

August 2023

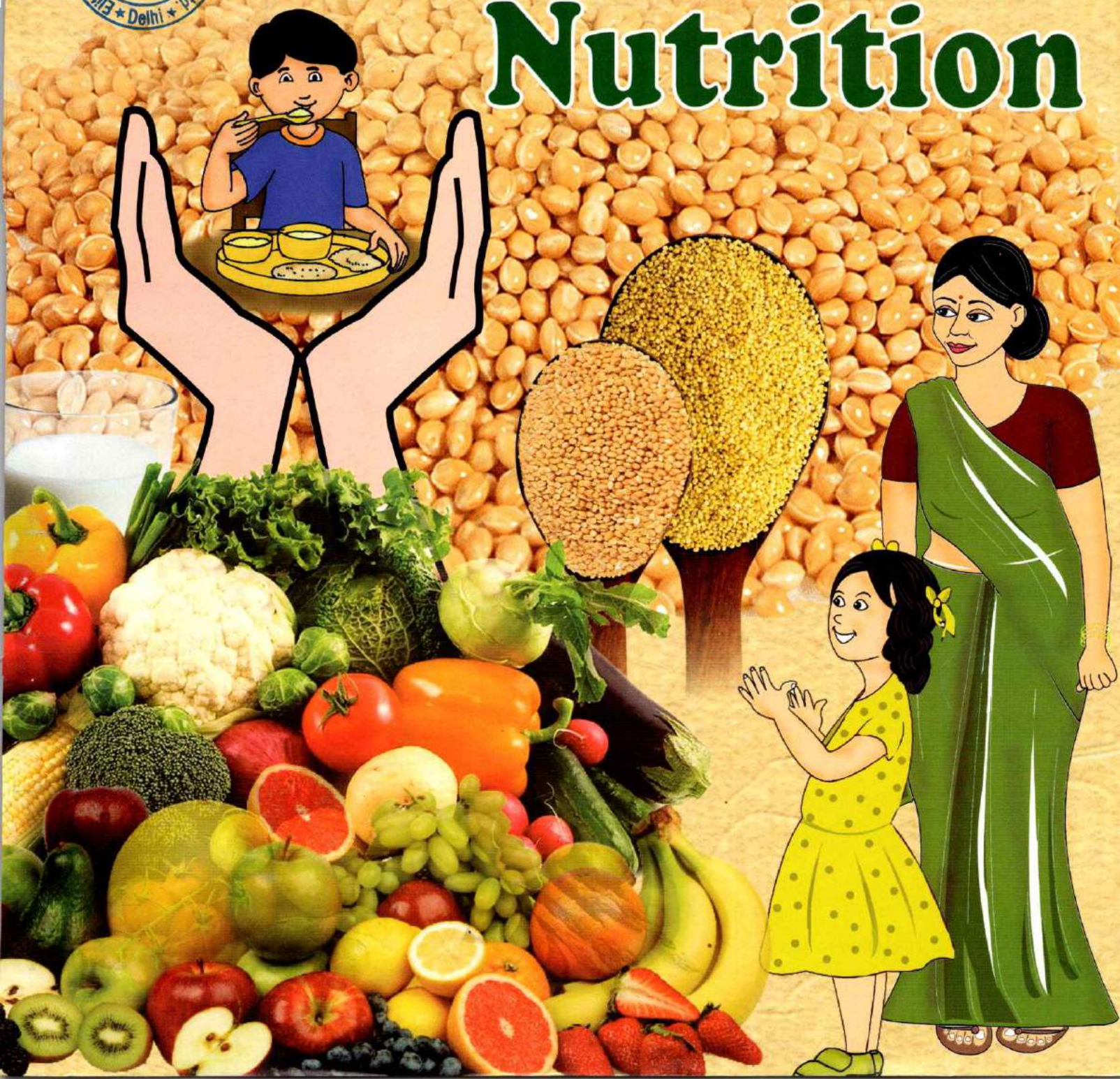
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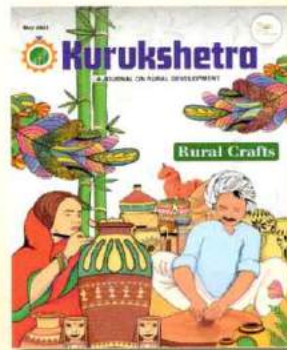
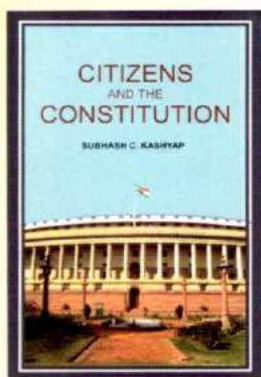
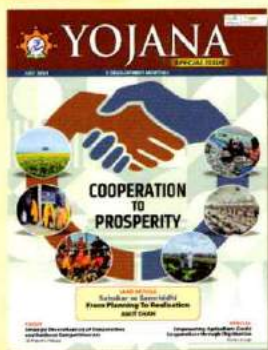
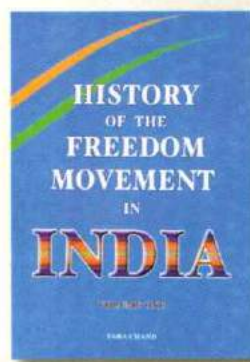
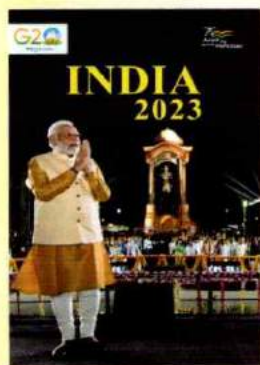
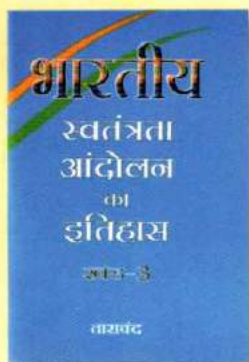
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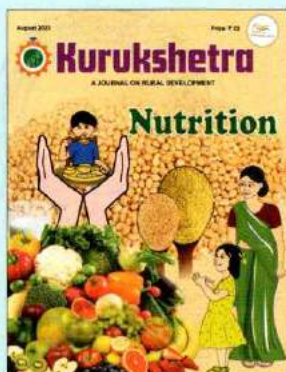


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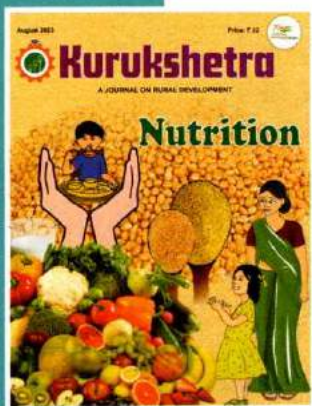
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Editorial

Nutrition is absolutely essential for individual well-being. Nutrition, at its most fundamental, is about eating a regular, balanced diet. Good nutrition provides fuel for the body for daily routine work and ensure development of the body. Nutrients include proteins, carbs, fat, vitamins, minerals, fibre, and water. People are more likely to acquire various health disorders if their diet lacks the proper nutrient balance.

The Government of India's institutional actions, interventions, and programmes have brought about a great revolution in the entire nutrition management ecosystem. This phenomenon is evolving and will continue to contribute to the integrated development of all vulnerable groups in India, especially women and children.

The article '**Adequate Nutrition for Women and Children**' discusses that adequate nutrition is vital at all stages of life, but it is especially critical during periods of fast development, such as pregnancy, nursing, early childhood, and adolescence. As a result, appropriate nutrition for women, children, and adolescents, particularly female children, is critical. The author further writes that regular monitoring, evaluation, and innovative modifications of existing initiatives are essential to combat malnutrition at the grassroots level.

This issue also attempts to comprehend about promoting family food and nutrition security, which is a multidimensional enterprise that necessitates the collaboration of numerous stakeholders. The author in the article '**Household Food and Nutrition Security**' writes that food and nutrition insecurity has numerous, linked causes that stem from structural and economic constraints. The author discusses how various Governmental initiatives towards promoting food and nutrition security can greatly improve the well-being and livelihoods of millions of Indian households by combining targeted interventions, sustainable agriculture practises, social protection measures, and policy assistance.

The article titled '**Nutrition and Health in School Education**' focuses on considering good health and nutrition for learning and an important investment in creating a more sustainable and inclusive future for children. These can aid in the improvement of educational outcomes, the empowerment of learners to thrive, and the promotion of inclusion and equity in education and health. The Government can provide a unique opportunity to revolutionise education by focusing on and significantly contributing to the health and nutrition of children in schools.

In this issue, read about the extensive steps taken by the Government of India to popularise millet production, consumption, and export in the country in the article '**Shree Anna for Nutritional Wellbeing**'. Millets, widely regarded as 'smart food' or 'super food,' play an important part in altering agri-food systems around the world. They are nutrient-rich, carbon-neutral, and resource-efficient, and hence play an important role in developing sustainable and nutrient-sensitive food value chains.

Given the backdrop of the SDGs-2030 agenda and India's long-term growth, an appropriate nutritional framework is crucial in addressing nutrition challenges. This issue of Kurukshetra intends to give a comprehensive discussion of Nutrition and related areas, and we believe that the expertise supplied by subject matter experts will assist our readers in better understanding the significance of national nutritional initiatives and policy interventions required to bring the much-needed improvement in nutritional health and well-being.

Happy Reading!!

Adequate Nutrition for Women and Children



Adequate nutrition for women and children is crucial. Women's nutritional wellbeing, particularly during the reproductive years, is the single most important criterion influencing their pregnancy outcome. Malnutrition among women, both prior to- and during pregnancy, may lead to high incidence of low-birth weight (LBW)/pre-term deliveries, stillbirths, abortions as well as high maternal mortality rates; and that during infancy/childhood hampers the child's growth and development.



T

* Dr Santosh Jain Passi

** Dr Shipra Gupta

he importance of adequate nutrition for women and children cannot be undermined. Women's nutrition directly influences their own health, which in turn affects the well-being of their children and the family as a whole. Since women shoulder the major responsibility of childbearing, childrearing, and childcare; their proper health and nutritional well-being should be a prime concern for the family, community, and the nation at large.

Inadequate intake of nutritionally appropriate diets - both in terms of quantity and quality, can lead to malnutrition, deficiency diseases, and other ailments/

disorders as well as lower life expectancy. The poor health status of the women reduces their productivity, earning capacity, and ability to take care of their families, particularly the well-being of their young ones. Malnutrition and poor health among women, both prior to-and during pregnancy, is a matter of serious concern; it may lead to high incidence of low-birth weight (LBW)/pre-term deliveries, stillbirths, and abortions, as well as high maternal mortality rates.

Studies indicate that a large percentage of our Indian women are either underweight or overweight/obese—both these conditions pose risks during pregnancy and affect the long-term health of the mother

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and the infant. Anaemia among pregnant women is an established cause of higher maternal mortality during childbirth. Not only the physical but even the mental and emotional health of the woman – both during pregnancy and thereafter, are crucial for preventing any nutritional deficits and birth complications, as well as for attaining the postnatal wellness of the mother-child dyad. Mentally-unhealthy mothers fail to follow adequate child-feeding/childcare practices leading to poor growth and development of the child. Therefore, a holistic approach to women's nutrition/health needs to be adopted with a special focus on the needs of girls/women during the life cycle. In Telangana, for improving overall maternal nutrition and wellness during pregnancy, weight monitoring (for tracking gestational weight gain), nutrition counselling, anaemia prevention/treatment (supervised distribution/consumption of iron Folate tablets), and mental health screening have been integrated into routine antenatal check-ups.

Very often women - the producers, processors and distributors of the food ignore their own nutrition/health needs by taking a back seat; and in most cases, even the family remains incognisant of this fact. Hence, widespread nutrition/health related awareness needs to be generated for addressing the issue of gender bias in intra-household food distribution as well as for overcoming the nutritional imbalances.

Inadequate dietary intake by women, especially during the reproductive years, results in nutritional deficiencies, leading to adverse effects on their own health, as well as that of their infants/children. Hence, nutrition education highlighting the importance of appropriately balanced diet and eating right needs to be imparted to everyone irrespective of their age, gender, education, class, and creed.

Adequate nutrition is prime-most for human development. Nutrition/health status of the women can make or mar the entire generations. Undernourished women of childbearing ages usually end up being undernourished mothers who bear undernourished children with poor physical and mental development setting-in the inter-generational cycle of malnutrition and poor health; and this needs to be broken at all costs.

Adequate nutrition is important during all phases of life but it acquires a greater importance during the periods of rapid growth namely pregnancy, lactation, early childhood, and adolescence. Therefore, adequate nutrition for women, children, and adolescents, particularly for the girl children, is extremely crucial.

Due to the unique physiological/developmental needs, women and children are particularly vulnerable to the consequences of malnutrition. In India, women face several nutritional challenges throughout their lifetime. As per the latest National Family Health Survey 2019-21 (NFHS-5), 18.7% women in the reproductive age group (15-49 years) have a body mass index below normal ($BMI < 18.5 \text{ kg/m}^2$) and 57% of them suffer from anaemia. This indicates high levels of under/malnutrition which are associated with their poor nutritional intakes. Further, the NFHS-5 data also reveals that of the children aged less than five years, nearly 35.5% are stunted (low height-for-age), 19.3% and 7.7% wasted/severely wasted (low weight-for-height) and 32.1% underweight (low weight-for-age); this again highlights an alarmingly high prevalence of malnutrition among children.

Adequate nutrition for children in the early years of life, especially the first 1000 days from conception till the child is 2 years old, has an enormous impact on their future health and well-being. Adequate intake



of macro- and micronutrients during these early years is essential for their proper growth and cognitive development. Quantitatively/qualitatively inadequate dietary intakes during these years can result in stunted growth, poor brain development, and compromised immune function; making the children vulnerable to various infections as well as the victims of compromised cognitive development, poor learning capacity, adversely impacted educational attainment, poor productivity, and lowered earning potential during their adulthood.

The Estimated Average Daily Requirements (EAR) of energy and macro and micronutrients for moderately active adult women, children (1-3 years), and adolescent girls (13-15 years) have been compared with those of moderately active adult men, taking their (men's) nutrient needs as 100% (Figure 1). Further, for these age/gender groups, the EAR of energy, protein, and visible fat have also been compared on the basis of per kg body weight/day (Table 1). Despite a comparatively lower body weight (nearly 85%), the nutritional needs of the women are either higher (iron) or equal to (calcium, vitamin B12), or slightly lower than those of the men. This indicates that their total food intake needs to be lower, but the quality of their diets should be far better than that of the men. This becomes all the more pertinent when women go through the phases of pregnancy and lactation since during these stages their nutritional needs increase substantially. This is clearly evident from the graph (Figure 2) comparing the needs of non-pregnant non-lactating (NPNL) women with those of pregnant women (3rd trimester) and lactating mothers (0-6 months).

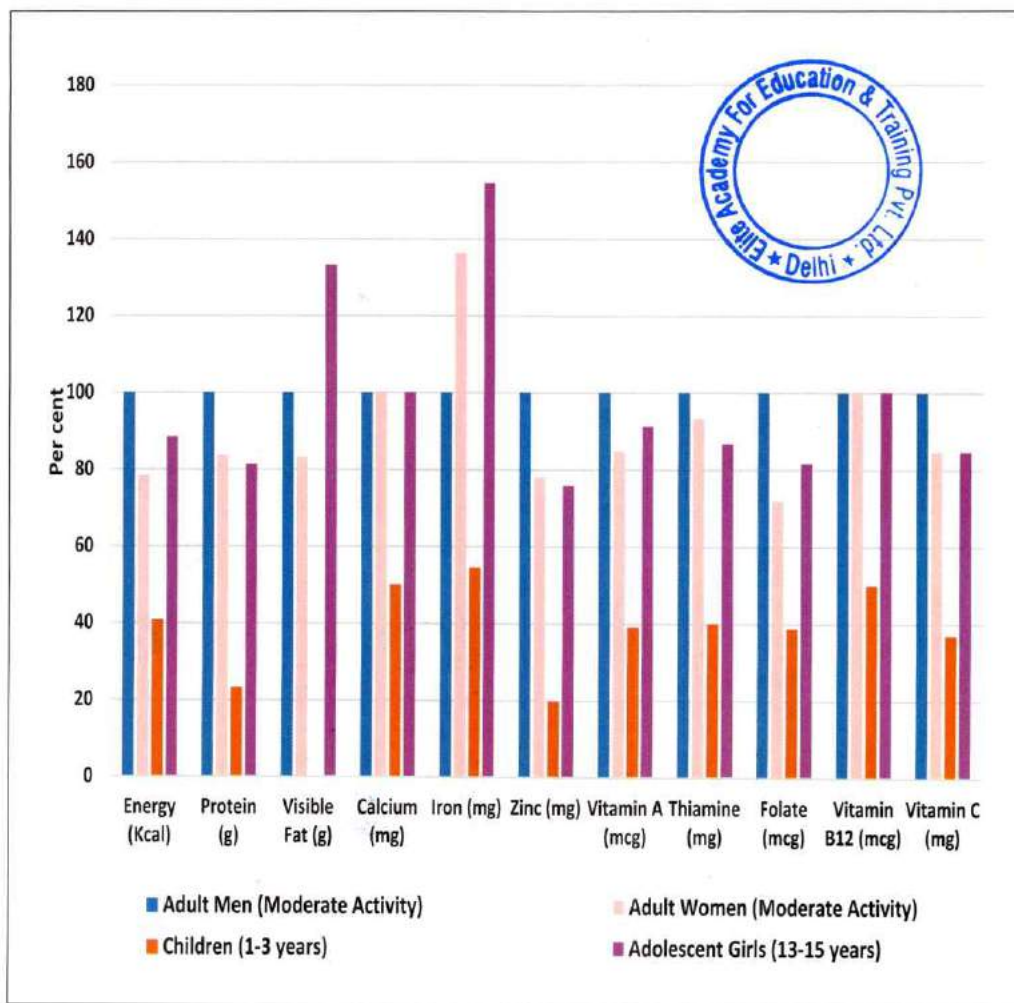


Figure 1: Comparative Estimated Average Daily Requirement of Nutrients (Energy, Macro- and Micronutrients) for adult men/women, children (1-3 yrs) and adolescent girls (13-15 yrs) - Taking adult man's requirements as 100% (Adapted from ICMR-NIN, 2020)



Table 1: Estimated Average Daily Requirement of Energy, Protein and Visible Fat for Men, Women, Children & Adolescent Girls (Adapted from ICMR-NIN, 2020; 2023)

Age Group		Body Weight (kg)	Estimated Average Requirements (EAR)					
			Energy		Protein		Visible Fat	
			(kcal/day)	Kcal/kg body wt./day	(g/day)	g/kg body wt./day	(g/day)	g/kg body wt./day
Adult Men	Sedentary activity	65 (100%)*	2110	32	43.0	0.66	25	0.38
	Moderate activity		2710	42			30	0.46
	Heavy activity		3470	53			40	0.61
Adult Women	Sedentary activity	55 (84.6%)*	1660	30	35.0	0.66	20	0.36
	Moderate activity		2130	39			25	0.45
	Heavy activity		2720	49			30	0.54
Children (1-3 yrs)		12.9 (19.8%)*	1110	83	10.0	0.79	Not listed	Not listed
Adolescent Girls (13-15 yrs)		49.6 (76.3%)*	2400	49	35.0	0.70	40	0.81

* These figures indicate body wt. of adult women, children and adolescent girls expressed as % of adult man's body wt.

