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INDIA STATE HUNGER INDEX

# Comparisons of Hunger Across States

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## ADVANCE COPY FOR DISCUSSION

### ***The India State Hunger Index: Comparisons Of Hunger Across States***

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Anil Deolalikar  
Anjor Bhaskar**

**October 14, 2008**

This advance copy version is intended for discussion and feedback. The report will be revised in response to feedback received from workshop participants at the release of the Global Hunger Index 2008 and the India State Hunger Index 2008 on October 14, 2008.

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## KEY FINDINGS

- India's GHI 2008 score is 23.7, which ranks it 66<sup>th</sup> out of 88 countries. This indicates continued poor performance at reducing hunger in India.
- The India State Hunger Index (ISHI) 2008 was constructed in a similar fashion as the GHI 2008 to enable comparisons of states within India, and to compare Indian states to GHI 2008 scores and ranks for other countries.
- The ISHI 2008 score was estimated for 17 major states in India, covering more than 95 percent of the population of India.
- ISHI 2008 scores for Indian states range from 13.6 for Punjab to 30.9 for Madhya Pradesh, indicating substantial variability among states in India. Punjab is ranked 34<sup>th</sup> when compared to the GHI 2008 country rankings, while Madhya Pradesh is ranked 82<sup>nd</sup>.
- All 17 states have ISHI scores that are well above the "low" and "moderate" hunger categories. Twelve of the 17 states fall into the "alarming" category, and one -- Madhya Pradesh -- into the "extremely alarming" category.
- ISHI scores are closely aligned with poverty, but there is little association with state level economic growth. High levels of hunger are seen even in states that are performing well from an economic perspective.
- Inclusive economic growth and targeted strategies to ensure food sufficiency, reduce child mortality and improve child nutrition are urgent priorities for all states in India.



## INTRODUCTION

Food and good nutrition are basic human needs, the recognition of which is enshrined in the first Millennium Development Goal (MDG), the eradication of extreme poverty and hunger. However, developing sound ways to monitor progress towards the eradication of hunger is vital to sustain the salience of hunger in global and national policy discussions. The Global Hunger Index (GHI) is one approach to measuring and tracking progress on hunger and enabling widespread discussion about the reasons for, and the consequences of hunger. The GHI was developed by the International Food Policy Research Institute (IFPRI) in 2006 (Wiesmann *et al.* 2006) as a means of capturing three interlinked dimensions of hunger – inadequate consumption, child malnutrition, and child mortality.

Although hunger is most directly manifested in inadequate food intake, over time inadequate food intake and lack of a proper diet, especially in combination with low birth weights and high rates of infections, can result in stunted and underweight children. The most extreme manifestation of continued hunger and malnutrition is mortality. The Global Hunger Index recognizes the interconnectedness of these dimensions, and therefore, captures performance on all three of them in how it is constructed. The index has been an effective advocacy tool which has brought the issue of global and national hunger to the fore in policy debates, especially in developing countries. The ranking of nations on the basis of their index scores has been a powerful tool to help focus attention on hunger, especially for countries like India which under-perform on hunger and malnutrition relative to their income levels.

India has consistently ranked poorly on the Global Hunger Index. The Global Hunger Index 2008 (von Grebmer *et al.* 2008) reveals India's continued lackluster performance at eradicating hunger; India ranks 66<sup>th</sup> out of the 88 developing countries and countries in transition for which the index has been calculated. It ranks slightly above Bangladesh and below all other South Asian nations.<sup>1</sup> It even ranks below several countries in Sub-Saharan Africa, such as Kenya, Nigeria, Cameroon, and even Congo and Sudan. This is in spite of the fact that the level of per capita income in these sub-Saharan African countries is much lower than that in India. **Table 1** below shows how these countries have much lower hunger index scores their lower per capita income levels.

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<sup>1</sup> India's slightly better performance relative to Bangladesh is entirely due to better access to food in India relative to Bangladesh, which in turn is a consequence of India's higher agricultural productivity. On the other two components of the GHI – child underweight and child mortality, India ranks below Bangladesh. Indeed, India's child underweight rates are among the highest in the world.

**Table 1. GDP per capita in relation to scores on the Global Hunger Index 2008**

Country	GHI 2008	GDP per Capita*
Nigeria	18.4	1977
Cameroon	18.7	2124
Kenya	19.9	1535
Sudan	20.5	2088
<b>India</b>	<b>23.7</b>	<b>2753</b>

\* Gross Domestic Product (GDP) dollar estimates at Purchasing Power Parity (PPP) per capita

Source: World Development Indicators, 2007 (World Bank)

### **A state level hunger index for India**

With over 200 million people who are food insecure, India is home to the largest number of hungry people in the world. While there has been attention to hunger and undernutrition at the central level, within India's political system, states are important political units with regard to the planning and execution of development programs. Thus, unpacking the hunger index at the level of the state is an important tool to build awareness of the levels and disparities in hunger among states. In addition, the variability in the relative contribution of the underlying components of the hunger index across the different Indian states can help inform the discussion about the drivers of hunger in different state contexts.

The availability of national household surveys in India that capture the three underlying dimensions of the Global Hunger Index at the state level enables us to develop a state hunger index for India. The state hunger index is calculated using a procedure that is similar to that used for calculating the GHI scores of countries. This permits comparison of Indian states to other countries in terms of their performance on hunger and malnutrition.

***The overall objective of the development of an India State Hunger Index is to focus attention to the problem of hunger and malnutrition at the state and central levels in India through the development of an index that enables comparisons within India, and globally.***

### **DATA AND METHODS**

The India State Hunger Index is based on the same underlying variables as the Global Hunger Index. These are:

- The proportion of population that does not consume an adequate level of calories
- The proportion of underweight children under five years of age; and,
- The mortality rate among children under five years of age, expressed as the percentage of children born alive who die before they reach the age of five.

We use two data sources for the estimation of the India State Hunger Index. These are the third round of the National Family Health Survey (2005-2006) for India (referred to as the NFHS-III data)<sup>2</sup> and the 61<sup>st</sup> round of the National Sample Survey (NSS) data from 2004-2005<sup>3</sup>.

The India State Hunger Index is calculated and presented for 17 major states in the country. These states cover 95 percent of the country's population, according to the 2001 census in India. While the NFHS-III has a large enough sample size to yield representative estimates of the child underweight and mortality rates even for the smaller states and union territories in the country, the sample size of the NSS 61<sup>st</sup> round is insufficient for estimating undernourishment rates in these places. Therefore, we restricted our sample to those states for which the NSS yields precise state-level estimates.

