



Feeding India's Growing Billion: Inclusive Growth of Food Production Indispensable

Growing hunger and malnutrition is a global concern. Defining hunger as the “want or scarcity of food”, the number of hungry people in the world is estimated at 925 million of which Asia and the Pacific alone has 578 million and the Sub-Saharan Africa has 239 million in 2010¹. About 67 per cent of them live in just seven countries (Bangladesh, China, the Democratic Republic of the Congo, Ethiopia, India, Indonesia and Pakistan). This implies that, almost 1 in 7 people is hungry. More seriously, 42 per cent children under five are underweight.

According to the report of the United Nations World Food Programme, India ranks 67th in the Global Hunger Index of 119 countries. It also points to some staggering figures. More than 27 per cent of the world's undernourished population lives in India while 43 per cent of children (under 5 years) are underweight. This is the highest figure in the world and even higher than the Sub-Saharan Africa's figure (28 per cent).

The 2011 population census indicates that India today needs to feed 1.2 billion people. During the last decade, 182 million new consumers of food have been added every year. Ironically, despite significant economic progress in the wake of global slowdown, India has one of the largest numbers of hungry and malnourished people (HUNGaMA report 2012). Under the circumstance, growing more food and to manage it efficiently, is indeed a concern capturing the attention of both governmental (programmes like the National Food Security Mission) and non-governmental campaigns (Oxfam's recent Grow campaign).

Then what exactly has been India's performance in food production in recent years? India faces two major issues in the food management system – one is related to the supply-side issues including risk and variability of food production and other is access to quality food (Food security is defined as access to food to everyone at every time). This happened to be one of the main themes of the current debate on National Food Security Bill. Figure 1 depicts a clear picture by combining the supply-side dynamics of food security in terms of changing trend of unmatched decadal growth of population and respective food production. It shows unabated population growth on one hand, and on the other hand, highly fluctuating behaviour of the food production over the decades. During the decade of 2010s, the incremental production/supply of home grown food was 28 million ton, a level equal to that of the 1980s, which is down from 44 million ton in 2000s. Can this level of incremental production feed 182 million new consumers, after satisfying the food need of the existing billion plus population in India?

Rice in India

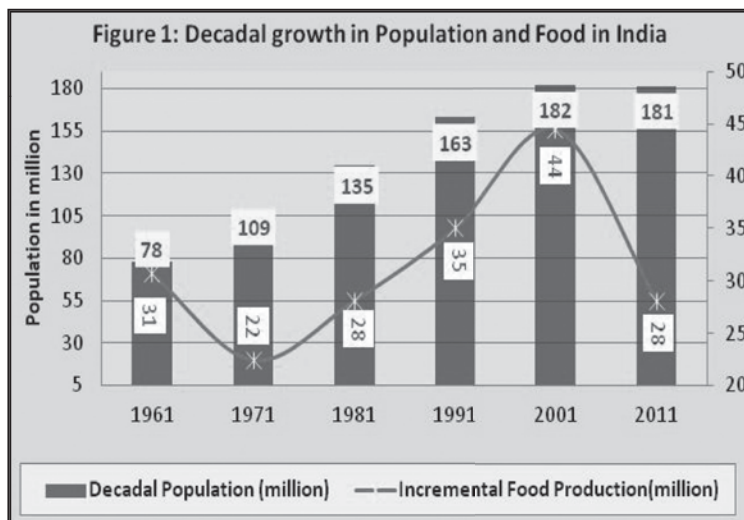
Rice is the most important and popular staple food in India. Rice occupies the highest area (45 million hectare) among the food crops and contributed around 95 million ton of production in 2010.

