a misnomer. Zero Hunger being the priority goal under the Sustainable Development Goals (SDGs), it is imperative to develop a robust and country specific acceptable measure of hunger to track the progress. This is a big challenge for statisticians and other subject specialists.

*Key Words:* Child mortality; Hunger; Stunting; Over nutrition; Under nutrition; Wasting.

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### 0. Prologue – Life and work of Late M.N. Das

*I was honoured to have delivered Dr. M. N. Das Memorial Lecture on his Birth Centenary during the conference of Society of Statistics, Computer and Applications (SSCA) on 15<sup>th</sup> February 2023 at Department of Statistics, University of Jammu, J&K. I was student of Dr. Das during my M.Sc. in Agricultural Statistics at the Institute of Agricultural Research Statistics (IARS) 1966–68. I was fascinated by his simple way of teaching the construction of confounded factorial designs in the course Design of Experiment-I. In spite of taking sampling theory as specialized subject during my M.Sc., I opted for Design of Experiments-II taught by Dr. Das wherein I learned Balanced Incomplete Block Design and Partially Balanced Incomplete Blocked Designs which helped me in developing some  $\pi$ PS sampling through these designs.*

*I owe my entire career to Dr. M. N. Das. When I joined the Institute as a Statistical Investigator in 1970, I was posted in the computer division, but he transferred me to the training division which provided me the opportunity of teaching the students of various courses. This helped me in developing skills for becoming an effective teacher. Also my first promotion from Statistical Investigator to Junior Statistician in 1972 was made by him during his tenure as Director, IARS.*

*Dr. Das was blessed with the power of intuition. Many of his path breaking contributions, especially in designs for factorial experiments, augmented designs, designs for fitting response surfaces, and statistical computing by writing his own software programs, had*

*a strong intuitive appeal rather than complex algebraic manipulations. Taking lead from such a researcher, I too developed several newer sampling designs merely through the power of intuition.*

## 1. Background

Global Hunger Index (GHI) is being 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.

Table 1 presents the ranking of India for the last 6 years:

**Table 1: India's rank in GHI for last 6 years**

Year	Rank Of India in GHI	Position from Bottom
2017	100 Out of 119 countries	20 <sup>th</sup>
2018	103 Out Of 119 countries	17 <sup>th</sup>
2019	102 Out Of 117 countries	16 <sup>th</sup>
2020	94 Out Of 107 countries	14 <sup>th</sup>
2021	101 Out Of 116 countries	16 <sup>th</sup>
2022	107 Out Of 121 countries	15 <sup>th</sup>

Table 2 below presents relative ranking of India vis-à-vis neighbouring countries:

**Table 2: Rank of India and neighboring countries in GHI**

Sr .No.	Country	Rank 2021	Rank 2022
1	India	101	107
2	Pakistan	92	99
3	Bangladesh	76	84
4	Nepal	76	81
5	Sri Lanka	65	64

Surprisingly, India ranks below Sri Lanka, Pakistan, Bangladesh and Nepal.

This ranking is contrary to the fact that India ranks 5<sup>th</sup> in the World Economy and 4<sup>th</sup> among top Agricultural producing countries in the world.

The poor ranking of India has been a matter of concern. Planners, policy makers and noted columnists have argued that GHI is a misleading Hunger Index and that this faulty measure is creating a flawed narrative against India.

Among prominent researchers Messet (2011) pointed out that GHI has a problem of multiple counts, Hirotsugu (2015) observed that hunger measurement is complex methodological challenge which should not be crudely addressed by such an oversimplified concept and definitions as in GHI and Nigam (2016, 2018, 2019) argued that GHI has high upward bias because while hunger leads to stated syndromes but hunger alone is not the only reason for these.

In view of these issues, in 2019, the Indian Council of Medical Research (ICMR), Department of Health Research of the Ministry of Health and Family Welfare, Government of India, constituted an Expert Committee to critically review the Global Hunger Index.

