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India's food and nutrition security

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When India became independent, the country faced two major nutritional problems: one was the threat of famine and the resultant acute starvation due to low agricultural production and the lack of an appropriate food distribution system; the other was high prevalence of chronic energy and micronutrient deficiencies due to:

- low dietary intake because of poverty and low purchasing power;
- high prevalence of infection because of poor access to safe drinking water, sanitation and health care;
- poor utilization of available facilities due to low literacy and lack of awareness.

India had recognized the importance of optimal nutrition for health and human development. Article 47 of the Constitution of India states "the State shall regard raising the level of nutrition and standard of living of its people and improvement in public health among its primary duties". India's five-year plans

- enunciated the policies,
- laid down multi-pronged strategies and outlined multi-sectoral programmes to improve food security and nutritional status of the population
- laid the goals to be achieved within the specified time frame and
- provided the needed funds to implement the programmes.

The comprehensive, multipronged strategy for combating acute and chronic food insecurity consisted of the following components :

- efforts to improve availability of food by providing adequate priority and support for improving productivity, increasing food production and reducing wastage
- efforts to improve access to food through:
 - ✓ creation of adequate buffer stocks to tide over seasonal/regional shortfalls in food production
 - ✓ Improving household food security through
 - * economic growth, poverty, reduction, improving purchasing power
 - * interventions aimed at reducing poverty and improving purchasing power through employment programmes e.g., food for work programme in the earlier years and currently the National Rural Employment Gaurantee Scheme
 - * direct or indirect food subsidy for the poor such as providing subsidized food grains through the public distribution system (PDS) to the poor (Targeted PDS) and providing food at heavily subsidized cost to the very poor (*Anthyodaya Anna Yojana*)
 - * providing food supplements for bridging the gaps between nutrient

requirements and dietary intakes for vulnerable groups such as preschool children, pregnant and lactating women (Integrated Child Development Services Programme) and school children (Mid day meal programme)

- * effective food distribution of essential foodstuffs at subsidized cost to the food-insecure population through efficient and effective public distribution system (PDS).
- efforts to improve nutritional status through
 - ✓ reducing morbidity by improving environmental sanitation and access to potable water supply
 - ✓ efforts of the health sector to tackle
 - * adverse health consequences of undernutrition
 - * adverse effects of infection and unwanted fertility on the nutritional status
 - * micronutrient deficiencies and their health consequences
- * provide nutrition and health

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education so that the people optimally utilise the available goods and services to improve their health and nutritional status

A review of the progress over the last six decades shows that with the Green Revolution, the country rapidly attained self-sufficiency in food production and built up adequate buffer stocks. Famines no longer occur, though pockets with periodic severe food insecurity persist even today. The country had relatively low gross domestic product (GDP) growth till the Nineties but GDP growth had accelerated in the last two decades. Over the years, there has been a slow but steady decline in poverty. Universal access to PDS, ICDS, and health services is a reality today but coverage, content and quality of services provided are sub-optimal. In spite of these relatively favourable circumstances, the improvement in the nutritional status of the population has been slow and suboptimal. There has not been any reduction in low birth weight rates and anaemia; decline in under-nutrition rates is slow¹.

Over the last two years there has been a steep and sustained increase in food prices, globally, and in India; this has resulted in erosion of the household food security not only among the poorer segments of population, but also the low middle income groups, prompting the debate about whether the poor alone or others also should be entitled to access to foodgrains through PDS, and if so at what cost. Increasing expenditure on essential non-food items such as education and health care has prompted redefinition of the poverty line; the Planning Commission has accepted the recommendations of the Tendulkar Committee² that calories alone should not be the criteria and expenditure on health and education should be considered while defining the poverty line.

The President of India, during her address in the first session of the 15th Lok Sabha in June, 2009; stated that the government was considering the draft food security legislation "to provide a statutory basis for a framework, which assures food security for all. Under this legislation every family below the poverty line in rural as well as urban areas will be entitled, by law, to 25 Kg of rice or wheat per month at Rs 3 per Kg. This legislation will also be used to bring about a broader systemic reform in the PDS". The draft food security bill is currently being debated. Progress in

efforts to achieve food security over the last six decades and current efforts to improve household food and nutrition security are reviewed in this manuscript.

