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Challenges of Ensuring Food and Nutritional Security in Bihar

K.M.Singh¹ and Pushpa Singh²

Abstract

Ensuring food and nutrition security is a big challenge for India, given its huge population and high levels of poverty and malnutrition. Malnutrition among children is prevalent in almost all the states in India but Child malnutrition is a critical problem in Bihar, where the prevalence of underweight children is far worse than the Indian average and higher than any country in the world. The level of agricultural performance or income have a strong and significant negative relationship with indices of under-nutrition among adults and children, a result suggesting that improvement of agricultural productivity can be a powerful tool to reduce under-nutrition across the vast majority of the population. The data from NFHS III reveals that nearly 50 per cent of children below 5 years of age are underweight and 20-35 per cent is stunted in the above states. Similarly, around 35 per cent or more of adult men and women of 15-49 years of age are found to be 'thin' in these states. MS Swaminathan Research Foundation (MSSRF, 2008) classified various Indian states based on composite index of food insecurity and found that the eastern states such as Chhattisgarh and Jharkhand fell under the category of 'very high' food insecurity, while Bihar and Odisha were classified under 'high' food insecurity.

The efficacy of Public Distribution System for distribution of rice, wheat, sugar etc and a responsibility of both State and central Government is crucial in addition access to sanitation facilities and women's literacy are also strong factors affecting malnutrition. Access to healthcare for women and child-care practices, in particular breast-feeding within 1 hour after birth, are other important determinants of malnutrition among adults and children. Malnutrition is a multidimensional problem that requires multisectoral interventions. However, improvements in agriculture alone cannot be effective in combating malnutrition if several other mediating factors are not in place. Interventions to improve education, health, sanitation and household infrastructure, and care and feeding practices are critical. Innovative strategies that integrate agriculture and nutrition programs stand a better chance of combating the malnutrition problem.

Keywords: Food Security, malnutrition, healthcare, underweight, Sanitation, agricultural productivity.

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Introduction

With population approaching almost 1.25 billion in 2011, out of which the eastern region; consisting of Bihar, Jharkhand, West Bengal, Odisha, Chhattisgarh, eastern parts of U.P. and plains of Assam constitute 33% (0.4 billion) and expected to be 0.56 billion by the year 2050. India is likely to be the most populous country on this planet by 2030 with 1.6 billion people accounting for more than 17% of the global population and 456 million poor, or 41.6% living on less than \$1.25 a day (Chen and Ravallion 2008). Ensuring food and nutrition security is thus a challenge for India. The highest growth rate of population is expected to be in the eastern parts of U.P.(66%) followed by Bihar (55.4%), Jharkhand (36.7%), Chhattisgarh (31.5%), Assam (30.8%), Odisha (14.8%) and West Bengal (7%). Eastern region, produced 65.55 MT of foodgrains from 36.3 mha with a productivity of 1804.65 kg/ha in 2008. However, by 2050 it is expected that area under food grain production would be lower by 10.8% leaving behind an area of 32.39 mha only for food production. In the year 2011, 65.54 MT food grain was produced in the eastern region with 161 kg/annum/capita food grain availability. By the year 2050, food grain requirement of eastern region is expected to 85.58 MT as against the expected availability of 65.44 MT. In this region per capita food grain requirement is expected to 153 kg/annum but the expected availability is only 117 kg/annum, thus showing estimated deficit of 20.14 MT food grain in the eastern region by the year 2050. By incorporating some adaptation strategies, effect of climate change on crop production can be minimized to some extent (Singh, et al. 2011)

The deficiency in access to complete food for a large majority of people has put India in the league of countries with worst levels of malnutrition in the world as the country ranks 63 among 120 countries covered in the Global Hunger Index 2013, with the food security status designated as 'alarming' (IFPRI/ Welthungerhilfe/Concern Worldwide, 2013). The National Family Health Survey (NFHS) III (2005-06) had estimated that nearly 40.4 per cent of children under 3 years are underweight and 44.9 per cent are stunted; 36 per cent of adult women and 34 per cent adult men suffer from chronic energy deficiency; 79 per cent of children and 56 per cent of women are anaemic and so on (IIPS and Macro International, 2007). This situation reaches to an alarming proportion in the eastern states i.e., Bihar, Odisha, Jharkhand, Chhattisgarh, West Bengal, etc. The data from NFHS III reveals that nearly 50 per cent of children below 5 years are underweight and 20-35 per cent are stunted in