Due to rapid growth, the nutritional needs of children and adolescents are much higher than those of adult men/NPNL women. From the data (Figure 1; Table 1), it is evident that the children who weigh much less than

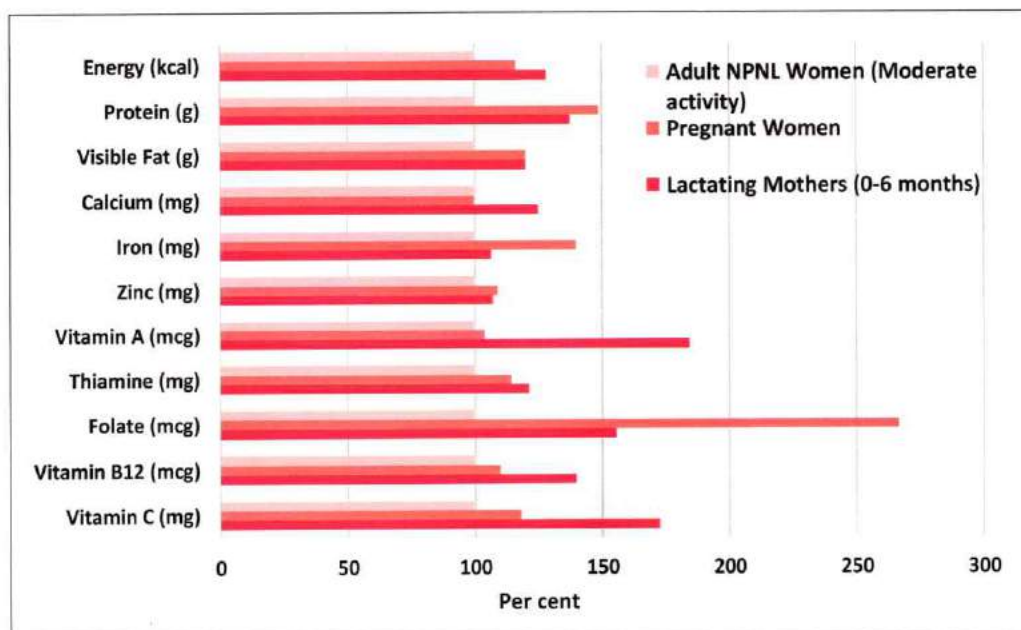


Figure 2: Estimated Average Daily Requirement of Nutrients (Energy, Macro- and Micronutrients) for Non-Pregnant Non-Lactating Women (moderate activity), Pregnant women (3rd trimester) and Lactating mothers (0-6 months) - Taking NPNL woman's requirements as 100% (Adapted from ICMR-NIN, 2020)

the men – just about one-fifth, have comparatively far greater requirements when expressed on the basis of per kg body weight/day. This calls for a smaller quantity but much better quality of nutrient dense diets to be fed in small amounts at frequent intervals. Similarly, adolescents weighing much less than men have comparatively higher nutrient requirements, especially when expressed on the basis of per kg body weight/day. Hence this age group, particularly the adolescent girls, should

also be fed appropriate amounts of better quality diets for achieving their proper growth and development.

In India, unhealthy dietary patterns and nutritional deficiencies remain a public health problem; and achieving food, nutrition, and health security a major challenge. Some of the essential nutrition and health-linked interventions for women and children include-improving the quantity/quality of their diets, preventing micronutrient deficiencies including anaemia, improving access to basic nutrition/health services as well as water/sanitation and education facilities, especially nutrition-linked awareness, along with empowering women for preventing too early, too frequent, and/or closely spaced pregnancies.

Therefore, over the years, several policies and programmes have been implemented in India for addressing the nutrition and health issues of women and children. However, most of our nutrition programmes have primarily focused on feeding-centred interventions post childbirth while it is well known that 50% of the growth failure in children accrued by the second year occurs during their foetal life owing to poor maternal nutrition - both prior to and during pregnancy.

The National Nutrition Policy (1993) and the National Plan of Action on Nutrition (1995) have laid ample emphasis on the importance of adequate nutrition for women and children. In recent years, there have been much more concerted efforts in this direction. For making India "Kuposhan Mukta", in 2017, NITI Aayog (Government of India) drew up the National Nutrition Strategy document entitled "Nourishing India". This document emphasises the importance of reducing/preventing undernutrition across the life cycle, especially during the first three years of life, so as to prevent irreversible and cumulative growth/development deficits compromising their health and survival. High levels of malnutrition would also hinder in achieving our National as well as the Global Sustainable Development Goals. The Budget 2014-15 speech highlighted that to halt the deteriorating nutrition situation in our country, there is a dire need for national-level mission mode programme/s. This brought nutrition to the centre-stage and paved the way for formulation and implementation of the POSHAN Abhiyan in 2018.

Prime Minister's Overarching Scheme for Holistic Nutrition - POSHAN Abhiyan, the flagship programme

of the Ministry of Women and Child Development (GoI), is implemented in a mission mode for improving the nutritional outcomes of children, pregnant women, and lactating mothers. It involved convergence of various programmes, such as Integrated Child Development Services (ICDS), Pradhan Mantri Matru Vandana Yojana (PMMVY), Scheme for Adolescent Girls (SAG), Janani Suraksha Yojana (JSY), National Health Mission (NHM), Swachh Bharat Mission, Public Distribution System (PDS), Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), and initiatives of the Ministry of Drinking Water & Sanitation.

For reducing stunting, under-nutrition, and anaemia among young children, women, and adolescent girls, as well as reducing the low birth weight deliveries in a time-bound manner, some of the key interventions of this Abhiyan are infant and young child feeding (IYCF), food and nutrition, institutional delivery, water sanitation and hygiene (WASH), deworming, provision of ORS-Zinc, food-fortification, dietary diversification, adolescent nutrition, maternal health/nutrition, early childhood development (ECD)/early childhood care and education (ECCE). This Abhiyan has played an important role in modifying the nutrition scenario in our country through its innovative ideas/measures such as the celebration of Poshan Maah (1st-30th September) and Poshan Pakhwada every year, and initiating a Jan-Andolan or People's Movement to create nutrition awareness.

In 2022, the Government of India approved the Integrated Nutrition Support Programme "Saksham Anganwadis and POSHAN 2.0" which seeks to address the challenges of malnutrition in children (till 6 years), adolescent girls (14-18 years), pregnant women and lactating mothers through a strategic shift in nutrition content and delivery of services. The Anganwadi Services of ICDS, Scheme for Adolescent Girls, and POSHAN Abhiyan have been realigned under POSHAN 2.0 for maximising the nutritional outcomes. It focuses on Maternal Nutrition, Infant, and Young Child Feeding Norms, Treatment of Moderate Acute /Severe Acute Malnutrition (MAM/SAM) and Wellness through AYUSH practices for reducing the prevalence of wasting and underweight besides stunting and anaemia. For bridging the nutritional gaps, supplementary nutrition including morning snacks, hot cooked meals and take home ration (THR) are provided to children till the age of 6 years (including SAM Children), adolescent girls

(14-18 years), pregnant women, and lactating mothers at the Anganwadi Centres for a minimum of 300 days/year; diversified diet including locally available fresh foods, fortified rice and millets are provided to the beneficiaries. Anganwadis are being equipped with added services and better infrastructure (internet/Wi-Fi connectivity, LED screens, water purifiers, audio-visual/smart learning aids, child-friendly learning equipment and art work).

Under POSHAN 2.0, the revised Scheme for Adolescent Girls (SAG) aims at providing nutritional support, IFA supplementation, Health check-up and Referral Services, Skill development and Nutrition/Health Education to the adolescent girls (aged 14-18 years). Conditional cash transfer schemes - Pradhan Mantri Matru Vandana Yojana (PMMVY) and Janani Suraksha Yojana (JSY) cater to the needs of pregnant women/lactating mothers by providing them cash incentives on fulfilling certain conditions. Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA; Ministry of Health & Family Welfare) aims at providing assured, cost-free, comprehensive, and quality antenatal care to all pregnant women on the 9th day of every month and guarantees a minimum package of antenatal care services to women in their 2nd/3rd trimesters of pregnancy. Janani Shishu Suraksha Karyakram (JSSK), launched in 2011 aims to achieve 100% institutional delivery and elimination of out of pocket expenditure for both pregnant women and the sick neonates. Pregnant women are also entitled to free of cost facilities such as cashless-delivery/caesarean section, drugs/consumables, diagnostics, daily diet (during the stay), transport, etc.

In reducing/tackling malnutrition, contributions of other programmes, particularly those addressing the nutritional needs of women, children, and adolescents - such as the National Iron Plus Initiative (NIPI) or Anaemia Mukht Bharat (the Intensified NIPI) in mission mode, National Programme for Prevention of Blindness due to Vitamin A Deficiency, National Programme for Nutritional Support to Primary Education/Mid-day Meal Scheme (recently renamed as Prime Minister-Poshan Shakti Nirman; PM-POSHAN) are well-documented. The National Policy for Women (drafted in 2016) envisages addressing diverse needs of the women.

The Poshan Tracker – a governance tool by the MoWCD (2021) is envisaged to bring transparency and

The POSHAN Tracker app acts as a job aid to Anganwadi Workers and provides complete beneficiary management for pregnant women, lactating mothers, and children under 6 years on select indicators.

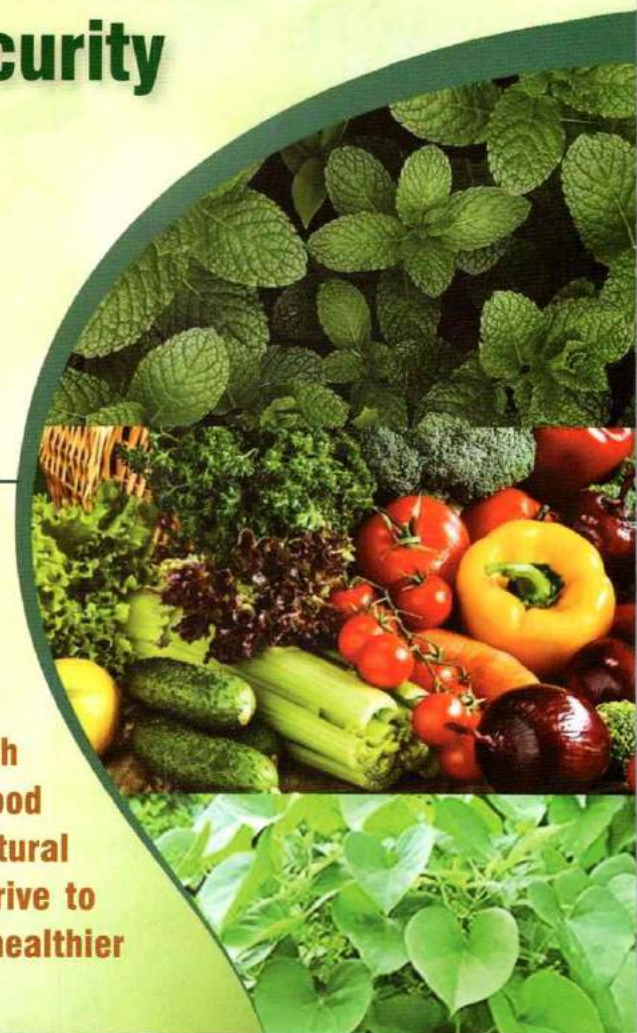


strengthen the nutrition delivery support systems. Apart from tracking nutrition service delivery, technology is being used for the identification of stunting, wasting, and underweight among children.

Although there are numerous well-planned initiatives undertaken for tackling malnutrition and ensuring adequate nutrition among women and children, the real challenge lies in their effective implementation; and to some extent, this can be overcome by regular monitoring, evaluation and innovative modifications of the schemes as per the need at the grassroots level.

There is no doubt that adequate nutrition is vital for overall development and well-being of all individuals, particularly that of the women and children. Women's adequate nutrition/health can go a long way in improving the household dietary patterns and maintaining a good health status of the children, family, and the nation as a whole!

Promoting Household Food and Nutrition Security



Promoting household food and nutrition security is a multifaceted endeavour that requires concerted efforts from various stakeholders. It involves addressing factors such as availability, accessibility, utilisation, and stability of food, as well as ensuring nutritional adequacy and dietary diversity. Through a range of Governmental interventions, such as food distribution, nutritional supplementation, agricultural support, and capacity building, these programmes strive to achieve sustainable development goals and ensure a healthier and more prosperous society.

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**** Capt. Parminder Sehgal**

ood security implies that 'all people, at all times, should have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life' (FAO, 2000, reaffirmed officially in 2009). Nutrition security goes beyond food security. Nutrition security is achieved 'when all people at all times consume food of sufficient quantity and quality in terms of variety, diversity, nutrient content and safety to meet their dietary needs and food preferences for an active and healthy life, coupled with a sanitary environment, adequate health, education and care' (FAO, 2012).

Food security and nutrition are closely interlinked. The causes of food and nutrition insecurity are complex, interconnected, and derive from structural and economic constraints. Poverty is the root cause of nutrition insecurity. Lack of access to education, affordable housing, and healthcare, transportation, employment, and living wages can impact a household's ability to access adequate and nutritious food.

As per UN FAO, 'food and nutrition security exists when all people at all times have physical, social and economic access to food, which is consumed in sufficient quantity and quality to meet their dietary

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needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life.'

The pillars of household food and nutrition security encompass a range of interconnected factors that contribute to ensuring that households have access to sufficient, safe, and nutritious food. These pillars can be summarised as follows:

1. **Food Availability:** This pillar focuses on ensuring an adequate and consistent supply of diverse food options. It encompasses aspects such as agricultural productivity, sustainable farming practices, and efficient food production systems.
2. **Food Access:** This refers to the ability of individuals and households to obtain sufficient food for a nutritious diet. It includes factors such as affordability, physical access to markets, infrastructure for storage and transportation, and social safety nets. Strategies to improve food access include promoting income-generating opportunities, improving market infrastructure, ensuring fair and transparent pricing, and implementing targeted social protection programmes for vulnerable populations.
3. **Food Utilisation:** This focuses on maximising the nutritional value of food and ensuring optimal health outcomes. It involves addressing issues like dietary diversity, nutritional education, safe

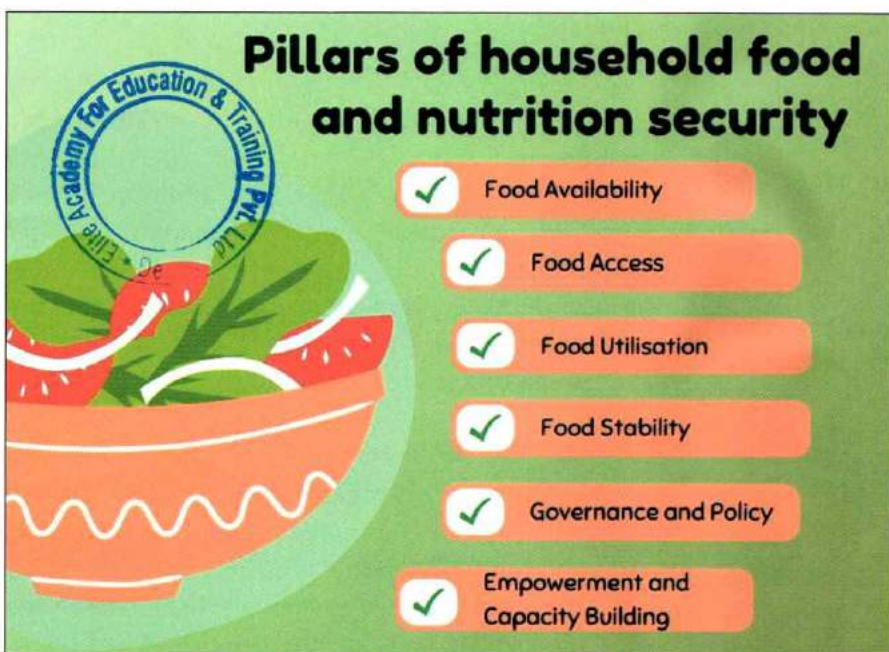
food handling/preparation, and access to clean water and sanitation facilities. Promoting food utilisation requires nutrition education campaigns, behaviour change communication, micronutrient fortification, hygiene, and sanitation programmes.

4. **Food Stability:** This refers to the ability of households to maintain access to food during shocks and crises. It involves building resilience and reducing vulnerability to natural disasters, price fluctuations, and economic shocks.
5. **Governance and Policy:** It involves the development and implementation of coherent policies, strategies, and programmes that address all dimensions of food security. This includes policies related to agriculture, trade, social protection, health, education, and environmental sustainability. Good governance ensures coordination among various stakeholders, establishes regulatory frameworks, and fosters transparency and accountability.
6. **Empowerment and Capacity Building:** It plays a crucial role in enhancing household food and nutrition security. It involves empowering individuals and communities to make informed decisions about food choices, promoting gender equality, and strengthening local institutions and community participation. Capacity building initiatives can include training on sustainable farming practices, nutrition education, entrepreneurship, and leadership skills.

These pillars are interdependent and require a holistic approach to address household food and nutrition security comprehensively.

Achieving household food and nutrition security involves implementation of some key methods that can be employed to ensure households have access to sufficient, safe, and nutritious food:

1. **Sustainable Agriculture Practices:** This involves promoting sustainable farming practices that enhance agricultural productivity while minimising environmental impact. It also includes adopting





agroecological approaches, organic farming, conservation agriculture, and precision farming techniques. Implementing sustainable agriculture practices helps increase crop yields, conserve natural resources, and preserve ecosystem health.

2. **Diversification of Food Production:** This includes promoting traditional and underutilised crops, horticulture, agroforestry, and aquaculture. Diversification enhances dietary diversity, improves nutritional intake, and reduces dependence on a few staple crops.
3. **Enhancing Access to Inputs and Technologies:** Facilitating access to quality seeds, fertilisers, pesticides, and modern agricultural technologies. This includes promoting the development and dissemination of improved crop varieties, resilient seeds, and appropriate technologies for smallholder farmers. Access to quality inputs and technologies enhances agricultural productivity and supports sustainable farming practices.
4. **Social Protection Programmes:** It includes implementing targeted social protection programmes to address immediate food needs and reduce vulnerability. This includes programmes such as subsidised food distribution, school feeding programmes, conditional cash transfers, and public works programmes. Social protection programmes provide temporary relief and enhance the purchasing power of vulnerable households.
5. **Nutrition Education and Behaviour Change:** This implies promoting nutrition education and behaviour change communication to improve household dietary practices. Further, raising awareness about the importance of diverse and nutritious diets, promoting breastfeeding, hygiene, and sanitation practices, and addressing cultural and social norms related to food and nutrition. Nutrition education empowers individuals to make informed choices and adopt healthier dietary behaviours.
6. **Strengthening Health and Nutrition Services:** This refers to enhancing access to quality health and nutrition services, particularly for women, children, and vulnerable groups. This includes improving antenatal and postnatal care, promoting breastfeeding practices, providing micronutrient

supplementation, and addressing malnutrition through community-based nutrition programmes.

7. **Policy and Governance:** This comprise of developing and implementing policies and governance frameworks that prioritise food and nutrition security. This includes integrating food security into national development plans, establishing regulatory mechanisms, and enhancing coordination among relevant ministries and agencies. Effective policy and governance frameworks provide a supportive environment for implementing food and nutrition security interventions.
8. **Research and Innovation:** It involves investing in research and innovation to generate knowledge, develop technologies, and address emerging challenges in food and nutrition security. This includes conducting research on climate-smart agriculture, nutrition-sensitive interventions, and sustainable food production systems. Research and innovation drive evidence-based decision-making and enable the development of context-specific solutions.

By employing such methods/approaches, our country can make significant strides towards achieving household food and nutrition security. It also requires a coordinated effort involving government institutions, civil society organisations, research institutions, private sector actors, and communities to create an enabling environment and implement effective interventions.


Achieving household food and nutrition security in India is crucial for meeting the Sustainable Development Goals (SDGs). The SDGs provide a comprehensive framework to address various dimensions of development, including hunger eradication, nutrition improvement, sustainable agriculture, and poverty reduction. Following are the ways and means how promoting household food and nutrition security in India contributes to SDGs:




SDG 1: No Poverty – Household food and nutrition security play a vital role in poverty reduction. By ensuring access to sufficient, nutritious food, vulnerable households can break the cycle of poverty, improve their health and productivity, and enhance their overall well-being.