Food and nutrition security

The term "food security" was first used in the international development literature of the 1960s and 1970s, and referred to the ability of a country or region to assure adequate food supply for its current and projected population. The term reflected the era's main concern, focused on developing country's ability to produce adequate food to meet the needs of their growing population. If this criterion is used, India has been food secure from the mid Seventies; however undernutrition rates and micronutrient deficiencies continued to be high; several Asian countries are in a similar situation. The World Food Summit in 1996 redefined food security as a situation in which "all people, at all times, have access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life". This definition goes beyond mere availability and access to food and includes a whole lot of prerequisites to promote optimal utilisation of food including healthy environment and good eating practices, and provides the link between food, nutrition and health. Many countries use the term food and nutrition security for this broader definition. Gaps in availability, access and utilisation of food result in 'food insecurity outcomes' such as increased child mortality, undernutrition and micronutrient deficiencies in all age groups, especially children; improvement in food security is expected to lead to reduction in child undernutrition and mortality.

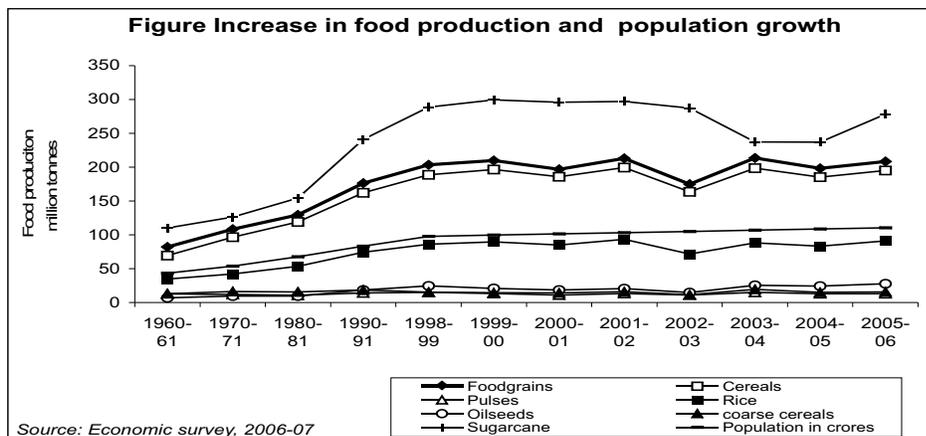
Food production and food security

Adequate food grain production is the essential prerequisite for food security in

any large country. India was a net importer of food grains in the Fifties and Sixties; the country's dependence on imported food was reflected in the picturesque term a "ship to mouth" existence. Those who had lived through that era, consider the Green Revolution as the best example of what the country can achieve when it strives to attain a cherished goal. Though the technology of high-yielding varieties provided the necessary impetus, policy initiatives such as land reforms, investment in irrigation and fertilizer subsidy, and programme initiatives such as investment in lab-to-land agriculture extension education, farm level procurement of food grains and minimum support price played a major role in the country achieving self-sufficiency in food production within a decade. Considering that the agricultural land in the country is privately owned, becoming self-sufficient in food production, is a good example of mission-mode public-private-partnership to achieve a national goal within a decade. Over the last five decades, increase in food production was higher than increase in population. The last century ended with the country's output of food grains crossing 200 million tonnes, a fourfold increase since 1960-61 (Figure)³.

Emerging problems in food security

The very success of the drive to achieve self-sufficiency in rice/ wheat production brought with it some major problems. Intensive mono-cropping led to deterioration of soil health. Many states attempted to increase production through subsidies on inputs such as power, water and fertilizers, rather than by building new capital assets in irrigation and power. Unsustainable practices like excessive use of water and imbalanced use of fertilizers, especially



in northern and northwestern parts of the country, have adversely affected soil health and environment. Though the use of pesticides seems to have declined, because of the propagation of the Integrated Pest Management (IPM) approach and the increasing awareness about the health hazards of pesticides, the availability of quality pesticides and pesticide residues in foodstuffs, remain a matter of concern. Many of the erstwhile high -producing states are experiencing 'Green Revolution fatigue'. Very little attention is being paid to achieve integrated farming systems that will ensure sustainable evergreen revolution essential for appropriate dietary diversification to achieve nutrition security.

