

The Hungry Child Cannot Wait

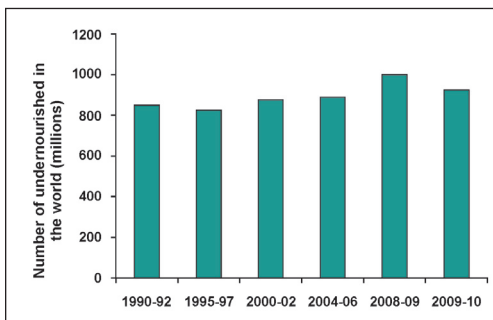
I. Global Dimensions of Hunger

Distinguished Fellows of the Academy, Ladies and Gentlemen!

The number of undernourished people in the world has been increasing for a decade or so (Figure 1) and the number of hungry for the first time had crossed the 1 billion mark in 2008-09 (FAO, 2009), but the number came down to 925 million in 2009-10. Nearly all hungry people were from developing countries. The gains made in the 1980s and early 1990s in reducing chronic hunger have been lost and the hunger reduction targets of the Millennium Development Goal 1 (MDG1) as well as of the World Food Summit (WFS) remain elusive.

The soaring food prices of 2007-08 had drawn the poor farther from food, resulting in the unusual increase in the number of undernourished. Despite the fall in international food and fuel prices starting in the late 2008, the prices in domestic markets remained 15 to 25 percent higher in real terms than the trend level – continuing the distress for the poor. In India, high food prices and inflation rates have emerged as a major livelihood concern. As shown in Figure 2, The Asia-Pacific region, with 578 million undernourished, and Sub-Saharan Africa with 239 million hungry people accounted for 62 and 26 percent, respectively (jointly 88 percent), of the world's hungry people.

Fig. 1. Chronic hunger in the world has been increasing since 1995-97

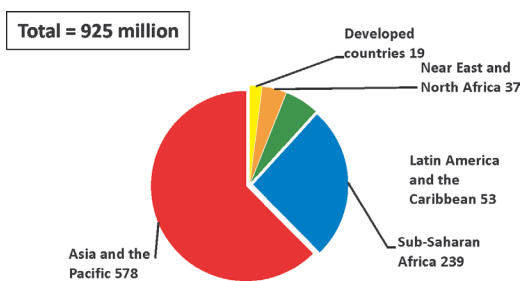


Source: FAO, 2009, 2010

Poverty is the principal cause as well as consequence of hunger. As per a World Bank study, nearly 1.4 billion people in the developing countries live on \$ 1.25 a day or less. Generally, the hunger intensities (undernutrition percentage) followed the poverty incidences (Table 1). But, this general trend is necessarily not always true and other factors such as women status, education,

health care services etc. make significant difference.

Fig. 2. Number of hungry people by region, 2010



Source: FAO, 2010

Table 1. Poverty (\$ 1.25 a day or less) and hunger levels in the developing world, percentages

| Region | % Poverty | % Hunger (undernourished) |
|----------------------------|-----------|---------------------------|
| Asia-Pacific | 27 | 17 |
| Latin America & Caribbean | 8 | 10 |
| Sub-Saharan Africa | 51 | 32 |
| Total Developing Countries | 29 | 20 |

Source: FAO, 2010

Performances of countries and regions have varied widely. India has made little progress towards WFS and MDG targets, whereas China and Brazil are fairly close to achieving the targets (Table 2)

Table 2. Prevalence of undernourishment and progress towards the World Food Summit (WFS) and the Millennium Development Goal (MDG) targets in developing countries.

| World/Region/Country | Total popIn 2004-06 (Million) | Number of People Undernourished (Million) | | | | Progress in Number towards WFS (Target 0.5) * | Progress in prevalence towards MDGs (Target 0.5) ** |
|----------------------|-------------------------------|---|---------|---------|---------|---|---|
| | | 1990-92 | 1995-97 | 2000-02 | 2004-06 | | |
| India | 1134.4 | 210.2 | 193.5 | 223.0 | 251.5 | 1.2 | 0.9 |
| China | 1320.5 | 177.8 | 143.7 | 132.5 | 127.4 | 0.7 | 0.6 |
| Brazil | 186.8 | 15.8 | 15.6 | 16.6 | 11.9 | 0.7 | 0.6 |
| Asia-Pacific | 3518.7 | 585.7 | 528.5 | 552.1 | 566.2 | 1.0 | 0.8 |
| Developed Countries | 1269..5 | 19.1 | 21.4 | 18.7 | 15.2 | 0.8 | Na |
| Developing Countries | 5213.8 | 826.2 | 803.5 | 838.0 | 857.7 | 1.0 | 0.8 |
| World | 6483.3 | 845.3 | 824.9 | 856.8 | 872.9 | 1.0 | 0.9 |

Source: FAO, 2009

* Ratio current/baseline number of undernourished – ratio for WFS target = 0.5

** Ratio current/baseline prevalence of undernourished – ratio for MDG target = 0.5

Under Brazil's Zero Hunger Programme, led by the then President, His Excellency Lula, various food and nutrition programmes, including food distribution programmes (via both private and public sector channels) and direct subsidies, were implemented. These programmes were almost fully supported by national resources and food and nutrition spending between 2003 and 2007 was more than doubled to about US\$13 billion annually (see Box 1).

Box 1 (Brazil)

Policy instruments:

- The period of sharpest economic growth and poverty reduction occurred from 1970 to 1980, before improvements in child malnutrition and infant mortality (that is, there was a lagged response).
- Coverage of safe water increased from 35 percent in 1967 to 80 percent in 1980. Sewerage coverage increased to 50 percent by 1980.
- Immunization coverage more than tripled from 1975 to 1988; the number of physicians per 1,000 people doubled.
- Major investments were made in direct nutrition inputs (food programs) and in social-sector spending on water and sanitation, health, and education.