Based on the report of the committee, a white paper entitled “Global Hunger Index does not really measure hunger – An Indian Perspective”, has been published in Indian Journal of Medical Research (IJMR).

During a meeting on the Global Hunger Index (GHI) held under the Chairpersonship of Dr. Rajiv Kumar, Honourable Vice Chairman, NITI Aayog on 12th November, 2021, it was clearly brought out that Global Hunger Index in its present form is a “misnomer” and does not measure “hunger” correctly due to the choice of indicators and its methodological issues.

This paper presents an overview and critical appraisal of indicators and data used in measuring hunger under GHI.

## 2. Definition 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.

Following couplet (Doha) from Kabir Das, a Hindi poet is very relevant in the context

साई इतना दीजिए, जामे कुटुंब समाए मैं भी भूखा न रहूं, साधु न भूखा जाए।  
कबीर दस जी कहते हैं कि परमात्मा तुम मुझे इतना दो कि जिसमें बस मेरा गुजरा चल जाए, मैं खुद भी अपना पेट पाल सकूं और आने वाले मेहमानों को भी भोजन करा सकूं।

## 3. Indicators used in GHI

The four indicators used in GHI are as under:

- i. PUN: Proportion of the population with insufficient calories intake *i.e.*, Percentage of population consuming less than Minimum Dietary Energy Requirement of 1800 Kcal/Capita per day Cal (%).
- ii. CST: Prevalence of stunting in children under five years old (low height for age) (%).

Children whose height-for-age (Z-score) is below minus two standard deviations from the median of the reference population are considered short for their age (stunted), or chronically undernourished.

- iii. CWA: Prevalence of wasting in children under five years old (low weight for height) (%).

Children whose weight-for-height (Z-score) is below minus two standard deviations from the median of the reference population are considered thin (wasted), or acutely undernourished.

- iv. CM: Proportion of children dying before attaining the age of five years (%).

#### 4. Appropriateness of indicators in measuring hunger

The appropriateness of indicators in measuring hunger is discussed in what follows:

##### 4.1. 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 “Undernourished”. If this is so there should not be any symptoms of “Over nutrition” among those consuming less than MDER. In order to examine this, the results of National Nutrition Monitoring Bureau (NNMB) survey on prevalence of overweight, obesity, hypertension and diabetes among those consuming less than 1800 calories/capita/day are presented in Table 3.

Evidently, a significantly sizable proportion of symptoms of over nutrition indicators suggest that all those consuming less than 1800 calorie are not undernourished or hungry. In fact Those who are obese, diabetic and hypertensive might be consuming less than 1800 calories by choice under doctor’s or nutritionist’s advice.

**Table 3: Prevalence of symptoms of over nutrition among those consuming less than 1800 Kcal per day**

Particulars		Urban 2016		Rural 2012	
		Male (%)	Female (%)	Male (%)	Female (%)
SBP $\geq$ 140 and/or DBP $\geq$ 90	Hypertension	33.1	22.5	22.2	20.3
Blood Sugar (mg/dl)	Pre diabetic (110-126)	10	10.4	8.7	8.8
	Diabetic ( $\geq$ 126)	14.1	10.5	7.3	6
BMI WHO Classification	Overweight(25-29.9)	28.1	30.4	8.3	11.2
	Obese ( $\geq$ 30)	5.7	15.9	0.9	2.5
BMI Asian Classification	Overweight (23-27.49)	36.1	33.3	15.2	16.8
	Obese ( $\geq$ 27.5)	16.6	28.5	3.1	6.2

The latest information on symptoms of over nutrition as per NFHS 5 are given in Table 4.

**Table 4: Symptom of over nutrition - NFHS 5**

Symptoms	Men			Women		
	Rural	Urban	Total	Rural	Urban	Total
<b>Overweight or Obese</b>	19.3	29.8	22.9	19.7	33.2	24
<b>Diabetic</b>	14.5	17.9	15.6	12.3	16.3	13.5
<b>Hypertension</b>	22.7	26.6	24	20.2	23.6	21.3

Thus, a little less than one-fourth are overweight or obese. An equal proportion are hypertensive. Another 15% are diabetics. A large proportion among these might be consuming less calories by choice under doctors' advice.