*Population undernourished based on calorie consumption:* The proportion of the population undernourished based on calorie consumption was estimated using unit-level food consumption data from the 61<sup>st</sup> round of the National Sample Survey, conducted in 2004-05. The NSS obtained household consumption data on more than 225 individual foods; these were converted to calories using food-to-calorie conversion factors reported by NSSO (2007). Allowances for calories from meals eaten outside the home were made using the procedures suggested and followed by NSSO (2007).

The GHI 2008 (von Grebmer *et. al*, 2008) reports the calorie-based undernutrition for India to be 20%, based on the FAO-recommended daily calorie norm of 1,820 kcals per person.<sup>4</sup> The FAO estimate of calorie undernutrition is based on data on food *availability*, collected from national food balance sheets. As such, it is likely to differ from calorie undernutrition estimates that are

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<sup>2</sup> The National Family Health Survey III is the third one in a series of such surveys. It was conducted by the International Institute for Population Sciences (IIPS, Mumbai which acted as the nodal agency. The survey collected data on 51,555 children under 5 years of age. Technical support was provided by Macro International while USAID provided financial assistance for the study.

<sup>3</sup> The National Sample Survey Organisation conducts surveys on various socio-economic issues annually. The 61<sup>st</sup> round of the National Sample Survey(NSS) was conducted between July 2004 to June 2005. The Household Consumer Expenditure Survey was conducted on a large sample basis and was the seventh quinquennial survey on the subject. It covered a sample of 79,298 rural and 45,346 urban households in all the states and union territories of India.

<sup>4</sup> It should be noted that the calorie norms for *poverty* used within India differ significantly from the FAO-recommended norms for *undernourishment*. Dandekar and Rath (1971) used a norm of 2,250 calories per day per person to set a poverty line for India. A task force of the Indian Planning Commission subsequently revised these calorie norms to 2,400 in rural areas and 2,100 in urban areas (the difference being attributed to the lower rates of physical activity in the urban areas (GOI 1979). These are the calorie norms that underlie the official poverty line currently in use by the Government of India. To complicate matters further, the National Sample Survey Organisation (NSSO) uses a daily calorie norm of 2,700 calories per *consumer unit* (not per capita) (NSSO 2007).

based on consumption data obtained from household consumption expenditure surveys, such as the NSS (Smith and Weisman, 2007). In the case of India, the use of a calorie norm of 1,820 kcals per person per day yields a calorie undernutrition rate of 34%, which is substantially larger than the 20% reported by FAO and used in the estimation of the Global Hunger Index 2008. Since an important goal of this study was to ensure comparability of the India State Hunger Index with the Global Hunger Index, we use a calorie norm that yields a national calorie undernutrition rate of exactly 20%. This leads to a calorie norm of 1,632 kcals per person per day.

*Child underweight:* The proportion of underweight among children under five years of age was estimated at the state level using unit-level data from the NFHS-III data set (available at [www.measuredhs.com](http://www.measuredhs.com)). We used the WHO 2006 international growth reference and NFHS-recommended sample survey weights to estimate the proportion of children in each state whose weight for age was less than two standard deviations below the WHO reference.

*Child mortality:* We utilize the under-five mortality rates at the state level as reported in the NFHS-III report (Table 7.4, Chapter 7, pp. 187) (IIPS, 2007). The mortality rate is expressed as the percentage of live-born children who do not survive past age 59 months.

The **India State Hunger Index** is computed by averaging the three underlying components of the hunger index – viz., the proportion of underweight children, the under-five mortality rate (expressed as a percentage of live births), and the prevalence of calorie undernutrition in the population.

## RESULTS

### *Current status and ranking of states within India*

**Table 2** presents the India State Hunger Index (ISHI) as well as its underlying components for the 17 major states in the country.

**Table 2. Underlying components of India State Hunger Index and India State Hunger Index scores**

State	Prevalence of calorie undernourishment <sup>3</sup>	Proportion of underweight among children <5 years <sup>2</sup>	Under-five mortality rate, reported as deaths per hundred <sup>1</sup>	India State Hunger Index score	India Hunger Index Ranking
<b>India</b>	<b>20.0</b>	<b>42.5</b>	<b>7.4</b>	<b>23.31</b>	
Andhra Pradesh	19.6	32.7	6.3	19.54	<b>3</b>
Assam	14.6	36.4	8.5	19.85	<b>4</b>
Bihar	17.3	56.1	8.5	27.30	<b>15</b>
Chhattisgarh	23.3	47.6	9.0	26.65	<b>14</b>
Gujarat	23.3	44.7	6.1	24.69	<b>13</b>
Haryana	15.1	39.7	5.2	20.01	<b>5</b>
Jharkhand	19.6	57.1	9.3	28.67	<b>16</b>
Karnataka	28.1	37.6	5.5	23.74	<b>11</b>
Kerala	28.6	22.7	1.6	17.66	<b>2</b>
Madhya Pradesh	23.4	59.8	9.4	30.90	<b>17</b>
Maharashtra	27.0	36.7	4.7	22.81	<b>10</b>
Orissa	21.4	40.9	9.1	23.79	<b>12</b>
Punjab	11.1	24.6	5.2	13.64	<b>1</b>
Rajasthan	14.0	40.4	8.5	20.99	<b>7</b>
Tamil Nadu	29.1	30.0	3.5	20.88	<b>6</b>
Uttar Pradesh	14.5	42.3	9.6	22.17	<b>9</b>
West Bengal	18.5	38.5	5.9	21.00	<b>8</b>

1: Source: NFHS III National Report (2005-06 data, report published 2007)

2: Source: NFHS III Final Data Set (2005-06); authors' calculations

3: Source: NSSO 61st round (2004-05); authors' calculations

*Note: The India State Hunger Index represents the index calculated using a calorie undernourishment cut-off of 1632 kcals per person per day to enable comparability of the India State Hunger Index with the Global Hunger Index 2008.*

The severity of hunger is reported in **Table 3**, while the ranking of the 17 states by the India State Hunger Index is displayed below in **Figure 1**. The severity of hunger is based on the classification of countries by the severity of their hunger index by the Global Hunger Index 2008.

What is disconcerting to note in Table 3 is that not a single state in India falls in the ‘low hunger’ or ‘moderate hunger’ categories defined by the GHI 2008. Instead, most states fall in the ‘alarming’ category, with one state – Madhya Pradesh – falling in the ‘extremely alarming’ category. Four states – Punjab, Kerala, Haryana and Assam – fall in the ‘serious’ category. The map of the India State Hunger Index in **Figure 2** depicts this clearly, and shows that the bulk of Indian states for which the hunger index was estimated are in the “alarming” category.

