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The changing nutrition scenario

C. Gopalan

During the past six to seven decades there has been a remarkable change in the pattern of nutrition-related problems in India. Looking back, we can see how far we have come. But, looking forward, we see that the road ahead is long and challenging.

LOOKING BACK 1940s to 1960s

In the 1940s and 1950s, the major nutritional diseases prevalent in large sections of the population were kwashiorkar (acute protein-energy malnutrition), keratomalacia (attributable to severe vitamin A deficiency), beri-beri (arising from vitamin B1 deficiency) and pellagra (nicotinic acid deficiency). Over the course of two to three decades, the most florid manifestations of these malnutrition diseases virtually disappeared. How did this happen in a poor country with a burgeoning population and limited resources? These “miraculous changes” did not come about through distribution of synthetic vitamins, drugs or special formulations, but through a better understanding of the diseases themselves, and through local-level health and diet-based interventions. There was a strong move to introduce a protein supplementation programme with fish concentrates and wheat fortification with lysine to tackle kwashiorkar. Indian nutrition scientists argued against these moves, and were ultimately proved to be right.

The banishment of beri-beri is a classic example of a common sense approach. It was known that beri-beri was caused by vitamin B1 deficiency, and there were some who advocated vitamin B1 supplementation. However, a look at ground realities gave a clue to the solution. The people living in a region (which is now Andhra Pradesh) ate milled and highly polished rice as their staple diet. Beri-beri was rampant there. The people living further south were eating rice that was only partly milled and not polished. There was no beri-beri in this population. A policy decision was made that the rice being accessed by the low socio-economic groups would not be milled and polished. Beri-beri soon died a natural death. Sometimes unforeseen factors unleashed by the developmental process have worked tangentially but effectively to help in changing the epidemiology of nutritional diseases. An example is the disappearance of pellagra, a disease associated with nicotinic acid deficiency. Populations that consumed the millet jowar (sorghum) almost exclusively as their staple diet were prone to pellagra. Research showed that the high leucine content in this millet inhibited the absorption of nicotinic acid. But scientists did not resort to

nicotinic acid supplementation. Instead, they advised these populations not to rely solely on jowar but to vary their diets by including other cereals and millets. Meanwhile, when the Green Revolution arrived in the late 1960s, the price of rice and wheat supplied through ration shops fell to low and readily affordable levels. People switched to eating rice, and soon thereafter pellagra perished.

Diseases have natural histories of their own. The natural histories of the severe nutritional diseases hold lessons and valuable insights for nutritionists. They must remain ever alert to local conditions and changing environments, to anticipate the nutritional fallouts¹.

During the British regime, India experienced recurrent famines that killed several hundreds of thousands of people. The casualties during the Great Bengal Famine were said to have been greater than the total casualties of all the Allied armed forces in World War II. After Independence in 1947, major famines were no longer seen, but the threat of starvation still loomed over large sections of the people. Malnutrition continued to haunt the poor, though there has been a reduction in severity of the manifestations. Alongside these problems, the population of Independent India surged at a rate that dwarfed the population growth of the previous 200 years. By the 1960s, India was faced with fast-emptying grain baskets, and the prospect of having to import food to ward off famine.

Green Revolution

With the timely advent of the Green Revolution, this threat was staved off. Intensive cultivation of high-yielding varieties of rice

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and wheat filled the granaries. But, not surprisingly, the Green Revolution had some deleterious side-effects. The heavy use of chemical fertilizers and intensive cultivation practices depleted soil fertility in many areas, robbing it of valuable and essential micronutrients and thereby compromising the nutritional quality of the foods grown in these soils. Importantly, the near-exclusive emphasis on rice and wheat resulted in the virtual disappearance of millets from the diets of large sections of the population. This was unfortunate because millets are valuable as adjunct foods, not only from the nutritional point of view but also because these have a low glycaemic index. For instance, the rise in blood glucose levels is much less with a ragi-based diet than with a rice-based diet². While it is true that the “epidemic” of diabetes that we are witnessing today is multifactorial in origin, sharp changes in long-held dietary patterns (abandonment of millets from the diet and fewer complex carbohydrates) may have contributed to the problem.

1970s to 1990s

While the food scarcity problem was largely solved by the 1970s, the malnutrition problem was not. The Green Revolution had focussed almost exclusively on rice and wheat. The result was a relative neglect of pulses and horticultural products. Pulses are an important source of protein in Indian diets, particularly for vegetarians. There has been a progressive escalation in the cost of all the pulses; these are generally not being distributed under the subsidized Public Distribution System, and are, therefore, not within the purchasing power of the poor. Again, while India is among the largest milk producers in the world, the milk intake of the people who need it the most (young children and pregnant women in the poor socio-economic groups) is low³. Vegetables and fruits are perishables, and in the absence of effective storage, preservation and transportation, the prices are unstable and the availability uncertain. With all these factors coming into play, the diets of the average Indian household did not show any significant improvement over the last few decades of the century.