At the global level, rice is the staple food for more than half of the world's population and around 2 billion people in Asia rely on it for 60 to 70 per cent of their daily calorie intake. Over 90 per cent of present production and

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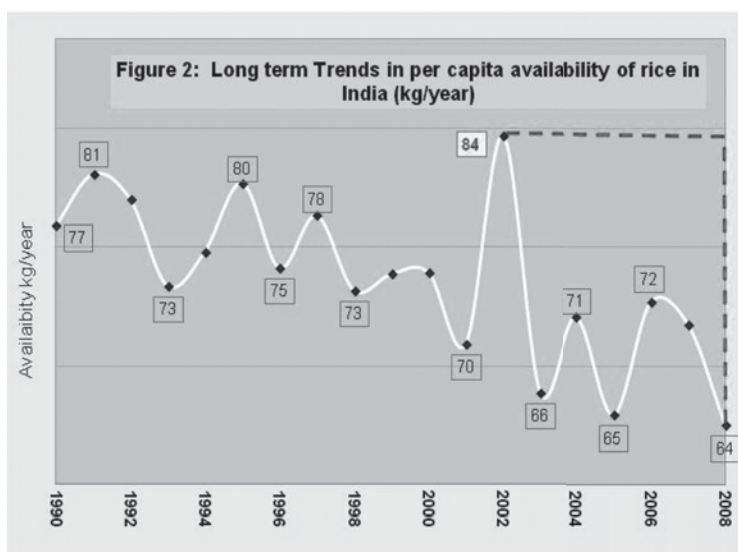
This *Policy Brief* has been prepared by Prof. B. C. Barah, Chair Professor, Indian Agricultural Research Institute, New Delhi.

The increased malnutrition is mainly due to three factors: 1) neglect of agriculture relevant to very poor people by governments; 2) the current worldwide economic crisis, and 3) the significant increase of food prices which has devastated those with only a few dollars a day to spend.



consumption of rice occur in Asia—of which two-thirds of it is in just three countries (China, India, and Indonesia). Moreover, as much as 40 per cent of Asian rice is cultivated under rainfed systems (60 per cent in India), where crop production depend on the vagaries of erratic monsoonal weather. This apparently jeopardised the household food security scenario. Given the present level of growth of population and the food production, the world would require nearly 200 million tons of additional rice annually in the near future. Strangely enough, a back of the envelope calculation shows that in India, the per capita annual availability of rice has reached the lowest of 64 kg in 2008 (Figure 2), as compared to the requirement of 84 kg/year for a standard person as estimated by the National Statistical Survey Organisation (Ministry of Agriculture, GOI 2010). In order to reduce this gap and meet the massive requirement, the food production has to be “more than double” in next two decades.

The gap is likely to further exacerbate if crop fails due to climate aberrations. For instance, the severe drought of 2009 in India resulted in drastic reduction of nearly 13 million of food production. This certainly raises major challenge to planners and policy makers. In meeting such huge requirement from a thin world rice trade of 25 million ton, India will face a herculean task. The problem will further magnify if global trade in rice accelerated in the face volatile international prices. This situation assumes greater importance as Punjab – the state reputed for it being the food bowl (rice and wheat), now plan to drastically reduce area under rice and wheat in favour of horticulture crops under the pretext of climate change. If so happens, can the resource poor rainfed areas compensate the food deficit? It thus urgently calls for careful in-depth analysis of cause and effect relationship of rice production systems and other policy imperatives.



The challenge is more precarious as the vast stretch of rice fields in India is rainfed and production is risky. In particular, rainfed rice production system is characterised by:

- High dependence on the vagaries of monsoon. Moreover, increasing threat due to biotic and abiotic stress and climate change put tremendous strains on the food system resulting in more risky production.
- Predominance of small and marginal farmers (having operational holding less than two hectares), almost invariably poor performance of the staple food of rice. A big chunk of about 82 per cent of the farmers is small and marginal farmers are not only resource poor, but also commonly subjected to under-investment in agriculture, making resource use inefficient.
- These farmers are basically producer-consumers, but due to low productivity, most of them are vulnerable to poverty and malnutrition leading to food and nutrition insecurity. They are also unable to benefit from the emerging marketing system.

Apparently, the major challenge is to enhance crop and land productivity in the vast rainfed areas. These areas have ample untapped potentiality; there is scope for increasing production and bridging the yield gaps. It is essential, therefore, to carefully identify the inhibiting factors affecting production and to address the problem with appropriate strategy.