these states. Similarly, around 35 per cent or more of adult men and women of 15-49 years of age are found to be 'thin' in these states. The states of India on the basis of two index of malnutrition namely, Normalized Adult Malnutrition Index (NAMI) and Normalized Child Malnutrition Index (NCMI) found that most eastern states fell in top two categories of malnutrition, with Bihar faring the worst among them (Gulati et al, 2012). Similarly study conducted by MS Swaminathan Research Foundation (MSSRF, 2008) classified various Indian states based on composite index of food insecurity and found that the eastern states such as Chhattisgarh and Jharkhand fell under the category of 'very high' food insecurity, while Bihar and Odisha were classified under 'high' food insecurity. West Bengal was relatively better off with moderate levels of food insecurity. These studies serve as a reminder that various steps undertaken by the Governments since independence to alleviate food deficiency has still not delivered desired results and more needs to be done.

Under Nutrition in Bihar

In India, 43% of children under age five are underweight for their age. Bihar has the 3rd highest prevalence of underweight children (56.1%) after only Jharkhand (57.1%) and Madhya Pradesh (59.8%) (World Bank, 2012). The prevalence of underweight children in Bihar is higher than any country in the world (Menon et al., 2009). Bihar houses 11% of India's under-five population or 12.7 million children, of these, 49% (6.3 million) suffer from chronic under-nutrition (stunting) and 37% (1.7 million) suffer from acute under-nutrition i.e. wasting³ -Stunting is more prevalent in the more vulnerable scheduled caste (SC) population (58% opposed to 49% state average); wasting is marginally higher in this group. Of 43.6 million stunted Indian children, 6.3 million (14%) live in Bihar and of the 16.9 million wasted children in India, 1.7 million (11%) live in Bihar. In Bihar, prevalence of severe stunting is 26%, severe underweight is 14.7% and severe wasting is almost 4%. Thus, over 50% of the stunted children are severely stunted, nearly 40% of the total underweight are severely underweight and 30% of wasted children have severe form of under-nutrition (UNICEF, discussion paper). Prevalence of stunting among children under-five in Bihar (49%, RSOC 2013-14) continues to be worse than the national average was in 2006 (48%, NFHS-3, 2005-06). Stunting, a marker of chronic under-nutrition has long term implications on child's physical growth, intellectual capacity and economic productivity. With over 6 million stunted children, Bihar has the second highest prevalence of stunting among all states in India. More vulnerable scheduled caste groups are more undernourished than average under-fives. Over

³ Wasting is acute weight loss indicated by low weight-for-height, together with bilateral oedema.

half of the stunted children are already severely stunted; their physical and cognitive development is permanently impaired. Pace of reduction in stunting is slow at annual decline of less than one% point in eight years (2005 to 2013) that is, from 56% to 49%. Seven of the 38 districts in Bihar account for 30% of the stunted children. In 20 of 38 districts, severe form of stunting contributes to over 50% of total prevalence of stunting. Almost every second girl aged 15 to 18 years, who will soon be a mother, is undernourished. Nine in 10 girls aged 10 to 17 years suffer from anaemia. Nearly 65% of children are not breastfed within an hour of birth; 30% Complementary feeding is delayed for over 50% of children. Practice of adequate frequency of complementary feeding has declined from 56% to 45.7% (NFHS 3, 2005-06; RSOC 2013-14). Four of 10 children still remain incompletely immunised. Over 50% children are outside the ambit of Vitamin A supplementation and almost all are outside weekly IFA supplementation coverage.

Agriculture is the main source of livelihood employing 60% of the total workforce (FAO, 2013) the focus of agricultural policies and programmes need to be more nutrition-sensitive for improving the nutritional outcomes (FAO, 2013). The potential of agriculture to reduce malnutrition can be tapped for producing nutritious food which alone may not improve nutritional outcomes, unless malnutrition is addressed by adopting a multi-sectoral approach (FAO, 2013; Das et al., 2014). Although women constitute approximately 35% of the agricultural workforce engaged in agricultural sector, indicating their importance in agriculture (FAO, 2011) but they face major constraints in accessing production resources, markets, and services than those faced by men. Because of high dependence on agriculture for livelihood and the role of agriculture for women it is crucial for promoting improved nutritional outcomes through nutrition-sensitive agricultural interventions.