SDG 2: Zero Hunger – Promoting household food and nutrition security directly aligns with SDG 2. By ensuring that all individuals have access to nutritious food year-round, India can significantly reduce hunger and malnutrition. This includes achieving targets related to ending all forms of malnutrition, promoting sustainable agriculture, and increasing agricultural productivity.




SDG 3: Good Health and Well-being – Access to a diverse and nutritious diet is essential for improving health outcomes. Promoting household food and nutrition security contributes to reducing undernutrition, stunting, wasting, and micronutrient deficiencies, leading to improved overall health and well-being, and addressing targets under SDG 3.



SDG 5: Gender Equality – Household food and nutrition security can help address gender inequalities. Women and girls often bear the primary responsibility for food preparation and household nutrition. Empowering women with knowledge, resources, and decision-making power in food production and consumption can contribute to achieving gender equality.




SDG 12: Responsible Consumption and Production – Promoting sustainable agriculture practices and diversifying diets align with SDG 12. By encouraging the production and consumption of diverse and locally grown foods, India can reduce food waste, conserve biodiversity, promote sustainable farming methods, and minimise the environmental impact of agriculture.



SDG 13: Climate Action – Household food and nutrition security strategies should be aligned with climate action goals. Promoting climate-smart agriculture, agroforestry, and sustainable farming practices can enhance resilience to climate change, reduce greenhouse gas emissions, and mitigate the environmental impact of agriculture.



SDG 17: Partnerships for the Goals – Achieving household food and nutrition security requires strong multi-stakeholder partnerships.



Collaboration between governments, civil society organisations, research institutions, and the private sector is essential for implementing effective policies, programmes, and initiatives to address food and nutrition security in India.

By promoting household food and nutrition security, India can make significant progress towards achieving the SDGs. It not only addresses the immediate challenges of hunger and malnutrition but also contributes to poverty reduction, improved health outcomes, gender equality, sustainable consumption and production, climate resilience, and overall sustainable development.

In India, millets were traditionally consumed, but due to the push given to food security through Green Revolution (1960s), millets were rendered as 'orphan crops' – less consumed and almost forgotten. The Government of India realised the importance of millets in building nutritional security in the country and made several efforts such as gazetting millets as Nutri-Cereals, the celebration of the National Year of Millets in 2018 and proposing to UN, the International Year of Millets (2023).

Millets have substantially higher amounts of minerals like calcium, potassium, magnesium, iron, manganese, zinc, and B complex vitamins, making them a preferable choice over the cereal grains (Table 1). Millets can also help tackle health challenges, such as obesity, diabetes and lifestyle problems, as they are gluten-free, have a low glycaemic index, and are high in dietary fibre and antioxidants.

Millets also play a significant role in promoting household food and nutrition security in India. By increasing the cultivation, consumption, and value addition of millets, India can significantly enhance household food and nutrition security, improve rural livelihoods, and contribute to a more sustainable and resilient agricultural system.

Promoting kitchen gardening can play a significant role in enhancing household food and nutrition security in India by increasing access to fresh and nutritious food, promoting sustainable agriculture practices, and empowering individuals to take control of their own food production.

Table 1: Comparative study of Nutritional value of Millets vs. Wheat & Rice

Grain (Millet/ Cereal)	Carbohydrates(g)	Protein (g)	Fat (g)	Energy (Kcal)	Dietary Fibre (g)	Ca (mg)	Mg (mg)	Zn (mg)	Fe (mg)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Folic acid (mg)
Sorghum	67.7	10.0	1.7	334.1	10.2	27.6	133.0	2.0	4.0	0.4	0.1	2.1	39.4
Pearl Millet	61.8	11.0	5.4	348.0	11.5	27.4	124.0	2.8	6.4	0.3	0.2	0.9	36.1
Finger millet	66.8	7.2	1.9	320.7	11.2	364.0	146.0	2.5	4.6	0.4	0.2	1.3	34.7
Kodo millet	66.2	8.9	2.6	331.7	6.4	15.3	122.0	1.7	2.3	0.3	0.2	1.5	39.5
Proso millet	70.4	12.5	1.1	341.1	-	14.0	153.0	1.4	0.8	0.4	0.3	4.5	-
Foxtail millet	60.1	12.3	4.3	331.0	-	31.0	81.0	2.4	2.8	0.6	0.1	3.2	15.0
Little millet	65.6	10.1	3.9	346.3	7.7	16.1	91.4	1.8	1.3	0.3	0.1	1.3	36.2
Barnyard millet	65.6	6.2	2.2	307.1	-	20.0	82.0	3.0	5.0	0.3	0.1	4.2	-
Wheat	64.7	10.6	1.5	321.9	11.2	39.4	125.0	2.9	4.0	0.5	0.2	2.7	30.1
Rice	78.2	7.9	0.5	356.4	2.8	7.5	19.3	1.2	0.7	0.1	0.1	1.7	9.3

(IIMR; IFCT NIN - 2017)

Dietary diversification is crucial for enhancing household food and nutrition security in India. Dietary diversification refers to the inclusion of a wide variety of foods from different food groups to ensure a balanced and nutrient-rich diet. Here are strategies to promote dietary diversification:

- Nutrition education and awareness through public campaigns, school programmes, community workshops.
- Promoting local and traditional foods through organising festivals and events that celebrate local and traditional foods, promoting their cultural significance, nutritional value; and collaborations with local farmers and food producers.
- Encouraging development of recipes and cooking demonstrations that incorporate local and traditional ingredients, showcasing culinary versatility and nutritional benefits.
- Promoting the cultivation of diverse crops, including traditional and underutilised crops; home gardening; sustainable farming practices.
- Developing and implementing policies that prioritise nutrition-sensitive agriculture, food production, and distribution, promoting dietary diversification, and addressing food and nutrition security at a systemic level.
- Encouraging food fortification programmes to enhance the nutritional content of staple foods,

such as rice, wheat flour, and edible oils, with essential vitamins and minerals, improving the nutrient profile of commonly consumed foods.

By implementing these strategies, India can promote dietary diversification, improve household food and nutrition security, and address the challenges of malnutrition and diet-related diseases.

Food fortification is a strategy aimed at enhancing the nutritional value of food by adding essential vitamins, minerals and other nutrients. It plays a crucial role in attaining household food and nutrition security in light of the following points:

- Enhanced nutrient content
- Address micronutrient deficiencies
- Accessibility and affordability
- Targeted approach
- Effective public health intervention
- Sustainable solution
- National/global support and recognition

There are various governmental initiatives for promoting food and nutrition security:

The National Food Security Act (NFSA, 2013) aimed to provide for food and nutritional security by ensuring access to adequate quantities of quality food at affordable prices. India has transitioned from being

a food-deficit nation to a self-sufficient food-producing country in the last 30 years.

A new Integrated Food Security Scheme has been approved to provide free food grains to Antyodaya Anna Yojana (AAY) and Primary Household (PHH) beneficiaries from 1 January 2023. The new scheme has been named Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY). Free food grains for the year 2023 will be provided to all PHH and AAY beneficiaries under PMGKAY. This integrated scheme will strengthen the provisions of NFSA-2013 in terms of access, affordability, and availability of food grains to the poor. There has been a sub-mission under the National Food Security Mission to encourage millet cultivation and its inclusion in Targeted Public Distribution System (TPDS). Currently, millets are part of the TPDS.

India's food security measures in the PDS, ICDS, and PM POSHAN, and PMGKAY directly contribute to the attainment of some of the UN's Sustainable Development Goals (SDGs) in the field of women and child nutrition, health, education, and food security, being the foundational indicators of human development as well.

Under the Pradhan Mantri Matru Vandana Yojana, registered women have been provided Rs 5000/- on the birth of their first child for wage support and nutritious food during pregnancy and post-delivery period.

To strengthen the efforts of the Government to address malnutrition in the country and to involve the country's wide population through a Jan Andolan, the Poshan Maah is celebrated every year.

Saksham Anganwadi and Poshan 2.0 is an Integrated Nutrition Support Programme for implementation during the 15th Finance Commission period 2021-22 to 2025-26. It seeks to address the challenges of malnutrition in children, adolescent girls, pregnant women, and lactating mothers through a strategic shift in nutrition content and delivery and by creation of a convergent eco-system to develop and promote practices that nurture health, wellness, and immunity.

Mission Poshan 2.0 is designed to address the issue of malnutrition through transparency, accountability, balanced diets, diet diversity and quality, greater grassroots involvement, and last-mile delivery of services supported by key strategies, viz., corrective strategies

to address nutrition related deficiencies, nutrition awareness strategies to develop good eating habits for sustainable health and well-being, and strategies for communication and development of green eco-systems. Under Poshan 2.0, focus is on diet diversity, food fortification, leveraging traditional systems of knowledge and popularising use of millets. Nutrition awareness strategies under Poshan 2.0 aim to develop sustainable health and well-being through regional meal plans to bridge dietary gaps. Further, millets are being used for the preparation of hot cooked meal and take-home rations at Anganwadi Centres for pregnant women, lactating mothers and children below the age of 6 years.

Under Pradhan Mantri Poshan Shakti Nirman (PM POSHAN), there is provision of hot cooked meal to children of pre-schools or Bal Vatika (before class I), and classes I to VIII. The main objectives of the PM POSHAN Scheme (previously known as Mid-Day Meal Scheme) are to address two pressing problems for majority of children in India, viz., hunger and education.

Poshan Vatikas or Nutri-Gardens are being set up across the country to provide easy and affordable access to fruits, vegetables, medicinal plants, and herbs. It involves providing fresh and regular supply of locally produced fruits, vegetables, and medicinal plants to women and children straight from a nutri-garden at or near an Anganwadi Centre.

In conclusion, promoting household food and nutrition security is a multifaceted endeavour that requires concerted efforts from various stakeholders. It involves addressing factors such as availability, accessibility, utilisation, and stability of food, as well as ensuring nutritional adequacy and dietary diversity. Through a range of Governmental interventions, such as food distribution, nutritional supplementation, agricultural support, and capacity building, these programmes strive to achieve sustainable development goals and ensure a healthier and more prosperous society. They reflect a comprehensive and holistic approach to tackle the complex interplay of factors affecting food and nutrition security. By combining targeted interventions, sustainable agricultural practices, social protection measures, and policy support, these programmes have the potential to significantly improve the well-being and livelihoods of millions of households in India. □

Nutrition and Health in School Education



Purabi Pattanayak

Good health and nutrition lay the foundation for learning and are an essential investment in the development of a more sustainable and inclusive future for children. These can help to improve education outcomes, empower the learners to thrive, and promote inclusion and equity in education and health. Numerous studies have highlighted the significant connection between health and education. Good health and nutrition are essential for children's learning, as well as their broader well-being. These are also essential

to maximising educational potential. Children who are happy and healthy will learn better and are more likely to lead healthy lives.

Status of Health and Nutrition in Schools

Global research has demonstrated the serious effects of malnutrition, which is defined as stunting, underweight, or wasting, on a child's physical and brain development. This in turn has a detrimental effect on cognitive development, as well as on the overall productivity and economic development of a country.

Emphasising on health and nutrition of children in schools is about investing in learners' education, health, nutrition and well-being at the same time, with benefits extending to homes and communities. Interventions focusing to health and nutrition bring children into school and help them to stay and learn – especially those most at risk of missing out. Healthy and happy children learn better and are more likely to lead healthy and fulfilling lives.

Globally, 90% of countries have some form of school health and nutrition programme, which is one of the most widely implemented approaches to delivering health and social protection. According to research, early childhood, specifically the first 1,000 days of life, is a critical window for child development. However, for early gains to be sustained and children to achieve their full potential, it is essential to support their health, nutrition, and development during the next 7,000 days of life, throughout middle childhood and adolescence (Bundy, de Silva et al., 2018).

So, the Global School health and nutrition aims to protect and promote the physical and mental health, nutrition, well-being, and development of school-age children and adolescents and the wider school community through coordinated and comprehensive strategies, activities, and services that are integrated and sustained within the education system (UNESCO, GPE et al., 2020). The essential elements include:

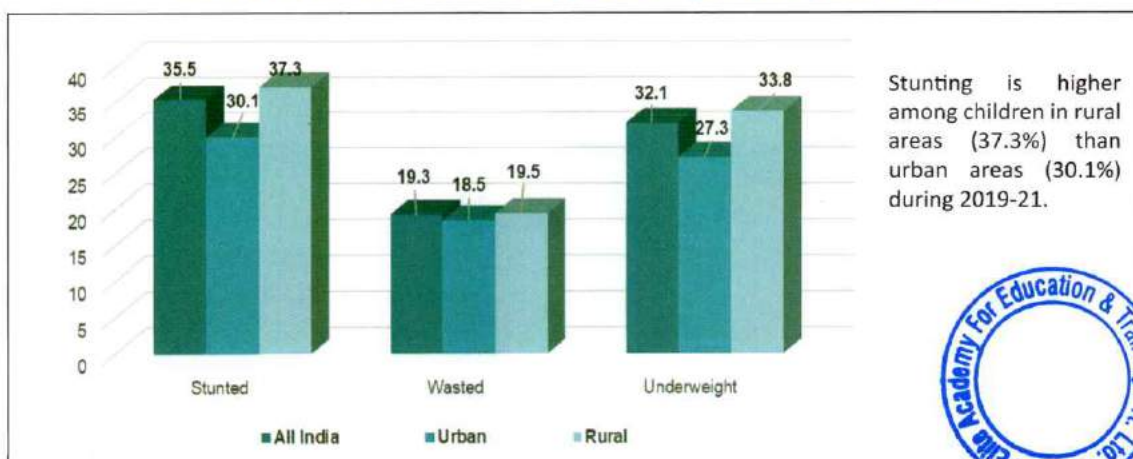
- Policies and laws that provide an enabling environment at national, subnational, and school levels.
- Education for health and well-being delivered through skills-based school curricula and extracurricular activities.
- A school physical and socio-emotional environment that is safe, inclusive, and conducive to health, well-being, and learning.
- School health and nutrition services and school feeding programmes that provide simple, safe and effective health interventions, and healthy school meals.

According to the recently released report 'Ready to learn and thrive', which highlights the significant impact and high returns of investments in school health and nutrition programmes, and urges governments to scale up their efforts to provide comprehensive and inclusive set of interventions. The major findings of the report are:

- 9 in 10 countries in the world currently implement School Health and Nutrition programmes.
- 3 in 5 countries include food and nutrition education
- More than 100 countries have school-based vaccination programmes
- 9 in 10 include physical education as a compulsory school curriculum subject
- 80% of countries now have a school feeding policy
- 388 million children in 161 countries – nearly half of all children enrolled in primary schools receive school meals.

Over the years, India has made progress on key nutritional indicators of children, whereas significant challenges still remain. The National Family Health Survey (NFHS) provides data related to the health of India's children among various other key indicators; three indicators of malnutrition: stunting (low height for age), wasting (low weight for height), and underweight (low weight for age) have shown an overall improvement. These indicators reflect the issue of chronic under nutrition, which are usually associated with poverty, poor maternal health, and nutrition, and inappropriate feeding and care in early life. These prevent children

Table 1: Nutritional Status of Children (under 5 years of age)



Source: National Family Health Survey-5 (2019-21), MoH&FW



from reaching their physical and cognitive potential. As per the recent report of NFHS-5 (2019-21), the nutrition indicators for children under 5 years have improved as compared with NFHS-4 (2015-16). Stunting has reduced from 38.4% to 35.5%, wasting has reduced from 21.0% to 19.3% and underweight prevalence has reduced from 35.8% to 32.1%. A comparative data for India and urban-rural is also given in Table 1. (See on page no. 20).

Policy Perspective on Health and Nutrition in Schools

Through school health and nutrition policies, almost every country makes investments in its children. Over a period of time, Governments have realised that these initiatives are wise investments since they improve students' health, nutrition, and learning outcomes while also significantly advancing their communities and countries (UNESCO, 2023). Emphasising health and nutrition in schools is about investing both in learners' education and their health, with benefits extending to homes and communities. Ensuring the health and well-

opportunities for all. The National Health Policy (NHP) 2017 also envisages the attainment of the highest possible level of health and well-being for all ages, through preventive and promotive health care. The policy places greater emphasis on investment in school health by incorporating health education as part of the curriculum, promoting hygiene and healthy practices within the school environment.

Towards Building Healthy Learning Environment:

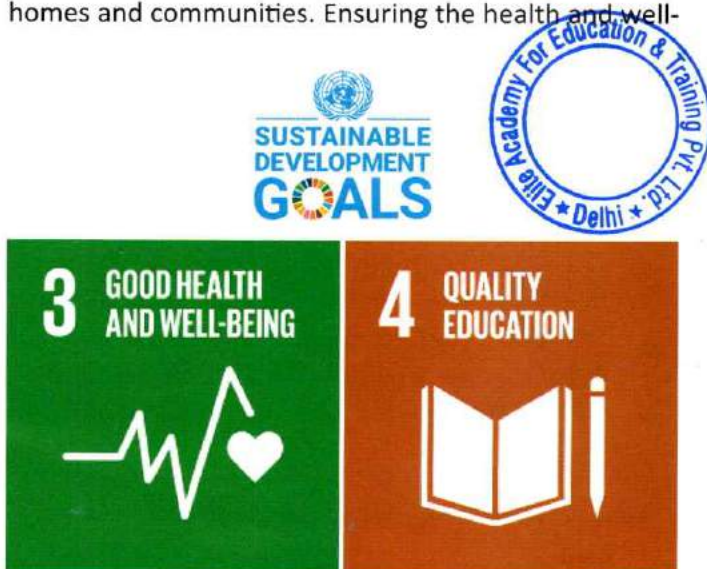
The National Education Policy (NEP) 2020 takes a step towards integrating education and health to enable children to learn and grow as healthy individuals. The policy makes it mandatory for all students to acquire skills in the areas of health and nutrition, physical education, wellness, fitness, and sports. This calls for a paradigm shift in Indian education. As a result, it acknowledges the necessity of nutrition and regular exercise for effective learning. This includes regular health check-ups in schools, especially for 100% immunisation, and health monitoring through health cards.

NEP has recommended the provision of early childhood care and education to children below 5 years of age in preparatory classes in primary schools, and extends the mid-day meal programme to these students. Further, NEP recommended the provision of breakfast for school children in addition to mid-day meals, so that children can benefit from a healthy breakfast. Where serving cooked meals is not feasible, breakfast may include simple yet nutritious foods like groundnuts/chana with jaggery and/or fruits.

Recognising the importance of health education in schools, NEP 2020 includes health and nutrition, physical education, fitness, mental health and wellbeing, sports, sanitation, and hygiene as key subjects for students in order to promote their holistic development. The policy has clearly taken a step towards integrating education and health to enable children to learn and grow as healthy individuals.

Initiatives Undertaken in India

Keeping in view the varied challenging aspects, a lot of initiatives have been undertaken to ensure the health and nutrition of children in schools so that the programmes in place are comprehensive, meet the needs of all learners, and can be sustained. However, more attention needs to be paid to the quality of such programmes through regular monitoring and



being of learners is one of the most transformative ways to improve education outcomes, promote inclusion and equity, and to rebuild the education system, especially following the Covid-19 pandemic. The pandemic has highlighted these linkages and the critical role that schools play in the physical and mental health, nutrition, and well-being of children and adolescents.

Addressing health and education together underlines all Sustainable Development Goals (SDGs). Goal 3 of the SDG underlines ensuring healthy lives and promoting well-being for all at all ages, while Goal 4 of the SDG focuses on inclusive and equitable quality education and promoting lifelong learning

evaluation of their impact. Some of the major initiatives undertaken by the Government of India are:

(i) **Pradhan Mantri Poshan Shakti Nirman (PM POSHAN):** India's PM POSHAN (earlier mid-day meal programme) exemplifies the convergence of education with a food and nutrition programme and has been aligned with the recommendations of the NEP 2020. The scheme is one of the foremost rights based Centrally Sponsored Schemes under the National Food Security Act, 2013 (NFSA). Around 12 crore children studying in 10.84 lakh schools in all Government and Government-aided schools have been covered under the scheme across the country. As per the guidelines, the objectives of the scheme are to address two of the pressing problems for the majority of children in India, viz., hunger and education by:

- i. Improving the nutritional status of children studying in Bal Vatika and classes I – VIII in Government and Government-aided schools and Special Training Centres (STCs).
- ii. Encouraging poor children, belonging to disadvantaged sections, to attend school more regularly and help them concentrate on classroom activities.
- iii. Providing nutritional support to children of elementary stage in drought affected areas during summer vacation and during disaster times.