Success factors:

- Various food and nutrition programs, including food distribution programs (via both private and public sector channels) and direct subsidies, were implemented; these programs were almost fully supported by national resources.
- Food programme expenditures went from 0.06 percent of GDP in 1980 to 0.21 percent of GDP in 1989. Food and nutrition-related expenses went from 0.16 percent to 0.25 percent of social-sector expenses.
- Investments in health showed an upward trend from 1975 to 1982, with lower levels in 1983–84. They further increased to a peak of US\$68.73 per capita in 1989 (2.4 times the expenditures in 1975).
- Spending on education increased during 1976–82. Per capita education expenditure was US\$31.9 in 1982, dipped to US\$24.5 in 1984, but increased again to reach US\$54.8 in 1988 (a sevenfold increase compared with 1970).

Since 2004, Brazil has further accelerated its nutrition policy efforts with its Zero Hunger programme and nutrition has improved significantly. That programme more than doubled food and nutrition spending between 2003 and 2007 (to about US\$13 billion annually in 2007).

In China, effective adoption of packages of modern technologies *viz.* hybrid rice, biotech products and dedicated extension system leading to extremely high and stable yields, integrated on-farm and non-farm employment and

Village Township Enterprise programme were the main elements of the success. Moreover, China pursued a successful poverty alleviation strategy along with rapid economic growth and effective nutrition, health, and family-planning interventions (see Box 2).

Box 2 (China)

Policy instruments:

- China pursued a successful poverty alleviation strategy along with rapid economic growth.
- Effective nutrition, health, and family-planning interventions were implemented at a large scale.
- China also focused on complementary interventions to address other determinants of child malnutrition, such as water and sanitation (which help reduce illness from infectious diseases) and education (between 1992 and 2005, the share of mothers who had completed middle school increased from 32 to 57 percent and the share of illiterate women fell from 22.5 to 7 percent).

Success factors:

- Central leadership was combined with a commitment to the process and the establishment of local government ownership.
- China established an effective data collection system that provides regular data for monitoring progress, and the country's strong research institutions ensure that data and information are effectively communicated to policymakers and used for policymaking.
- Strong and effective partnerships were established between the Chinese government and international partners.

The budget share of government expenditure on education increased to 20 percent during the 1990s, although the share spent on health was relatively low (~3–4 percent).

II. The Indian Enigma

India faces the rare enigma of attaining and maintaining an impressive economic growth of about 8% per annum accompanied by a stubbornly high incidence of malnutrition, food insecurity and rural poverty. Despite the Green Revolution leading to India's national level food self-sufficiency and security, the number of food insecure people in India has remained unacceptably high, in recent years hovering around 250 million, one-fourth of the world's food insecure people. In fact, during 2005 to 2010, the number of hungry in the country, as in the world as a whole, has increased. In percentage term, however, food insecurity in India had reduced from 25 percent in 1990-92 to 20 percent in 2001-2003, but in recent years has increased to 21 percent (Table 3).

Table 3. Number and percentage of undernourished people in India since the base year 1990-92

| Year | Total Population (Million) | Undernourishment | |
|---------|-------------------------------|------------------|---------|
| | | Number (Million) | Percent |
| 1990-92 | 863 | 215 | 25 |
| 1995-97 | 949 | 202 | 21 |
| 2001-03 | 1050 | 212 | 20 |
| 2005-07 | 1116 | 221 | 20 |
| 2009-10 | 1168 | 250 | 21 |

Source: Ministry of Agriculture, GoI 2007 and FAO 2010

Although most rampant in children, malnutrition is prevalent in every age group (Table 4), adversely impacting health (increased susceptibility to infections), productivity and overall quality of life. And, between the two latest surveys, there is little progress in reducing the hunger indices.

Table 4. Levels of malnutrition (percent)

| Indicators | NFHS-2 (1998-99) | NFHS-3 (2005-06) |
|--|---------------------|---------------------|
| Children under 3 yrs. who are stunted | 45.50 | 38.40 |
| Children under 3 yrs. who are wasted: weight for height | 15.50 | 19.10 |
| Children under 3 yrs. who are underweight: weight for age – less than 2 S.D. | 47.0 | 45.9 |
| Anemia among children aged 6-59 months | 74.0 | 70.0 |
| Women in 15 to 24 years with BMI < 18.5 | | 44.1 |
| Women in 25 to 49 years with BMI < 18.5 | | 30.7 |
| Women in 15 to 49 years with BMI < 18.5 | 36.2 | 35.6 |
| Men aged 15 to 24, with BMI < 18.5 | | 47.3 |
| Men aged 25 to 49, with BMI < 18.5 | | 26.9 |
| Men aged 15 to 49, with BMI < 18.5 | N.A. | 34.2 |

Source: National Family Health Survey

Another enigmatic paradox is that more than 50% of the two-thirds of the farming families, the marginal and sub-marginal farmers, are undernourished and poor - below poverty line (Table 5). As per the 59th Round NSS, GoI, 2004, 57 percent of the rural poor were marginal farmers and another 26 percent were agricultural labourer. As regards hunger, marginal farmers and agricultural labourers accounted for 51 and 22 percent, respectively of the rural undernourished persons. The overall high rate of economic growth has thus been highly iniquitous and hollow for the rural masses. The disparity

in the per worker GDP in agriculture and in non-agriculture during the past 20 years had widened from 1:3 to 1:5 (Fig. 3).

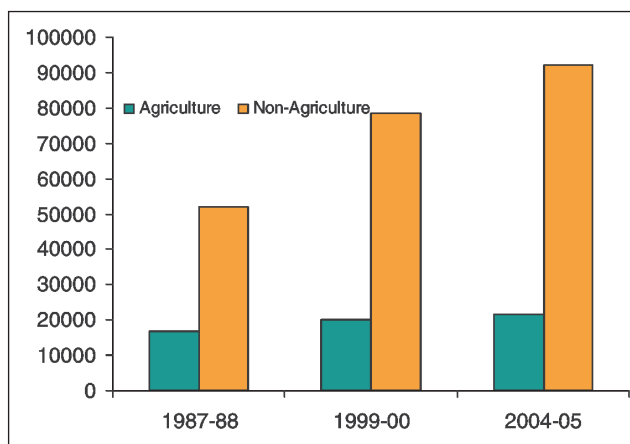
Table 5. Proportion of poor and undernourished persons in different farm-size groups in rural India, 2004

| Farm Size | Share of each group in total poor, % | Share of each group in total under-nourished, % |
|----------------|--------------------------------------|---|
| Agrl. labourer | 26.4 | 22.0 |
| Marg. Farms | 56.8 | 51.3 |
| Small Farms | 2.9 | 3.9 |
| Med. Farms | 1.3 | 2.1 |
| Large Farms | 0.4 | 0.6 |
| Other Rural | 12.2 | 20.1 |