**Table 3. Severity of Indian State Hunger Index, by State.**

<4.9 (low)		<5.0-9.9 (moderate)		10.0-19.9 (serious)		20.0-29.9 (alarming)		>30.0 (extremely alarming)	
State	ISHI	State	ISHI	State	ISHI	State	ISHI	State	ISHI
None		None		Punjab	13.6	Andhra Pradesh	20.0	Madhya Pradesh	30.9
				Kerala	17.7	Uttar Pradesh	20.9		
				Haryana	19.5	Tamil Nadu	21.0		
				Assam	19.8	Rajasthan	21.0		
						West Bengal	22.2		
						Karnataka	22.8		
						Orissa	23.7		
						Maharashtra	23.8		
						Gujarat	24.7		
						Chhattisgarh	26.6		
						Bihar	27.3		
						Jharkhand	28.7		

1: Source: NFHS III National Report (2005-06 data, report published 2007)

2: Source: NFHS III Final Data Set (2005-06); authors' calculations

3: Source: NSSO 61st round (2004-05); authors' calculations

4: Note: The categorization of states is done using the same cut-offs for severity as the Global Hunger Index 2008. India's GHI 2008 score of **23.7** places it in the “alarming” category.

Figure 1. Ranking of states within India from lowest to highest India State Hunger Index scores.