Under School Health Component, in convergence with M/o Health & Family Welfare, regular health checkup of children under Rashtriya Bal Swastha Karyakram has been conducted. Deworming medicine and Iron & Folic Acid (IFA) tablets are also provided to children (Ministry of Education, 2022). There are evidences to suggest that apart from enhancing school attendance and child nutrition, this scheme plays a very important role in fostering social values and equality.

(ii) **School Health and Wellness Programme:** The School Health Programme under AYUSHMAN BHARAT is a joint collaborative programme between the Ministry of Health and Family Welfare and the Ministry of Education. This initiative is envisaged to facilitate an integrated approach to health programming and more effective learning at the school level.

Major features of the scheme to improve the efficiency and effectiveness are as follows:

- i. TithiBhojan: A community participation programme in which people provide special food to children on special occasions/festivals.
- ii. School Nutrition Gardens: Development of schools to give children first hand experience with nature and gardening. More than 4 lakh schools in India are now equipped with Nutrition Gardens.
- iii. Social Audit of the scheme is made mandatory in all the districts.
- iv. Special provision is made for providing supplementary nutrition items to children in aspirational districts and districts with high prevalence of Anemia.
- v. Cooking competitions been encouraged at all levels right from village level to national level to promote ethnic cuisine and innovative menus based on locally available ingredients and vegetables.
- vi. Vocal for Local for Atmanirbhar Bharat: Involvement of Farmers Producer Organisations (FPO) and Women Self-Help Groups in scheme implementation. Use of locally grown traditional food items for a fillip to local economic growth will be encouraged.

Source: PM Poshan Guidelines, Ministry of Education, 2022

In every public school, two teachers-preferably one male and one female are declared Health and Wellness Ambassadors (HWA) and trained to promote healthy lifestyles and disease prevention information through engaging weekly activities in the classroom. To prevent anaemia among children, the programme also provides mid-day meals and weekly iron-folic acid supplementation including nutrition counselling, tobacco prevention, and life skills education.

(iii) **Mission Saksham Anganwadi and Poshan 2.0 :** The Ministry of Women and Child Development (MoWCD) implementing an integrated nutrition support scheme called Saksham Anganwadi and POSHAN 2.0. The programme aims to address

the issues of malnutrition in children, adolescent girls, and pregnant women. The schemes of Anganwadi Services, Scheme for Adolescent Girls, and Poshan Abhiyan have been realigned under the scheme to maximise nutritional outcomes. It has been organised to address three primary verticals: (i) nutritional support for women, children, and adolescent girls, (ii) early childhood care and education (3-6 years), and (iii) Anganwadi infrastructure including modernisation.

Poshan 2.0 addresses malnutrition challenges, promote nutrition awareness, and good eating habits for sustainable health & well-being, and address nutrition related deficiencies through key strategies. As per the data and information of MoWCD, the scheme operates through a network of 7074 fully operational Projects, and 13.91 lakh AWCs as on June, 2022. The services are currently being provided through 12.72 lakh Anganwadi Workers and 11.69 lakh Anganwadi Helpers to 951.35 lakh beneficiaries, of which 770.98 lakh are children under six and 180.37 lakh are pregnant women & lactating mothers. Till June 2022, a total number of 303.17 lakh children of 3-6 years were covered under pre-school education of which 154.67 lakhs were boys and 148.50 lakhs were girls.

Further, in order to capture near real-time data on the implementation and monitoring of Anganwadi Services across the country, a robust ICT-enabled platform named Poshan tracker has been designed. This tracker management application monitors different activities at the Anganwadi Centre (AWC), service deliveries by Anganwadi Workers (AWWs), and facilitates complete beneficiary management.

(iv) POSHAN Abhiyaan: An overarching Scheme for Holistic Nourishment named 'POSHAN Abhiyan' (Prime Minister's Overarching Scheme for Holistic Nutrition) was launched by the Hon'ble Prime Minister in 2018 to attain the goal of 'Suposhit Bharat' in mission mode. The Abhiyaan aims to reduce malnutrition in the country with an aim to achieve improvement in nutritional status of Children aged 0-6 years, adolescent Girls, pregnant women and lactating mothers in a time bound manner.

(v) Poshan Bhi, Padhai Bhi: Under the Mission Saksham Anganwadi and Poshan 2.0, Centre's

flagship programme 'Poshan Bhi, Padhai Bhi', has been launched by MoWCD on 10 May 2023, which will focus on Early Childhood Care and Education (ECCE) covering 13 lakh Anganwadis across the country. The aim is to make Anganwadi centres both nutrition hubs as well as education-imparting centres. The objective of this programme is to ensure holistic development of children under the age of 6 years, with focus on building skills in key development domains identified under NEP.

Paving the Way Ahead

A nation's future depends on its children, because healthy children are the cornerstone of a healthy society. It has been acknowledged around the world that schools are an important setting where children develop behaviour skills for physical, emotional, and social well-being. School health and nutrition interventions contribute positively to the socio-economic benefits of the most vulnerable children and reinforce the human capital base of communities.

Healthy and well-nourished school children will learn better. Ensuring that children remain in school and are able and ready to learn allows individuals to more fully achieve their potential in life. Investing in health and nutrition interventions in schools serves to promote a well-nourished, healthy, and educated population, which can stimulate long-term growth and economic development. To ensure that children in India receive proper nutrition and health care, we must collaborate in more streamlined and integrated ways. By focusing on and contributing substantially to the health and nutrition of children in schools, we will offer a unique opportunity to transform education. □

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2. In Financial Year (FY) 2021-22, Government of India (GoI) restructured the Integrated Child Development Services (ICDS), POSHAN (Prime Minister's Overarching Scheme for Holistic Nourishment) Abhiyaan, and the Scheme for Adolescent Girls (SAG) into Mission Saksham Anganwadi and Poshan 2.0, also known as Poshan 2.0.
3. <https://pib.gov.in/PressReleaselframePage.aspx?PRID=1897355>



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Foods that Address Nutritional Deficiencies

T

Rajiv Theodore



ypically, nutritional deficiency is considered a problem plaguing the poor, who cannot afford a balanced meal. Thus, poverty remains the biggest cause of nutritional problems in India. However, lately, research has shown prevalent malnutrition even in urban, and wealthy individuals. The urban rich have enough to eat, but poor food choices have caused nutritional deficiencies among them. The influence of the Western diet has led to people consuming more fats, refined carbohydrates, and sugars that only provide empty calories without any substantial nutrition.

Although, the situation is easing because of the Government policies and concerted efforts, however, more efforts are required to deal with the issue.

Economic inequality and low economic status all hit the diets of a large section of the population, which often lack both quality and quantity. Many times, it is a vicious circle, women who suffer from malnutrition are less likely to have healthy babies and inflict long-term damage to both individuals and society. Compared with their better-fed peers, nutrition-deficient individuals are more likely to have infectious diseases such as pneumonia and tuberculosis, which lead to a higher mortality rate and are less productive at work. Under-nutrition also brings inefficiency to society, especially in India, where labour is a major input factor for economic production. On the other hand, overnutrition also has severe consequences and causes several non-communicable diseases, such as



Over the last few years, India has been implementing several nutrition interventions as part of its national strategy to address malnutrition and its associated risks. These include the provision of food supplements, Iron and Folic Acid (IFA) supplementation during pregnancy, breastfeeding promotion, access to clean water, sanitation, etc.

cardiovascular disease, diabetes, cancer, and chronic respiratory issues.

September is celebrated as Nutrition Month, or Poshan Maah, which is marked by creative and diverse efforts such as better use of technology and public participation across the country against malnutrition. Prime Minister Narendra Modi launched this campaign (Poshan Abhiyaan) in March 2018, which today continues to address nutritional deficiencies among adolescent girls, pregnant women, lactating mothers, and children from 0-6 years of age. It seeks to reduce the level of stunting, undernutrition, anaemia, and low birth weight in children through the use of technology and community involvement. This campaign has been taken forward ever since by Krishi Vigyan Kendras (Farm Science Centre) by organising several nutrition sensitisation programmes across the country.

Over the last few years, India has been implementing several nutrition interventions as part of its national strategy to address malnutrition and its associated risks. These include the provision of food supplements, Iron and Folic Acid (IFA) supplementation during pregnancy, breastfeeding promotion, access to clean water, sanitation, etc.

The existing systems in both urban and rural areas are strategically placed to decentralise the efforts under POSHAN and move towards last-mile convergence for better nutrition service delivery. Elected bodies at the grassroots, SHGs consisting of community members, youth groups, Integrated Child Development Services (ICDS), and Anganwadi Centres, can be effectively leveraged for community mobilisation. To generate demand for nutrition services and develop an understanding of nutrient-rich foods, this could also be achieved by using a 360-degree communication approach along with an enabling environment. Interventions that stress on Information, Education and Communication (ICE) and Social and Behaviour Change Communication (SBCC) can prove indispensable. They can go a long way in creating awareness among beneficiaries about programmes like the supplementary feeding programme, Public Distribution Scheme (PDS) fortification, mid-day meal scheme (MDM), and provisions for tribal groups. These could be effectively used for targeted behaviour change in the community on nutrition-related practices. For example, in Rajasthan, the government has taken the lead in developing a State-specific SBCC strategy to

support nutrition programmes.

To keep the message about nutrition intake targeted, effective messaging customised to the requirements of communities and easy to comprehend is needed. The idea of eating right based on locally available and accessible nutrient-rich food, and educating the community on food groups and simple ways of obtaining them are some of the points that could be driven home through this. Effective messaging, being true to local realities and finding simple solutions are the needs of the hour.

Most Common Nutritional Problems

Vitamin D Deficiency--An important nutrient for maintaining bone health, vitamin D is a fat-soluble vitamin that is also known for preventing certain types of cancer. It maintains normal calcium and phosphate levels and helps in muscle contraction, nerve signalling, and cell functions. A deficiency of vitamin D can lead to osteoporosis, repeated fractures, and bone and muscle weakness. It can also lead to severe medical conditions such as:

Vitamin A Deficiency--Vitamin A is essential for healthy vision, metabolism, and cell development. It also keeps the lining of your intestines and urinary tract in proper shape. A major cause of vision loss and blindness, vitamin A deficiency can lead to certain complications with the heart, lungs, skin, tissues, and immune system.

Vitamin C Deficiency--Important for the normal functioning of the blood vessels, vitamin C is essential for the absorption of iron in the body, which is used to make red blood cells. Vitamin C benefits the teeth, gums, skin, and tissue.

Vitamin B12 Deficiency--In order to maintain a healthy nervous system, prevent mutations in the DNA, and induce the formation of red blood cells, vitamin B12 is extremely important. A lack of this vitamin can lead to atrophic gastritis, Crohn's disease, parasitic infections, celiac disease, or certain neurological symptoms.

Protein Deficiency--Known as the building blocks of the body, proteins are essential to maintain muscle mass. Lack of protein can cause oedema of the legs, hands, and abdomen. It can also lead to mood changes, slow healing of wounds, preeclampsia, weakness, fatigue, etc.

Calcium is a crucial nutrient for building and maintaining strong bones and teeth, and it is often associated with dairy products. There are several plant-based sources of calcium that can be easily incorporated into a vegetarian Indian diet.

Iron Deficiency--Iron deficiency is one of the most common nutritional problems in India. Its deficiency results in iron deficiency anaemia, fatigue, paleness, and shortness of breath.

Folate Deficiency--Also known as vitamin B9, folate plays a vital role in DNA and RNA synthesis in the

Iodine Deficiency--The deficiency of iodine is known to cause impaired thyroid functioning, leading to hypothyroidism symptoms, such as weight gain, fatigue, dry skin, weakness, etc.

Addressing Food Deficiencies

Protein Deficiency

Protein is an essential macronutrient for proper body functioning and is necessary for building and repairing muscle, producing hormones, and producing enzymes. A common concern in vegetarian diets is the lack of adequate protein intake. Including a variety of protein-rich plant-based foods such as lentils, chickpeas, beans, soy products, and dairy can help vegetarians meet their daily protein requirements. Consuming a mix of complementary protein sources can ensure the intake of all essential amino acids. Additionally, incorporating protein-rich foods such as tempeh, tofu, and seitan can help to meet protein needs.

Calcium: Finding Alternative Sources Beyond Dairy

Calcium is a crucial nutrient for building and maintaining strong bones and teeth, and it is often associated with dairy products. However, for those following a vegetarian Indian diet, finding alternative sources of calcium beyond dairy is essential. Fortunately, there are several plant-based sources of calcium that can be easily incorporated into a vegetarian Indian diet.

Leafy Green Vegetables

Spinach, kale, and collard greens, are excellent sources of calcium, as are other vegetables such as broccoli, okra, and bok choy. Additionally, some nuts and seeds, such as almonds and sesame seeds, are rich in calcium. Tofu, a popular vegetarian protein source, can also be an excellent source of calcium, particularly if it has been fortified. By incorporating these alternative sources of calcium into a vegetarian Indian diet, individuals can ensure they are meeting their calcium needs and supporting optimal bone health.

Iron Deficiencies

To increase iron intake, consume iron-rich plant foods like spinach, legumes, nuts, seeds, and fortified cereals. Pairing these foods with vitamin C-rich foods, such as tomatoes, citrus fruits, or bell peppers, can enhance iron absorption.

Zinc

This can be found in whole grains, legumes, and nuts, while calcium is abundant in dairy products, green leafy vegetables, and fortified plant-based milk alternatives.

Essential Fatty Acids

This is important for maintaining good health, as they provide the building blocks for many important hormones and help to reduce inflammation. A vegetarian Indian diet may be low in omega-3 fatty acids while high in omega-6 fatty acids. To balance the intake of these essential fats, incorporate omega-3 rich foods like flaxseeds, chia seeds, walnuts, and algae-based supplements. Simultaneously, reduce the consumption of vegetable oils high in omega-6 fatty acids.

Fibre

A vegetarian Indian diet is typically low in whole grains and fibre, as these are found primarily in processed grains and refined carbohydrates. To ensure adequate intake of whole grains and fibre, we should focus on eating foods such as oats, barley, brown rice, quinoa, whole wheat bread, and legumes. Additionally, incorporating foods such as fruits and vegetables can help to meet fibre needs.

A fibre-rich diet promotes digestive health and helps prevent chronic diseases. Incorporate whole

grains, legumes, fruits, vegetables, nuts, and seeds into your meals to maximise fibre intake and support overall health. Whole grains like brown rice, whole wheat, and millets are packed with fibre, vitamins, and minerals. Including these in the diet can improve digestion, regulate blood sugar levels, and lower cholesterol.

Vitamin B12

This is predominantly found in animal products, making it difficult for vegetarians to meet their daily requirements. Fortified foods, such as plant-based milk and breakfast cereals, or B12 supplements can help. Vitamin D is essential for calcium absorption, and exposure to sunlight, fortified foods, or supplements can be beneficial. Riboflavin is present in dairy products, fortified cereals, and certain vegetables like spinach and mushrooms.

Micro-Nutrients

India is in a stage of nutrition transition. Being overweight and underweight are two common predicaments, but irrespective of them, micronutrient deficiency is another glaring reason for nutritional deficiencies. The Government of India has launched several schemes and programmes in the wake of micronutrient deficiency. Food fortification, dietary diversification, nutritional education, micronutrient supplementation, maintenance of environmental sanitation, and hygiene are the various available measures taken to tackle the problem of micronutrient malnutrition.

Blue foods

Blue food, sourced from aquatic environments, can reduce nutritional deficiencies and contribute to employment and export revenue in India. Blue foods are important for the economies, livelihoods, nutritional security, and cultures of people in many countries. Compared to terrestrial meat, blue foods generate lower emissions. They can also contribute to the health, well-being, and livelihoods of rural communities. India can use aquatic foods to address B12 and omega-3 deficiencies, the data showed.

Government Initiatives

The Indian Council of Agricultural Research (ICAR) developed 79 biofortified varieties of various crops that are nutritionally rich and also launched two programmes, Nutri-sensitive Agricultural Resources and Innovations (NARI) and Value Addition and Technology Incubation Centres in Agriculture (VATICA), for upscaling biofortified varieties of crops through Krishi Vigyan Kendras.

Today, there is a kind of revolution occurring in the wonder cereal—Millets — often called 'nutri-cereals' due to their high nutritional value. Millets are a group of small-seeded grasses grown mainly in dry zones of Asia and Africa. These include sorghum (or great millet), pearl millet, finger millet, fonio, proso millet, foxtail millet, teff, and other smaller varieties. Millets are a good source of energy, carbohydrates, fats, proteins, soluble and insoluble fiber, antioxidants, iron, zinc and vitamins, and can help eliminate micronutrient deficiency in India and other developing nations.

The resurgence of this cereal could be gauged from the fact that the United Nations has declared the year 2023 as "the International Year of Millets." The Indian Government's efforts to mark the International Year of Millets (2023) was endorsed by the members of the Food and Agriculture Organization (FAO) governing bodies, as well as by the 75th Session of the United Nations General Assembly. India also launched the 'Mainstreaming Millets for Nutrition Security' programme in 2021. It provides a detailed framework for strengthening the entire value chain by addressing the gaps and calling for replicating scalable models across states for millet promotion in the country. The Indian Ministry of Agriculture and Farmers Welfare has made elaborate plans to promote millets.

Extensive use of millets could also help attain the sustainable developmental goals (SDGs) of the United Nations and could just be the crucial link in the sustainable food supply chain. Across rural India, the Indian government, through various grassroots institutions, is encouraging farmers to cultivate a mix of crops that improve their own food security and nutrition requirements. India's agriculture and food security policies, thus, are now going beyond the calorie sufficiency approach towards ensuring access to a nutritionally balanced and diverse diet and help bring positive change in the nutrition profile of India's undernourished millions. □



Millets

Future Food

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Millet is a cereal grain that belongs to the Poaceae family, commonly known as the grass family. It is widely consumed in developing countries throughout Africa and Asia. While it may look like a seed, millet's nutritional profile is similar to that of sorghum and other cereals.

Millet is no longer promoted as mota anaj; instead, it will be called shree anna, or nutri- cereal, a superfood high in iron and calcium. The resilient grain also fits in well with the current global climatic concerns – it consumes little water, has low carbon footprint, and grows in arid conditions.

They are smart foods- good for you, the planet, and the farmer. Rich in calcium, iron, zinc, protein, and fiber, and with a low-glycemic index, they are nutricereals. They allow multiple farm-revenue streams as they can be food, fodder, a source of sugar production, and even biofuels. They can be grown at high temperatures, with less rainfall or water, in nutrient-poor and saline soils. They have a smaller environmental footprint. They can be eaten in many ways, including the ones we are accustomed to.

Efforts to bring Indian millets to the international forefront began in October 2017, during the Committee on Food Security event in Rome. A series of meetings involving the Government of India (GOI), the agricultural research body International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), and other stakeholders were organised at the Food and Agriculture Organization (FAO) of the UN to identify the process of promoting the idea with FAO departments and the Indian Embassy in Rome. Following this initial step, in November 2017, the

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then Union Agriculture Minister of the Government of India, Radha Mohan Singh wrote to Antonio Guterres, UN Secretary-General, requesting the inclusion of the proposal in the UN General Assembly agenda for an International Year of Millets in 2018. Although this process can typically take five years, the GoI, ICRISAT, the Indian Council of Agricultural Research (ICAR) of the Ministry of Agriculture & Farmers' Welfare, and its millets research institute, Indian Institute of Millets Research (IIMR), along with others, pursued the cause, which came to fruition in 2021. It is encouraging to note that the world is talking about depleting natural resources like arable land and water, and the pressing need to produce more to meet the food and nutritional requirements of the growing population. Staple crops like rice and wheat are part of our traditional diets but are known to be water guzzlers, challenging our farmers, consumers, and policymakers to explore ways to diversify our cropping system. Millets suit this requirement.

