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Leveraging Agriculture for Improving Nutrition & Health

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INTRODUCTION

Although tremendous progress has been made in meeting the India's food demand, still many parts of the country and many sections of the society suffer from under nutrition-that is, deficiencies in energy, protein and essential vitamins and minerals. As per UNICEF report the scale and the gender dimension of nutrition in India shows that while there is economic growth of nearly 8 per cent annually, rates of child under-nutrition remains very high. According to NFHS-3, 48 per cent of children under the age of five are stunted due to chronic under-nutrition, with 70 per cent being anemic. The nutrition situation of children is largely due to the situation of women. NFHS-3 indicates that 36 per cent of Indian women are chronically undernourished and 55 per cent are anemic. Recent data form Bihar and Madhya Pradesh shows that girls represent up to 68 per cent of the children admitted to programmers for the severely malnourished.

The World Bank estimates that India is one of the highest ranking countries in the world for the number of children suffering from malnutrition. The prevalence of underweight children in India is among the highest in the world, and is nearly double that of Sub-Saharan Africa with dire consequences for mobility, mortality, productivity and economic growth.

The 2013 Global Hunger Index (GHI) Report ranked India 63rd, amongst leading countries with hunger situation. As per Global hunger report 2013 India has the highest prevalence of underweight in children under five—more than 40 percent. In India, around 46 per cent of all children below the age of three are too small for their age, 47 per cent are underweight and at least 16 per cent are wasted. Many of these children are severely malnourished. 1 in 3 of the world's malnourished children lives in India The prevalence of malnutrition varies across states, with Madhya Pradesh recording the highest rate (55 per cent) and Kerala among the lowest (27 per cent).

Malnutrition in children is not affected by food intake alone; it is also influenced by access to health services, quality of care for the child and pregnant mother as well as good hygiene practices. Girls are more at risk of malnutrition than boys because of their lower social status.

Malnutrition in early childhood has serious, long-term consequences because it impedes motor, sensory, cognitive, social and emotional development. Malnourished children are less likely to perform well in school and more likely to grow into malnourished adults, at greater risk of disease and early death. Around one-third of all adult women are underweight. Inadequate care of women and girls, especially during pregnancy, results in low- birth-weight babies. Nearly 30 per cent of all newborns have a low birth-weight, making them vulnerable to further malnutrition and disease.

Vitamin and mineral deficiencies also affect children's survival and development. Anemia affects 74 per cent of children under the age of three, more than 90 per cent of adolescent girls and 50 per cent of women. Iodine deficiency, which reduces learning capacity by up to 13 per cent, is widespread because fewer than half of all households use iodized salt. Vitamin A deficiency, which causes blindness and increases morbidity and mortality among pre-schoolers, also remains a public-health problem.

Economic growth, which many assume naturally, has a positive impact on people's nutritional status through increased incomes and food expenditures, has not translated into improved nutrition in a number of regions of the country. As per Dr. C. Rangarajan's expert group on the review of methodology for the estimation of poverty, 29.5 per cent population of the country is living below poverty line in 2011-12. It means this segment of the population is not able to meet nutritional requirement at subsistence level. According to expert group, 2155 Kcal per person per day in rural areas and 2090 Kcal per person per day in urban areas are the survival of a person. Along with

this 48 gms of protein and 28 gms of fat per capita in rural area and 50 gms and 26 gms per capita respectively in urban areas are the minimum requirement.

As part of overall economic growth, agricultural growth has an important role to play in reducing and preventing under nutrition through a number of channels. Its impact extends from increased household ability to purchase and produce more nutritious food to economy wide effects, such as increasing government revenues to fund health, infrastructure and nutrition intervention programs. Questions remain, however, about the effects of different patterns of agricultural growth on nutrition. Furthermore, other factors, such as infrastructure, the status of women (including their educational level), and land distribution, may contribute to how well agricultural growth translates into nutritional improvements This brief examines how different growth patterns lead to different nutritional outcomes and identifies the factors that influence the magnitude of this relationship.

Does Growth Matter?

It is a matter of serious debate that to what extent the economic growth contributes to reducing under-nutrition. One reason could be the widely accepted assumption that economic growth will ultimately lead to improved nutrition through increased incomes and food expenditures. However, the limited evidence that exists offers either inconclusive or conflicting results on the link between growth and nutrition.