How was this unsatisfactory nutritional situation manifested? The social development indices of the late 1990s continued to be unflattering. The rates of maternal mortality, infant mortality and under-five mortality were still unacceptably high. About one-third of newborn infants were of low birth weight and there was a distressingly high prevalence of wasting and stunting in children⁴. Maternal anaemia was so widespread as to be termed endemic.

The role of micronutrients

The period from the 1970s to the 1990s saw added focus on the role of micronutrients. Of course, nutrition scientists even in the earlier part of the century had seen at first hand the health problems caused by deficiencies of vitamin A, iron, and iodine. But the roles of other micronutrients such as zinc, folic acid, magnesium, selenium and vitamin D, among others, in processes ranging from growth and development of children to the functioning of the immune system started receiving greater attention. The increasing evidence that micronutrients function synergistically within the human system, and that stand-alone supplementation of one or the other micronutrient would have only limited benefits, made it even clearer that only food-based approaches could achieve nutritional balance in the long run. For instance, India’s experience with decades of iron supplementation programmes in pregnant women has been less than satisfactory, with the levels of anaemia remaining stubbornly high in this vulnerable group even in the face of supplementation. The challenge, therefore, is to increase the intake, bioavailability and absorption of iron in the system. It has been reported that the presence of some other micronutrient(s)

like vitamin C enhances iron absorption⁵. This continues to be an important area of research. Meantime, the ideal approach to tackle micronutrient deficiency would be to provide supplements only where and when absolutely necessary, fortify foods where the technology is simple, sustainable and demonstrably safe, and push steadily for a diet-based approach involving a variety of locally available foods.

Factors that influenced the changing nutritional scenario

Throughout the latter part of the twentieth century, certain trends associated with the overall development process in the nation began to gather momentum:

(i) Population growth: As death rates fell, birth rates continued to be high, and some of the earlier killer diseases began to be tackled, the population grew rapidly. Fortunately, the Green Revolution staved off the threat of foodgrain shortages.

(ii) Urban migration: As the cities developed and offered more opportunities for employment, and agriculture became gradually less labour-intensive, people moved in large numbers into the cities. This phenomenon resulted in the mushrooming of urban slums and sharp changes in the lifestyles and diets of the erstwhile rural people.

(iii) Mechanisation and labour-saving devices: The energy expenditure of almost all sections of the population fell substantially as lifestyles became more sedentary.

Dual nutrition burden

Not surprisingly, therefore, in the last decades of the twentieth century, a new nutritional problem began to emerge in India - the problem of overnutrition and obesity. This was a phenomenon that had already entrenched itself in developed countries, with increasing mechanisation, changing lifestyles, and fast foods. All these factors inevitably made their way into India as well, particularly in the urban areas, with predictable results. Within a single generation, the prevalence of obesity rose substantially and, by the late 1990s, the trend was inexorably upwards. This problem constituted a dual burden - persistent undernutrition alongside emerging overnutrition.

The twist to the tale as far as India and other countries in the region are concerned is that this sharp rise in obesity is a manifestation of “nutritional transition”. Children who experienced intrauterine growth retardation, resulting in low birth weight, appear to be programmed to develop along a lower growth trajectory. Paradoxically, however, many overweight and obese adults are those who had experienced calorie deprivation and faltering growth in early childhood due to poverty and deprivation. Subsequently, with better access to food and low physical activity, they fall prey to the opposite problem of obesity. Barker’s hypothesis⁶ linking low birth weights and early nutritional deprivation with obesity in adulthood, with its accompanying metabolic disorders, focuses the spotlight on the crucial importance of a “life-cycle approach” to nutrition. The early signs of malnutrition throw long shadows well into adulthood. Indeed the consequences of metabolic imbalance are being felt even earlier in life, with obesity becoming more and more prevalent even in childhood.