Given the present situation it is imperative to seek self-sufficiency in food production, with added challenge of doing so in an environmentally and financially sustainable manner. The government's flagship programs such as the National Agriculture Development Programme (Rashtriya Krishi Vikas Yojana or RKVY) and National Food Security Mission (NFSM), and programs related to irrigation like the Accelerated Irrigation Benefit Program, Integrated Watershed Management Program, Micro Irrigation Mission are geared toward providing the much needed boost to enhance agricultural productivity and, thereby, higher agricultural growth. For high-value agriculture, the National Horticulture Mission (NHM) is an initiative by the public sector. The paper tries to analyse how agriculture help in promoting nutritional outcomes; though the linkages are rather complex (Haddad and Meeker, 2013; Kadiyala et al., 2014).

Availability of Cheap and Nutritious Food to all:

Compared with the overall increase in agricultural growth rates it is the increase in production of staple grains, pulses and vegetables which showed more conclusive evidence on improving the nutrient intake and nutritional outcomes. (Adhiguru and Ramasamy, 2003;). Several studies have however reported that increased food supplies facilitated the calorie intakes and improved diet diversity, but did not necessarily yield more favourable nutritional outcomes (Bhagowalia *et al.* 2012) showing a weak relationship between calorie consumption and nutritional outcomes in India at household and regional level. (Headey, 2011; Parasuraman and Rajaretnam, 2011).

Shift in the cropping pattern to rice-wheat cropping system from pulses and millets due to increased irrigation facility and thereby agricultural intensification, measured in terms of irrigation and improved seed or fertilizer use, have shown a negative correlation with child nutritional outcome like wasting and stunting⁴. (means Vegetable based cropping system followed by small and marginal farmers in states like Bihar are reported to have a lower deficiency from Recommended Daily Allowance in the consumption of vitamin A, iron, and vitamin C for adults and for children vis-à-vis those having non-vegetable based production systems (Adhiguru and Ramasamy, 2003). The interventions focused on women-headed small holding households are reported to yield better results, with school-age children and adolescents in beneficiary households being slightly taller than those in small farm-holding households operated by men. Including some less cultivated traditionally used vegetables in diet may also facilitate a higher micronutrient intake with better nutritional outcomes (Ogle *et al.*, 2001). Interventions for increasing the productivity and crop diversification are very important in promoting targeted food production and consumption, leading to dietary diversity and the intake of specific nutrient types. Similarly the importance of homestead nutrition garden is very important in improving diet diversification and enhanced nutritional outcomes at micro level as crop diversity leads to diet diversity, particularly for mothers, and improves the calorie and nutrient intake. In eastern states these agricultural interventions need to be supplemented with bio-fortification and nutrition knowledge for addressing the socio-economic needs of landholders.

Economic Access to nutritious food to all:

⁴ Stunting is chronic under-nutrition and indicated by a low height-for-age. Stunting starts in the foetal stage and accumulates through the first two years of life; after which point it becomes irreversible. Stunting is a biological adaptation to inadequate maternal nutrition, and then inadequate food, frequent episodes of disease or both – during infancy and early childhood. (Shively *et al.*, 2012).

Food accounts for more than 50% of the monthly per capita expenditure in India and even more for the low income groups. With the decline in consumption of cereals and increase in intake of high-value food cereals consumption has declined over time from nearly 15 kg in 1983 to 12 kg in 2004–2005 in rural areas, while it has declined in urban areas from 11.3 kg in 1983 to almost 10 kg in 2004–2005 per capita per month. The change in consumption pattern is observed across income classes in both rural and urban areas. Increasing agricultural production, crop diversification and other such measures alone may not be able to ensure food security and its imperative to design social safety net and employment-generating programs to improve accessibility of food to the poor and vulnerable.

The efficacy of Public Distribution System for distribution of rice, wheat, sugar etc and a responsibility of both State and central Government is crucial in identifying the poor. Several initiatives have been taken up by the government from time to time like social audit for identification, food coupons and even direct cash transfer. The beneficial programs of central govt. like Mahatma Gandhi National Rural Employment Guarantee Scheme (MNREGS) by providing minimum 100 days of employment have improved livelihood security in rural households and created job opportunities. Similarly National Food Security Bill is a mean to ensure food security by providing 25-35kg of rice or wheat at Rs 3/kg to those household below poverty line.