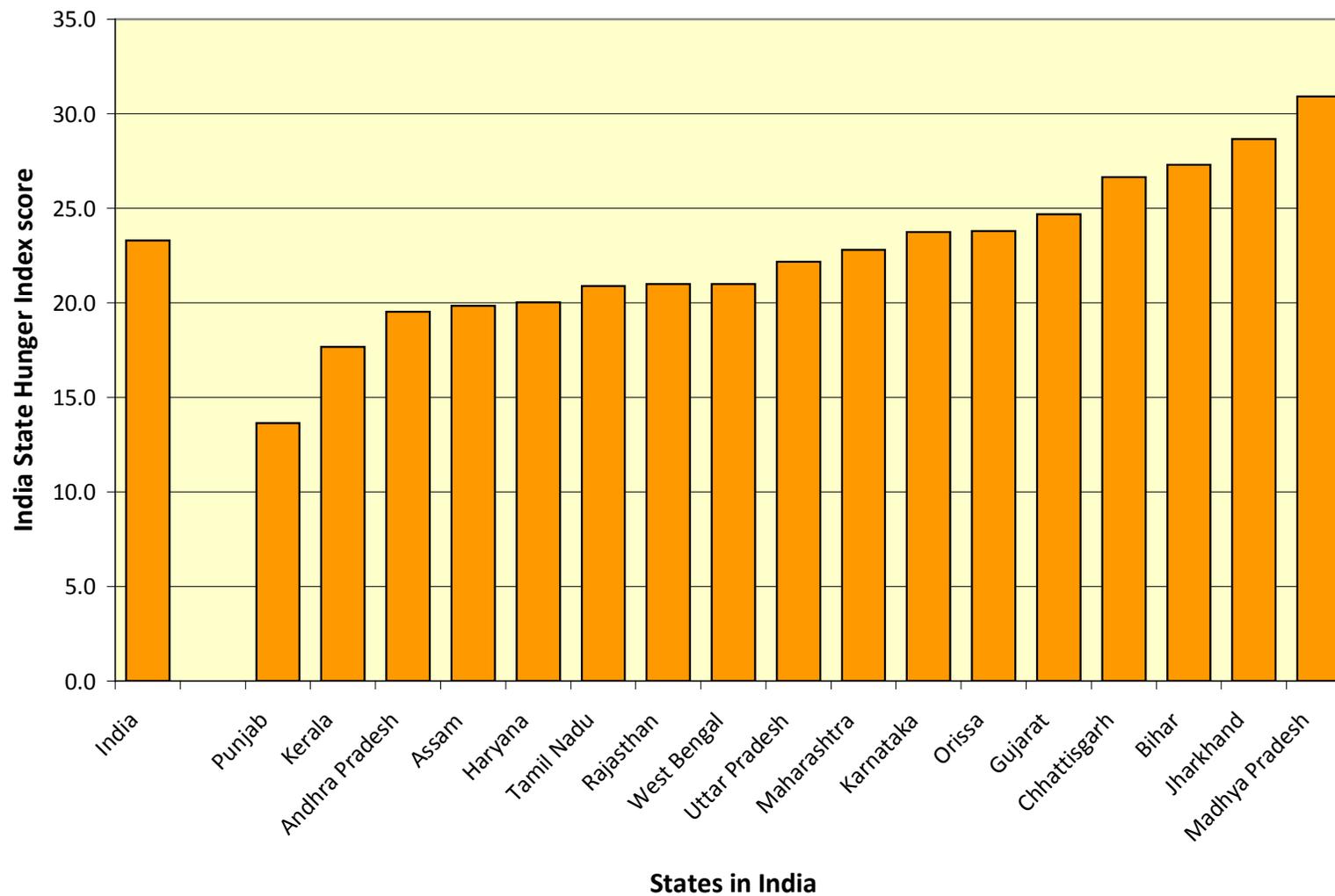
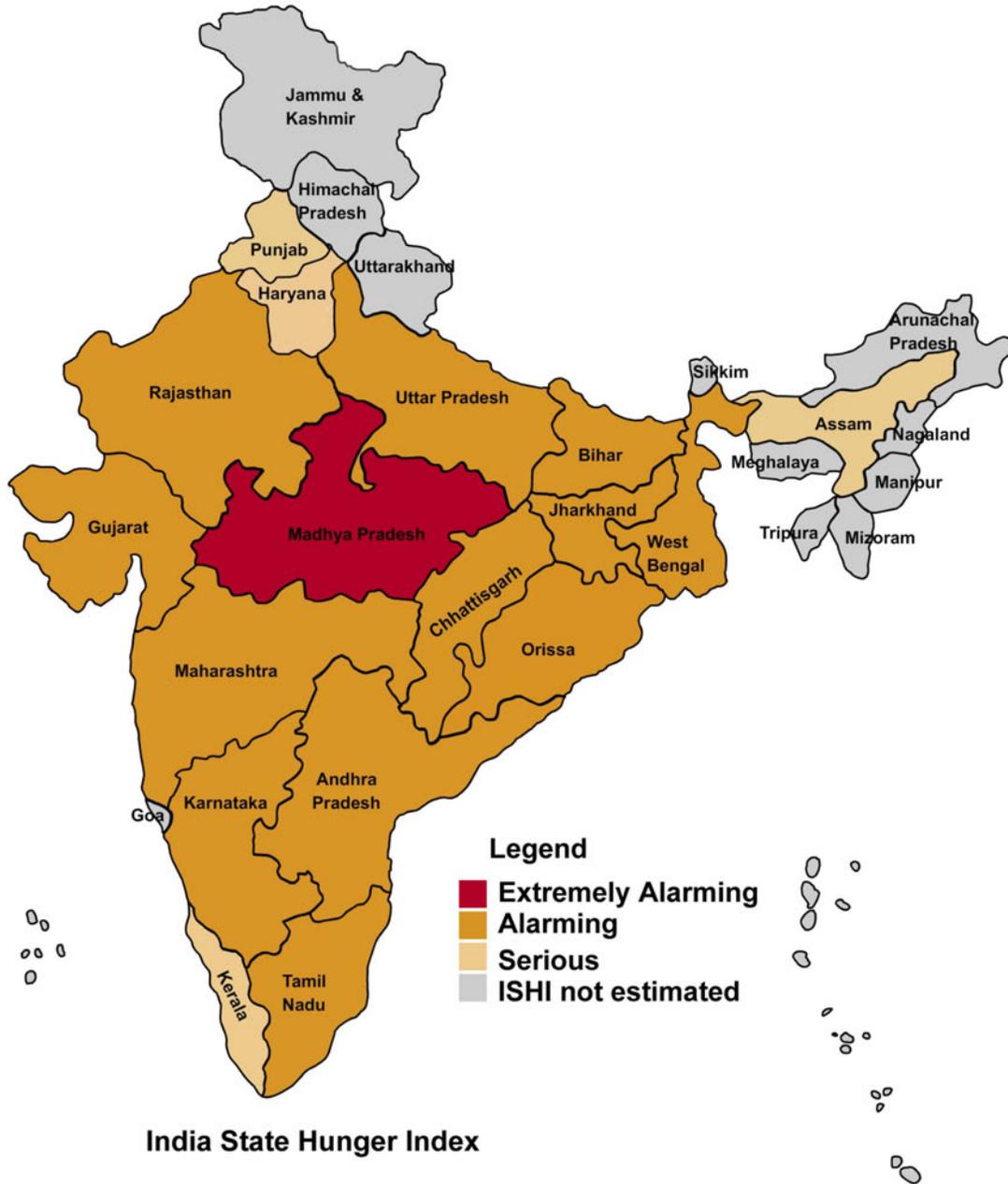
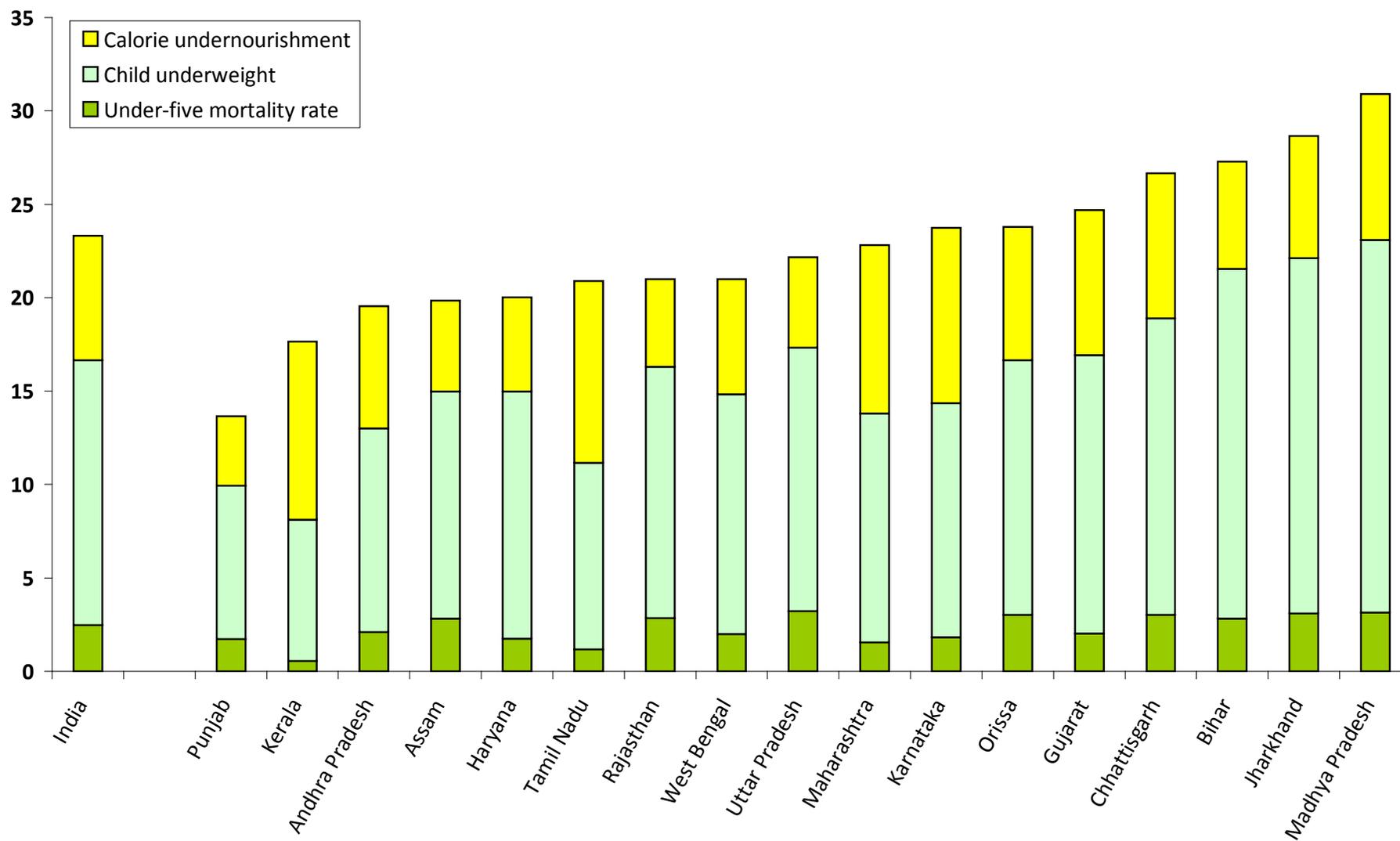


Figure 2. Map of the India State Hunger Index, by severity<sup>5</sup>.



<sup>5</sup> This map is intended only to be a schematic representation of hunger.