Overweight and obesity are health risks by themselves. Added to this is the associated risk of developing chronic lifestyle diseases such as diabetes and coronary heart disease. This trend has serious consequences for the health and quality of life of adults in the prime of life; it is also a tremendous drain on national public health resources, which have now to be used to defend enemies

on both flanks. Therefore, by the end of the century, nutritionists and policy planners were battling the old enemy, undernutrition and micronutrient deficiency, by stepping up food availability, fine-tuning large, national level programmes of supplementation and nutrition support, universalizing a mid day meal (MDM) programme for school children, researching potential inputs that could make a dent in stubborn problems, and trying to step up governance to meet Millennium Development Goals relating to social indicators of development. They were also just beginning to turn their attention to the new battle against obesity. This is a battle for minds, involving education, awareness building and persuasion, where no handouts or supplementation can help.

The new millennium

We are now more than a decade into the new millennium. During this last decade, the Government of India has attempted to strengthen its social sector programmes and launch new ones:

(i) It has been trying to strengthen its flagship nutrition supplementation programme, the Integrated Child Development Scheme (ICDS), and its nation-wide school feeding programme (Mid day Meal Programme).

(ii) Launched a unique work-guarantee scheme for the vulnerable sections of the population (NREGA). The latter has encountered problems on the ground, and attempts are on to monitor the scheme so as to plug the leaks.

(iii) A Food Security legislation is planned, that aims to put adequate stocks of food grains into every poor Indian household at heavily subsidized prices.

(iv) The widening use of electronic databases and the launch of a programme to give every Indian a unique identity number (UID scheme) are designed to target the government funds and subsidies more efficiently.

(v) Through a new legislation, every Indian child has been given the Right to Education. It is another matter that millions of children and their parents remain unaware of this right and are in no position to exercise it for a variety of reasons.

There have also been some tentative moves towards public-private partnerships for improving social sector programmes such as primary health and primary education, with the involvement of corporates and non government organizations (NGOs). However, these are still on a limited scale.

Millennium Development Goals (MDGs)

As the new century dawned, globalization had become more than just a concept. It had become reality. Enlightened people everywhere were realising that hunger and malnutrition anywhere on the planet was everyone's concern. In a bid to accelerate development towards a better quality of life for all citizens especially those from poorer segments of population living in developing countries, 193 United Nations Member States and many major international organizations have agreed to achieve by the year 2015 the following Millennium Development Goals: (i) Eradicate extreme poverty and hunger; (ii) Achieve universal primary education; (iii) Promote gender equality and empower women; (iv) Reduce child mortality rates by 2/3rd between 1990-2015; (v) Improve maternal health and reduce maternal mortality by 3/4th between 1990 and 2015; (vi) Prevent further increase in prevalence by 2015 and later reduce prevalence of HIV/AIDS, malaria, tuberculosis and other diseases; (vii) Ensure environmental sustainability; and (viii) Develop a global partnership for development⁷.

Setting specific targets and quantifying progress towards these targets has been helpful in identifying areas of weakness and in drawing up report cards. India is a signatory to the Millennium Development Goals and the Eleventh Five Year Plan had set time bound measurable nutrition and health goals taking MDG into account. A brief statement of the goals set and the current status is given in the Table. As we can see, India will not meet many of its MDG targets. The problems of low birth weight and maternal anaemia are still worryingly high. Undernutrition leading to poor growth and stunting continues to take its toll on succeeding generations of children. Simultaneously, the problem of obesity and chronic lifestyle diseases is now virtually an "epidemic". It is estimated that, unless effective interventions are undertaken, the current prevalence of obesity of 10-15 per cent among adults will double over the next two decades⁸. The number of deaths from cardiovascular diseases (CVD) annually in India is projected to rise from 2.26 million in 1990 to 4.77 million in 2020⁹ with a similar potential for steep increase in risks of cardiovascular disease and diabetes^{10,11}. This constitutes only the proverbial tip of the iceberg, because many people with these conditions may be unaware of these and may not seek medical help. With the growing trend towards sedentary lifestyles, hypertension may become the rule rather than the exception, and start at earlier and earlier ages, especially in urban areas. As we have seen, the link between these diseases and overnutrition is now well established.

It is no surprise, therefore, that the "dual disease burden" runs in parallel with the "dual nutrition burden". The malnutrition-infection link has long been known, because poor nutritional status affects the immune system and increases vulnerability to infection. Infectious and communicable diseases continue to decimate large numbers of people, particularly children; simultaneously, non communicable, lifestyle diseases such as diabetes and coronary heart disease are rising inexorably. The overnutrition-chronic diseases link has been firmly established towards the latter part of the last century - obesity predisposes to metabolic syndrome and thereby to non communicable diseases. In short, the dual nutrition problem has multiplied the pressure on the public health system and continues to use up scarce resources.