The Government of India observed 2018 as the year of millets to encourage and promote millet production. Leading this initiative further, GoI spearheaded the UNGA resolution for declaring 2023 the International Year of Millets. India's efforts to promote the consumption and production of millet got a boost when the UNGA accepted the country's proposal and dedicated 2023 to spreading awareness about these grains.

In declaring 2023 the International Year of Millets, the resolution calls on all stakeholders to provide support to 'activities aimed at raising awareness of and directing policy attention to the nutritional and health benefits of millet consumption and their suitability for cultivation under adverse and changing climatic conditions, while also directing policy attention to improving value chain efficiencies.'

A Smart Food

Millets are an important staple cereal crop for millions of smallholder dryland farmers across Asia and sub-Saharan Africa. They are also called nutri-cereals or dryland cereals, and include sorghum (jowar), pearl millet (bajra), finger millet (ragi), foxtail millet (kangni), proso millet (chena), barnyard millet (samvatke chawal) and kodo millet (kodon), and offer high nutritional benefits. Millets are also referred to as Smart Food,

which are good for the consumers, the planet and the farmers. For instance, finger millet has three times the amount of calcium as in milk and most millets have very high levels of iron and zinc, low glycemic index, good levels of protein and fiber, and are gluten-free. Millets can also contribute to addressing some of the largest global issues in unison: poor diet (malnutrition to obesity); environmental issues (climate change, water scarcity and environmental degradation); and rural poverty. They have a low carbon footprint and have the ability to survive and grow in warm climate with very little water. They are climate-smart and hence constitute a good risk management strategy for farmers as compared to rice and wheat crops, which require higher quantities of water and fertiliser supplements.

Super-grain, super-food and wonder-grain are some of the adjectives often used to describe millets, one of the oldest foods known to humans, and probably the first grain used for domestic purposes. The unanimous adoption by the United Nations General Assembly (UNGA) of the resolution to declare 2023 as the International Year of Millets, a proposal sponsored by India and supported by over 70 nations, underlines the international community's support for recognising the importance and benefits of these grains for the global food system.

Speaking on the subject, India's former permanent representative to the UN, Ambassador TS Tirumurti, said, "There is an urgent need to promote the nutritional and ecological benefit of millets to consumers, producers, and decision-makers, to improve production efficiencies, research and development investments, and food sector linkages". He expressed gratitude to all the co-sponsors, especially Bangladesh, Kenya, Nepal, Nigeria, Russia, Senegal, and all member states of the UN, for their strong support.

Boost Production

In India, traces of millets have been found in the archaeological sites of Harappa and Mohenjo-daro, and several ancient Indian scriptures make references to millets. For many years, millets were a part of our daily diet. Today, there is a growing realisation among Indian

farmers that cultivating millets requires fewer inputs and it is also an economically viable option, especially in harsh and dry environments. This is supported by the new-found knowledge on the health benefits of millets. Also, over the last few years, the Indian Government has been making extensive efforts to encourage the cultivation of millets. The Union Government of India, headed by the Prime Minister Narendra Modi, had declared 2018 as the National Year of Millets to boost production of the nutrient-rich grains.

According to Indian Institute of Millet Research in India, finer millet is rich in calcium, the amount of Iron in Ragi is also more than that of wheat and rice.

For many generations, millets were a regular part of the diet. These grains are rich in many essential nutrients for nutrition and health. A variety of cuisines can be prepared, like Millet cheela, Millet Dosa, Millet Momos, Millet Pizzas, Millet manchuria, Pasta, Idli, and Kodo Biryani.

As part of the International Millets Year, 2023, Central Ministries, State Governments, and Indian embassies will hold events throughout the year to promote and spread awareness about the benefits of millets for the 'cultivator, consumer, and climate'. A Government release said millets will also be an integral part of G-20 meetings. India assumed the Presidency of the G-20 summit in December, 2023.

Priority identified for the Government to help, after promotion and support of healthy food, were both to simplify and assist the process of obtaining permission to operate and allowing more transportation (prioritised by over 60% of companies).

For the survey, responses from SMEs in 11 cities having business operations in 24 states and Union Territories was collected as part of the Smart Food initiative, founded by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). The results are being discussed with the Confederation of Indian Industry (CII), which is working to address challenges faced by the industry.

The Indian Government is leading a global movement for the UN International Year of Millets in 2023. This initiative is being followed up with the 'Millet Mission'. ICRISAT-founded Smart Food initiative



is advocating demand driven by strengthening of millet and sorghum value chains.

Iron Deficiency

A new study has shown that regular consumption of millets can improve haemoglobin and serum ferritin levels to reduce iron deficiency anaemia, which is rising globally. The recently published research, a meta-analysis of 22 studies on humans and eight laboratory studies on millets consumption and anaemia, was undertaken by seven organisations across four countries and was led by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).

“The study concluded that millets can provide all or most of the daily dietary iron requirements of an average person. Although the amount of iron provided depends on the millet variety and its form of processing, the research clearly shows that millets can play a promising role in preventing and reducing high levels of iron deficiency anaemia,” highlighted Dr S Anitha, the study’s lead author and Senior Nutritionist at ICRISAT.

Dr. Hemalatha, Director, National Institute of Nutrition (NIN) said, “The results of the meta-analysis based on 19 efficacy studies conducted on anaemic

individuals clearly indicate that including millets in our daily diets, as a meal or beverage, decreases anaemia. Contrary to the belief that micronutrients in millets are not bioavailable, the findings have shown that when millets are included as a part of the balanced diet, the iron from millets is bioavailable and improves the haemoglobin status of the participants. Including millets in our daily diet, as suggested in 'My Plate for the Day', has the potential to decrease the burden of anaemia in India."

"This study is part of a series of the largest studies ever collated on the impacts of consuming millets. The scientific evidence gathered has surpassed our expectations, showing that millets have a significant positive impact on reducing the risks of diabetes, which is increasing at dangerous levels, and cardiovascular disease, which is the number one cause of deaths globally. Now, we also have strong evidence for the impact of high levels of iron in millets reducing anaemia – which is also increasing and is one of the top three micronutrient deficiencies globally. Millets not only are healthy but target some of our biggest needs, making them a powerful solution for our diets," highlighted Ms. Joanna Kane-Potaka, former Assistant Director General, ICRISAT, and Executive Director of the Smart Food initiative, who is a co-author of the study.

A medical doctor and co-author, Dr Raj Kumar Bhandari, noted, "The National Millet Mission, an initiative of the Government of India, started in 2018 to

promote millet production and consumption in our daily diet as an answer to malnutrition and climate change. Most recently, NITI Aayog launched Poshan Gyan, a digital repository with 14 thematic areas of health and nutrition, where millets have also been prominently positioned in diverse languages, media types, target audiences, and sources. We are also promoting the use of indigenous grains in the inter-sectoral convergent actions envisaged in the flagship programme of Poshan Abhiyan aimed at a reduction of undernutrition, wasting, stunting and anaemia."

The Union and State Governments across India have been recognising the value of millets, especially since 2018, when a National Year of Millets was declared, followed by the establishment of a Millet Mission.

A recent survey of millet entrepreneurs across India has revealed challenges and areas of intervention for the Government including promoting healthy foods, GST exemption, more options for online selling among others, during and post lockdown.

The highest priority helps the millet entrepreneurs requested both during and post lockdown was for the Government to promote and support healthy food, which includes millet. Nearly 80% requested this for post lockdown, a few suggestions made for promoting millet and supporting millet enterprises were inclusion of millet in the mid-day meal schemes, and allow Small and Medium Enterprises (SMEs) to play a role in providing the food for mid-day meals and to poor sections of the community.

"Post Covid-19, millet as a healthy alternative option will grow in demand. Also, millet does not consume fresh water to the extent rice does, making its cultivation a sustainable food alternative," said Mr P Ravichandran, Chairman of the Agriculture and Food Processing Sub-Committee, CII Southern Region.

Dr Jacqueline Hughes, Director General, ICRISAT, emphasises, "Agribusiness is important to ensure agriculture is successful and profitable. Agribusiness and agriculture go together and support for both is important. With Covid-19, we are recognising this even more through challenges across the value chain."



“Compared to the more commonly known cereals such as wheat, rice, or corn, millets are capable of growing under drought conditions, under non-irrigated conditions even in very low rainfall regimes, having a low water footprint”, explained Dr. Aburto, Deputy Director in the nutrition and food systems division of the UN Food and Agriculture Organization.

Joanna Kane-Potaka of ICRISAT, gave the example of India where “during the green revolution, high yielding varieties of rice and wheat were introduced and supported to scale out on a massive scale, to improve food security, while arguably, inadequate attention was paid to nutrition or environmental factors.”

“Farmers have therefore shifted to more remunerative crops grown to sell for profit and moved away from subsistence agriculture responding to changing consumer preferences and markets inputs,” said Dr Aburto.

“1.74 billion people were anemic in 2019. That number is rising,” said Dr Jacqueline Hughes, Director General, ICRISAT. “It has been proven that iron deficiency anemia affects cognitive and physical development in children and reduces productivity in adults. The need for a solution is critical, and therefore bringing millets into mainstream and Government programmes are highly recommended.”

“Now that there is strong evidence of the value of millets in reducing or preventing iron deficiency anaemia, it is recommended that one major research study be undertaken on anaemia covering all the different types of millet, common varieties and all major forms of processing and cooking, using a uniform testing methodology. This will provide the detail required for designing interventions needed to have a major impact on reducing anaemia globally,” said Professor Ian Givens, a co-author of the study and Director at University of Reading’s Institute of Food, Nutrition and Health (IFNH) in the UK.

At Nutrihub, ICAR-IIMR, synergise millet startups, and other stakeholders (corporations, governments, academia and investors) to bring transformative change.

“Can we expect a millet revolution in Startups in the coming years?” to a query, speaking to this author,

Dr. C. Tara Satyavathi, Director, IIMR said” There are 400 Startups in Nutrihub (Ideate, Incubate, Accelerate-Empowering Millet Startups) which is part of IIMR, and many people coming forward to take advantage of millets and many entrepreneurs are involved in promoting and projecting millets, we are going to witness a millet revolution not only in consumption but also in the business, here we to say that, millets are good for humans, millets are good for planet, millets are good for climate and also millets are also good for business .

To commemorate International Millet Year, MyGov is hosting various interactive activities around Millets, like quiz, mega food event, recipe contests, create awareness on millets through catchy songs, etc.

World Food India 2023, is expected to be held at Pragati Maidan from November 3-5, 2023. MILLIND, the new avatar for the futuristic spirit of India's Food Processing Industry, which comprises two parts: Mill-from Millets representing the 'International Year of Millets' And Ind-As in India, the potential Food basket of the World!

Realising the importance of small millets for nutrition security and the contextual issues related to small millets, Karnataka based, DHAN Foundation has started working on mainstreaming small millets in the regular diets in a focused manner since 2011. DHAN Foundation was bestowed with National Siridhanya Award 2019 under ‘Best NGO’ category by the Department of Agriculture, Karnataka, and the Indian Institute of Millets Research (IIMR) for its work on millets since 2011.

With the support of world leaders and initiation of the Indian Government, millets, the superfood will become the future food in the coming years and witness the World Food Basket to reach out many in have not countries, by fulfilling the objectives of Sustainable Development Goals and aspirations of global living beings. □

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Nutritional Management Framework for Rural India



The success of national nutritional initiatives/policies predominantly depends upon food policy, education policy, health policy, agriculture policy and rural development programmes. Thus, the collection of data from various sources on real-time and addressing the related issues on a continuous basis with structured and streamlined institutional mechanisms for deriving long-term benefits is essential.



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*** Dr. Amiya Kumar Mohapatra**
**** Dr. Nandeesh V Hiremath**

he universal human needs revolve around food, clothing, health, and shelter in any country. Food and nutrition are critical to human development, which is much needed for maintaining good health, enhancing productivity, and enabling socio-economic development. Nutrition affects the development as much the development affects the nutrition. Within food, nutrition is one of the core global agenda in integrated development; and recent global nutrition report has found that among 17 Sustainable Development Goals (SDGs) of the United Nations-2030, almost 12 SDGs possess parameters/indicators connected with health/nutrition, thereby indicating its paramount significance. Nutrition related issues are multi-faceted and multi-dimensional in nature, which require to be addressed

carefully at various levels for the best outcome.

Why Nutrition Matters

Nutrition refers to the process of consuming food and converting it into the sources of energy and other essential nutrients/vitamins required for life. The key nutrients of nutrition include protein, carbohydrates, fats, minerals, vitamins, and fibre/roughage. Simply stated, a healthy and balanced diet is most essential for healthy living. Better nutrition is directly related to good health and enhanced immunity systems, which in turn reduces the risk of nutritional-deficiencies and diseases. Malnutrition in its all forms, directly poses great challenges to health and livelihood, and indirectly presents a threat to fiscal imbalance due to its cost involved.

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Indian nutritional landscape is undergoing a major transition, which is influenced by significant transformation in socio-economic aspects along with demographic parameters, apart from impact by multiple developmental initiatives undertaken by the Governments, NGOs (Non-Government Organisations), private entities and CSR (Corporate Social Responsibility) projects. The knowledge of the causes and impact of these transformations can help in managing the impact of both under-nutrition and over-nutrition.

Besides, the consumption patterns have undergone significant changes during the couple of decades with a major shift in higher consumption of processed and snack foods from the traditional-healthy and home-made diets. This has resulted in increased incidence of nutrition/diet-related imbalance in nutrition, obesity, diabetes, and such disorders/diseases. This has been compounded due to chemical-based intensive agriculture, adopting unhealthy nutritional habits with modern lifestyles, environmental pollution, etc. Thus, the study of nutrition is critically important, so that preventive measures can be taken along with corrective actions for dealing with diseases and nutrition-related disorders.

In the development agenda, the nutrition interventions for vulnerable groups is of utmost importance which includes women, children, lactating women, adolescent girls, etc. Therefore, the incidence and the impact of malnutrition and under-nutrition is found to be higher in the rural areas, in tribal areas, and in the urban slums of India including most people under the BPL (below poverty line). Malnutrition and under-nutrition weaken the immune system and health, resulting in reduced work output capacity and decreased productivity among adults and causing high mortality and morbidity among the children. The lack of balanced and healthy nutrition creates a trap of vicious cycle on health, productivity, and immunity. It has been found from researchers that the first 1,000 days of a child's life (i.e., from conception of child in mother's womb till 2nd birthday of the child) is a defining moment in terms nutritional management and good health. Thus, the holistic management of nutrition, health and well-being has emerged as a significantly important dimension, especially for the women and children in rural India.

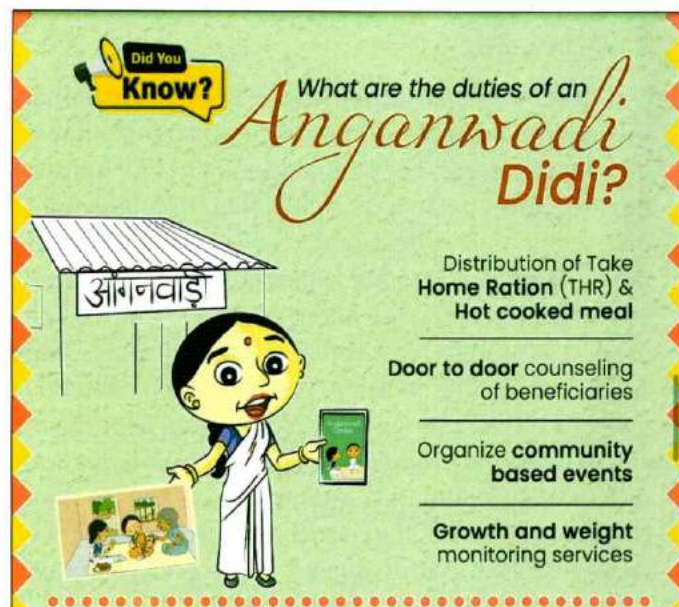
Initiatives by the Government

Government has been making dedicated and concerted efforts to reduce malnutrition and under-

nutrition in the country. A variety of initiatives have been taken, out of which Integrated Child Development Services (ICDS) is one of the important interventions. The Integrated Child Development Services - Common Application Software (ICDS-CAS) has enabled Anganwadi Workers (AWWs) to ensure tracking health/nutritional services across the country and equipping them with data-driven decision-making at grassroots level, thereby enhancing the effectiveness of delivery services. Although AWWs face challenges of internet connectivity and tech-glitches, the availability of smart phones in various language-compatible monitoring software has brought in multi-fold advantages, especially with incremental learning approach. Anganwadi Workers Centres (AWCs) deliver services in improving nutrition at grassroot levels including the last mile beneficiaries. More than 14 lakhs Anganwadi Centers are working in 36 States and Union Territories in India, in addressing the issues of 10 crore people through various ICT-based platforms and mobile apps, thus helping the government initiatives by real time monitoring and best usage of facilities.

POSHAN Abhiyaan, started on 8 March 2018, with the primary aim of improving nutritional outcomes for the children, adolescents, women, lactating women, and with an exclusive focus on nutritional health through variety of community-based interventions. Further, POSHAN Abhiyaan 2.0 was strengthened to promote and develop practices that nurture health, wellness, and immunity of targeted beneficiaries and achieves key parameters for both children and women. POSHAN Abhiyaan has been implemented through ICDS-CAS, which is mobile-based and web-enabled software application to improve the outcomes in nutrition. The extensive network of Anganwadi Centres and Anganwadi Workers is discharging an important role in nutrition and health delivery under the Abhiyaan. In this programme, the beneficiaries included are children below 6 years, pregnant women and lactating mothers, women, severely acute malnutrition children and adolescent girls. This Abhiyaan has a special thrust focus on rural areas since the nutritional challenges are predominant in the rural India.

The Ministry of Women and Child Development uses POSHAN Tracker as a digital tool, using a centralised data architecture, provides a digital identity to each beneficiary. It provides 360-degree view of the activities such as monitoring and tracking of all AWCs, AWWs,



and about the beneficiaries such as women, adolescent girls, children, lactating women, etc. The Government of India has also integrated AYUSH (Ayurveda, Yoga, Unani, Siddha and Homeopathy) concepts that build and promote the health and well-being further, thus addressing the nutritional-related issues by tapping into the reservoir of India's indigenous traditional health management practices for the holistic development.

Further, the Ministry of Women and Child Development has introduced the 'National Nutrition Mission (NNM)' across approximately 583 districts, which is a comprehensive institutional and nation-wide programme, launched with the prime objective of enhancing nutritional outcomes for the pregnant women, lactating mothers, and children, by addressing undernutrition, malnutrition, low birthweight of children, and related diseases with over 33 lakhs of malnourished children and over half of them are severely malnourished in India. Further, the 'National Institute of Nutrition (NIN)'s Nutrition Atlas', which compiles data from various sources like the World Health Organization (WHO), National Nutrition Monitoring Bureau and National Family Health Survey (NFHS) also provides data and curated information on the nutritional status both at state and national levels. Besides, 'Nutrify India Now', a mobile-app developed by the NIN is guiding to assess the nutrients from variety of foods consumed. Three dashboards viz., 'Anemia Mukta Bharat Dashboard', 'Jan Andolan Dashboard' and 'Nutrition India' provide much-needed information about malnutrition and create awareness of best practices to manage the

malnutrition. This tech-enabled system furnishes data and trends at district, state, and national levels, thereby facilitating effective management and monitoring of the interventions by GoI.

On the overall, it can be observed that a variety of institutional initiatives, interventions, and projects of GoI together have brought-in a tremendous transformation in the entire nutrition management ecosystem. This phenomenon is getting evolved and will continue to contribute for the integrated development of all the vulnerable groups including women and children in India, since the partnership and collaboration with NGOs and corporate entities with CSR projects have also playing an important role.