Figure 3. Contribution of underlying components of the Indian State Hunger Index to overall scores



**Table 4. Comparison of Indian states with countries outside India, based on the GHI 2008**

GHI Rank	Country/State	Hunger Index	GHI Rank	Country/State	Hunger Index	GHI Rank	Country/State	Hunger Index
<b>Note: Shaded cells represent Indian States</b>								
	Argentina	<5		Syrian Arab Republic	<5	<b>23</b>	Thailand	9.93
	Belarus	<5		Tunisia	<5	<b>24</b>	Armenia	10.20
	Bosnia and Herzegovina	<5		Turkey	<5	<b>25</b>	Azerbaijan	10.38
	Brazil	<5		Ukraine	<5	<b>26</b>	Uzbekistan	11.23
	Bulgaria	<5		Uruguay	<5	<b>27</b>	Indonesia	11.27
	Chile	<5	<b>1</b>	Mauritius	4.98	<b>28</b>	Honduras	11.43
	Costa Rica	<5	<b>2</b>	Jamaica	5.07	<b>29</b>	Bolivia	11.73
	Croatia	<5	<b>3</b>	Moldova	5.37	<b>30</b>	Dominican Republic	12.03
	Ecuador	<5	<b>4</b>	Cuba	5.45	<b>31</b>	Mongolia	12.07
	Egypt, Arab Rep.	<5	<b>5</b>	Peru	5.65	<b>32</b>	Vietnam	12.63
	Estonia	<5	<b>6</b>	Trinidad and Tobago	5.95	<b>33</b>	Nicaragua	12.80
	Iran, Islamic Rep.	<5	<b>7</b>	Algeria	6.00		<b>Punjab</b>	<b>13.64</b>
	Jordan	<5	<b>8</b>	Albania	6.32	<b>34</b>	Ghana	13.93
	Kazakhstan	<5	<b>9</b>	Turkmenistan	6.39	<b>35</b>	Philippines	13.97
	Kuwait	<5	<b>10</b>	Malaysia	6.45	<b>36</b>	Lesotho	14.27
	Kyrgyz Republic	<5	<b>11</b>	El Salvador	6.53	<b>37</b>	Namibia	14.34
	Latvia	<5	<b>12</b>	Morocco	6.53	<b>38</b>	Guatemala	14.60
	Lebanon	<5	<b>13</b>	Colombia	6.73	<b>39</b>	Myanmar	15.00
	Libya	<5	<b>14</b>	South Africa	6.90	<b>40</b>	Sri Lanka	15.02
	Lithuania	<5	<b>15</b>	China	7.07	<b>41</b>	Benin	15.07
	Macedonia, FYR	<5	<b>16</b>	Fiji	7.30	<b>42</b>	Cote d'Ivoire	15.30
	Mexico	<5	<b>17</b>	Suriname	7.46	<b>43</b>	Senegal	15.37
	Romania	<5	<b>18</b>	Gabon	7.63	<b>44</b>	Uganda	17.13
	Russian Federation	<5	<b>19</b>	Venezuela, RB	7.75	<b>45</b>	Gambia, The	17.27
	Saudi Arabia	<5	<b>20</b>	Paraguay	7.90	<b>46</b>	Mauritania	17.63
	Serbia and Montenegro	<5	<b>21</b>	Guyana	8.56		<b>Kerala</b>	<b>17.66</b>
	Slovak Republic	<5	<b>22</b>	Panama	8.91	<b>47</b>	Swaziland	17.70

**Table 4 (continued)**

GHI Rank	Country/State	Hunger Index	GHI Rank	Country/State	Hunger Index	GHI Rank	Country/State	Hunger Index
48	Botswana	17.90		Orissa	23.74	86	Burundi	38.26
49	Togo	18.17		Maharashtra	23.79	87	Eritrea	38.97
50	Timor-Leste	18.37	67	Zimbabwe	23.83	88	Congo, Dem. Rep.	42.70
51	Nigeria	18.43	68	Tanzania	24.17			
52	Cameroon	18.67	69	Haiti	24.30			
53	Korea, Dem. Rep.	18.77		Gujarat	24.69			
54	Congo, Rep.	19.13	70	Bangladesh	25.23			
	Haryana	19.54	71	Tajikistan	25.89			
	Assam	19.85	72	Mozambique	26.33			
55	Kenya	19.87		Chhattisgarh	26.65			
	Andhra Pradesh	20.01	73	Mali	26.93			
56	Sudan	20.52		Bihar	27.30			
57	Nepal	20.57	74	Guinea-Bissau	27.45			
58	Lao PDR	20.63	75	Central African Republic	28.05			
59	Djibouti	20.87		Jharkhand	28.67			
60	Guinea	20.87	76	Madagascar	28.77			
	Uttar Pradesh	20.88	77	Comoros	29.07			
	Tamil Nadu	20.99	78	Zambia	29.17			
	Rajasthan	21.00	79	Angola	29.50			
61	Pakistan	21.67	80	Yemen, Rep.	29.77			
62	Malawi	21.80	81	Chad	29.93			
	West Bengal	22.17		Madhya Pradesh	30.90			
63	Rwanda	22.33	82	Ethiopia	30.97			
	Karnataka	22.81	83	Liberia	31.80			
64	Cambodia	23.20	84	Sierra Leone	32.19			
65	Burkina Faso	23.53	85	Niger	32.40			
66	India	23.70						

Notes: GHI 2008 ranks and scores are from the GHI 2008 report (von Grebmer et al., 2008); only countries with GHI >=5 are ranked..

### ***Comparison of Indian states with other countries***

**Table 4** shows the position of the 17 Indian states relative to the countries for which the Global Hunger Index 2008 is reported. India's rank on the GHI 2008 is **66**; the ranks of the different states in relation to the GHI range from **34** for the state of Punjab (whose ISHI score lies places it between Nicaragua and Ghana) to **82** for Madhya Pradesh (whose ISHI score places it between Chad and Ethiopia). Ten of the 17 states have an ISHI rank that is above India's (66), which indicates that these states are relative out-performers (at least relative to the Indian average). Sadly, even the best-performing state in India, Punjab, ranks below such countries as Gabon, Honduras, and Vietnam.

It is useful to examine the underlying dimensions on the hunger index to understand the contributions of different dimensions to the overall hunger index. This is shown in **Figure 3**, and reveals that for the majority of states, child underweight is responsible for the largest variability between states. In addition, for most states, the overall scores are high because of particularly high child underweight rates. When compared to the majority of states, the contribution of low calorie consumption levels to the hunger index is higher for Kerala and Tamil Nadu, and to a lesser extent in Maharashtra and Karnataka. The contribution of child mortality to the hunger index scores, however, is relatively small and less variable across all the states when compared to the contributions of child underweight and calorie undernourishment.