A poor monsoon and global food grain price rise had an impact on food prices in the country. The last two years witnessed huge food inflation with all its attendant adverse consequences on the quantity and quality of food consumed, especially by the poorer segments of the population. To meet all the nutritional needs of the growing population, the country will have to produce an extra five million tonnes of food grains annually and increase the production of livestock, fish and horticultural products. This has to be achieved in the face of shrinking arable land and farm size, low productivity, growing regional disparities in productivity and depletion of the natural resource base. Appropriate steps have to be taken to minimise the potential adverse consequences of globalisation on domestic production, employment and price stability of food commodities.

Pulses are the major source of protein in Indian diets. Pulse production does not require too much water and is not very labour intensive. Growing pulses enriches the soil. Pulses command reasonable price in the market. In spite of all these favourable factors, pulse production has been stagnant for five decades. The gap between demand and supply necessitated import of pulses. The cost of pulses soared, and household consumption of pulses has come down. Reduction in pulse consumption will have an adverse effect on nutrient intake and the nutritional status of the population.

Fruits and vegetables provide essential micronutrients vital for nutrition and health. India is the first or second country in the world in the production of vegetables and fruits. Export earning

from fruits and vegetables are growing but per capita vegetable and fruit consumption continues to be low in all segments of the Indian population including the families with no economic constraints. This is the major factor responsible for widespread anaemia and micronutrient deficiencies in the population. Nutrition education that emphasises the need to increase vegetable consumption will succeed only when vegetables are available throughout the year at affordable cost. This can be achieved if the National Horticultural Mission focuses attention on production, processing and marketing of low-cost, nutrient-rich vegetables.

National Food Security Mission (NFSM)

In India, it is difficult to increase the land under cultivation, and productivity has also been quite low. It might be possible to improve productivity without worrying too much about the country's inability to expand the area under cultivation and achieve the Eleventh Plan goal of 4 per cent growth in the agriculture and allied sectors⁴. The National Food Security Mission (NFSM)⁵ was launched in August 2007 in order to:

- increase production of rice and wheat through productivity increase and increase in pulses through area expansion and productivity enhancement in a sustainable manner;
- restore soil fertility and productivity at individual farm level;
- enhance farm-level economy (i.e. farm profits) to restore the confidence of farmers in the targeted districts

The Mission is focussed on states / districts with higher yield potential and large yield gaps. The **rice component of NFSM** will be implemented in 20 million hectares in 133 districts in 12 states with more than 50,000 ha area under rice and productivity less than the state average. The **wheat component of NFSM** will be implemented in 13 million hectares in 138 districts in 9 states with sizeable area under wheat, in well-irrigated districts with productivity less than national/state average. The **pulses component of NFSM** would cover 4.5 million hectares in 168 districts in 14 states with potential for area expansion through inter-cropping /

fallow land. The implementation of the NFSM is expected to result in increasing the production of rice by 10 million tones, wheat by 8 million tones and pulses by 2 million tones by 2011-12. It would also create additional employment opportunities.

National Horticultural Mission

The National Horticultural Mission⁶ was set-up to meet the increasing need for fruits and vegetables and simultaneously to facilitate diversification for making agriculture more profitable through efficient land use, optimum utilization of natural resources (soil, water and environment) and creating skilled employment for the rural population. Post harvest losses can be outright physical losses (as in fruits or vegetables) or deterioration in quality and infestation with pests which reduce the value of the foodstuffs (as in food grains and pulses). Losses occurring at drying, storing and transport in cereals is estimated to be between 6-10%; 25-40% of the fruits are lost due to spoilage; the estimated losses in vegetables are about 20-25%. Some of the major interventions needed include:

- creation of essential infrastructure for preservation, cold storage, refrigerated transportation, rapid transit, grading, processing, packaging and quality control of fruits and vegetables;
- provision of necessary investment to enable the horticultural sector to achieve its full economic potential;
- focus on appropriate technology to reduce waste to prevent distress sale at low cost by the farmers and to provide remunerative employment to the rural youth.

All these efforts would make horticulture more remunerative for the farmer, reduce losses due to wastage and increase availability of vegetable at affordable cost throughout the year for the consumers, thereby improving food and nutrition security

Poverty and food security

In the Seventies, income was one of the major determinants of food security; more than 70% of households were food insecure, in spite of household expenditure on food being more than 70% of the total household expenditure, and 70% children were undernourished.