Source: 59th Round NSS, GOI

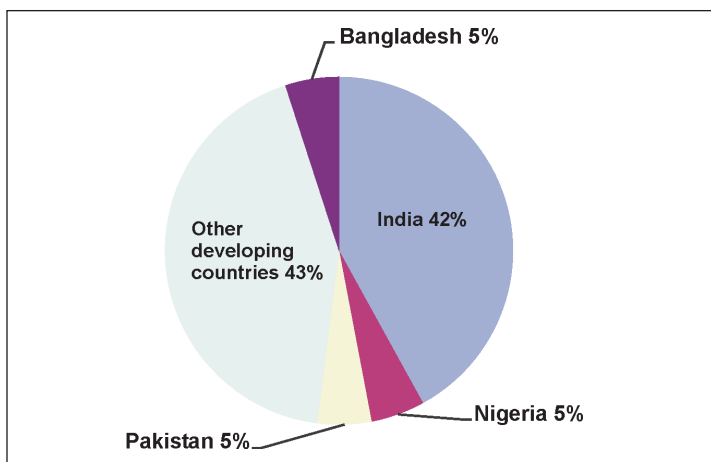
Thus, national level food production and self-sufficiency, although a necessary condition, is not a sufficient condition to lead to family and individual level food and nutrition security. Several interdependent factors, namely, poverty, inadequate food availability and distribution, inequity and gender imbalance, poor child care and health care, unsafe drinking water, poor sanitation and limited access to education and social services affect food security and nutrition.

Fig. 3. Per worker GDP in agriculture and non-agriculture sectors, Rs at 1999-00 prices



Source: FAO, 2009.

Fig. 4. Share of underweight children under five years of age.



Source: UNICEF (2009)

III. Child Malnutrition

India is home to 44 percent of the world's severely malnourished children under five and 35 percent of the developing world's low-birth-weight infants. A recent UNICEF report reveals that India accounts for 42 percent of world's underweight (low weight for age) children under five years of age (Figure 4). Forty eight percent of our children are stunted (low height for age) and nearly 20 percent are wasted (low weight for height). Overall, nearly 40 percent of the undernourished children in the world are our own children.

As seen from Table 6, India is far behind other most populous countries of the different continents in nutritional status of its children. This must not be acceptable to the Fellow scientists and other stakeholders.

Table 6. Extent of child undernutrition in selected countries

| Indicators | India | Brazil | China | Russia | Nigeria |
|---|-------|--------|-------|--------|---------|
| Low birth weight: 0% of infants with LBW – 2000-2007 | 28.0 | 8.0 | 2.0 | 6.0 | 14.0 |
| Children under 3 yrs. who are stunted, % | 47.9 | 7.1 | 21.8 | | 43.0 |
| Children under 5 yrs. who are underweight: weight for age – less than 2 S.D.: % | 43.5 | 2.2 | 6.8 | - | 27.2 |

Source: UNICEF: maternal and newborn health, State of world's children 2009

Every year, 2.5 million children die in India, accounting for one in five child deaths in the world - the highest for any Nation. According to one estimate,

32 babies out of every 1,000 born alive die before their first birthday. The Infant Mortality Rate (IMR) in India has declined from 114/1000 live births in 1980 to 58 in 2004, but it is still high by international standards, although, there are wide variations amongst and within the states. In 2004, while Kerala recorded an IMR of 12/1000 live births, in the same year the IMR in Madhya Pradesh was 79/1000. The other states with an IMR significantly above the national average of 58/1000 live births are Orissa (77), UP (72), Rajasthan (67) and Assam (66). It is generally believed that more than half of these deaths could be prevented if children were well nourished.

Among the hungry children, one population is especially vulnerable – those upto two years of age. Undernutrition in the first two years of life threatens a child's life and can jeopardize physical, motor and cognitive development. Those who survive, being undernourished during the first two years of life, can suffer irreversible long-term damage. It is therefore of particular importance that we take concerted action to combat hunger especially among young children.

Undernutrition has a whole range of effects that impede not only children's nutrition and development in the short term, but also their cognitive abilities and productivity in adulthood, with measurable economic impacts. The economic cost of child malnutrition may be more than 10 percent of lifetime earnings for individuals and 2-3 percent of GDP for the nation. Recent studies have shown that the window of opportunity for addressing child nutritional needs in ways that produce healthy and productive adults lasts from conception through age two. After that, the effects of undernutrition are largely irreversible. By addressing the large and severe problem of early childhood undernutrition, policymakers could maximize the effectiveness of investments designed to achieve overall development goals. Copenhagen Convention (2008) had brought out that greatest development good would come from a nutrition intervention viz. micronutrient supplements for children.

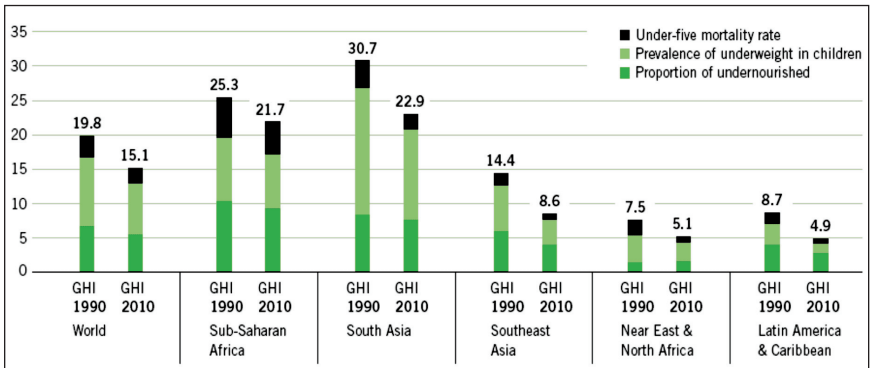
Another study estimates “that every year of schooling increases adult yearly income by 9%. The loss of adult income for being stunted but not in poverty is 22.2%, the loss from living in poverty but not being stunted is 5.9% and from being both stunted and in poverty is 19.8%. Clearly when large number of children is affected national development will also be substantially affected”. In particular, the availability of quality labour in the fast-transforming India would be a matter of major concern.