Thus in measuring hungry out of all consuming less than 1800 calorie those who consume less by choice under doctor's advice should be discounted.

Further a significant proportion of adolescents and working population presently consume packaged food, fast food, soft drinks *etc.* Probably these are not properly captured in NSSO and NNMB surveys.

Further, the MDER of 1800 calories per capita per day seems to be on higher for India. If these issues are addressed the proportions of populations consuming less than MDER due to lack of purchasing power might be less than even one-fourth of the current estimated level.

#### 4.2. Are stunting and wasting manifestation of hunger?

Global Hunger Index (GHI) considers stunting and wasting as its constituents. The inclusion of these indicators in GHI has implicit assumption that those who are hungry are likely to be short-statured and lighter. If stunting and wasting are manifestation of hunger, then there should not be stunted and wasted children among relatively rich who do not have problem of purchasing power.

Table 5 presents status of stunting and wasting for top quintiles based on latest NFHS 5.

**Table 5: Stunting and wasting among children according to wealth quintiles**

Wealth Quintile	Stunting	Wasting
<b>Fourth (top 61/% – 80%)</b>	28.1	17.7
<b>Highest (top 81/% – 100%)</b>	22.9	16.2

It is seen that significant proportion among top two quintiles have stunted and wasted children. Therefore, hunger is not the cause of stunting and wasting. Further the difference in height and weight between individuals are influenced by parental, genetic/biological factors and environmental factors rather than nutrition alone. Thus, stunting and wasting are not the manifestations of hunger.

#### 4.3. Does hunger contribute to child mortality?

The million death study in India, covered 1176.6 thousand deaths during 2010 – 2015. Of these 57.0% deaths were neonatal and 43.0% as post neonatal. Based on this study, the details on major causes of death are summarized in Table 6.

**Table 6: Leading cause of under five deaths**

Cause	Number of Death	Percent (%)
<b>Prematurity or low birth weight</b>	370	31.4%
<b>Pneumonia</b>	108	9.2%
<b>Neonatal infections</b>	103	8.8%
<b>Diarrhoea</b>	82	7.0%
<b>Injuries</b>	82	7.0%
<b>Birth asphyxia or trauma</b>	57	4.8%

According to this, in India, pre-term birth resulted in 31.4% deaths. Other causes of under five deaths were pneumonia 9.2%; neonatal infections 8.8%; Diarrhoea 7.0%; injuries 7.0% and Birth asphyxia or trauma 4.8%. Thus hunger as the major cause of child mortality is not supported by the cause of death statistics. Importantly, no family will risk the child to die because of hunger.

#### 5. Quality of data used

It is important to discuss the quality of data used in computation of GHI. In view of this, data used for calculation of GHI for India and other neighbouring countries are discussed as under:

**Indicator 1: Proportion of undernourishment in population (%)**

Year	India	Nepal	Pakistan	Bangladesh	Sri Lanka
<b>2015</b>	15.2	7.8	22	16.4	22
<b>2016</b>	15.2	7.8	22	16.4	22
<b>2017</b>	14.5	8.1	19.9	15.1	22.1
<b>2018</b>	14.8	9.5	20.5	15.2	10.9
<b>2019</b>	14.5	8.7	20.3	14.7	9

From this data (Indicator 1), it is seen that the level of under nourishment for Nepal is surprisingly about half of that of India, which is unbelievable. Further, for Sri Lanka, it shows a sudden drop of more than 10 percentage points in a year (2017-2018), whereas for other countries, the levels are almost stagnant.