The way forward: changing the nutritional scenario

The key to long-term solutions lies in prevention. This requires a proactive approach. The current programmes are aimed largely

Table: Eleventh Plan goals and current level of achievement		
Indicator	Eleventh Plan goal	Current level
Reducing the maternal mortality rate (MMR)	1 per 1000 live births	2/1000 live births
Reducing the infant mortality rate (IMR)	30 per 1000 live births	50/1000 live births
Reducing the total fertility rate	2.1	2.6
Undernutrition in under 3 children	Reduce by 50%	No significant reduction
Reducing anaemia among women and girls	Reduce by 50%	No significant reduction
Raising the sex ratio of girls: boys in the age group 0 to 6 yr	935:1000	914:1000

Source: Reference 8

at alleviating the effects of poverty and low income, and are, therefore, based on a system of food subsidies and hand-outs. While this is certainly necessary in the present context, the long-term approach should be to empower all households to access their food and health needs and be able to raise their standards of living. This calls for accelerated programmes to improve the quality of our human resources, starting at the root of the problem.

(i) The problem of low birth weight can be solved only by ensuring better maternal nutrition. The weight gain in a woman during pregnancy should be at least 9 to 10 kg for any reasonable expectation of a >2.5 kg baby. Maternal and Child Health Centres should take up strong counselling programmes to help achieve this goal.

(ii) However, maternal nutritional status is itself dependent on nutritional inputs earlier in life. Adolescent girls, many of who are outside the school system, especially in rural areas, should receive intensive non-formal life-skills education focusing on hygiene and sanitation, reproductive health, and child rearing practices. That such programmes can have a visible impact has been demonstrated in an early pilot study¹². In the absence of such a structured approach, age-old beliefs and misguided practices continue to flourish and maintain the vicious cycle.

(iii) The national-level nutrition support programmes including the ICDS and the MDM are well-structured and adequately funded. But, inevitably, the performance has been patchy because of sharply differing levels of commitment and competence among States as well as among regions within States. These programmes require local-level monitoring which will be both constructive and supportive. Our academia, especially those in the fields of Nutrition and Public Health in Home Science colleges and Medical colleges are ideally placed to guide and monitor the programmes in their immediate geographical neighbourhood. This hands-on approach by professionals would not only improve the performance parameters, but also raise awareness levels of the professionals as well as of the members of the community. Currently, there is no move towards attempting this.

(iv) Schools are the logical entry point for a preventive approach to nutritional problems. School Health Scouts movement can help through which school children can be agents of change, trained to spread the message of good hygienic and nutritional practices to their homes and communities. Of course, all such programmes would presuppose the existence of a sound, functional school system, which is not the case in many parts of India. However, there is an urgent need to fix the system and get primary education to a more acceptable plane. Only then can it serve as a platform from which programmes of early nutritional education can take off.

(v) With the advent of lifestyle diseases, it has become more important than ever before to stress the importance of physical exercise. Growing urbanization, increasing mechanization in all areas from farms to city roads, and more sedentary occupations are big contributors to the overweight trend. Nutritionists and dieticians must include advice about physical exercise as an important adjunct to their nutrition counselling and messages.

(vi) Infrastructure such as clean water supply and functional toilets are essential to ensuring sanitation and thereby minimize infections. In the absence of infrastructure, awareness-raising is pointless.

(vii) Educating the community about its rights and responsibilities is an essential prerequisite for participatory programmes of nutrition and health. For instance, regular

washing of the hands by those who prepare meals and handle children would go a long way in reducing the diarrhoea burden. Health workers should be sufficiently informed and sensitized so that they can raise awareness levels in the community with commitment and empathy.

(viii) Nutritionists need to be aware that the population demographics are becoming increasingly heterogeneous. Old notions based on the "one-size-fits-all" approach have to be abandoned. In the same poor household there may be both obese and wasted individuals. In a well-to-do family there may be persons with micronutrient deficiencies. Lifestyle diseases have begun to invade rural areas as well. Therefore, the trend should be towards a more nuanced approach to nutritional management. There must be a thinner stratification of "target groups" with inputs that are tailored to the needs of these groups. In the field of medicine, there is a growing trend towards "personalized treatment". While it is impractical to do this in delivering nutritional services, it is important that health and nutrition workers be sensitized to see the people they serve not as an amorphous set of "beneficiaries" but as different human beings with varying requirements.

People are not potential problems; they are potential assets. If India is to reap the demographic harvest of its young population, it must ensure that the quality of the population is good and productive. The nutritional status of the population is a measure of the calibre of the people. Therefore, efforts to change the existing nutritional scenario should be a top priority in the years ahead.