IV. Prevalence of underweight children underpins India's Global Hunger Index (GHI)

The Global Hunger Index (GHI), a new concept and tool developed by the International Food Policy Research Institute (IFPRI) in 2006, is being

widely used to comprehensively measure and track global hunger. The GHI incorporates three interlinked hunger-related indicators – the proportion of undernourished in the population, the prevalence of underweight in children, and the mortality rate of children. Although the relative weight of the three indicators varies across regions, the extent of child underweight is the highest contributor to the GHI, especially in South Asia (Figure 5).

Fig. 5. Contribution of components to 1990 GHI (based on data from 1988-92) and 2010 GHI (based on data from 2003-08)



Source: 2010 Global Hunger Index

The GHI aims to raise awareness of regional and country differences in hunger and trigger action to eliminate hunger. Targeted at a wide range of audiences – including policymakers, donors, nongovernmental organizations, educators, the media, and the broader public, the GHI provides insights into the drivers of hunger and highlights successes and failures in hunger reduction. The index ranks countries on a 100-point scale, with 0 being the best score (no hunger) and 100 being the worst, although neither of these extremes is reached in practice. Values less than 5.0 reflect low hunger, values between 5.0 and 9.9 reflect moderate hunger, values between 10.0 and 19.9 indicate a serious problem, values between 20.0 and 29.9 are alarming, and values of 30.0 or higher are extremely alarming.

As seen from Figure 5, the GHI worldwide improved from 19.8 percent in 1990 to 15.1 percent in 2010. The higher GHI was for South Asia at 22.9. In 2010, among the 84 countries (for which data could be available), having GHI above 5.0 (ranging from 5.2 percent in Syria Arabs Republic to 41.0 in Congo, Democratic Republic), India, with GHI at 24.1, ranked 67th, which could be considered as an alarming situation. The high GHI in India was driven by high levels of child underweight (Table 7) resulting essentially from the low nutritional and social status of women. Thus, in order to improve the GHI score, India must accelerate progress in reducing child underweight by improving childhood nutrition and awareness and social status of women.

Table 7. Contributions of the three components of GHI and the underlying data for calculating the 1990 and 2010 GHI

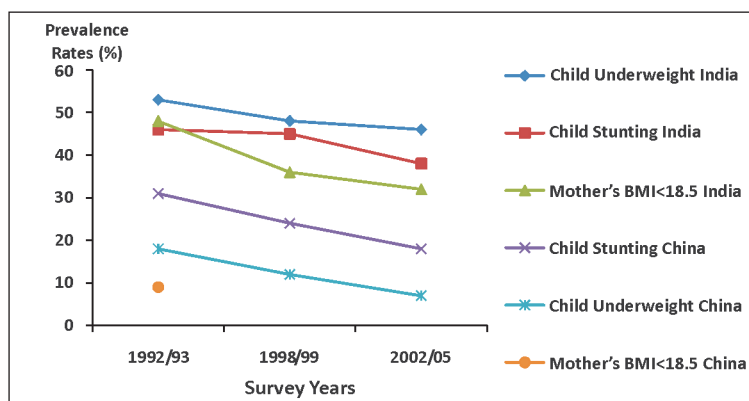
| Country | Proportion of undernourished in the population (%) | | Prevalence of underweight in children under five years (%) | | Under five mortality rate (%) | | GHI | |
|------------|--|---------|--|---------|-------------------------------|------|------------------------|------------------------|
| | 1990-92 | 2004-06 | 1990-92 | 2003-08 | 1990 | 2008 | With data from 1988-92 | With data from 2003-08 |
| | | | | | | | 1990 | 2010 |
| India | 24.0 | 22.0 | 59.5 | 43.5 | 11.6 | 6.9 | 31.7 | 24.1 |
| Bangladesh | 36.0 | 26.0 | 56.5 | 41.3 | 14.9 | 5.4 | 35.8 | 24.2 |
| China | 15.0 | 10.0 | 15.3 | 6.0 | 4.6 | 2.1 | 11.6 | 6.0 |
| Pakistan | 22.0 | 23.0 | 39.0 | 25.3 | 13.0 | 8.9 | 24.7 | 19.1 |
| World | - | - | - | - | - | - | 19.8 | 15.1 |

Source: Global Hunger Index, 2010

V. India-China Comparison in Child Malnutrition

Drawing from an IFPRI study (2007), in the early 1990s, India and China together accounted for 50 percent of the malnourished preschool children in the world. Child malnutrition has since then declined in both countries but from different levels and at different paces. In 1992, in India the incidence of stunting among children aged 0–3 years was notably higher than in China (47 versus 32 percent), and underweight was three times more prevalent (52 and 17 percent respectively in India and China), as shown in Figure 6.

Fig. 6. Child stunting and underweight, and mothers with low body mass indexes in China and India, 1992/93 to 2002/05.



Source: 2010 Focus Brief, IFPRI, 2007

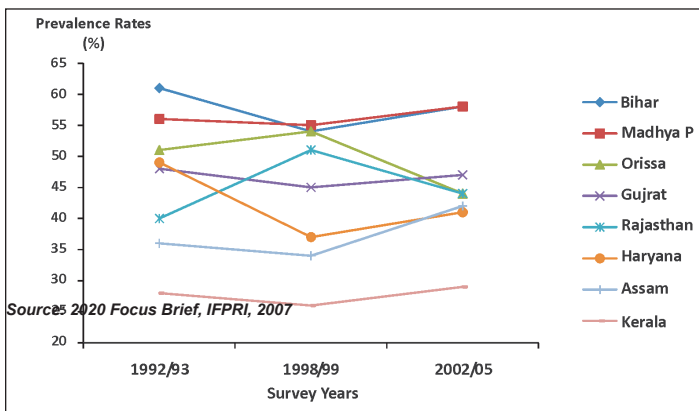
In India, the share of underweight children declined by a few percentage points between 1993 and 1999 but remained virtually unchanged from

1998/99 to 2005/06. Child stunting, in contrast, was almost flat between 1992/93 and 1998/99 but declined by 8 percentage points between 1998/99 and 2005/06. In China, the incidence of child underweight and stunting between the 1992 and 2002 surveys was halved (Figure 6).