#### **Indicator 2: Prevalence of stunting in children under five years (%)**

<b>Year</b>	<b>India</b>	<b>Nepal</b>	<b>Pakistan</b>	<b>Bangladesh</b>	<b>Sri Lanka</b>
<b>2015</b>	38.8	37.4	45.0	36.1	14.7
<b>2016</b>	38.7	37.4	45.0	36.4	14.7
<b>2017</b>	38.4	37.4	45.0	36.1	14.7
<b>2018</b>	38.4	35.8	45.0	36.1	17.3
<b>2019</b>	37.9	36.0	37.6	36.2	17.3

For stunting (Indicator 2), the values for India, Bangladesh, and Nepal are stagnant but there is a drop of 7 percentage points for Pakistan in a year (2018 vs 2019). On the other hand, there is an increase of 2.6% points for Sri Lanka in a year (2017 – 2018).

For wasting (Indicator 3) there is an increase of 6 percentage points for India (2016 vs 2017) and decrease of similar magnitude for Sri Lanka (2017 vs 2018) in a year. Further there is decline of 3.4% points for Pakistan (2018 vs 2019) and 2.0% points for Nepal (2017 vs 2018).

#### **Indicator 3: Prevalence of wasting in children under five years (%)**

<b>Year</b>	<b>India</b>	<b>Nepal</b>	<b>Pakistan</b>	<b>Bangladesh</b>	<b>Sri Lanka</b>
<b>2015</b>	15.0	11.3	10.5	14.3	21.4
<b>2016</b>	15.1	11.3	10.5	14.3	21.4
<b>2017</b>	21.0	11.3	10.5	14.3	21.4
<b>2018</b>	21.0	9.7	10.5	14.3	15.1
<b>2019</b>	20.8	9.6	7.1	14.4	15.1

#### **Indicator 4: Under-five mortality rate (%)**

<b>Year</b>	<b>India</b>	<b>Nepal</b>	<b>Pakistan</b>	<b>Bangladesh</b>	<b>Sri Lanka</b>
<b>2015</b>	<b>5.3</b>	<b>4.0</b>	<b>8.6</b>	<b>4.1</b>	<b>1.0</b>
<b>2016</b>	<b>4.8</b>	<b>3.6</b>	<b>8.1</b>	<b>3.8</b>	<b>1.0</b>
<b>2017</b>	<b>4.8</b>	<b>3.6</b>	<b>8.1</b>	<b>3.8</b>	<b>1.0</b>
<b>2018</b>	<b>4.3</b>	<b>3.5</b>	<b>7.9</b>	<b>3.4</b>	<b>0.9</b>
<b>2019</b>	<b>3.9</b>	<b>3.4</b>	<b>7.5</b>	<b>3.2</b>	<b>0.9</b>

Though the level of under 5 mortality (Indicator 4) showed large variations across countries, there is a steady decline in under 5 mortality across all countries.

The change in indicators of these magnitude in a year is not acceptable. All these variations in data could be due to change in methodology of data collection during those years in different countries.

The data for India on under nourishment is available only for 2012 and that for stunting wasting and child mortality for 2015. It is understood that for subsequent years data were collected using Gallup Surveys. Therefore these data lack credibility. Use of such data for computation of Index and ranking of country raises serious concerns.

## **6. Conclusions and way forward**

The index intended to assess the hunger status for entire population is giving undue excessive weightage to under five children. Moreover, the indicators of undernourishment, stunting, wasting and child mortality do not measure hunger per se and thus, referring GHI as Hunger Index is misnomer. Importantly, the data used on these indicators lack credibility.

In view of this, Global Hunger Index (GHI) reminds us of the phrase “Lies, Damned Lies and Statistics”.

This ill-conceived measure of hunger for ranking of countries should not be accepted.

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.”

The only indicator relevant in the context is the population consuming less than the minimum dietary energy requirement (MDER). In this regard the MDER of 1800 calories per capita per day needs to be revisited for India. In the surveys capturing this information through “household consumption expenditure” or “dietary surveys” in addition to collecting information on dietary intake should also collect the information on obesity, overweight, hypertension and diabetes. This information is needed to discount for those consuming less due to choice and ultimately net out those consuming less than MDER due to lack of purchasing power.

The measurement of hunger being a complex methodological issue, there is a need to develop a robust and acceptable country specific measure of hunger. It is a challenge for all concerned.

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