A big achiever

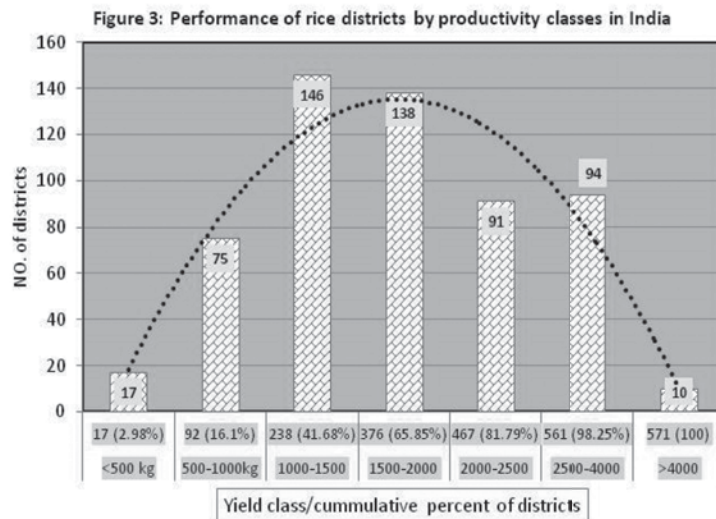
In less than six decades, food production in India achieved five folds increase due to Green Revolution giving tremendous complacency of never-before production of 245 million ton in 2010-11, which is up from barely 50 million ton in 1950. But the spread of the ostracised green revolution has been iniquitous and has been limited to rice and wheat alone and that too in irrigated tracts of the North West India (Punjab, Haryana and parts of Uttar Pradesh) and some parts of the southern India. One observes that this achievement was made possible due to a combination of increase in area, adoption of high yielding modern varieties and other technical change, but more importantly backed by supportive nation-wide preparation in infrastructure building, institutional reforms and matching policies on the institutional side. It is indeed a moot point why such a strategy would not work in today's context as there is stagnating

yields and severe ecological crises. Punjab that contributes close to a quarter of India's rice under the Public Distribution System (PDS) today faces a situation where three-fourths of the 137 blocks of the state are facing acute shortage of groundwater and the State Government and Planning Commission are jointly deciding on ways to wean farmers away from rice to save water. Subsidies on chemical fertilisers are expected to decrease given the burden to the exchequer and rising prices of crude oil. Sustaining productivity gains in the older system is not going to come easily even as the government is considering shifting towards the East for improving food production, unless policy reforms accompany simultaneously.

The current status of production performance is also dismal. The long term analysis of the 571 rice growing districts brings out the wide inter-regional and inter-district disparity in rice productivity, being highly skewed towards the rainfed areas. It is a matter of concern that the average productivity of rice in as many as 376 districts (66 per cent of rice districts in India) is less than 2 ton per hectare (ha), which is less than the national average of 2.2 ton/ha in TE2008 (Figure 3). Incidentally, the low productivity districts are concentrated in the vast rainfed areas, where the strategy for productivity enhancement and bridging the yield gap should be the priority. If that happens, it will go a long way in fulfilling household food security. Household food security is emphasised, because poor are deprived from food access, knowledge empowerment and far from institutional infrastructure and support. This implies that many more miles are to be scaled in addressing the issues of inter-regional disparity on yield and increased yield gap at macro as well as micro level planning and food security .

Growth Dynamics

The picture is equally distressing for the growth scenario too. During the green revolution, growth of productivity reached over 3 per cent in the 1970s and 1980s, but the same has tumbled to a low level hovering around one per cent in the 1990s, and remained unaltered hereafter (Figure 4). The year-on-year growth pattern during the past decade is even more disappointing. The situation gets worst as the cost of production of rice and wheat is increasing, while productivity is declining, which is ringing an alarming bell (Barah 2010). As farmers adopt input (market) intensive modern agricultural technologies, they



suffer from the externalities in various fronts. On one hand, they face the deteriorating environment due to indiscriminate use of agrochemicals, and galloping price escalation on the other. These unfavourable factors make production unsustainable. Moreover, the farm income has eroded, soils have degraded, water is stressed and biodiversity depleting. On the whole, the analysis clearly brings out dual dimension of the problem of food security.