As further seen from Figure 6, in India, the share of mothers with a body mass index (BMI) of less than 18.5 declined notably between the first two surveys, but only by 3.2 percentage points between 1998/99 and 2005/06, from 36.2 to 33.0 percent. For China, in the 1992 survey, 9.9 percent of adult women were underweight, about one-fifth of the prevalence rate in India around that time.

As regards intracountry differences, among 15 larger Indian states the prevalence of child underweight has uninterruptedly declined in 7 states since 1992/93, while it increased in the other 8 states between two of the survey years. In 6 of these states, the increase took place between the two most recent surveys (Figure 7). In 2005/06, the incidences were lowest in Kerala (28 percent) and almost twice as large in Bihar, MP and Orissa.

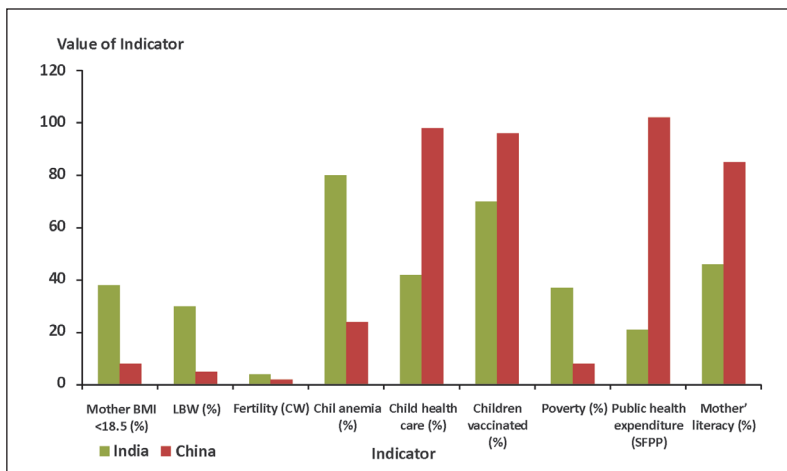
Fig. 7. Child underweight in eight large Indian states where it increased in a subperiod between 1992/93 and 2005/06



Regarding rural-urban divide, the prevalence of child stunting and underweight in India was 30 percent higher in rural areas as compared to that in urban areas. In China, the relative concentration of child malnutrition in rural areas was almost 300 percent of that in urban areas.

The differences in the incidence of child malnutrition between China and India can largely be attributed to the differences in levels of income, female (mother's) status and nutritional status, birth weight and health care (Figure 8).

Fig. 8. Selected proximal and underlying determinants of child malnutrition in India and China, 2004 or nearest year



Source: 2020 Focus Brief, IFPRI, 2007

VI. Leveraging Agriculture for Improving Nutrition

Prime Minister of India, Dr. Manmohan Singh, while inaugurating the Global Conference on Leveraging Agriculture for Improving Nutrition and Health in February 2011 in New Delhi observed that “Leveraging agriculture for improving nutrition and health is particularly important in developing countries, where agriculture is also the mainstay of a very large number of people”. This is particularly true for India.

At the above Conference, Madam Hillary Rodham Clinton, Secretary of State, United States of America had observed that we must find ways “to do even more to improve agricultural productivity, more to connect farmers to markets, more to increase access to nutritious crops and health care, and more to support the women who are growing food and caring for children around the world”.

The above profound statements underpin the centrality of agriculture in alleviating hunger and undernutrition. The food price crises of 2007-08, and more recent increase in food prices and inflation expose the high vulnerability of global food system to disruptions caused by weather and government policies. Moreover, agriculture is facing challenges of burgeoning population, climate change, water crises, land degradation and soil health deterioration, urbanization, changing dietary pattern, energy crises, and recurrent intense natural disasters. Can agriculture meet the challenges? The answer must be ‘yes’ for the Indian Agriculture.

Greater thrust must be put on accelerating domestic production of food. Per capita production of foodgrains had peaked to 207 kg during 1991-95, but

has since been declining and slided to 193 kg in 2006-07, although during the last two years the foodgrain production has been around 230 million tons – all time high. Per capita availability of milk, fruits and vegetables – the high value commodities, had fortunately steadily increased (Table 8).

Table 8. Per capita production of various food items (kg)

| Year | Cereals | Pulses | Food-grains | Oil-seeds | Sugar-cane | Milk | Fruits | Vegetables | Fish |
|-----------|---------|--------|-------------|-----------|------------|------|--------|------------|------|
| 1991-1995 | 192 | 15 | 207 | 23 | 283 | 67 | 33 | 64 | 5.0 |
| 1996-2000 | 191 | 14 | 205 | 24 | 297 | 75 | 45 | 83 | 5.6 |
| 2001-2005 | 177 | 12 | 189 | 20 | 258 | 82 | 43 | 88 | 5.8 |
| 2005-2006 | 176 | 12 | 188 | 25 | 254 | 88 | 50 | 99 | 6.0 |
| 2006-2007 | 180 | 13 | 193 | 21 | 281 | 90 | 51 | 100 | 6.2 |

Source: Ministry of Agriculture, GoI, Various years

As seen from Table 9, the production growth rates for foodgrains (cereals and pulses) – the mainstay of food security, during the decade ending 2007 was hardly 0.6 percent, which was almost one-third of the rate of the population growth. The required growth rate of these commodities towards the year 2020 is about 2 percent, seeking much greater efforts on part of all stakeholders (scientists, extensionists, farmers and private sector).