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Food Security Act 2013 – a step towards optimal nutrition

Prema Ramachandran

India with 2.5% of the global land mass is the home of one-sixth of the global population. In 1947, the country was not self-sufficient in food production; rapid population growth imposed great strain on the country's efforts to reduce hunger, undernutrition, micronutrient deficiencies and associated health problems. India recognized that optimal nutrition and health are prerequisites for human development and that human resources hold the key for national 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
- outlined multi-sectoral programmes to improve food security and nutritional status of the population
- set the goals to be achieved in specified time frame and
- provided the needed funds to implement the interventions.

The Green Revolution, brought about by accelerating convergence of policies, programmes and R&D efforts, enabled the country to achieve self-sufficiency in food-grain production by 1970. However, India continued to face major challenges because:

- over 70% of the population were poor;
- they spent over 70% of their income on food
- despite this expenditure, over 70% were undernourished
- morbidity due to infections was high and these extracted a heavy nutritional toll
- access to essential and health care was low

It is, therefore, obvious that mere self-sufficiency in food-grain production will not by itself ensure improvement in food security of the families and improvement in nutritional status of the individuals. The country, therefore, embarked on defining poverty and providing households below the poverty line with subsidised food grains through Targeted Public Distribution System (TPDS), supplementary feeding, totally free of cost, to the vulnerable groups such as children, pregnant and lactating women through Integrated Child Development Services and Mid Day Meal programmes and free access to services such as water supply, sanitation and health care. This policy decision preceded the redefinition of 'food security' (as spelt out at the World Food Summit) by a whole 25 years. These interventions had resulted in a slow but steady decline in undernutrition rates over the last four decades.

Progress in the new millennium

Per capita income and food inflation rates are important determinants of household food security. Since 2004, India has been the second fastest growing economy in the world with GDP growth rates between 7-8%, but from 2009 there has been reduction in GDP growth rate. In 2013, GDP growth rate is below 5%. Tight economic policy aimed at curbing inflation has been blamed as one of the factors responsible for this slowdown in GDP growth. Reduction in GDP growth and per capita income lead to low purchasing power.

The year 2008 witnessed a steep increase in global food grain prices, and a consequent increase in the number of food-insecure households. Prior to 2005, food price inflation was low in India but since then the country has been experiencing persistent, steep rise in food price inflation rates. There are differences in the inflation rates for different food stuffs. So far the cereal price inflation rates have been lower as compared to pulse and vegetable price inflation rates. During the period between 2000 and 2008, GDP growth rates were higher than food price inflation rates. Since 2009 the country has been having a decline in GDP growth and rise in food price inflation; this combination can have adverse impact on household food security¹.

National Food Security Act 2013

In an effort to offset the possible adverse effects of rising food price inflation and falling GDP on household food security and nutritional status of its citizens, the Indian parliament enacted the National Food Security Act (FSA) in September 2013. The FSA aims at improving household food security by providing adequate quantities of food-grains at highly subsidised prices as legal entitlement to two-thirds of all Indians. Priority households are entitled to 5 Kgs of food grains/person/month, and Antyodaya households (poorest of the poor) to 35 Kgs/household/month at the rate of Rs. 3/2/1 for rice/wheat/millet, respectively, through the TPDS. The combined coverage of Priority and Antyodaya households (called "eligible households") is up to 75% of the rural population and upto 50% of the urban population. In the ration card, the oldest woman in each household is designated as the head of the household. Under the FSA, the ongoing programmes of food supplementation to pregnant and lactating women and preschool (ICDS food supplementation) and school children (midday meal) will continue to be supported.

The responsibility of the Central Government is to procure food grains, create and maintain adequate modern food-grain storage facilities to prevent wastage, and allocate and transport food grains to the various States. The State governments will take delivery of the food grains and ensure their transport and distribution upto village/urban wards through the TPDS. Local self-government (Panchayati Raj) institutions are responsible for the proper implementation of the FSA in their respective areas.

Food production and agricultural policy

Adequate food-grain production to meet the needs of the growing population is an essential prerequisite for implementing the Food Security Act; therefore, the Act calls for revitalisation of agriculture through:

- agrarian reforms and measures to safeguard the interests of small and marginal farmers
- increase in investments in agriculture, including research, extension services, micro and minor irrigation projects and electricity to increase productivity and production
- increasing the livelihood security of farmers through remunerative prices, access to subsidised inputs and bank loans, irrigation, electricity, and crop insurance
- prohibiting unwarranted diversion of land and water from food production.

During the last decade, the agriculture sector has laid the foundation for sustainable nutrition-oriented agriculture by initiating National Food Security Mission, National Horticultural Mission, and National Mission for Sustainable Agriculture. These continue to be crucial elements of an overall attempt to ensure that the country remains self-sufficient in food production to meet the growing needs of the Indian population.