All-India rural and urban poverty line baskets (PLB) were derived for rural and urban areas separately, anchored in the per capita calorie norms of 2400 (rural) and 2100 (urban) per day. The existing all-India rural and urban official poverty lines were originally defined in terms of per capita total consumer expenditure (PCTE) at 1973-74 market prices and adjusted over time and across states for changes in prices. However, the consumption patterns underlying the rural and urban PLBs remained tied down to those observed more than three decades ago in 1973-74. Alterations in income, lifestyles and consumption pattern of all segments including the poor has not been reflected in the poverty line computations. Consumption expenditure on food has decreased and expenditure on other items such as transport, education and health care have increased. The earlier poverty lines assumed that basic social services of health and education would be supplied by the state and hence, although private expenditure on education and health was covered in the base year 1973-74, no account was taken of either the increase in the proportion of these in total expenditure over time or of their proper representation in available price indices.

The Planning Commission constituted an expert group to review the methodology for estimation of poverty. This committee² had recommended that actual private expenditure per capita on food, education and health consistent with optimal nutritional, educational and health outcomes should be used to define the poverty line. The new definition of poverty is broader in scope and fits well with the current definition of food and nutrition security. Due to increasing mechanization over decades, there has been a reduction in physical activity and energy requirements both globally and in India⁹. Using the new poverty line definition, the people near the poverty line in urban areas continue to be able to afford the original calorie norm of 2100 per capita per day, but their actual observed calorie intake from 61st Round of National Sample Survey Organization (NSSO) is 1776 calories per capita⁷. This actual intake is very close to the revised calorie intake norm of 1770 per capita per day currently recommended by the Food and Agriculture Organization (FAO)⁸. Actual observed calorie intake of those near the new poverty line in rural areas (1999 calories per capita) is higher than the FAO norm. It has been estimated that if these revised criteria are applied,

poverty at the all-India level in 1993-94 was 50.1% in rural areas, 31.8% in urban areas and 45.3% in the country as a whole as compared to the 1993-94 official estimates of 37.2 per cent rural, 32.6 per cent urban and 36.0 percent combined. The new methodology gives a higher estimate of rural head count ratio at the all-India level for 2004-05 also, but the extent of poverty reduction between 1993-94 and 2004-05 is not different from that inferred using the old methodology.

At present, the government provides 35 kg of food grains, including wheat and rice, to 65.2 million families classified as living below the poverty line (BPL). These subsidised rations are made available at a price of Rs 4.15 per Kg for wheat and Rs 5.65 per Kg for rice. For the 24.3 million families classified under the *Antyodaya* scheme (also part of the BPL category), the prices of these grains are further reduced to Rs. 2.00 for wheat and Rs. 3.00 for rice. The proposed National Food Security Bill will be using the new methodology for poverty estimates and would cover a larger proportion of the population. However, if the proposal aims at providing only 25 kg of food grains to families below poverty line at the subsidised cost, there will be reduction in the quantity of grains given to the families.

Food and nutrition security in India

In spite of self sufficiency in food production, adequate buffer stocks and relatively low food prices over the last three decades at the national level, reduction in undernutrition rates in India have been very slow. Data from India show that undernutrition rates in preschool children are comparable to those in Sub-Saharan Africa with substantially lower GDP. However, infant and child mortality rates in India are much lower than those in Africa - the so called South Asian Enigma. Low birth weight rates in India are higher than in Sub-Saharan Africa, but the majority of Indian low birthweight neonates are mature; they have better access to health care and so under-five mortality in Indian children is lower than in Sub-Saharan children. However, birthweight is an important determinant of growth in childhood. The Indian low birthweight children have a lower growth trajectory and hence have comparable undernutrition rates (as assessed by underweight and stunting) as Sub-

Saharan children. Data from India suggest that that in countries undergoing health and nutrition transition, improvement in health and nutritional status may not happen simultaneously; in situations where access to health care is better, reduction in under-five mortality may be faster than decline in undernutrition rates.