A number of studies find that overall economic growth - usually represented by gross domestic product (GDP), per capita GDP, and per capita income-is only weakly associated with indicators of nutritional status and argue instead in favor of more direct nutrition interventions. 1n contrast, another group of studies has found a positive and significant link between increased economic growth and nutritional status-either unidirectional or bidirectional. One cross-country study, for example, not only found that income growth had a positive effect on children's weight-for-age but also projected that similar income growth rates can produce significantly different reductions in malnutrition across countries over a period of about 25 years. Because many of these countries have not been able to sustain significant annual income growth, the academicians argue that improving nutritional status will require balancing income growth with cost-effective health and nutrition interventions, including vitamin supplementation and nutrition education.

The compound annual rate of growth of food grains production, which stood at just 0.8 per cent during 2000-01 to 2005-06, accelerated to 2.9 per cent per annum during 2005-06 to 2012-13. As a result, production in agricultural year 2012-13 is estimated to have touched a record 255.4 million tonnes. This growth in production should not be exaggerated. In per capita terms production (after adjusting for seed, feed and wastage) was just 164.9 kgs in 2011, which had been exceeded as far back as 1984, and was below its 2008 peak of 171 kgs. So there was no excess production of food grain. Yet the government has been burdened with a rising stock of food grain, being unable to distribute the amount it procures. From about 35.6 million tonnes in 1999-2000, procurement of food grains by the government fluctuated in a range with a ceiling of 42.5 million tonnes till 2007-08, and stood at 39.9 million tonnes in 2007-08. Since then procurement has risen sharply to touch 57.4 million tonnes in 2009-10, and 63.4 million tonnes in 2011-12. In 2012-13, procurement had reached a record 64.2 million tonnes by late March 2013.

The compound growth rate of area, production, and productivity during 2000-01 to 2013-14 has been higher than in the previous two decades for coarse cereals, pulses, oilseeds, and cotton, while it has largely declined for rice and wheat. The decline in the yield of wheat is a matter of concern keeping in view the consumption pattern of food grains in the country.

Table: Compound Growth Rates of Area, Production, and Yield of Principal Crops during 1980-81 to 1989-90, 1990-91 to 1999-2000 & 2000-01 to 2013-14

A - Growth rate of area, P - Growth rate of production, Y - Growth rate of Yield (% per annum)

Crop	(Base: TE 1981-82=100)						(Base: TE 1993-94=100)		
	1980-81 to 1989-90			1990-91 to 1999-2000			2000-01 to 2013-14*		
	A	P	Y	A	P	Y	A	P	Y
Rice	0.41	3.62	3.19	0.68	2.02	1.34	0.00	1.82	1.82
Wheat	0.46	3.57	3.10	1.72	3.57	1.83	1.35	2.65	1.29
Coarse Cereals	-1.34	0.40	1.62	-2.12	-0.02	1.82	0.25	2.96	2.70
Pulses	-0.09	1.52	1.61	-0.60	0.59	0.93	1.59	3.72	2.10
Sugarcane	1.44	2.70	1.24	-0.07	2.73	1.05	1.34	2.10	0.75
Nine oilseeds	1.51	5.20	2.43	0.86	1.63	1.15	2.35	4.71	2.31
Cotton	-1.25	2.80	4.10	2.71	2.29	-0.41	3.22	13.53	9.99

Source: *Department of Agriculture and Cooperation*
*Note: (Base: TE 1981-82=100), and for 2000-01 to 2013-14 (Base: TE 1993-94=100, (*TE: Triennium Ending)

Do Sectoral Growth Patterns Matter?

Past experience has shown that agricultural development can serve as an engine of growth and poverty reduction, primarily for two reasons:

(1) There are backward and forward links in production and consumption between agriculture and the rest of the economy, and

(2) The majority of the poor live in rural areas, so agriculture makes up a large share of their income, expenditures and employment.

The question we face now is to what extent can agricultural growth-and growth in particular subsectors of agriculture-be a springboard for nutritional improvement through such channels as increased agricultural production and lower food prices.