### ***The Hunger Index in relation to other social and economic indicators***

How does the India State Hunger Index (ISHI) compare to other indicators of economic and social progress? To address this question, we present in **Figure 4** the simple association between ISHI scores and levels of poverty at the state level. The association between the hunger index and the percentage of the population below the poverty line is strong. This is expected, given that poverty is often the root cause of insufficient food intake, child malnutrition, and child mortality. A few states, however, deviate from the predicted line. Gujarat and Madhya Pradesh are clear "negative outliers", meaning that they have a much higher hunger index than would be expected based on their poverty level; Punjab, Orissa and Kerala, on the other hand, stand out as "positive deviants" – that is, they have significantly lower hunger index scores than would be expected of states with their level of poverty.

In addition to the above, **Figure 5** presents a scatter-plot of the 17 states by the hunger index and net state domestic product (NSDP) per capita, with the latter serving as a proxy for per capita income in a state. In this case, a strong *inverse* association is observed between the two variables, with poorer states having a significantly higher hunger index than more prosperous states. However, the association is far from perfect, with a number of states appearing as outliers. For instance, Madhya Pradesh again stands out as having a much higher level of hunger than would be expected based on its per capita income; Jharkhand and Chhattisgarh are also "negative outliers", as is Maharashtra which has a hunger index almost as high as that of Orissa, but a NSDP twice as large. Several states are also doing better than expected given their economic level, with Punjab being a noticeable positive outlier, and, to a smaller extent, Kerala, Assam and Rajasthan.