Procurement, storage, and movement of food-grains

The FSA envisages improvement in procurement, storage and movement of food-grains by

- incentivising the decentralised procurement of food grains
- geographical diversification of procurement operations
- augmentation of adequate decentralised modern storage and
- giving top priority to food-grain movement by rail from surplus States to other States.

Distribution of food-grains

Recognising the importance of having an effective, transparent, and efficient distribution system in place, the Act requires that Central and State governments “shall endeavour to progressively undertake” reforms in the Public Distribution System (PDS), including: doorstep delivery of food grains; information and communications technology (ICT) applications and end-to-end computerisation; leveraging “aadhaar” (unique Identification card) for identifying entitled beneficiaries; full transparency of records; preference to be given to public institutions or bodies in licensing of fair price shops; management of fair price shops by women or women’s collectives; and diversification of commodities distributed under the PDS.

Monitoring the programme

People’s representatives from local self-government and civil society will monitor the implementation at the local level right down to the households or sites where the food supplementation programmes are implemented. There will be social audit of the programme at all levels. Appropriate mechanisms for redressing grievances, including call centres, helplines, and designated nodal officers will be set up.

Other measures

While adequacy of food-grains will certainly improve household food security, pulses, vegetables, oil, and dairy products are also essential components of a balanced diet. The FSA has made a provision for supply of other food stuffs also, as and when needed or viable, in the future. However, improving access to food might not by itself be adequate to achieve significant improvement in the nutritional status of the population if there is concurrent nutrient loss due to infections. Therefore, the Act also calls for improvement in access to safe drinking water and improvement in environmental sanitation to prevent infections, and also for better health care for early detection and effective management of infections to prevent nutrient loss and deterioration in nutritional status.

FSA: Implications for the economy

Food grains are procured by the government from farmers at remunerative prices but are distributed to consumers, particularly the vulnerable sections of society, at heavily subsidised prices. The Government provides subsidised food grains for distribution under the TPDS to the poor, for the ICDS

and Mid Day Meal programmes, and open-market operations. The rising food subsidy bill puts a heavy financial burden on the government². Many economists worry that, with the implementation of the FSA, the already high food subsidy (approximately 1% of the GDP) will increase substantially and seriously impair the ability of the government to invest in developmental activities, leading to slower economic growth and adverse consequences on national development.

Food consumption patterns and FSA

The National Sample Survey Organization (NSSO) has been providing data on consumer expenditure on food and non-food items from 1973 to 2012³. In this period, the share of food expenditure as a proportion of total consumer expenditure fell from 73 to 55 percent in rural areas and from 64 to 42 percent in the urban areas. This is partly due to the availability of heavily subsidized food grains (especially to poor households) and also to a slow but steady rise in incomes. Cereals are the major source of energy in Indian diets. NSSO data, disaggregated by expenditure classes, showed that over the last four decades there has been an increase in the quantity of cereals consumed per month among the poor both in urban and rural areas. As of 2009-10, cereal intakes were essentially similar in all expenditure classes and were adequate to meet the cereal and energy requirements of the average person in India

Nutritionists acknowledge that the FSA will serve as a buffer against food price inflation and ensure sufficient cereal (and therefore energy) intake; but they point out that this does not address the problem of the habitual low intake of vegetables and the consequent high prevalence of micronutrient deficiencies. Obviously, under the FSA, it will not be possible to supply to all households all the food items needed for preparing a balanced meal. Targeted nutrition education to women (who are the ration card holders under FSA) on the importance of pulses and vegetables in the family meal, coupled with efforts to persuade them that the money saved on food-grains (estimated to be about Rs. 400-500/month/family) should be spent in purchasing pulses and vegetables for preparing balanced meals for their families, may help in opening the pathway for better nutrition.

Recommended Dietary Allowances and FSA

In India, Recommended Dietary Allowances (RDAs) are computed on the basis of a reference population whose weight corresponds approximately to mean +2SD of the actual weight of the average Indian. In order to enable computation of the energy requirements for the average Indian, the expert group has recommended the energy requirements/Kg body weight⁵. Computed energy requirements for average Indians according to age, sex and physiological status, based on their current average weight, the actual intake and the difference between requirement and intake is given in the Table. The current average energy intake by and large meets the revised RDA figures for Indian adults. There are relatively small energy deficits in children and large energy deficits in adolescents and in pregnant and lactating women. Bridging the energy gap in pregnant and lactating women is a priority not only because of the implications of maternal undernutrition for the mother’s health but also because it is a critical determinant of intrauterine growth as well as growth during infancy. FSA provides support to the ongoing food supplementation programmes for children and for pregnant and lactating women (ICDS and Mid Day School Meal programmes). Universal coverage under these programmes, coupled with universal screening of these vulnerable segments for early detection and effective management of undernutrition, can result in substantial reduction in undernutrition.