The increase in household income through crop production or any other means at the household level had a significant positive effect on calorie intake because of the increased food expenditure (Jahan and Pemsil, 2011; Yu, 2012). Increased household wealth also significantly affected the diet diversity of children in India. Studies by Parasuraman and Rajaretnam (2011) have shown a positive association between per capita expenditures on food by households and nutritional outcomes amongst children (indicated by stunting), adolescents and ever married women indicating of positive impact of food expenditure on nutritional outcomes.

Nutrition specific interventions:

Various programmes are run by state and central govt. targeting the vulnerable population. *Sabla*, a flagship scheme for health, nutrition and life skill development of adolescent girls is implemented in 12 districts in Bihar under the Integrated Child Development Services (ICDS). National programmes on micronutrient deficiency prevention and management such as the NIPI, Weekly Iron Folic Acid Supplementation (WIFS), vitamin A supplementation programme and National Iodine Deficiency Disorders Control Programme (NIDDCP) are also running. Janani Suraksha Yojana (JSY) is implemented state-wide and Indira Gandhi

Matritav Sahyog Yojana (IGMSY) in two districts. Under the Janani Shishu Suraksha Karyakram (JSSK) pregnant women can avail free delivery and postnatal care services at select institutions. Government of Bihar is focussing on the 1000 day window period from conception till child is two years, the most critical period for providing strong growth and development foundation, through the Bal Kuposhan Mukta Bihar (BKMB) programme. In addition to Take Home Ration (THR) and preventive services provided through Anganwadi Centres (AWC) at each village, other community based platforms such as Village Health, Sanitation and Nutrition Days (VHSND) Annaprasan ceremony, Bachpan diwas and Kishori diwas are central to providing a range of services through the life cycle. Facility based care and counselling is available through Infant and Young Child Feeding (IYCF) counselling centres functional in all districts and at Nutrition Rehabilitation Centres (NRC) for Severe Acute Malnutrition⁵ (SAM) of children.

Bihar government through its Public Distribution Scheme (PDS), Poorak Poshahar Yojana under ICDS and Jeevika's (under Bihar Rural Livelihood Mission) grain banking scheme aims to improve household food security and overall food intake. Information on locally available nutritious crops is also made available through these pilots and through ICDS. There is dedicated Mission for improving access to water and sanitation services - Bihar State Water and Sanitation Mission (BSWSM) and implements subsidised toilet construction under Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA). The Bihar Mahadalit Vikas Mission (BMVM) focuses on bringing the most deprived castes under the ambit of development programmes. The state has established an overarching Mission- Manav Vikas Mission (MVM) to improve coordination across the multiple departments that need to harmonise their interventions for reaching the adolescent girls, women and children with the recommended services at the right time.

Immediate factors influencing the malnutrition levels are the quality and level of food intake and the behavioural patterns influencing health and nutrition. The tables presented below provide details of these aspects in Bihar and all India (Table 1).

An examination of the average level of food intake in rural Bihar indicates that with respect to cereals, the average monthly per capita intake of 12.13kg on par with the required dietary allowance (RDA) norm of 12kg/month/person. Average per capita consumption of pulses and

⁵ Wasting in its severe form is called severe acute malnutrition (SAM). SAM can be easily defined by mid upper arm circumference (MUAC) <11.5 cms and/or presence of bilateral pitting oedema. The risk of death in a SAM child is nine times greater than their well-nourished peers.

milk in rural Bihar is lower than the national average as well as the daily recommended allowances (Table 2).

Table 2 indicates the deficiencies in diet that leads to deficiencies in average intake of pulses and milk in rural Bihar. Consumption of all the food items (except for cereals) is below the required daily allowance and these result in deficiencies of almost all the nutrients. It is in this context promotion of nutrition sensitive agriculture becomes important as a method of enhancing household production of nutritious food leading to diversified diet of farm families.

Factors impacting Nutrition

Agricultural policies affecting food prices

Policy intervention for affecting food prices played an important role in diet diversification and nutritional outcomes (Gaiha et al., 2012). The policy of improving the affordability of staples by the public distribution system provided food and nutritional security (Adhiguru and Ramasamy, 2003; Parasuraman and Rajaretnam, 2011). The transferring of productive assets to poor farm households in poverty alleviation programmes have lead to an increase in agricultural productivity, and consequently, improve nutrition security. Facilitating an increased access to agricultural credit by the rural households improved the household's purchasing power and contributed towards enhancing the nutritional outcomes (Kiresur et al., 2010).