Although empirical evidence on the nutritional impacts of agricultural growth is limited, it shows that the impact varies across measures of under-nutrition and stages of development. One cross-country study finds that agricultural growth in particular is associated with a reduction in underweight and leads to reduced stunting in more food- insecure countries, with the exception of India while evidence from the analysis also suggests that the effect of agricultural growth on calorie intake is significant, its effect on diet diversity-used as a rough proxy for micronutrient consumption is minimal. Furthermore, cross-state evidence shows that the growth-nutrition relationship varies according to a state's economic status; with the largest impact occurring at low levels of per capita's GDP.

Within the agricultural sector, individual subsectors-like staple crops or livestock have different impacts on development outcomes. Whether growth in a subsector is pro-poor and pro-nutrition depends on –

1. Its linkages with rest of the economy,
2. Its initial size and geographic concentration,
3. Its growth potential, and
4. Market opportunities.

It is to be noted here that high agricultural growth did little to improve nutrition if it is driven primarily by crops less likely to be grown by the poor. Growth in staple crops contributes more to poverty reduction and calorie intake than does growth in export crops, given that poor farmers often lack the financial resources and technologies to cultivate crops for export. These differences in the impacts of agricultural subsectors are amplified by regional variations in natural resources and economic conditions in India, so maximizing the potential of specific agricultural subsectors to improve nutrition requires regionally differentiated strategies.

Policymakers can thus boost the effectiveness of growth-in terms of poverty reduction and improved calorie and micronutrient intake-by seeking to accelerate growth with stronger links to specific population groups and regions and to specific subsectors like vegetables, fruits, and livestock. Research on the effects of different growth patterns on nutrition needs to go beyond calorie intake to include a range of indicators of nutritional status, including micronutrient intake and wasting, underweight, and stunting among children.

LINKAGES BETWEEN GROWTH AND NUTRITION OUTCOMES

Many factors related to underlying conditions affect the links between growth and nutritional outcomes. Given the same rate of economic or agricultural growth, improvements in these factors will result in better nutrition outcomes whereas lack of attention to these conditional factors can result in an overestimation of the impact of growth on nutrition.

Land distribution: Justification for land reforms has been based on the assumption that land is one of the most valuable productive resources in agriculture-based economies. Not only do land endowments provide individuals and households with a source of income, but they also facilitate farm households' access to food from their own production, which is especially important in areas with underdeveloped markets. When land distribution is more egalitarian, income and nutritional benefits from growth will be more widely shared. In fact, one of the main features distinguishing China from other developing countries with high growth and high malnutrition rates such as India is China's relatively egalitarian distribution of land and virtual lack of landlessness. However, the progress on the front of land reforms, especially the abolition of intermediaries and distribution of surplus land to landless poor's in rural areas, has resulted not only in the increase in agricultural production, but also in the mass reduction in poverty and malnutrition.

Women's status: Gender inequality in nutrition-resulting from women's weak land rights; lower levels of education; and lack of access to credit, extension services, and technologies-has been widely documented, especially in South Asia. However, many past growth-nutrition analyses have overlooked the potential impact of gender- based variables. When women have more control over household resources, children's nutrition has been found to be higher. Furthermore, households in which women have more resources often spend more on household and child nutrition –diet quantity and quality-than do male-dominated households. In fact, low-income female-headed households often exhibit better nutrition than higher- income male-headed households. While agricultural growth that benefits women can lead to improved household and child nutritional status through higher incomes among women, it can also have a negative impact on nutrition by changing time and labor allocation patterns, which reduces women's time for childcare and the quality of food provided by the mother.

Rural infrastructure: Investment in infrastructure-including roads, water, sanitation, and electricity is closely linked with growth in agricultural productivity and poverty reduction, and infrastructure is also positively related to better nutrition through a variety of channels. Improved infrastructure can promote income growth by raising agricultural productivity, lowering production and transaction costs, and removing bottlenecks that impede the participation of the poor in the development process, thereby facilitating increased access to, availability of, and consumption of food among larger segments of the population. It

also improves people's access to more and better healthcare and sanitation services. A number of country studies have found a positive association between the quality and quantity of infrastructure development and nutritional status. However, evidence also shows that the magnitude- and, at times, even the existence-of the nutritional impact of improved infrastructure differs across population groups.