Intra-family distribution of food and FSA

The FSA is currently providing food grains to two-thirds of all households at subsidised cost to ensure household food security. Data from National Nutrition Monitoring Bureau (NNMB) surveys⁷ have shown that in the last four decades there has been a rise in the proportion of food-secure families. However, currently, in over half of the households, adults get adequate energy but children do not. These data suggest that poor intra-family distribution of food due to poor child feeding and caring practices, rather than lack of household food security, is the major cause of low dietary intake in children. FSA can improve household food security but nutrition education holds the key for improving intra-family distribution of food based on individual requirements.

FSA and undernutrition in children

There is growing concern that, during the past four decades there has not been any decline in low birth weight rates and only a slow reduction in under-five undernutrition rates despite the following:

- India has been the second-fastest growing economy in the world for much of the previous decade,
- has been self-sufficient in food-grain production,
- poorer segments of population receive subsidized food grains,
- there is universal access to essential health care and nutrition supplementation for under-five children and pregnant/lactating women.

To what extent can FSA be expected to improve the scenario as regards low birth weights and under-five undernutrition?

Low birth weight

Undernutrition begins in utero. Currently about one-third of Indian neonates are born with birth weight below 2.5 kg. It is important to remember, however, that parental stature is an important determinant of birth weight and neonates born to short-statured parents are generally small. The FSA provides for

Table: Energy requirement for actual weight				
Group	Actual weight (Kg)	Requirement for actual wt (Kcal)	Act Intake (Kcal)	Gap (Kcal)
Adult man	51	1989	2000	11
Adult woman	46	1656	1738	82
Pregnant		1906	1726	-180
Lactating		2155	1878	-277
Children				
1 – 3 y	10.5	840	714	-126
4 – 6 y	14.6	1095	978	-117
7 – 9 y	19.7	1379	1230	-149
Boys				
10 - 12 y	26.6	1729	1473	-256
13 – 15 y	36.8	2208	1645	-563
16 – 17 y	45.7	2514	1913	-601
Girls				
10 – 12 y	26.7	1469	1384	-85
13 – 15 y	36.9	2030	1566	-464
16 – 17 y	42.6	2130	1630	-500
Source: Reference 5				

take-home food supplements to pregnant women to bridge the gap between dietary requirement and intake. But only those whose dietary intake is low would benefit from food supplementation. Improved household food security plus food supplementation to pregnant women of the household, when coupled with good antenatal care aimed at early detection and management of undernutrition, anaemia and obstetric problems, can bring about sustained reduction in low birth weight.

Under-five nutritional status

Birth weight, infant and young child feeding practices and infections in early childhood are major determinants of nutritional status in infancy and early childhood. Breast feeding is universal in India and the mean duration of breast feeding ranges between 18-30 months. The major factors responsible for increase in undernutrition rate in the first year are: too early introduction of animal milk, too late introduction as well as inadequate and infrequent feeding of complementary foods, and failure to feed the 12 to 23 month-old child on adult food 5 to 6 times a day. The nutritional toll because of infections caused by poor environmental hygiene and lack of access to health care is also an important factor in undernutrition rates in under-five children. Data from National Family Health Survey (NFHS)-3⁸ showed that, while child undernutrition rates are higher when the mother is undernourished, even when the mother was overweight 20% of the children were underweight. These data suggest that overall household food insecurity may not be a major factor responsible for undernutrition in under-five children. While FSA will improve household food security, it is unlikely to have any effect on the intra-family distribution of food. The FSA provides for take-home supplements for under-three children and hot cooked meals to 3 to 6 year-old children, so that the gap between intake and requirement is bridged. The impact of these interventions in terms of reduction in undernutrition will be greater if all the children are screened for undernutrition, and those who are undernourished are given double rations and monitored closely.