Women's status and education:

The status of a woman's nutrition and her position in the household and society are significant for the short- and long-term nutritional status of her children. Constituting roughly half the population, women make important decisions on family health, education, and feeding and are the primary caregivers (Meena et al. 2018). Therefore, women empowerment with women-friendly agricultural technologies will result in an increased intra-household bargaining power and a larger say in household resource allocation leading to the provision of nutritious food for themselves and their children (Hallman et al., 2003; Allendorf, 2007; Ghosh, 2007). An effective participation of women in the nutritional programme requires a gender sensitive approach (Jahan and Pems, 2011). The agricultural interventions with a multi-sectoral approach and targeted at empowering women can enhance the nutritional outcomes for women and children.

Where do we go from here?

The agricultural interventions have the potential to influence nutritional outcomes although the linkages are very complex and require multi-sectoral and multi-dimensional approaches to tackle the malnutrition problem in eastern region and India as whole. It is small interventions like home production of nutrient-rich food crops in homestead gardens and bio-fortification of staples which will improve the nutritional outcomes. The diversification of agriculture towards fruits and vegetables and fisheries and livestock based integrated farming system can potentially promote dietary diversity and improve nutritional outcomes with additional impetus from government with favourable nutrition-sensitive agricultural policies and empowerment of women.

One of the major issues concerning eastern states like Bihar is the persistent problem of malnutrition among children and women. Malnutrition is caused by multiple factors and any approach to address the problem of malnutrition needs a holistic, multidimensional approach. A combination of nutrition specific and nutrition sensitive programmes are required to address issues related to malnutrition. Our objective should not be just “*Freedom from Hunger*” but “*Freedom from Under-nutrition*” i.e the nutritional well-being of our people. What we need a Food and Agricultural Policy with a nutrition orientation, which will result in balanced augmentation of not only the conventional food grains, but also of “quality foods” like pulses, green leafy vegetables, fruits, milk, poultry and fish. It is through such a policy that we can ensure that diets in households across the country are balanced and nutritious. A forward-looking food production policy must be based on these considerations.

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Table 1: Causes of Under-nutrition in rural areas of Bihar and India, 2015-16

Indicators	Bihar	India
Immediate Causes		
Children under age 3 years breastfed within one hour of birth (%)	34.2	41.1
Children under age 6 months exclusively breastfed (%)	54.2	56.0
Children age 12-23 months fully immunized (BCG, measles, and 3 doses each of polio and DPT) (%)	61.9	61.3
Prevalence of diarrhoea in last 2 weeks preceding the survey (%)	10.7	9.6
Mother who had at least 4 antenatal care visits (%)	13.0	44.8
Pregnant women age 15-49 years who are anaemic (%)	58.0	52.1
All women age 15-49 years who are anaemic (%)	60.5	54.2
Underlying causes		
Women's status		
Population (female) age 6 years and above who ever attended school (%)	54.8	63.0
Women who are literate (%)	46.3	82.6
Women with 10 or more years of schooling (%)	19.5	27.3
Women age 20-24 years married before age 18 years (%)	40.9	31.5
Hygiene and Sanitation		
Household with improved drinking water source (%)	98.2	89.3
Households with improved sanitation facility (%)	20.7	36.7
Households using clean fuel for cooking (%)	10.8	24.0
Households with electricity (%)	54.1	83.2

Source: NFHS -4, 2015-16.

Table 2: Monthly per capita quantity of consumption of selected commodities in rural areas, 2011-12

Commodities	Per capita average consumption of food items in rural areas	
	Bihar	India
Rice (kg)	6.04	6.03
Wheat (kg)	5.58	4.29
Total cereals	12.13 (101%)	11.22 (94%)
Arhar (Tur) –kg	0.08	0.21
Moong (green gram) -kg	0.08	0.09
Masur (red lentil)-Kg	0.29	0.11
Urd (black gram) kg	0.006	0.08
Gram split (kg)	0.127	0.08
Total pulses	0.74 (31%)	0.78 (33%)
Milk (litre)	3.92 (44%)	4.33 (48%)
Eggs (no.)	1.0	1.94
Fish (kg)	0.24	0.27
Goat meat /mutton (kg)	0.05	0.05

Source: GoI (2014a); ICMR (2009).