Nutritional Management Framework in India

It is well-known fact that addressing the hunger and starvation is not enough, and it is equally crucial to manage the health, nutrition, and well-being of people across all the strata. As nearly 70% of Indian population lives in rural areas, there is huge opportunity to address the nutritional deficiencies and in strengthening the health management programmes, particularly in rural India. Both the State and Central Governments must scan the rural landscape in addressing the nutritional deficiencies, which will in turn enhance the health and well-being, thereby fostering higher productivity and enhanced sustainable livelihoods.

The befitting nutritional framework is critical in addressing issues of nutrition, given the context of SDGs-2030 agenda and long-term growth in India. Holistic nutrition management essentially requires real-time and reliable data at all (village, block, district, state & centre) levels. Various interventions through policy framework viz., POSHAN Abhiyaan, ICDS-CAS Dashboard, National Institute of Nutrition's Nutrition Atlas, Nutrify India Now mobile app, etc., are also helping in developing a robust nutritional ecosystem in a diverse country like India. These initiatives enabled State and Central Governments to make nutrition analytics before designing new programmes/projects. Technology-usage for collection, compilation, analysis, and interpretation of the data on nutrition has offered variety of advantages for strategic planning and policy making by governments and other related agencies, thus helping in developing a robust nutritional ecosystem.

However, there is always a scope of improvement



in comprehensive framework of evidence-based nutrition interventions for developing countries including India, that endorse actions along the life course, i.e., from lactation, childhood, adolescence to ensure improved child nutrition and holistic health. The framework of nutrition interventions should include the integrative role of all the relevant stakeholders from health and wellness perspectives. The framework of nutrition interventions suggests that there are four key categories in holistic nutrition management at the level of households i.e., under 5-years of children, pregnant & lactating women, young women, and adolescents. The strategies, interventions and implementation approaches must be specific or customised to address these categories, since their needs and abilities to perceive nutrition are strikingly distinct.

Regular monitoring and surveillance systems are inevitable for nutrition management, not only to assess the impact of on-going nutrition and development programmes but also to act as an early warning systems for ready rectifications. Nutritional education programmes are also undertaken by government to encourage appropriate dietary intake and healthy lifestyles, especially in the rural areas, tribal areas and in the urban slums. Government of India has also initiated training for managers and functionaries for their capacity building, those are an integral part of the nutrition programs. Different target groups are sensitised to address the specific needs by designating nutritional-related information and activities to manage the malnutrition and under-nutrition.

However, there is a spectrum of challenges for managing nutrition in India, which primarily include poverty, illiteracy, poor knowledge on nutrition among users (especially in rural India), lack of family support, role of taboos/social stigma on usage of nutritional & dietary supplements etc. In addition, lack of reliable and timely data from all the parts of the country stands as an obstacle for framing suitable nutritional policy framework. The local governance system, at gram panchayat and taluk panchayat levels, is working closely with State and Central Government programmes becoming an operational challenge, owing to ideological differences. The NGOs have been doing yeomen services with bilateral and global funded projects, but the sources of donor funding have declined significantly during the last couple of decades, and only depends upon CSR grants.

Way Forward

National development and nutritional management are closely related, so also sustainable development, which is embedded in the holistic health and balanced nutritional management interventions and best practices for the citizens at large. Central and State Governments have done adequately to manage the health and nutritional aspects through institutional mechanisms and collaborative interventions, which are constantly evolving. This can be ably supported by private sector/corporates along with the active participation of NGOs, communities, and people. A few people-oriented NGOs have been successful, in reaching the last-mile beneficiaries due to active and voluntary participation/involvement of members.

Hence, the success of all the initiatives and interventions undertaken by the government for nutrition, health, and wellness significantly depends upon the engagement and commitment levels of all stakeholders, including field functionaries, beneficiaries, community and policy makers at large. Further, success can be strengthened and sustained through strong digital infrastructure, good governance, and people's participation. In addition, a wider net of policy interventions is essentially required to bring the much-needed improvement in nutritional health and well-being. Thus, the outcome-based sustainable model should be designed and implemented to make impact/outcomes to reach the target beneficiaries, thus making the interventions fruitful.

The success of national nutritional initiatives/policies predominantly depends upon food policy, education policy, health policy, agriculture policy and rural development programmes. Thus, the collection of data from various sources on real-time and addressing the related issues on a continuous basis with structured and streamlined institutional mechanisms for deriving long-term benefits is essential. There is tremendous scope for these initiatives in health and nutrition management interventions to become utility-oriented, impact-driven, and people-centric to achieve designed outcomes and results, and these would significantly contribute to the holistic development of rural India.



Rising Maternal Obesity

Implications and Way Forward

The Union Government has introduced several policies, such as Janani-Shishu Suraksha Karyakram, Janani Suraksha Yojana, and Pradhan Mantri Surakshit Matritva Abhiyan, to address problems in maternal health care. The Mission POSHAN 2.0 and National Health Mission can play a significant role in promoting healthy diets and healthy lifestyles through the most powerful platform in the country, i.e., Aanganwadi Centres.



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besity has become the most common medical condition in women of reproductive age, and the rise in prevalence of obesity is seen in both high-income countries and low- and middle-income countries (LMICs). Overweight and obesity, characterised by an adult body mass index (BMI, computed as weight in kilograms divided by the square of height in metres) of 25 or above, have become a serious global public health concern, with rising prevalence in low-resource nations. Between 1975 and 2016, the global proportion of adult women (aged 20 years) with obesity climbed from 6% to 15%. The proportion of overweight/obese adult women in India nearly quadrupled from 12.6% in 2006 to 20.7% in 2016. It is predicted that by 2025 more than 21% of women in the world will have obesity. Women who are malnourished during and throughout pregnancy are more likely to have low birth weight

babies, and these children are more likely to develop Non Communicable Diseases (NCDs) and obesity later in life. Global estimates of the prevalence of obesity among women of reproductive age range from 20–36%.

Prevalence of Maternal Obesity in India

In India, 24% of women in the age group of 15-49 years are overweight or obese. Moreover, 56.7% of the women also have a high waist to hip ratio [NFHS 5].

A study conducted by Chopra et al. (2020) based on NFHS – 4 population estimates reported that among pregnant women, the prevalence of obesity was over 40% in 31 districts, with the highest prevalence of 72% in Shopian district (Jammu and Kashmir). The prevalence of obesity among postpartum women was over 40% in 37 districts, with the highest prevalence of 61% in Pathanamthitta district (Kerala).

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Another study conducted by Luhar et al. (2020) has forecasted the prevalence of obesity in India in the year 2040. Using simulation models, they have reported that the prevalence of overweight and obesity is forecasted to remain higher in urban areas, compared with rural areas, reaching 32.3% (27.8%- 37.1%) and 19.7% (14.0%-24.5%), respectively among urban women by 2040. Under the assumption of a 1% annual increase in incidence of overweight and obesity from 2015, it is expected that the national prevalence of overweight will increase to 29.9% (26.7%-33.7%) by 2040 among women. Over the same period, it is also expected that the national prevalence of obesity will increase to 16.9% (11.9%-21.3%) among women. Under the high urbanisation scenario, the future national prevalence of overweight between 2010 and 2040 will increase to 28.4% (25.5%-31.8%) among women, compared to 27.0% (23.7%-30.5%) under the assumption of no further urbanisation.

Complications Associated with Maternal Obesity

Obesity during pregnancy is related to worse health outcomes for both mothers and their offspring, sustaining intergenerational cycles of obesity and associated NCDs, according to evidence from observational research. Obesity during pregnancy is linked to an increased risk of gestational diabetes (GDM), preeclampsia, miscarriage, venous thromboembolism, infection, and haemorrhage in the mother. Furthermore, obese women may be subjected to nutrient-poor but energy-dense diets, which may contribute to bad pregnancy outcomes.

Intrauterine hyperglycemia (in GDM) and hypertension can harm foetal development via

Obese pregnant mothers are at an increased risk of developing complications during antenatal, intrapartum, and postnatal periods. Several factors, including sociodemographic features, obstetric characteristics, knowledge, and perception of health-promoting behaviour, are linked to the likelihood of maternal obesity.

epigenetic mechanisms, resulting in preterm birth, macrosomia, congenital defects, stillbirth, and neonatal death. Between 1990 and 2010, maternal overweight and obesity were linked to a 0.6 million increase in fatalities and a 1.8 percent increase in disability-adjusted life years worldwide.

Globalisation, as well as the consumption of nutrient-poor, energy-dense processed foods, and high-carbohydrate diets, have been primary drivers of the worldwide obesity epidemic in the last three to four decades, along with the switch to sedentary professions and reduced physical activity. Previous research in India and other low- and middle-income nations has repeatedly found beneficial links between obesity and increased socioeconomic position, educational attainment, and dietary diversity.

In India, however, there is minimal research on obesity risk factors throughout pregnancy and the postpartum period. There is also paucity of data in this regard. Given India's escalating double burden of undernutrition and obesity, it's more important than ever to study the prevalence of obesity and its risk factors throughout pregnancy and the postpartum period in order to establish context-specific prevention interventions. Obese pregnant mothers are at an increased risk of developing complications during antenatal, intrapartum, and postnatal periods. Several factors, including sociodemographic features, obstetric characteristics, knowledge, and perception of health-promoting behaviour, are linked to the likelihood of maternal obesity. Gaining a thorough understanding of these determinants is critical to meeting the targets of SDG 3—to reduce global maternal mortality and eliminate avoidable deaths among children under the age of five by 2030. Identifying pregnant women at risk of maternal obesity is critical for planning and implementing effective and timely interventions for optimal pregnancy outcomes. Importantly, maternal obesity is widely modifiable as a key pregnancy risk factor.

FIGO's Guidance for the Management of Prepregnancy, Pregnancy, and Postpartum Obesity

The Pregnancy Obesity and Nutrition Initiative (PONI) developed by FIGO's (The International Federation of Gynecology and Obstetrics) Pregnancy and Non-Communicable Diseases (PNCD) Committee emphasises that management of obesity in pregnancy

should be considered in the context of a life course approach (Table 1), linking with preconception, postpartum, and interconception services to prevent excess weight gain before and during pregnancy. PONI also aims to support healthcare professionals, such as obstetricians/gynecologists, midwives, nurses, dietitians, and endocrinologists to develop collaborative action to prevent and reduce the burden of maternal obesity. This guidance also outlines potential actions to address the barrier of ineffective communication of risks related to maternal obesity. To date, over 30 clinical practice guidelines have been published internationally that focus specifically on or incorporate some guidance on the management of women with obesity during pregnancy. These guidelines vary in scope, evidence quality, and international relevance. Therefore, this guidance for the management of prepregnancy, pregnancy, and postpartum obesity consolidates recommendations from multiple practice guidelines and suggests a pragmatic approach for the management of obesity in women before, during, and after pregnancy.



Table 1: FIGO Committee guideline for the management of pre-pregnancy, pregnancy, and postpartum obesity

Time Point A: Pre-Pregnancy

- A.1 All women should have their weight and height measured and their body mass index (BMI, calculated as weight in kilograms divided by height in meters squared) calculated. Consider ethnic differences.
- A.2 All women with a BMI of ≥ 30 should be advised of the effect of obesity on fertility, the immediate risks of obesity during pregnancy and childbirth, and the subsequent long-term health effect of obesity including the higher risk of noncommunicable diseases for them and their children.
- A.3 All women with obesity should be encouraged to lose weight through diet and adopting a healthy lifestyle including moderate physical activity. If indicated and available, other weight management interventions might be considered, including bariatric surgery.
- A.4 All women with obesity should be advised to take at least 0.4 mg (400 μ g) and consider up to 5 mg folic acid supplementation daily for at least 1–3 months before conception.

Time Point B: Pregnancy

- B.1 All women should have their weight and height measured and their BMI calculated at the first antenatal visit. Consider ethnic differences. Advise on appropriate gestational weight gain.
- B.2 All women should receive information on diet and lifestyle appropriate to their gestation including nutrient supplements, weight management, and regular physical activity.
- B.3 All women with obesity should be advised of the risks of obesity and excess gestational weight gain on pregnancy, childbirth, and long-term health including

risk of noncommunicable diseases for them and their children.

- B.4 All antenatal healthcare facilities should have well-defined multidisciplinary pathways for the clinical management of pregnant women with obesity including the identification and treatment of pregnancy-related complications.

Time Point C: Postpartum

- C.1 All women with pre-pregnancy obesity should receive support on breastfeeding initiation and maintenance.
- C.2 All women with obesity and pregnancy complications should receive appropriate postnatal follow-up in line with local resources, care pathways, and in response to the individual health requirements of each woman and her children.
- C.3 All women with obesity should be encouraged to lose weight postpartum with emphasis on healthy diet, breastfeeding if possible, and regular moderate physical activity. They should be advised of the importance of long-term follow-up as they and their children are at increased risk for noncommunicable diseases.
- C.4 Maternal obesity should be considered when making the decision regarding the most appropriate form of postnatal contraception.

Source: McAuliffe et al, 2020.

Way forward for policy implementation

Given the huge body of documented evidence on the adverse impact of maternal obesity on child outcomes, most UN bodies and health organisations have drawn up guidelines for prevention, treatment, or management. The World Health Organization's (WHO) prenatal care guidelines advocate a wide range of antenatal care interventions (49 in all), 14 of which are nutrition-related, with only one having a direct impact on obesity. Other topics include maternal and foetal examinations (n=13), preventive measures (n=7), common physiological symptoms (n=6), and enhancing the quality and usage of health care systems (n=9).

Although the Government of India has made suggestions for lowering comorbidities linked with overweight and obesity, such as GDM and other NCDs, there is no guideline or standardised toolset on how to prevent, screen for, and manage obesity during pregnancy. The Government of India's Mission Poshan 2.0 (2021-22 to 2025-26.) announced a ground-breaking mandate for convergent action across 11 Government ministries to achieve a malnutrition-free India and ensure food security.

Maternal obesity during pregnancy is not yet a target of Mission Poshan 2.0, and existing initiatives aimed at women in India (such as antenatal care, nutrition and health education, and food supplementation) face significant implementation obstacles. Resource restrictions, supply chain gaps, hurdles to behaviour change, and insufficient access to health services, are just a few of the issues.

Key challenges for the policy implementation

Lack of gestational weight gain charts and corresponding optimal weight gain recommendations for pregnant women;

nutrition norms for preventing and managing maternal malnutrition lack penetration in service delivery system;

budget for implementation under several heads (capacity building, equipment, supplies, human resource, dissemination, etc) not costed;

engagement of private sector for demand creation; targets for maternal obesity missed in the Poshan Abhiyaan;

indicators for tracking and review missing from the government's health information management system.

Although behavioural and pharmacological therapies for obesity in the general population have received a lot of attention, there is little research on

the efficacy of weight management interventions in pregnancy in the India. During pregnancy, up to 60% of obese women and 68 percent of overweight women gain excess weight.

Implementation research on maternal nutrition needs to continue, and insights need to be consolidated as more evidence becomes available. The Union Government has introduced several policies, such as Janani-Shishu Suraksha Karyakram, Janani Suraksha Yojana, and Pradhan Mantri Surakshit Matritva Abhiyan, to address problems in maternal health care. The Mission POSHAN 2.0 and National Health Mission can play a significant role in promoting healthy diets and healthy lifestyles through the most powerful platform in the country, i.e., Aanganwadi Centres, by:

➤ Intensive system strengthening efforts are needed to improve the coverage and quality of maternal nutrition interventions, particularly calcium supplements and gestational weight gain monitoring. Focusing on improving maternal diets (both aspects of quantity and quality should be emphasised) ensuring that healthy and nutritious take-home rations are provided to the ICDS beneficiaries.

➤ The cost of nutritious diets needs more attention. Identify approaches for making a nutritionally adequate diet accessible and affordable for pregnant and lactating women households. Promoting the use of local traditional greens and other food items, and popularising Nutri-gardens, which are seen to improve diet diversity. Combining nutrition BCC with cash transfers could be helpful, but it needs to be tested.

➤ Strengthen the knowledge and skills of frontline workers on overweight, obesity as well as its consequences (especially Anganwadi workers, Accredited Social Health Activists (ASHA), Auxiliary Nurse Midwives, and teachers) through results-focused training, communication materials, and job aids, as well as their support systems, such as supportive supervision.

Harmonise overweight & obesity communication guidelines and critical messages across ministries and programmes. There is a need to initiate a comprehensive and coordinated national nutrition education programme, sensitive to overweight & obesity among women, to increase 'nutrition literacy' and promote key nutrition behaviours.

➤ Emphasising importance of optimal gestational weight gain, and strengthening regular ANC checkups (at least 4). Antenatal care reduces the adverse health effects for both newborns and mothers during and after pregnancy. It is considered a key element in the healthcare delivery system.

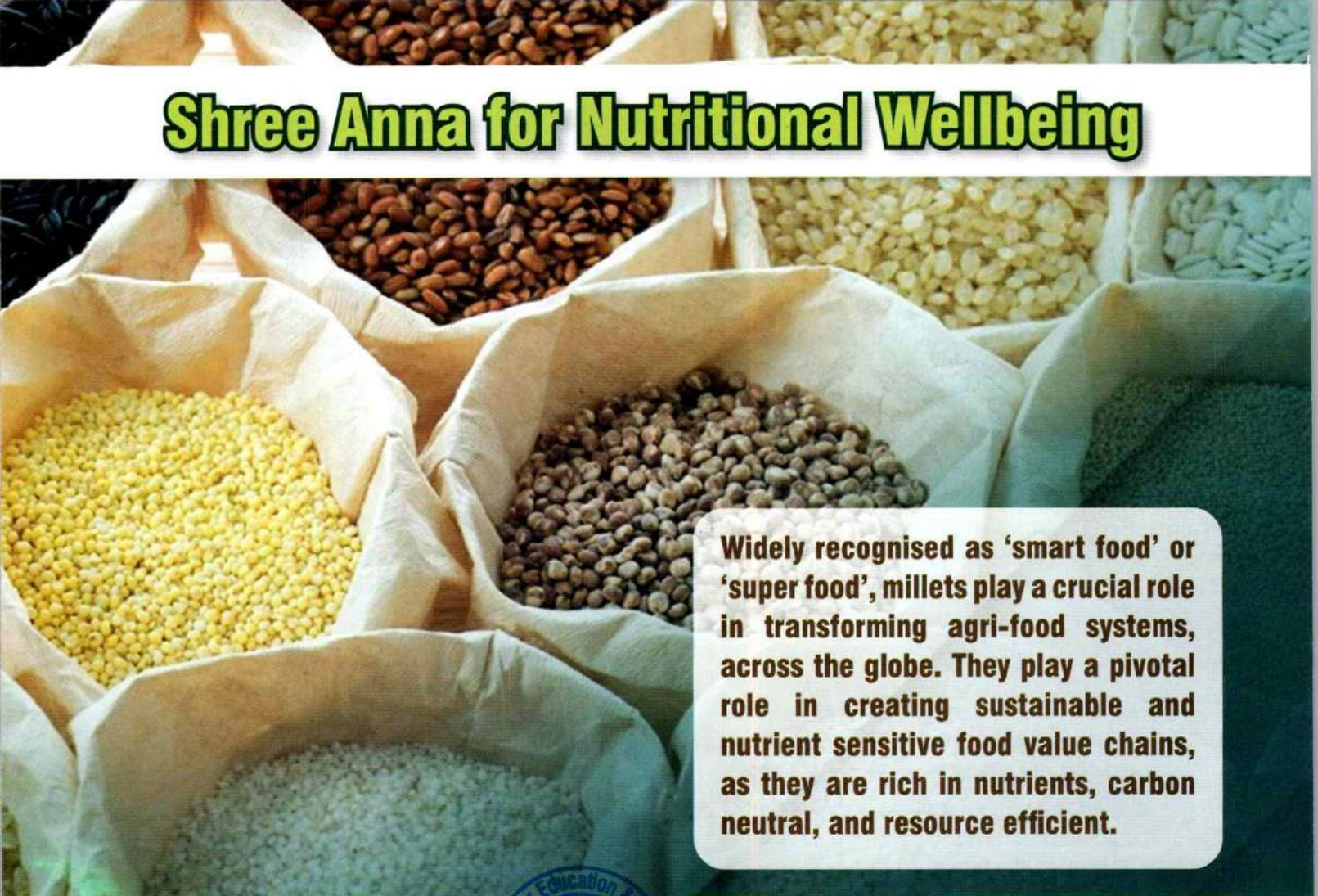
➤ Promote maternal nutrition in Village Health, Sanitation, and Nutrition Days (VHSND) to deliver these essential nutrition interventions. Increase local involvement in nutrition, particularly in planning, monitoring, and supporting key services and behaviour change efforts, such as through VHSND, home visits by FLWs, and panchayati raj institutions.