Table 9. Required growth over the base year production of 2006-07 to achieve domestic demand by 2020

| Commodity | Domestic production 2006-07 (million tons) | Projected demand (2020-21) | Growth rate during 1998-99 to 2006-07 | Required growth rate over 2006-07 to meet the demand (%) |
|---------------|--|----------------------------|---------------------------------------|--|
| Cereals | 201.9 | 262.0 | 0.62 | 1.9 |
| Pulses | 14.2 | 19.1 | 0.47 | 2.1 |
| Foodgrains | 216.1 | 281.1 | 0.61 | 1.9 |
| Oilseeds | 23.6 | 53.7 | 1.96 | 6.0 |
| Vegetable | 111.8 | 127.2 | 3.68 | 0.9 |
| Fruit | 57.7 | 86.2 | 3.06 | 2.9 |
| Sugarcane | 315.5 | 345.3 | -0.60 | 0.6 |
| Milk | 100.9 | 141.5 | 3.65 | 2.4 |
| Fish | 6.9 | 11.2 | 2.89 | 3.5 |
| Egg (billion) | 50.7 | 81.4 | 6.60 | 3.4 |

Source: Agricultural Statistics at a Glance, GoI, 2007; and Kumar, P. (personal communication)

With the increasing emphasis on value chain management, detailed analysis of value chains should be used to assess the problems and prospects of the main components of food and nutrition security, namely, availability, economic access and quality. This approach can lead to increased production, better distribution and greater consumption of desirable and diversified food such as fruits, vegetables, dairy products and fortified foods. It can also trigger new initiatives in the food industry to create more processed foods and also induce the farming community to diversify their production systems to meet such demands.

New initiatives such as effectively planned and managed home gardens can greatly enhance house-hold nutrition by increased consumption of micronutrient-rich vegetables, fruits, and animal-source foods to address deficiency in vitamin A and iron especially in young children and women. Besides, these will be helpful in augmenting the livelihoods of women and small holder farmers though improved access to markets.

As regards the economic aspects, as mentioned earlier, while India is the fastest growing economy in the world, the rates of child undernutrition in the country have remained stubbornly high, unlike most countries. This disconnect between agriculture and nutrition in India must be researched to find ways to break the myth. In the predominant agrarian economy, the economic levers must be friendly to farmers and the cultural settings. Home production of high quality complementary foods, which is often labour intensive, would greatly enhance availability of locally produced nutritious infant foods. Women self help groups, farmer cooperatives, small producer companies, duly supported with quality certifications, would help families meet their requirements of nutritional infant foods.

Socially, national mobilization of people, especially those at community level (supported by the national leadership) can greatly enhance the synergy between agriculture and nutrition. The Zero Hunger Program launched by the President Lula, in Brazil to fight extreme poverty and to ensure the human right to adequate food and nutrition, as described earlier, is an excellent example of social mobilization at national level to meet the highest priority of the people – freedom from hunger and undernutrition. The Brazilian program was marked by synergy among public policies, including income transfer, school feeding and support for public restaurant and food banks. This model is particularly suitable for India because of the high concentration of smallholder farmers.

The social empowerment should be accompanied with empowerment of communities through improved access to information and increased income. The private companies can also participate in such national social mobilizations by empowering smallholder farmers and other poor

communities by aligning themselves with value chain. Support to producers companies and women self help groups will be particularly rewarding.

Research should be pursued for combining high productivity with high nutritional quality and sustainability of food, fruit and vegetable crops. Suitable varieties and management practices for home gardens can greatly improve both nutrition and income. A recent study shows that home gardens in India can provide more than 100 percent of people's recommended daily allowance of beta-carotene and vitamin C, 75 percent of protein, and 20-25 percent of iron. Special arrangement will have to be made to ensure timely supply of quality seed and planting materials of the identified varieties.

Breeding fortified staple crops to have a higher content of micronutrients like iron, zinc, and vitamin A, should be a high priority as it will improve poor people's nutritional status in an extremely cost-effective way. Biofortification has already been achieved in rice (Golden Rice), sweet potato and potatoes, and work is in progress on bananas/plantains, beans, cassava, lentils, maize, pearl millet, sorghum, and wheat. Several of these products should be popularized. Biotechnology holds great promise for designer crops, but the food safety, regulatory and gene literacy aspects must be streamlined towards unleashing the huge potential of this technology.

This year the Government of India has allocated Rs. 300 crore for developing nutri-cereals, especially the millets, towards meeting the nutritional gaps. The rich crop, tree, animal, and fish diversity of the country should be evaluated and characterized for nutritional attributes and utilized in the development of nutritionally superior (and safe) genotypes. Through a Brainstorming Session on the role of millets – nutricereals, the Academy has recently evolved a strategic plan and framework for mainstreaming millets and their veritable products in nutrition augmentation.

Researchers should collect and analyze more information on people's dietary preferences, food consumption patterns and nutrient intakes. It would be helpful to know what populations eat now, where they obtain that food from, and where the "gaps" are in their ability to meet their nutrient requirements. Field-friendly and affordable methods to measure nutritional status, especially for several micronutrients simultaneously would be helpful in strategic planning by having reliable and more accurate demand estimates.

VII. Strategies and New Initiatives

The Life Cycle Approach to Fight Child Malnutrition: A Life Cycle Approach should be adopted for fighting malnutrition so as to target resources towards the critical nutritional periods of the human life cycle which includes the following: vulnerable women during pregnancy, the first two years of life of the child and during adolescence.

According to an estimate, malnutrition, as measured by stunting, affects 32.5 percent of children in developing countries. Geographically, more than 70 percent of malnourished children live in Asia, 26 percent in Africa and 4 percent in Latin America and the Caribbean. In many cases, they were handicapped even before birth with a malnourished mother. Undernutrition among pregnant women in developing countries leads to 1 out of 6 infants born with low birth weight (the GHI Study).

In the past, India and most other developing countries had targeted children under the age of five for nutrition, but generally the outcome had not been very encouraging. Recent evidence shows that the window of opportunity for improving nutrition is much narrower, spanning the period from -9 to +24 months (that is, the 1,000 days between conception and a child's second birthday). This is the period when children are in greatest need of adequate amounts of nutritious food for healthy development. Further, most importantly, interventions during this period are most likely to prevent undernutrition from setting in. Studies show that after the age of two, the effects of undernutrition are largely irreversible.