Summary and conclusions

The current phase of nutrition transition provides a window of opportunity to rapidly improve the nutritional status of Indians. About 65% of 1.3 billion Indians are normally nourished. The FSA provides subsidized food grains to combat poverty-related household energy deficiency and undernutrition. Nutrition and health education advocating that the money saved on account of the subsidy on food-grains should be used to purchase pulses and vegetables needed to provide a balanced meal to all the members of the family will help in improving vegetable intake; this may be the most feasible way of using the FSA from being limited to supply of mere food grains to improve household food security to an instrument which can promote balanced meals for all the members of the family. Universal screening of vulnerable groups can lead to early detection of undernourished women and children; providing them double rations of supplementary feeding and essential health care and monitoring progress in their nutritional status can bring about substantial reduction in undernutrition rates and an increase in the proportion of normally nourished, healthy persons in all age and physiological groups.

The FSA, as it is now, should be viewed as a short-term intervention to improve household food security; it has enabling provisions to address other aspects needed for improving the nutritional status of Indians, but no time frame for action has been set for these. Improving coverage, content and quality of

ongoing health and nutrition programmes for vulnerable segments and undernourished persons should, therefore, receive priority attention, as these are currently the major interventions for improving the nutritional status of individuals. ICDS envisages universal screening of under-five children to identify undernourished children. School health system assisted by the school teachers can screen and identify undernourished school children. FSA provides the food grains needed for supplementary feeding programme under ICDS and midday meal programmes. If undernourished children identified by the screening under ICDS and School health programmes, are given double rations and monitored for improvement in nutritional status, it will be possible to bring about sustained improvement in their nutritional status.

As Dr. C. Gopalan, President, Nutrition Foundation of India, has cautioned: "In the short term, handouts and heavily subsidized food entitlements under Food Security Act will help to alleviate hunger and deprivation in the most vulnerable sections. However, this cannot be a long-term solution for large sections of the population. In the long term, there can be no food security and improvement in nutritional status without the active participation of the community at large. The Food Security Act should, therefore, have to incorporate long-term measures for skill development and income generation. Above all, a strong national multimedia programme focusing on nutrition education and awareness building should be put in place immediately so as to pay dividends in the future".

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FOUNDATION NEWS

• Annual Foundation Day and C. Ramachandran Memorial Lecture: The Annual Foundation Day of NFI was celebrated on 27th November 2013. On this occasion, Dr K Srinath Reddy (President, Public Health Foundation of India) delivered the C. Ramachandran Memorial Lecture on "(Re) Positioning nutrition in the global developmental agenda".

• Symposium on clinical nutrition: The Nutrition Foundation of India, New Delhi organized a one day

Clinical Nutrition Symposium on "Assessment of nutritional status and nutritional intervention in the hospital setting" on 28th November 2013.

• Dr Prema Ramachandran (Director, NFI) attended, as a technical expert, the FAO and WHO organized Preparatory Technical Workshop for ICN 2 held from 13th to 15th November 2013, at FAO Headquarters in Rome.

• Dr Prema Ramachandran (Director, NFI) gave the inaugural address on "Home Science in India: retrospect and prospects" at the celebration of "100 years of Home Science retrospect and prospects" and the XXX Biennial National Conference of the Home Science Association of India at the MS University, Vadodara on 20th December, 2013.

NUTRITION NEWS

• National Conference of the Nutrition Society of India: The 45th National Conference of the Nutrition Society of India was held at National Institute of Nutrition, Hyderabad, on 21st and 22nd November 2013.

The theme of the Conference is "Inter-sectoral approach to promote food and nutrition security".

Gopalan Oration: The Thirty-seventh Gopalan Oration was delivered by Dr Robert Black (Professor, Chairman, Edgar Berman Professor in International Health, Baltimore, USA) on "Foetal growth restriction: nutritional determinants, consequences in childhood and interventions."

Srikantia Memorial Lecture: The Twenty-fifth Srikantia Memorial Lecture was delivered by Dr. Shiela Vir (Public Health Nutrition Consultant and Director, Public Health Nutrition and Development Centre, New Delhi) on "Scaling up nutrition interventions: key learning and challenges".

Dr. Rajammal P. Devadas Memorial Award: The Fourth Dr. Rajammal P Devadas Memorial Award Lecture was delivered by Prof. Jamuna Prakash (Department of Food Science and Nutrition, University of Mysore) on "Exploring food-based approaches for translational nutrition: from research to practice".

There was a debate on "Food Security Bill" and a Symposium on "Food and Inflammation." Dr Prema Ramachandran (Director, NFI) made a presentation on "Food security bill: way forward to optimal nutrition" in this debate.

• Kamala Puri Sabharwal Lecture: The 40th Annual Kamla Puri Sabharwal Memorial Lecture was delivered by Maj. Gen. (Dr) R. K. Marwah (Retd) on "Status of Vitamin D deficiency and its skeletal health consequences in Indians" on 28th October 2013. Dr Prema Ramachandran (Director, NFI) presided over the function.