➤ Expand efforts to engage and empower vulnerable communities, particularly women in these communities, to overcome malnutrition (including through Gram Sabhas and self-help groups).

➤ Promote mild to moderate physical activity during the first 1000 days. Awareness raising efforts – improve counselling around these issues, especially during the first 1000 days but also during life course.

India is at a historic juncture with respect to its development and its position in the world. The country faces critical choices in terms of benefiting from its recent economic growth. The cost of NCDs to women in terms of health, productivity, and economic development is tremendous. In order to make the dream of Kuposhan Mukta Bharat a reality, all stakeholders must strive to fight against all forms of malnutrition, including overweight-obesity.

Shree Anna for Nutritional Wellbeing



Widely recognised as 'smart food' or 'super food', millets play a crucial role in transforming agri-food systems, across the globe. They play a pivotal role in creating sustainable and nutrient sensitive food value chains, as they are rich in nutrients, carbon neutral, and resource efficient.

B

Urvashi Prasad



y declaring 2023 as 'The International Year of Millets', the United Nations General Assembly has set the tone for promoting millets across the world. Millet is a common term to categorise small-seeded grasses that are often termed nutri-cereals or dryland-cereals and includes Sorghum (Jowar), Pearl Millet (Bajra), Finger Millet (Ragi), Little Millet (Kutki), Foxtail Millet (Kakun), Proso Millet (Cheena), Barnyard Millet (Sawa), Kodo Millet (Kodon) and other millets.

Millets: Key Properties and Benefits¹

Millets are nutritionally superior to wheat and rice owing to their higher levels of protein with a more balanced amino acid profile. Similarly, the dietary fiber content of millet is higher compared to some of the staple cereals. Millets also contain various

phytochemicals that exert therapeutic properties owing to their anti-inflammatory and anti-oxidative properties. Millet grains are rich sources of nutrients like carbohydrates, protein, dietary fiber, and good-quality fat. They also have substantially higher amounts of minerals like calcium, potassium, magnesium, iron, manganese, zinc, and B complex vitamins, making them a preferable choice over cereal grains.

Millets can help tackle health challenges such as obesity, diabetes, and lifestyle problems as they are gluten-free and have a low glycemic index. A study was undertaken by ICRISAT across four countries, involving nearly 1,000 children, adolescents, and adults, to understand the impact of the inclusion of millets in the diet. The researchers found that millets increased haemoglobin levels by as much as 13.2%. Serum ferritin

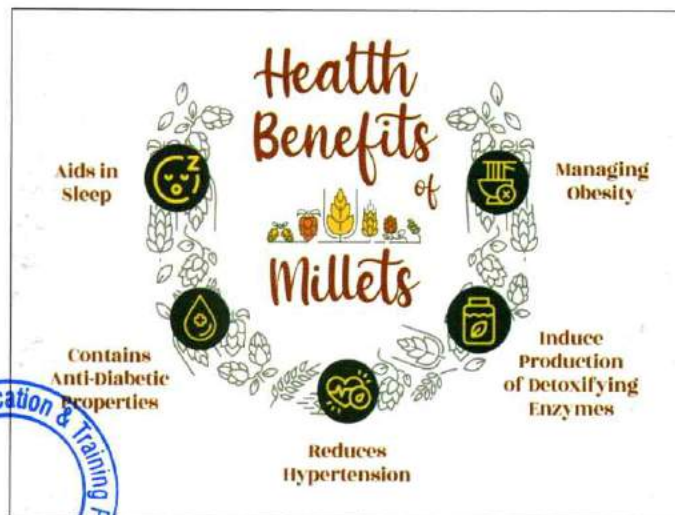
has been shown to increase by an average of 54.7% due to millet consumption. Ferritin is an iron-containing protein in the blood and a clinical marker for iron deficiency.

Widely recognised as 'smart food' or 'super food', millets play a crucial role in transforming agri-food systems, across the globe. They play a pivotal role in creating sustainable and nutrient sensitive food value chains, as they are rich in nutrients, carbon neutral, and resource efficient. They are also widely used for human consumption, animal fodder, and other untapped markets like biofuels and fermentation.

Millets are the backbone of dry-land agriculture. They are hardy, resilient crops that have a low carbon and water footprint, can withstand high temperatures, grow on poor soils with little or no external inputs, and are therefore termed 'miracle grains' or 'crops of the future'. They are the most secure crops for small farmers as they are the hardiest, most resilient, and climate-adaptable in harsh, hot (up to 50 degrees Celsius) and drought-prone environments. Further, millet production is not dependent on the use of chemical fertilisers. These crops do not attract pests, and a majority of millets are not affected by storage pests. These crops will be the sustainable food source of the future amidst worsening climatic conditions.

Millets in India have been given the identity of 'Shree Anna'. As highlighted by the Hon'ble Prime Minister, 'Shree Anna' means a door to prosperity for small farmers of the country; 'Shree Anna' means forebearer of nutrition for crores of people of the country; 'Shree Anna' means welfare of the tribal society of the country; 'Shree Anna' means more crop yield with less water; 'Shree Anna' means chemical-free farming; 'Shree Anna' means a way to tackle the challenge of climate change.

The latest research by Ruth DeFries et al. reveals that 'Jowar is India's sustainable alternative to Wheat in the face of climate challenges'. The research paper² titled, 'Climate resilience of dry season cereals in India', published in Nature's Scientific Reports examined the sensitivity of wheat and Jowar yields to increases in temperature and compared water requirements under different scenarios. The research revealed that 'Wheat is highly sensitive to increases in maximum daily temperature in its multiple stages of growth during the post-monsoon, dry winter season. In comparison,



Jowar is able to handle increases in temperature with far less impact on yields. In addition, wheat requires 1.4 times more water than Jowar owing to the extension of its growth cycle into the summer. With future climate projections, this study argues that without pragmatic changes in managing how wheat is cultivated in India, it is likely that the yields will decrease by 5 per cent coupled with a significant increase in the water footprint by 2040. Jowar, in that case is India's best bet with its meagre 4 per cent increase in the water footprint with the same climatic projections. A renewed focus on jowar also aligns with the sharpened focus of the Government on millets for nutrition and climate resilience, besides much-needed emphasis on protection for marginal farmers in the Indian context.'

Overview of India's Millet Sector³

India produces all nine commonly known millets. It is the fifth-largest exporter of millets in the world. Most States in India grow one or more millet crop species. India grows over 17 million tons (MT) of millet, which amounts to 80% of Asia's and 20% of global production. India recorded 27 per cent growth in millet production in 2021-22 over the previous year. Pearl Millet (60%) followed by Sorghum (27%), Finger Millet (11%) and Small Millets (2%) are the major varieties produced in India. The major millet producing States are Rajasthan, Uttar Pradesh, Haryana, Gujarat, Madhya Pradesh, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, and Telangana.

India exported millet products worth USD 34.32 million during 2021-22 compared to USD 26.97 million in 2020-21 and USD 28.5 million in 2019-20. The countries to which India predominantly exports millets are the

U.A.E, Nepal, Saudi Arabia, Libya, Oman, Egypt, Tunisia, Yemen, the U.K and the U.S.A. The major varieties of millets exported by India include Bajra, Ragi, Canary, Jawar, and Buckwheat. The major millet-importing countries in the world are Indonesia, Belgium, Japan, Germany, Mexico, Italy, the U.S.A, the United Kingdom, Brazil and the Netherlands. India could look to grow its millet exports further by focusing on the markets in these countries.

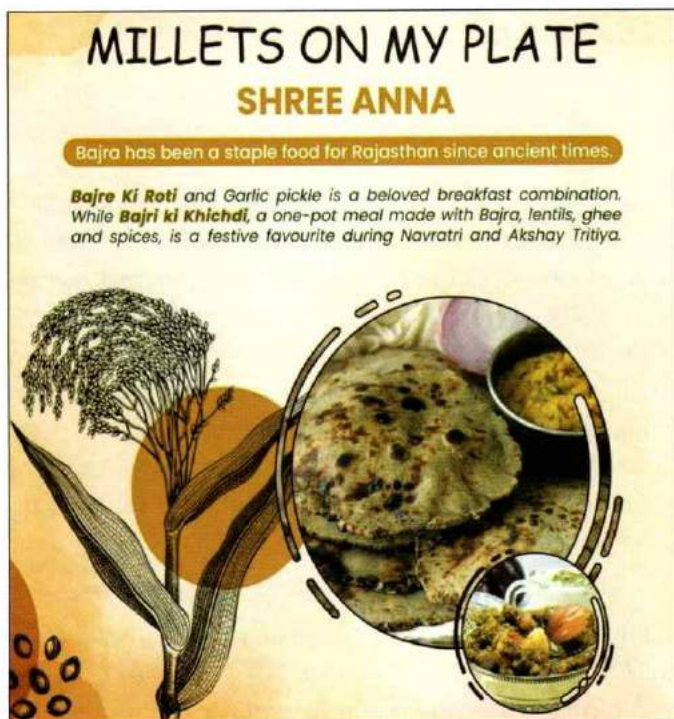
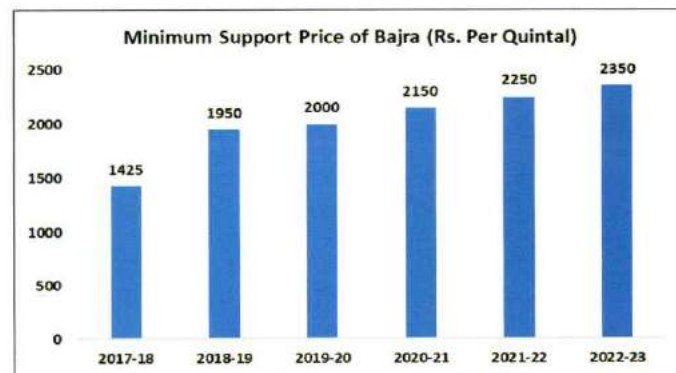
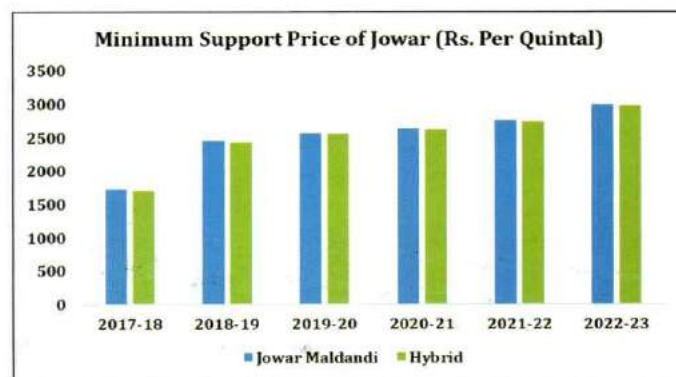
Government Initiatives to Promote Millets

India is taking wide-ranging steps to popularise the production, consumption, and export of millets in the country. The Government notified millets as nutri-cereals in April 2018. Efforts have been made at every level - from raising awareness among farmers to developing a market for millets. While millets are cultivated in around 12 States across India, their consumption was less than 2-3 kg per person per month. This has now increased to 14 kg per month. There has also been a 30% rise in the sale of millet-based products in the country. Millets have now become popular on social media and in cafes. At least 19 districts have chosen millets under the 'One District, One Product' scheme.

Under the National Food Security Mission (NFSM), awareness is being created among farmers about millets through demonstrations and training. The growing market for millets will directly benefit the 2.5 crore small farmers who are involved in its production.

Their income levels will rise, and the rural economy overall will gain tremendously. From villages, millets are reaching malls, markets, and stores across India. Self-help groups are also engaged in making millet products. Food Producer Organisations are also coming forward. The result is that the supply chain for millet products is getting built and strengthened across India, which will not only help farmers but also create jobs.

Farmers growing millets are supported by the remunerative Minimum Support Price (MSP) and procurement. During the Kharif season of 2021-22, 6.29 lakh tonnes of coarse cereals like Bajra, Jowar, Maize and Ragi were procured by the Government in Haryana, Karnataka, Maharashtra, Madhya Pradesh, Odisha, Uttar Pradesh, Gujarat, and Chhattisgarh. The procurement of millets is expected to double at 13.56 lakh tonnes, during the year 2022-23 to give further impetus to millet farmers. There has been a significant rise in the MSP of millets as shown in the charts below.



The Government is popularising millets through research and development support. Additionally, support is being provided to start-ups and entrepreneurs for developing recipes and value-added products that promote the consumption of millets. India has more than 500 start-ups working in the millet value-added chain. The Indian Institute of Millets Research has

incubated 250 start-ups under the Rashtriya Krishi Vikas Yojana - Raftar. The Production-Linked Incentive Scheme for the food processing sector can also benefit the millet sector as more companies come forward to develop millet products.

The Union Government is implementing Pradhan Mantri Poshan Shakti Nirman (PM POSHAN), from 2021-22 to 2025-26, wherein millets can be used by States/UTs. Along the same lines as the Wheat Based Nutrition Programme, millets are allotted to States and UTs at subsidised rates under Anganwadi Services. At least 6 States—Assam, Chhattisgarh, Jharkhand, Karnataka, Odisha, and Tamil Nadu have launched exclusive Millet Missions.

In order to improve the nutritional status of children, the Central Government is encouraging State Governments/Union Territory Administrations to explore the possibility of introducing millets under the PM POSHAN Scheme, preferably in districts where eating millets is a culturally accepted food habit. Under NFSM, a special programme on millets has been launched in 212 districts in 14 States. Interventions like cluster demonstrations on improved package of practices, demonstrations on the cropping system, distribution of seeds of High Yielding Varieties (HYVs)/hybrids and nutrients are being implemented in collaboration with States.

In 2021, NITI Aayog signed a Statement of Intent (Sol) with United Nations World Food Programme (WFP) to mainstream millets and support India in taking the lead globally in knowledge exchange. NITI Aayog has also published a Compendium⁵ titled 'Promoting Millets in Diets: Best Practices across States/UTs of India' to serve as a guiding repository for reviving and mainstreaming millets in our diets. The Compendium presents a set of innovative practices adopted by State Governments and organisations in various aspects of the millet value chain especially production, processing, and consumption. Three major themes are included in the Compendium, i.e., (a) State Missions and initiatives to promote millets; (b) Inclusion of millets in ICDS; (c) Research and Development and use of technology for innovative practices.

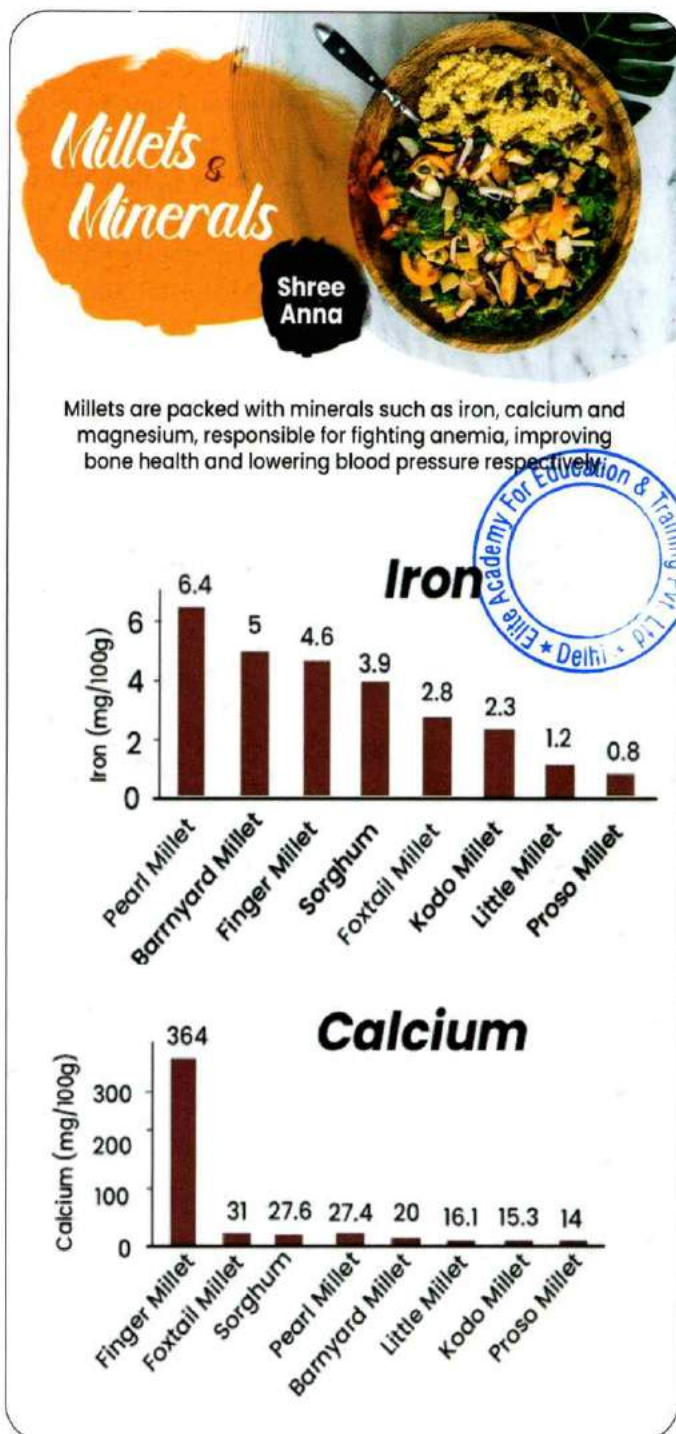
The Agricultural and Processed Food Products Export Development Authority (APEDA) has prepared a comprehensive strategy to promote Indian millet exports across the globe commencing December, 2022.

The Union Budget 2022-23 highlighted that support would be provided for post-harvest value addition, enhancing domestic consumption, and branding millet products nationally and internationally. In a post-budget webinar focused on the positive impact of the Union Budget 2022-23 on the agriculture sector, Prime Minister Narendra Modi called upon the corporate world to come forward in branding and promoting Indian millets. During the launch ceremony of the International Year of Nutri-cereals organized by the Food and Agriculture Organization (FAO) in Rome, Prime Minister Narendra Modi emphasised the importance of making millets a food choice for the future. He also highlighted how climate change is affecting food availability and the key role played by millets in this context due to their climate resilience.

Making 'Shree Anna' a Global Movement

India's motto during its G20 Presidency is 'One Earth, One Family, One Future'. The International Year of Millets also reflects this spirit of considering the whole world as one family. India has already taken Yoga to the world stage through the celebration of International Yoga Day. Today, over 100 countries globally are officially promoting Yoga. Similarly, India's efforts on the climate front have borne fruit, with over 100 nations joining the International Solar Alliance. Through its G20 Presidency, India is focusing on globalising Mission LiFE (Lifestyle for Environment), where we derive inspiration from our heritage and drive change for the benefit of society and the environment. 'Shree Anna' has also been a part of the traditional lifestyle in India for centuries. We are well positioned to share this knowledge with the world. During the 100th meeting under India's G20 Presidency, the Meeting of Agricultural Chief Scientists (MACS) on 'Sustainable Agriculture and Food System for Healthy People and Planet', it was unanimously agreed to launch a millet initiative – MAHARISHI, which was proposed by India for research in the field of millets. MAHARISHI stands for Millets And Other Ancient Grains International Research Initiative (MAHARISHI). Its secretariat will be housed at Indian Institute of Millets Research (IIMR), Hyderabad, with technical support from ICRISAT, One CGIAR Centre, and other international organisations.