Moreover, when poorly nourished girls grow up, they tend to give birth to underweight babies, perpetuating the cycle of undernutrition. Thus, the well-being of mothers is a critical element of the solution and for breaking the vicious cycle of undernutrition. Further, access to safe water, sanitation, and preventive and curative healthcare are critically essential.

The Right to Adequate Food and Nutritional Health: At the World Summit on Food Security in 2009, UN Member States reaffirmed “the right of everyone to have access to safe, sufficient and nutritious food, consistent with the progressive realization of the right to adequate food in the context of national food security.” The right to adequate food is a human right laid down in international legal human rights conventions, together with other rights conducive to food security and nutritional health. The majority of UN Member States have ratified these conventions and are thereby bound to implement their content.

An increasing number of states, international organizations, and civil society have begun to explore a rights-based approach to development efforts, including activities promoting food security and nutritional health. They recognize that merely increasing food production will not end hunger and malnutrition and that those who are poor, hungry, or undernourished must get access to food. Who and where they are must first be identified, and the causes of their situation fully understood and exposed. Vulnerable and marginalized groups can then be specifically supported by agricultural programs facilitating their ability to feed themselves or social protection schemes ensuring that no individual in need is left out.

A human rights-based approach to such programmes and schemes necessitates strict adherence to certain principles in their implementation. Some of those principles are already generally accepted in development language, such as transparency, empowerment, and participation, while human rights also require respect for human dignity, non-discrimination, a high request for accountability, and respect for the rule of law.

“Adequate food” entails not only sufficient quantity, but also dietary diversity to satisfy nutritional needs, food safety, and compliance with cultural food values. These attributes have traditionally not received proper attention in food security policies and programming, and should be internalized in assessing consumption patterns and estimating future food demands and supplies. New political commitments and initiatives should emerge from governments of food- and nutrition-insecure countries toward policies and programmes conducive to the realization of the right to adequate food.

International Initiatives: New international initiatives are also specifically targeting nutritional security under the overall umbrella of food security and poverty alleviation – The Millennium Development Goal 1. Following the Copenhagen Consensus in 2008, which declared that investments in nutrition initiatives were the most effective development investments in terms of cost and benefit, a group of nutrition actors, representing a range of stakeholders, issued a set of recommendations in 2010 for global and national action called “Scaling Up Nutrition: A Framework for Action”. This document endorses a package of nutrition interventions targeted toward the window of opportunity and estimates the costs of scaling up these interventions from current levels to the levels needed to achieve rapid reductions in undernutrition.

Further, based on discussions following the global food, fuel, and financial crises, the Group of Eight industrial countries agreed through the L’Aquila Joint Statement on Global Food Security to place new emphasis on food security and nutrition in poor countries. Building on this statement, multiple donors have contributed to the Global Agriculture and Food Security Programme (GAFSP), which will help countries develop comprehensive plans to address agriculture and food security to improve household resources for addressing child undernutrition. The Committee on World Food Security (CFS) underwent a reform process throughout 2009. The reform document sets forth its commitment to broader participation by food security stakeholders and also unequivocally states that nutrition is integral to the concept of food security and to the work of the CFS.

The United States Agency for International Development recently announced its Feed the Future initiative, which merges agriculture, health, and nutrition efforts and will spend at least US\$3.5 billion to support countries in developing country investment plans for improving agriculture, reducing

poverty, and improving nutrition. This followed pledges by other countries and a pool of over US\$ 18 billion has been erected to support the movement. The United Kingdom Department for International Development also recently launched its new nutrition strategy that sets out to tackle the “neglected crisis of undernutrition” by focusing on a set of immediate and long-term actions to reach children during the critical 1,000 days from conception to two years of age (DFID 2010). The Hunger Task Force Report, which lays out the Government of Ireland’s priorities for reducing and eliminating hunger, also includes as one of its three focus areas the implementation of programs focused on maternal and infant undernutrition.

Notwithstanding the much needed global initiatives, the national policies and programmes must be strengthened to reach the hungry and fight malnutrition. The successes of countries that have made concerted efforts to prioritize nutrition should set an example for others that lag behind. The success stories, although diverse in the specific modalities and instruments used to tackle undernutrition, rely on a few common principles:

- Strong government action coordinated across sectors and at central, state, and local levels; strengthening of existing health systems;
- Significant scaling up of public spending;
- Leadership and commitment at all levels;
- Focus on and empowerment of vulnerable populations, households, and age groups; and
- A strong monitoring and evaluation culture that provides a basis for incentives and correction of policy actions in the context of implementation.

VIII. Policy Options and Actions

To achieve significant improvements in child nutrition, health and survival, countries need to develop comprehensive strategies and policy options that include actions to address the immediate and underlying causes of child undernutrition.

Several countries have developed explicit policies on nutrition as an integral part of their multi-sectoral national development plans and achieved expectant results. Brazil, China, Thailand and Vietnam, for example have effectively and quickly reduced child undernutrition by adopting the integrated approach. For instance, between 1990 and 2002 China reduced child malnutrition by more than two-third, from 25 to 8 percent, with highly successful poverty reduction strategy; effective large-scale health, nutrition, and family planning interventions; and increased investment on water, sanitation and education.

Targeted nutrition interventions for women and children in the window of opportunity (between conception and the age of two), using evidence-based and locally appropriate approaches should be scaled up. Universal coverage of a package of preventive nutrition interventions for children under age two could reduce the global burden of childhood undernutrition by 25–36 percent. Scaling up these interventions will require addressing the substantial challenges related to resources, governance, and capacity.