Large-scale surveys in India have shown that there are substantial interstate differences in dietary intakes, undernutrition rates and infant mortality rates. Within the states, there are large inter-district disparities in food security and nutritional status of the population. Some pockets in some states continue to experience high levels of food insecurity as reflected by the periodic reports of hunger, inadequate dietary intakes, high undernutrition rates and occasional deaths due to undernutrition. While Orissa is an example of a state with low GDP, high poverty, food insecurity and undernutrition, Maharashtra, is an example of a state where high per capita income and economic growth co-exist uneasily with severe food insecurity and undernutrition in some districts of the state¹. Data from surveys carried out by the National Nutrition Monitoring Bureau (NNMB)¹⁰ indicate that even in food-secure households, preschool children often do not get adequate food. Surveys carried out by the National Nutrition Monitoring Bureau¹⁰, National Family Health Survey (NFHS)¹¹⁻¹³, and District level Household Survey (DLHS)¹⁴ have shown that undernutrition in all age groups remains a major public health problem, especially, among poorer segments of population. In all segments of the population, the majority are anaemic and have micronutrient deficiencies; a substantial proportion of the affluent segments of the population also suffers from micronutrient deficiencies. Paradoxically, overnutrition is emerging as a public health problem in all the states, especially, among urban affluent segments of population.

The Tenth Five Year Plan¹⁵ emphasised holistic food and nutrition security as the goal and suggested that there should be a paradigm shift from mere food (grain) security at national and household level to food and nutrition security at the household and individual level. India has set up several mechanisms to map food security and monitor progress towards food and nutrition security through multiple indices ranging from food production, availability, access at

affordable cost, and dietary intake by individuals, their nutritional status and prevalence of micronutrient deficiencies. The Swaminathan Foundation in collaboration with the World Food Programme has brought out the Rural and Urban Food Insecurity Atlas in 2003 and 2004^{16,17}. In order to analyse and document the sub-state patterns of food insecurity and nutritional insecurity, World Food Programme (WFP) together with the Government of India and the Institute of Human Development is in the process of preparing state-wise 'Food Insecurity Atlases', taking districts as units of analyses. The states being taken up initially are Orissa, Madhya Pradesh, Jharkhand, Bihar and Chhattisgarh. The approach is to analyse food security in the accepted framework of availability, access and absorption. The Atlas will be based on qualitative information as well as extensive analysis of secondary data (Census, NSSO, NFHS, DLHS). Ministry of Health and Family Welfare has initiated the Annual Health Survey for providing district wise data on health and nutritional status of the population. It is expected that this survey will provide information for decentralised district - specific planning of intervention programmes and also provide baseline information for assessing improvement in terms of process and impact indicators.

Conclusion

Nutrition scientists view agricultural production as a major input required for improving dietary intake and nutritional status of the individuals. However, the farmers have to be assured of returns for their investment if they are to meet the nutritionists' prescription on what to grow to meet the nutritional needs of the population. Whenever steps have been taken to ensure that there is congruence between the economic policies, (especially, those related to agriculture) and nutritional perspectives, the response of the farming community has been excellent and this has resulted in improvement in the nutritional status of the population. The Green Revolution in India and massive increase in production of rice and wheat are the best examples of what could be achieved if agriculture scientists, economists and nutrition scientists pull together. The country achieved self-sufficiency in food-grain production to meet the needs of the growing population, and adequate buffer stocks were built up within a relatively short time; improved access to

food and health care for poorer segments of the population led to reduction in undernutrition.

The future task is to sustain food security and improve nutrition security within the existing constraints. The population of India may peak at about 1300 million, and that of farm animals at 500 million, and food for them must be found on barely 0.15 hectare of land per head. Increased yields of foodstuffs per hectare, more crop rotations per year, and genetic improvements of plants and seeds will be required to meet these needs. Rich biodiversity should be preserved. Sustainable management of land, water, flora, fauna and the atmosphere should be ensured.

The experience in India and other countries undergoing economic and nutrition transition, shows that self-sufficiency in food production is an essential prerequisite but by itself will not result in improvement in nutritional status of the population. The country should continue the multi-pronged efforts to ensure nutrition security for all, especially, the poor by improving awareness and access to low cost balanced diets, safe drinking water, sanitation, education and essential primary health care. Convergence and coordination between all these programmes at village / urban areas can result in substantial reduction in undernutrition and improvement in nutrition security, especially among vulnerable groups of population.

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FOUNDATION NEWS

Study Circle Lectures

- Commonwealth Games 2010: Nutrition for the Athlete” by Prof Deeksha Kapoor on 28th April 2010.
- Politics of Vitamin A Supplementation in India” by Prof Umesh Kapil on 20th May 2010.
- Assessment of nutritional status in children” by Dr Prema Ramachandran on 21st June 2010.