Figure 4. India State Hunger Index in relation to poverty

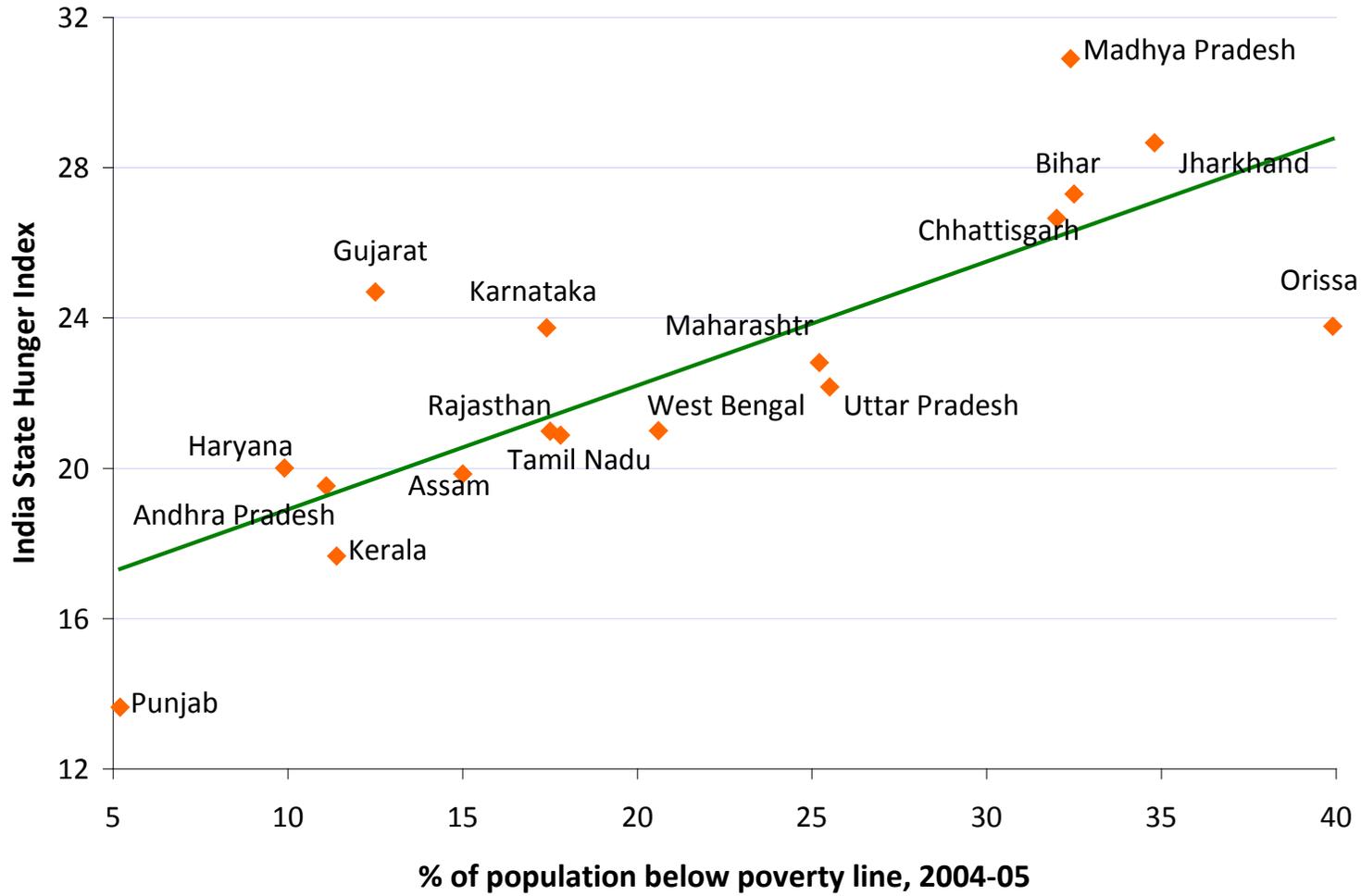
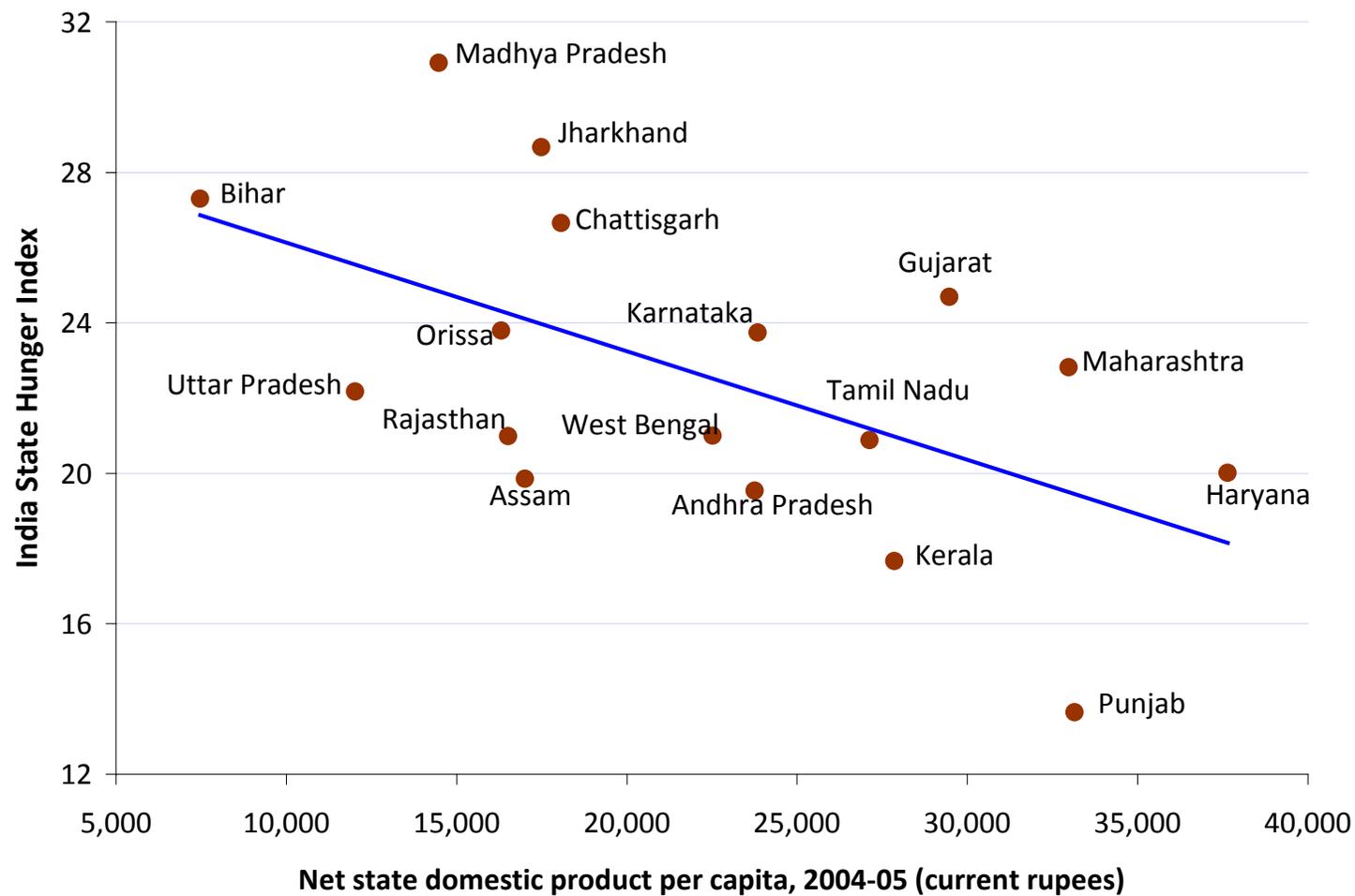
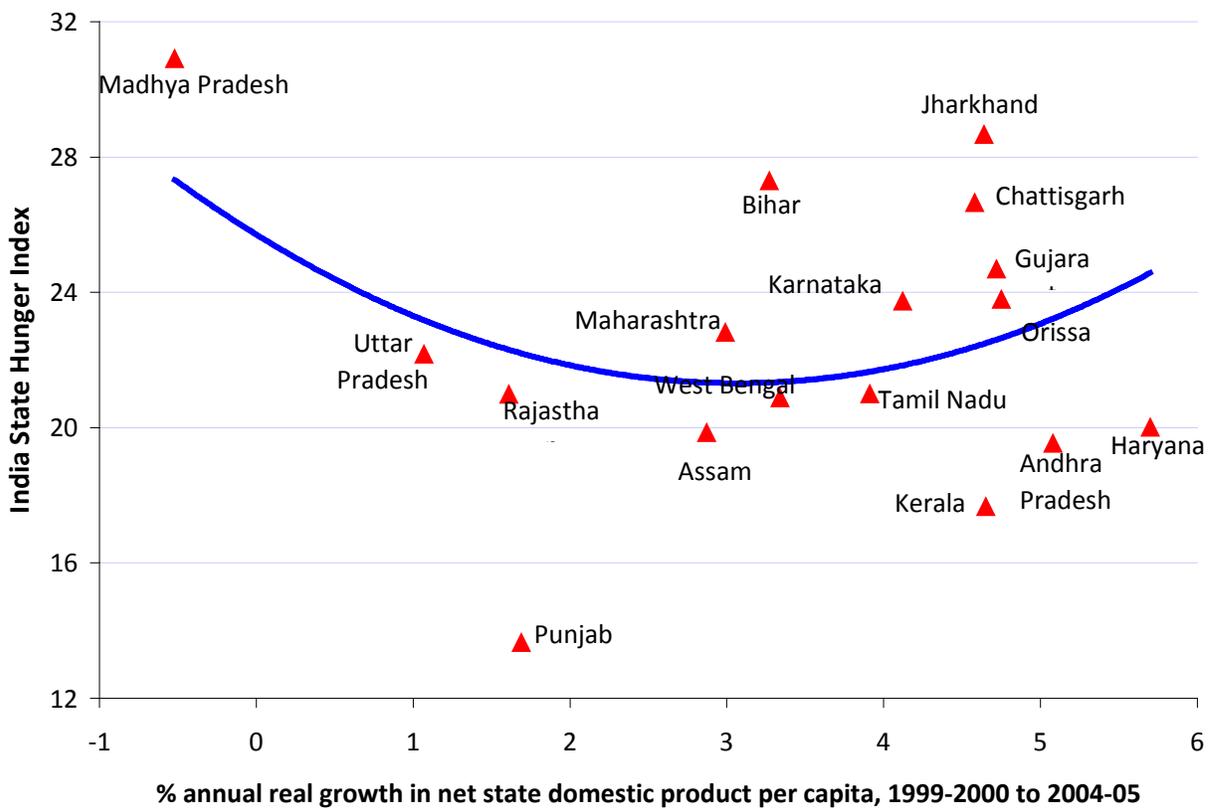


Figure 5. India State Hunger Index in relation to per capita income



Finally, Figure 6 presents the association between the hunger index and the *rate* of economic growth for each state. The figure shows little evidence of a consistent relationship between the two variables. A state that experienced negative real growth (in net state domestic product per capita) between 1999-2000 and 2004-05 (e.g., Madhya Pradesh) has a high hunger index, but so did states like Bihar, Jharkhand and Chhattisgarh that experienced much higher rates of economic growth over this time period. Again, Punjab stands out as a remarkable “positive outlier”, with its much lower hunger index than states such as Kerala, Andhra Pradesh and Haryana whose rate of economic growth was two- to three-times larger during the same period (<2% per annum for Punjab, compared to 4-6% for the other 3 states). Thus, economic growth appears to be weakly associated with the levels of hunger in a state.

**Figure 6. The India State Hunger Index in relation to economic growth.**



### ***Trends across time***

Since the India State Hunger Index has not been estimated over two points in time, it is difficult to examine changes in the values of the state Indices over time. However, the similarity in construction of the India State Hunger Index to a state level Nutrition Index<sup>6</sup> calculated using data for 1994 (Wiesmann, 2004) gives us the ability to examine, at a minimum, the changes in rankings of the different states over the last 14 years.