The National Nutrition Policy 1993 had identified key areas of action in various fields like food production, food supply, education, information, health care, rural development, and women and child development. The National Plan of Action on Nutrition 1995, through its Council headed by the Prime Minister ensures collaboration among national government agencies, State Governments, NGOs, the private sector and the international community. Several national programmes of the Ministry of Women & Child Development (MWCD), Ministry of Health & Family Welfare (MHFW), Ministry of Agriculture, Ministry of Rural Development, Ministry of Panchayati Raj and the Ministry of Urban Development, are involved in nutrition security. The National Rural Health Mission (NRHM), Integrated Child Development Services (ICDS) Scheme, National Food Security Mission (NFSM), National Horticulture Mission (NHM), Rashtriya Krishi Vikas Yojana (RKVY), National Rural Employment Guarantee Scheme (NREGS), Jawaharlal Nehru National Urban Renewal Mission and the Rajiv Gandhi National Drinking Water Mission are important programmes addressing nutrition issues. But, these have generally been operating in isolation. There is a need for greater focus at the household and community level. Among others, some of the challenges include:

- Lack of a comprehensive national programme or approach specifically aimed at improving nutrition, resulting in lack of convergence and synergy among existing programmes.
- Lack of a focus with nutrition as an outcome in the government programmes which have the potential to impact nutrition.
- Inadequate monitoring of delivery to the correct target groups.
- Insufficient national systems to collect and analyze data on nutrition outcomes as well as lack of data for monitoring and decision making.
- Weak implementation and poor governance which together impact on the effectiveness of most of well conceived programmes, viz. poor performance of the PDS.

In the 11th Plan, child malnutrition abolition is a high priority. The objectives of the Strategy to Address India's Nutrition Challenges, as defined in the Eleventh Plan Monitorable Targets, are:

- Reduce malnutrition among children in the age group 0-3 years to half its present level by the end of the Eleventh Plan.
- Reduce anemia among women and girls by 50% by the end of the Eleventh Plan.

The following core interventions were proposed:

1. Ensure household food security and livelihood through improved production of food and employment security.
2. Undertake food supplementation programmes and health care in the strategies for (i) addressing maternal undernutrition and low birth weight; (ii) improving infant young child nutrition; (iii) control of micronutrient deficiency; and (iv) addressing iron deficiency and anemia.
3. Ensure restructuring of ICDS and its efficient functioning.
4. Converge health services, hygienic interventions, food production and rural employment sectors.
5. Monitor nutrition interventions and dynamically upgrade the interventions leading to desired outcomes.
6. Ensure human resources development and align skilled workers along the value-chain to achieve effective implementation.
7. Undertake institutional, infrastructural and governance transformations for transparent and timely implementation of the various programmes, such as PDS, and the concerned Bills and Acts.

To achieve sustainable improvements in child nutrition, decision-makers must tackle the underlying causes of undernutrition: food insecurity, insufficient care for women and children, and limited access to healthcare and a healthy environment. Nutrition-sensitive policies; protective and productive social safety-net programs; and pro-poor, pro-women, pro-nutrition agricultural policies and programs that specifically integrate nutrition goals and actions and track nutrition impacts can play a critical role in improving the overall environment in which young children grow and develop.

Gender inequality and poor nutrition are intertwined. Therefore, in areas where women's health, nutrition, and social status are poor, these factors will compromise the impacts of interventions targeted to the window of opportunity and reduce overall household food security. Gender inequality needs to be tackled at all stages of the life cycle to prepare women for a healthy and safe reproductive life. It is particularly important to protect the health and nutrition of girls and young women before pregnancy, and this can be done by improving their access to health, nutrition, education, and social protection programs during adolescence and early adult life.

Recently, the Coalition for Sustainable Nutrition Security in India, chaired by Prof. M.S. Swaminathan, gave a Call for Nutrition Revolution in India, recommending the following interventions to improve nutrition security in India:

- Focus on proven, essential nutrition interventions viz. the timely initiation of breastfeeding, the timely introduction of appropriate complementary foods, dietary and micronutrient approaches to address micronutrient malnutrition etc.;
- Focus on proven, essential primary health care interventions, such as complete immunization, biannual vitamin A supplementation with deworming, appropriate feeding of children during and after illness, including oral rehydration with zinc supplementation during diarrhea, iron and folic acid supplements for adolescent girls and pregnant and lactating women;
- Promote personal hygiene, environmental sanitation, safe drinking water and food safety;
- Promote agricultural production, including horticulture, livestock and fish production, animal husbandry and fisheries and improved economic and livelihood to enhance household food and nutrition security; and
- Expand and improve nutrition education and behavior change programming at community level.

In order to ensure the above innovations, the Coalition had suggested that nutrition security should be a top priority on the development agenda of the country. A coordination mechanism with clear authority and responsibility for improving key nutrition indicators in the country should be established towards ensuring effective adoption of a life cycle based national nutrition programme.

IX. Conclusion

It is outrageous that despite being one of the world's largest and fastest growing economies, India is home to over 40 percent of the world's undernourished - stunted and wasted children. These "Children of the Lesser God" put at stake a whole generation of the future adult citizens.

Proven short route and long route interventions addressing immediate, underlying and basic causes of undernutrition have been effective in several large agriculturally important countries, such as Brazil and China, in significantly reducing the malady in all age groups, especially child undernutrition, and boosted economic growth with huge multiple benefits. Policies, technologies, quality investments, institutions, partnerships, and strong political will were the main drivers of the transformations.

Links between agriculture and nutrition are extremely strong and work on local, national and global scale as per the physical, social, legal, economic and governance settings. Anything that affects agriculture is bound to impact nutrition particularly in countries like India where agriculture is also the mainstay of a very large number of people, and the converse is equally true. In order to mainstream nutrition in agriculture-led and other human-oriented development plans, economic, social, equity, governance and science and technology components have to be synergistically congrued.

Distinguished Fellows, Ladies and Gentlemen!

The Academy's forte lies in augmenting and sharpening policy-science synergy in harnessing the whole bio-economy to free India from the stubborn twin curse of poverty and malnutrition in the context of a mammoth rising population, incomes and climate change. The ethically unacceptable level of child and women undernutrition needs policy-science champions among the academia to help alleviate the deprivation. The Academy may come up with a shared set of well-researched indicators to guide the various stakeholders in their actions.

Dear Fellows!

India has the knowledge, technologies and resources to free the child from undernutrition, but we must muster the necessary commitment and political will. The record foodgrain production of about 235 million tons during 2010-11 and the increased attentions of the Ministry of Agriculture, Health and Family Welfare and Women and Child Development towards reducing undernutrition augur well with the challenge. This is our chance to name the Hungry Child, "Today". "Tomorrow", is too late. His/her bones and brain are being formed today. The Hungry Child cannot wait. Time is not on our side. We must act now.