Firstly, uneven production performance of rice across the country is causing regional disparity. Secondly, despite bumper harvest, owing to inequitable access to food those who deserve most, suffer from acute food insecurity at the household level, symbolic to direct implication on poverty and nutrition security. The inequitable distribution led to extreme poverty and incidence of hunger and malnutrition. This is reflected in a calculation based on recent round of NSSO consumption data that most of population in India needs food security coverage (nearly 720 million). However, there is no consensus on the number of

households to be included in the priority list and on variables to be used to fix the cut off at state and further at district level. The Food and Agriculture Organisation (FAO) of the United Nations has proposed an interesting alternative that needs to be considered as part of the policy options. It is suggested to: (i) identify the high food-stress regions and districts across the country; and (ii) formulate or make a composite index of 'spread of agriculture', 'agricultural (cereal) productivity', 'irrigation intensity', 'presence of agricultural markets' and 'social practices' that influence local-area food production and markets. Rather than sticking to controversial single factor consumption expenditure based measure of poverty, Shukla (2010) has addressed the issue and suggested an effective multidimensional poverty measure, which appears to be a more comprehensive measure. Another version is that the regression weights-based index, known as Proxy Means Test (PMT), identifies a flexible set of variables that predicts their impact on a household's monthly per-capita expenditure. The coefficient weights

Figure 4: Decadal growth of productivity of foodgrains

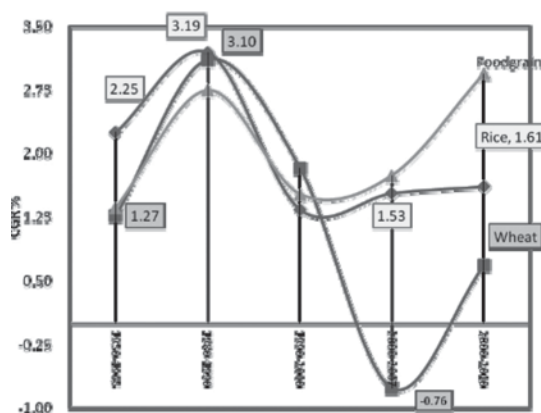
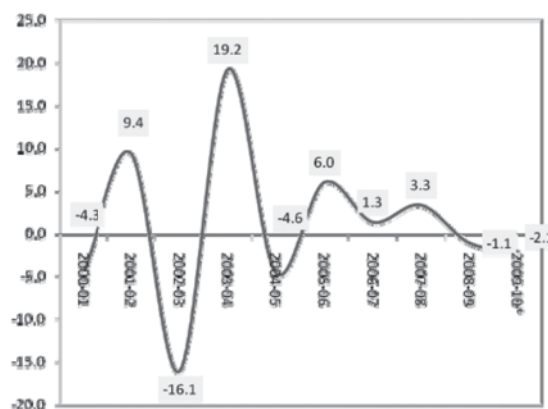


Figure 5: Trends in Growth rate (%) of Rice yield (GOI 2010)



are used as the scores unique to each household, which differ according to the socio-economic and environmental characteristics of a region, a state or a district; the levels at which one intends to identify the target households. (*Shariff and Bajpai 2012*).

Food Security

The on-going debate on national food security bill has taken an interesting turn, firstly, due to lack of measure of food need and, secondly, due to lack of consensus on identifying the BPL at the state level. At the present context, given the low share of agricultural in the country's GDP, a good number of districts will qualify for universal coverage under the NFSB. Perhaps, the smaller number of well-endowed districts, which will be mostly found in Punjab, Haryana, Western Uttar Pradesh and parts of Andhra Pradesh, can devise their own universal food security policies, including the PDS.

A set of strategies suggested for achieving sustainable food security:

- **Effective food management system and procurement policy (PDS)**

At present, this has been a most talked about subject as the farmers are unable to market their produce on one hand and on the other the foodgrains are rotting in the government godowns.

- **Identify food security needs and identify the BPL at rural as well as urban areas**

This has been a subject of intense debate for a long time throughout the country. To arrive at consensus, systematic work on methodology, which is easy to understand and estimate and also comprehended by the common man at large need to be carried out.