**Table 5** presents the rankings of states within India using the India State Hunger Index in 2008 and the Nutrition Index in 1994. We note some distinct changes in ranking over time. Particularly striking is the poor performance of the states of Orissa and Madhya Pradesh. In 1994, Madhya Pradesh ranked 11<sup>th</sup> out of the 15 states, while it ranked last (17<sup>th</sup>) in 2008. Given the large contribution of child underweight to the ISHI scores, the decline in ranking could be due to the lack of improvement in child undernutrition rates in Madhya Pradesh over the last seven years<sup>7</sup>. Similarly, Orissa, which ranked 5<sup>th</sup> on the Nutrition Index in 1994, now ranks 13<sup>th</sup> on the ISHI 2008. Haryana, despite its impressive economic performance, also seems to have performed poorly in terms of reduction of hunger; while it was ahead of all other states in 1994, it now ranks 5<sup>th</sup> on the ISHI 2008.

There are a few states which have outperformed others in enhancing food and nutrition security, and this is apparent in upward changes in the ranks between the NI and the ISHI 2008. Noteworthy among these is the increase in ranking of Assam. The state was one of the poorest performers and ranked 14<sup>th</sup> on the Nutrition Index in 1994 but became one of the best performers in 2008, in spite of having had the lowest growth rate of per capita income over the past 14 years among all states. Tamil Nadu is another state which has performed well and improved its ranking from 12<sup>th</sup> in 1994 to 6<sup>th</sup> in 2008.

Overall, the changes in rankings are somewhat sobering. The trends in few states that have improved despite the economic odds underscore the importance of investments in social protection, health and nutrition services to ensure progress on poverty and hunger alleviation. Continued monitoring of trends using indicators like the India State Hunger Index is essential to monitor progress and sustain attention to the issue of hunger and undernutrition.

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<sup>6</sup> The Nutrition Index estimated by Wiesmann (2004) uses the same variables as the India State Hunger Index, i.e., child nutrition, child mortality and calorie undernourishment. The Nutrition Index differs in that it uses FAO dietary energy supply data for estimating calorie undernourishment, and it uses prevalence of underweight among children under four years of age, rather than children under five years of age. While index scores cannot be compared between the Nutrition Index and the ISHI, the comparisons are still valid from the point of view of comparing rankings across time.

<sup>7</sup> Authors' calculations based on the NFHS data show that the underweight rate among children under three years of age increased from 55.1 percent in 1998-99 to 57.7 percent in 2005-06.

**Table 5. Changes in state rankings from the Nutrition Index 1994 to the India State Hunger Index 2008.**

Nutrition Index rank (1994) <sup>1</sup>	State	India State Hunger Index rank (2008)	State
1	Haryana	1	Punjab
2	Kerala	2	Kerala
3	Rajasthan	3	Andhra Pradesh
4	Punjab	4	Assam
5	Orissa	5	Haryana
6	Andhra Pradesh	6	Tamil Nadu
7	West Bengal	7	Rajasthan
8	Uttar Pradesh	8	West Bengal
9	Karnataka	9	Uttar Pradesh
10	Gujarat	10	Maharashtra
11	Madhya Pradesh	11	Karnataka
12	Tamil Nadu	12	Orissa
13	Maharashtra	13	Gujarat
14	Assam	14	Chhattisgarh
15	Bihar	15	Bihar
		16	Jharkhand
		17	Madhya Pradesh

<sup>1</sup> Nutrition Index 1994 results are from Wiesmann (2004).

## SUMMARY AND POLICY IMPLICATIONS

The India State Hunger Index 2008 findings highlight the continued overall severity of the hunger situation in India, while revealing the variability in hunger across states within India. It is indeed alarming that not a single state in India is either low or moderate in terms of their hunger index scores; most states have a “serious” hunger problem, and one state, Madhya Pradesh, has an extremely alarming hunger problem.

The positions of Indian states vis-à-vis the Global Hunger Index 2008 show that even though there is variability in the scores, and hence the ranking of Indian states in relation to other countries, there are few states that perform well in relation to the GHI. Even the best performing Indian state, Punjab, lies below 33 other developing countries ranked by GHI. Even more alarming is the fact that the worst-performing states in India – Bihar, Jharkhand, and Madhya Pradesh – rank most closely with countries that are precariously positioned on the GHI 2008 rankings. For instance, Bihar and Jharkhand rank lower than Zimbabwe and Haiti, while Madhya Pradesh falls between Ethiopia and Chad.

Our analysis of the associations between the ISHI 2008 and state economic indicators shows that the relationship between poverty and hunger is largely as expected – greater ISHI 2008 scores are seen in poorer states, with a few exceptions. Outliers like Punjab and Orissa and Kerala perform better on the ISHI 2008 than might be expected given their poverty levels, while Madhya Pradesh, Gujarat and

Karnataka perform worse. A closer examination of the past and current investments made by these states in social protection, health and nutrition programs can help inform the debate about policy instruments to protect populations against hunger even in the face of poverty.

The lack of a clear relationship between state level economic *growth* and hunger is alarming. The implications of this, taken along with the relationship between the ISHI 2008 and poverty, are that first, economic growth is not necessarily associated with poverty reduction. Additionally, even if there is equitable economic growth that improves food availability and access, this might not lead immediately to progress on improving child nutrition and mortality, which need more direct investments to enable rapid reductions. Thus, in addition to wide scale poverty alleviation, direct investments in improving food availability and access for poor households as well as direct targeted nutrition and health interventions to improve nutrition and mortality outcomes for young children will be needed to impact the ISHI scores and rankings of Indian states.

The experiences of states whose rankings on the Nutrition Index deteriorated on the ISHI 2008 scores in spite of consistent positive economic growth is indicative of the need to invest solidly in direct nutrition and poverty alleviation interventions even in the face of continued economic growth. The design and implementation of policies and programs to improve all three underlying dimensions of the ISHI will need to be strengthened and supported to ensure that hunger is reduced rapidly over time. While strides are being made on the public health front to ensure sustained reductions in child mortality, improvements in child nutrition are not satisfactory in India. This is largely because nutrition programs in India are not effectively delivering evidence-based interventions at scale to those vulnerable age groups which need to be reached to ensure rapid reductions in undernutrition.

In conclusion, for Indian states to progress along the ISHI, and to ensure that ISHI scores for Indian states are more closely aligned with GHI scores of countries with comparable economic growth, investments will be needed to strengthen agriculture, improve overall food availability and access to all population segments, and to improve child nutrition and mortality outcomes.

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