Proposed Initiatives by States/UTs for Promoting Millets in India



India is poised to become a global millet hub if all States and UTs maximize their participation. Some of the key initiatives that States/UTs can implement for the promotion of millets in the daily diet include:

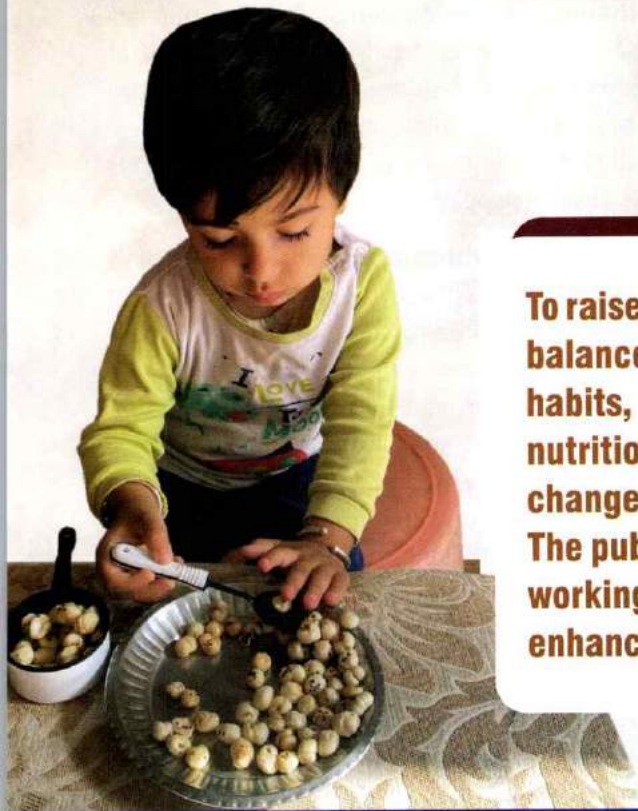
a) Awareness programmes on the health benefits of various millet grains.

- b) Millet melas and events to publicise the inclusion of millets in the daily food habits of farmers and consumers at the State-/District- level.
- c) Training and promotional campaigns on millet cultivation for farmers and Farmer Producer Organisations, at the district, gram panchayat, and block levels.
- d) Chaupals for millet related awareness sessions at the gram panchayat level.
- e) Awareness about improved millet production, seed production, and technologies with mechanisation, identification of village clusters for promotion of millets.
- f) Distribution of seed mini kits to farmers.
- g) Orientation of farmers on new age practices for branding, labeling, packaging, and export markets.
- h) Promotion of millets cultivation across fallow and degraded lands.
- i) Supplementation of millets in Integrated Child Development Services, Mid-Day Meal, Public Distribution System, and other State funded programmes. 'Shree Anna' has been included by several States in their Public Distribution System. This can be replicated in other States too.
- j) Engaging hotel associations for popularising millet recipes and enabling value addition. ☐

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Combating Malnutrition Achieving Prosperity



To raise knowledge of the value of a balanced diet and healthy feeding habits, it is crucial to promote nutrition education and behaviour change at the community level. The public and commercial sectors working together can significantly enhance nutrition efforts.



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Malnutrition is a pressing issue, with significant economic consequences that affect the country's growth and development. India has one of the world's fastest expanding economies, but the country still fighting with malnutrition, especially among children and women. India ranks 101 out of 116 nations on the Global Hunger Index 2021, demonstrating the severity of the issue. Malnutrition not only endangers people's health but also places financial strain. Malnutrition is influenced by a number of variables, such as poverty, poor access to nutrient-dense food, a lack of proper healthcare, and poor sanitation and hygiene standards. The consequences of malnutrition extend beyond immediate health concerns, affecting educational outcomes, workforce productivity, and overall economic

growth. This article aims to shed light on the economic implications of malnutrition. By understanding the economic ramifications, policymakers, stakeholders, and communities can work together to address the issue effectively and allocate resources towards comprehensive interventions that promote nutrition and well-being.

Cost of Malnutrition

1. **Human Capital Loss:** Malnutrition has a severe impact on human capital development. Children who suffer from malnutrition experience stunted growth and cognitive impairments, leading to reduced learning abilities and lower productivity in adulthood. According to estimates by the World Bank, India loses approximately 2-3% of its GDP

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annually due to the reduced productivity of its malnourished workforce.

2. **Increased Healthcare Expenditure:** Malnutrition contributes to a higher burden of disease and increased healthcare costs. Malnourished individuals are more susceptible to infections, chronic illnesses, and other health complications. According to a research by the Indian Council of Medical Research, malnutrition contributes between 15% and 20% of all diseases in India. Families and the healthcare system are put under a great deal of financial stress by the cost of treating and managing illnesses linked to malnutrition.
3. **Education and Skill Development:** Malnutrition affects cognitive development, leading to poor educational outcomes. Malnourished children often face difficulties in concentrating, retaining information, and performing well academically. According to the National Family Health Survey (NFHS-4), 38.4% of Indian children under the age of five are stunted, which has a negative impact on their chances of going to school. Reduced educational success has a negative impact on future work prospects and economic mobility, which feeds the poverty cycle.
4. **Impact on Agricultural Productivity:** Malnutrition is closely linked to agricultural productivity, as undernourished farmers face challenges in sustaining agricultural activities effectively. Lack of proper nutrition hampers physical strength, endurance, and productivity among farmers, affecting crop yields and agricultural output. The Food and Agriculture Organization (FAO) estimates that malnutrition reduces agricultural GDP by 3-8% annually, emphasising the detrimental effect on food security and rural livelihoods.
5. **Long-Term Economic Implications:** The economic consequences of malnutrition extend beyond the immediate impact on individuals. A malnourished population faces reduced earning potential, limited employment opportunities, and increased dependency on social welfare programmes. This creates a drag on economic growth and places an additional burden on government resources, diverting funds that could be allocated to other developmental initiatives.

Addressing the Challenge

Addressing malnutrition in India requires a comprehensive and multi-sectoral approach. Some key strategies include:

1. **Strengthening Health Systems:** One of the key strategies to address malnutrition is further strengthening the health systems to ensure accessible and quality healthcare services, especially for vulnerable populations. This involves several aspects:

a) **Improving Healthcare Infrastructure:** India's healthcare infrastructure, particularly in rural areas, needs to be further strengthened. The reach and caliber of healthcare services can be further improved by making investments in healthcare facilities like primary care clinics and community health centers. This entails assuring the accessibility of qualified medical personnel, sufficient medical supplies, and necessary medications.

- b) **Enhancing Nutritional Screening and Assessment:** Incorporating routine nutritional screening and assessment in healthcare settings can help identify individuals at risk of malnutrition and provide timely interventions. Acute malnutrition can be detected in children and adults using screening techniques such as the Mid-Upper Arm Circumference (MUAC) measurement, enabling early diagnosis and treatment.

- c) **Strengthening Maternal and Child Healthcare:** To combat hunger, more focus on maternal and child healthcare is essential. Promoting antenatal care, healthy eating throughout pregnancy and exclusive breastfeeding through the implementation of programmes can help to enhance mother and infant health outcomes. Additionally, ensuring that women and their growing children have access to high-quality prenatal and postnatal care services can promote their healthy development.

- d) **Capacity Building and Training:** It is critical to invest in the education and development of healthcare personnel, especially at the primary care level. This entails improving





their expertise in nutrition assessment, counseling, and malnutrition case treatment. The significance of a multi-sectoral strategy, integrating stakeholders from the health, agricultural, education, and social welfare sectors to work cooperatively in tackling malnutrition, should also be emphasised in training programmes.

- e) **Integration of Nutrition Services:** Integrating nutrition services within the healthcare system can facilitate a comprehensive approach to addressing malnutrition. This involves incorporating nutrition assessment, counseling, and interventions as part of routine healthcare visits. Integrating nutrition education within the curricula of medical and nursing schools can help build a cadre of healthcare professionals who are well-versed in nutrition-related issues.

By strengthening the health systems and ensuring comprehensive healthcare services, India can enhance its capacity to detect, treat, and prevent malnutrition effectively. This not only improves individual health outcomes but also contributes to the overall economic development of the country by reducing the economic cost associated with malnutrition-related health complications and productivity losses.

- 2. **Improved Nutrition Interventions:** An implementing targeted and evidence-based nutrition intervention is crucial to address the issue of malnutrition in India. These interventions should focus on improving dietary diversity, addressing specific nutrient deficiencies, and promoting optimal feeding practices. Here are some key aspects of improved nutrition interventions:

- a) **Food Fortification:** Adding vital micronutrients like iron, vitamin A, iodine, and zinc to frequently consumed food items is known as food fortification. Foods that are commonly consumed, such as salt, wheat flour, rice, and edible oils, can be fortified to help fight widespread nutrient shortages. For instance, adding iodine to salt has helped treat iodine deficiency illnesses in a number of nations. Similar to this, adding iron and folic acid to

wheat flour can help prevent iron deficiency anemia.

- b) **Promotion of Breastfeeding:** Infants receive the best nourishment from breastfeeding, which supports their healthy growth and development. The risk of infant malnutrition can be considerably decreased by programmes that encourage exclusive breastfeeding for the first six months, continuing nursing and adequate complementary feeding. The prevalence of breastfeeding can be increased by implementing programmes that help breastfeeding women through counseling, lactation assistance, and workplace policies.
- c) **Micronutrient Supplementation:** It is critical to provide tailored micronutrient supplements, especially for vulnerable groups including expectant moms, nursing mothers, and young children. Prenatal iron and folic acid supplementation can reduce maternal anemia and enhance the quality of births. Zinc supplementation can boost children's growth and immune response, while vitamin A supplementation can lower the incidence of childhood blindness and improve immune function.
- d) **Nutrition Education and Behavior Change:** To raise knowledge of the value of a balanced diet and healthy feeding habits, it is crucial to promote nutrition education and behaviour change at the community level. This can be accomplished by promoting the importance of eating a variety of nutrient-dense foods through awareness campaigns, community workshops, and educational resources. Furthermore, nutrition instruction in schools can aid in establishing healthy eating habits at a young age.
- e) **Public-Private Partnerships:** The public and commercial sectors working together can significantly enhance nutrition efforts. It can improve consumer choices and increase the availability and affordability of nutrient-dense meals by encouraging food producers, retailers, and the hospitality sector to offer healthier food options, promote nutrient-rich products, and adopt ethical marketing practices.

India can effectively treat vitamin deficiencies, improve dietary diversity, and encourage healthy eating habits by introducing enhanced nutrition interventions. These initiatives enhance general health outcomes, productivity, and human capital development while also helping to reduce malnutrition and have long-term economic advantages. A comprehensive strategy to address malnutrition and its financial repercussions is further ensured by integrating nutrition interventions with healthcare services and other development sectors.

3. Enhancing Agricultural Practices: Improving agricultural practices is an important part of combating malnutrition in India. Improving agricultural productivity and encouraging environmentally friendly farming methods can help to boost the availability and accessibility of nutritious food. Here are some essential areas to concentrate on in order to improve agricultural practices:

- a) **Diversification of Crops:** Promoting crop diversity can enhance dietary diversity and treat vitamin shortages. The cultivation of nutrient-rich foods such as fruits, vegetables, legumes, and millets can improve micronutrient availability. Encouraging smallholder farmers to diversify their crops can also contribute to increased revenue and livelihoods.
- b) **Sustainable Farming Techniques:** Organic farming, agro-ecology, and conservation agriculture are all examples of sustainable farming practices. These practices reduce the need for synthetic fertilisers and pesticides, while also improving soil health and biodiversity. Furthermore, sustainable agricultural approaches can boost crop resilience to climate change, maintaining a consistent food supply.
- c) **Irrigation and Water Management:** It is critical for agricultural productivity to have access to dependable irrigation infrastructure and efficient water management practices. Investing in irrigation infrastructure, such as

drip irrigation and sprinkler systems, can assist farmers in optimising their water usage and increasing agricultural yields. Effective water management practices, such as rainwater harvesting and watershed management, can increase agricultural water availability, particularly in water-stressed areas.

- d) **Support for Smallholder Farmers:** Smallholder farmers account for a sizable share of India's agricultural economy. Smallholder farmers' productivity and income can be increased by providing them with finance, superior seeds, modern farming technologies, and training programmes. Furthermore, through farmer cooperatives and market links, farmers can gain access to fair prices and improved market prospects for their produce.
- e) **Research and Development:** Continued investment in agricultural R&D is critical for improving agricultural production and nutrition outcomes. Climate-resilient crop varieties, nutrient-rich crop types, and new agricultural approaches that maximise resource utilisation can be developed by research institutions. Collaboration between research institutions, farmers, and extension agencies is critical to ensuring that research findings are effectively disseminated and adopted.

By enhancing agricultural practices, India can improve food production, increase the availability of nutritious crops, and enhance the overall food security and nutritional status of the population. These efforts contribute not only to combating malnutrition but also to promoting rural development, poverty alleviation, and sustainable agricultural growth. By prioritising the adoption of sustainable and diversified farming practices, India can ensure a more resilient and nutrition-sensitive agricultural sector.

4. Social Protection Programmes: Implementing effective social protection programmes is crucial for addressing malnutrition in India. These programmes provide support to vulnerable individuals and families, ensuring their access to

nutritious food, healthcare services, and other essential resources. Here are key aspects of social protection programmes that can contribute to combating malnutrition:

a) Targeted Cash Transfer Programmes:

Targeted cash transfer programmes can help to alleviate poverty and increase access to nutritious meals. The Public Distribution System (PDS) and the National Food Security Act are direct benefit transfer programmes that aim to supply subsidised food grains to eligible households. These programmes help to alleviate food insecurity and reduce the prevalence of malnutrition by providing access to affordable and diversified food options.

b) Maternal and Child Welfare Programmes:

Implementing social protection programmes aimed primarily at pregnant women, breastfeeding mothers, and early children can have a major impact on nutrition outcomes. Financial help, nutrition counseling, and healthcare services are provided to pregnant and breastfeeding mothers through programmes, such as the Integrated Child Development Services (ICDS) and the Pradhan Mantri Matru Vandana Yojana (PMMVY), assuring optimal maternal nutrition and infant care.

c) School Feeding Programmes: School feeding programmes, such as the Mid-Day Meal Scheme, are critical in combating both food insecurity and malnutrition among school-aged children. These programmes provide nutritious meals in schools, which improves children's nutritional status, encourages frequent school attendance, and improves their overall learning outcomes. Furthermore, incorporating nutrition instruction and cleanliness practices into school curricula can help to promote overall development.

d) Employment Generation and Livelihood Programmes:

Improving livelihood possibilities for vulnerable populations can help to alleviate poverty and improve nutrition outcomes. Programmes such as the Mahatma Gandhi National Rural Work Guarantee Act

(MGNREGA) provide work opportunities and economic support to rural communities, increasing their purchasing power and access to nutritious food. Individuals can be empowered to earn sustainable income and improve their overall well-being through skill development efforts and entrepreneurial programmes.

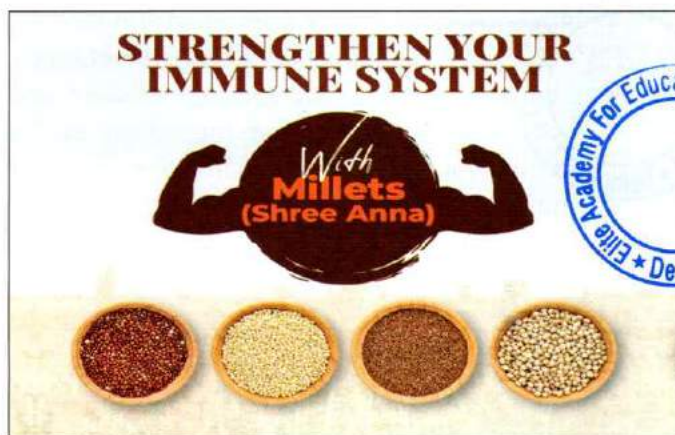
e) Behaviour Change Communication:

To educate beneficiaries on the importance of nutrition, health, and hygiene practices, social protection programmes should include behaviour change communication tactics. This can be accomplished through community health worker involvement, awareness campaigns, and community engagement programmes. These programmes can reinforce beneficial nutrition practices and improve health outcomes by fostering behaviour change at the individual and community levels.

f) Monitoring and Evaluation:

To measure the effects of social protection programmes on nutrition outcomes, effective monitoring and evaluation systems are required. Regular evaluations and surveys can offer information on programme efficacy, highlight gaps, and influence evidence-based policy decisions. To ensure that initiatives are accomplishing their intended aims, monitoring systems should track important variables relating to food security, dietary diversity, child growth, and maternal health.

India can create a safety net for poor communities by establishing well-designed social protection programmes that ensure access to appropriate nutrition and healthcare. These programmes not only treat the immediate implications of malnutrition, but they also help to reduce long-term poverty, create human capital, and promote inclusive economic growth. Collaboration among the government, civil society organisations, and communities is critical for creating and executing successful social protection programmes that can have a long-term influence on malnutrition in India.



Conclusion

Malnutrition has significant economic effects, influencing human capital development, healthcare expenditures, educational performance, agricultural production, and long-term economic growth. To combat malnutrition, the Government, civil society, and the commercial sector must work together to invest in nutrition-specific and nutrition-sensitive measures. India can unlock its full economic potential, promote

social well-being, and assure a healthier and more prosperous future for all of its residents by prioritising the fight against malnutrition. □

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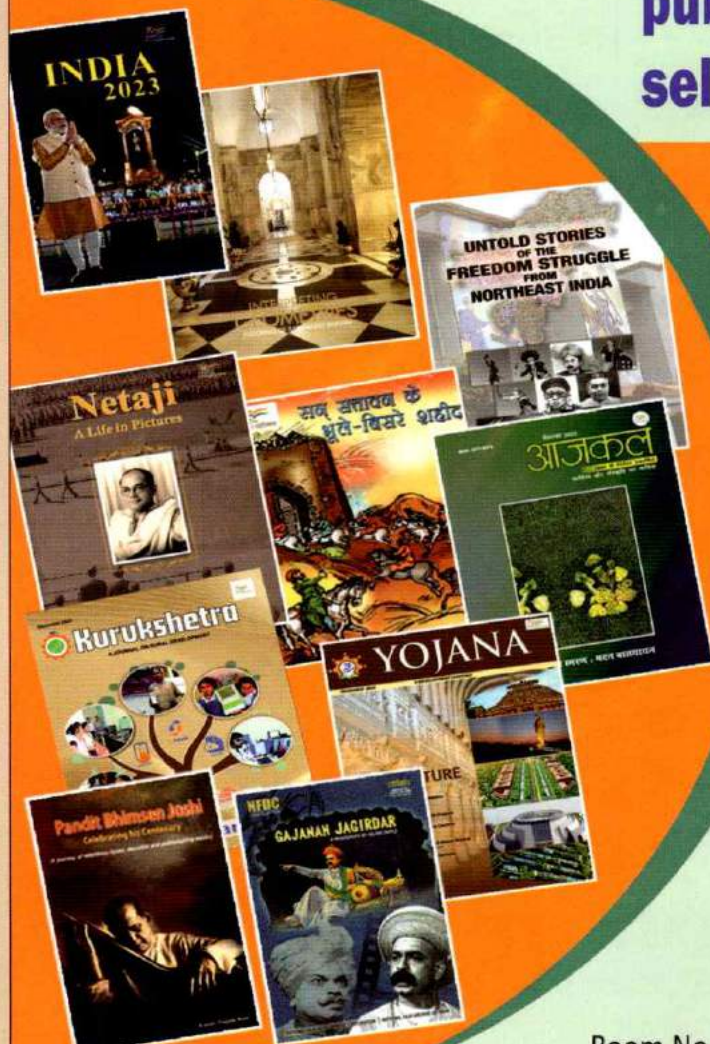
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