- **Increase investment in agriculture, but performance monitor to be in place**

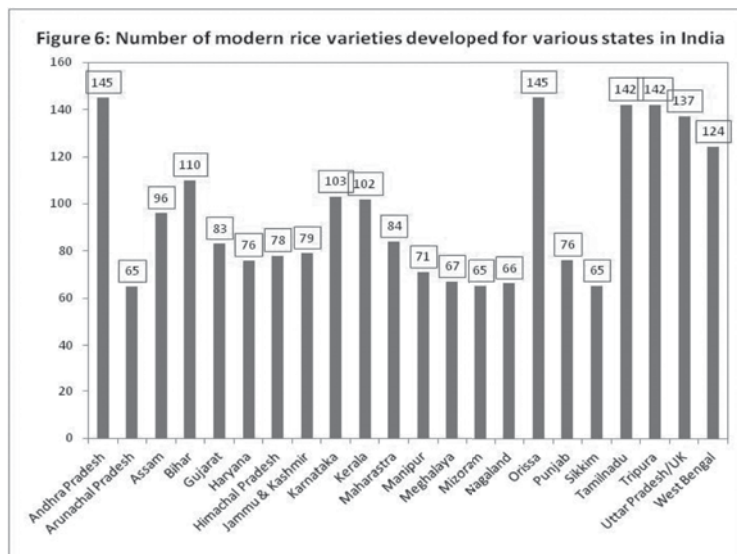
Studies show that investment on agriculture was lagging behind for a long time (which is less than half a per cent of agricultural GDP). But at present there is seasonable investment earmarked in the sector; however its achievement remained unchanged. It thus calls for stricter monitoring and accountability.

- **Sustainable food production and conservation of natural resources**

Accumulated evidences indicate that the practice of System of Rice Intensification (SRI) provides scope for enhancing productivity to break the yield barrier of smallholder farms. The novelty of SRI is that it produces more rice with less input while conserving precious

water and other resources, an important pre-requisite for climate smart agriculture. Another intrinsic feature is that it is a pro-poor option for household food security that is why large number of farmers across the country have adopted this agro-ecological innovation, mostly on private initiatives. At present, some government departments in some states (such as Bihar, Tamil Nadu, Andhra Pradesh, Jharkhand and Tripura) scaled up SRI in their respective states. Financial institutions such as NABARD, civil society organisations such as PRADAN, WASSAN, AKRSP, etc., are promoting SRI and helping farmers in capacity building and increasing productivity, which resulted in unparalleled outreach of more than a million hectares under SRI. Yet much need to be done, which requires effective scaling up strategy for wider adoption and innovative institutional architecture framework (Planning Commission 2012, Report of the subgroup on Upscaling Innovative Technologies in the 12th FYP). Briefly, SRI is an integrated package of agronomic approaches which together exploit the genetic potential of rice plants; create a better growing environment (both above and below ground); enhance soil health; and reduce input usages (seeds, water, labour). Phenomenal saving in seed (90 per cent saving) and water (40-50 per cent saving) attracted farmers to adopt SRI. In the context of scale up strategy, transferability, transparency and sustainability, and strengthening of some of existing institutional initiatives assume greater importance.

The National Consortium on SRI through a series of dialogues with NFSM, ICAR, IARI and the Planning Commission recommends following up of a pro-active policy that recognises the potential of innovations such as SRI for three policy pivots focused on (a) food security (at household and regional levels with implications for poverty reduction), (b) a much needed strategy for furthering irrigation sector reforms in canal and bore well irrigated areas, which experience increasing water stress and conflicts; and (c) ensuring sustainability of stressed rice ecosystems with focus on ensuring sufficient soil biota to revive soil health.



- Farmer-friendly agricultural R&D system and eco-friendly technology practices**
 Technology backstopping is indispensable to production increase. Since 1965, a huge number of modern varieties have been developed by the agricultural R&D system, yet their impact is very minimal at the farmers' field (Figure 6). Barely a fraction of these have reached target, due to lack of effective transfer of technology policy. This requires addressing several system inefficiencies, which affected sustainable food production. The phenomenon of "Crop Holiday" declared by Andhra farmers is an eye opener for reform

need for ensuring sustainable food security and feeding the growing billion population.

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