Health status: Health and nutritional status are directly linked through a synergistic relationship. Illness impairs nutritional status by reducing both appetite and the ability of the body to absorb nutrients, which in turn lowers the individual's resistance to further illness. Health status can also have a significant impact on nutrition by affecting a household's ability to take part in productive activities that generate food or income to purchase food. Working through these pathways, sickness and death have been shown to result in a reduction of cultivated land, food production, and crop varieties. Absenteeism and the loss of labor resulting from ill health can lead to changes to cropping patterns and declines in crop diversity, with affected households switching to less labor-intensive crops-such as root crops that are often lower in nutritional value.

STRATEGIES AND INVESTMENTS FOR PRO-NUTRITION GROWTH

Given the dynamic relationship between agricultural growth and nutritional status, nutritional improvements can be addressed in a number of ways.

Growth strategy

The relationship between growth (whether nonagricultural or agricultural) and nutrition is not straightforward. For growth strategies to maximize their effect on nutrition, the different impacts of specific economic and agricultural policies and conditional factors on growth-nutrition links need to be taken into account. So far, nutrition has not been widely used as an objective of economic or agricultural growth strategies. Food and nutrition fall under several government entities (including ministries of agriculture, social affairs, and health), with the result that nutrition is often a political and institutional orphan. It is thus difficult to incorporate nutrition effectively into a country's main agricultural strategy, which is designed mostly by the ministry of agriculture.

Growth strategies need to be designed with a nutritional lens and should take into account what types of Sectoral and sub-Sectoral practices and policies can enhance nutrition. These strategies could include the following:

- Increasing demand for and access to nutritious foods along the entire value chain through consumer knowledge and awareness campaigns;
- Mitigating health and nutrition risks associated with agriculture, such as water-borne, food-borne, and zoonotic diseases as well as occupational injuries and health hazards; and
- Breeding more nutritious varieties of staple food crops that are consumed by poor people in developing countries through bio fortification initiatives, such as the Harvest Pius Challenge Program of the Consultative Group on International Agricultural Research (CGIAR).

Setting priorities and sequencing such interventions as part of a pro-nutrition growth strategy will depend on country-specific conditions, stages of development, and institutional capacity.

INVESTMENT STRATEGY AND FISCAL POLICIES

Public investments in rural infrastructure and agricultural research have been shown to have one of the largest impacts on poverty reduction and economic growth in a number of developing countries. There is no empirical evidence, however, showing how different types of public spending affect nutrition. Given that public resources in most developing countries are scarce and the opportunity cost is high, decision makers should seek to allocate public resources more efficiently, taking into account positive and negative spillover effects on nutrition.

Fiscal policies, like taxes on unhealthy foods and subsidies on nutrient-rich foods, can also be used to maximize positive and minimize negative spillover effects on nutrition. While taxes on foods rich in saturated fats can be useful in generating government revenue, studies in developed countries show that such policies need to be complemented by interventions that discourage the consumption of these foods, including subsidies on nutrient-rich foods such as fruits and vegetables.

NATIONAL FOOD SECURITY PROGRAMME, 2013 AND NUTRITIONAL ASPECTS

Section 4:

Subject to such schemes as may be framed by the Central Government, every pregnant woman and lactating mother shall be entitled to—

A. Meal, free of charge, during pregnancy and six months after the child birth, through the local *anganwadi*, so as to meet the nutritional standards specified in Schedule II; and

B. Maternity benefit of not less than rupees six thousand, in such installments as may be prescribed by the Central Government:

Section 5

(1) Subject to the provisions contained in clause (*b*), every child up to the age of fourteen years shall have the following entitlements for his nutritional needs, namely:-

(*a*) in the case of children in the age group of six months to six years, age appropriate meal, free of charge, through the local *anganwadi* so as to meet the nutritional standards specified in Schedule II: Provided that for children below the age of six months, exclusive breast feeding shall be promoted;

(*b*) in the case of children, up to class VIII or within the age group of six to fourteen years, whichever is applicable, one mid-day meal, free of charge, every day, except on school holidays, in all schools run by local bodies, Government and Government aided schools, so as to meet the nutritional standards specified in Schedule II.

(2) EVERY school, referred to in clause (*b*) of sub-section (*1*), and *anganwadi* shall have facilities for cooking meals, drinking water and sanitation:

Provided that in urban areas facilities of centralized kitchens for cooking meals may be used, wherever required, as per the guidelines issued by the Central Government.

Section 6

The State Government shall, through the local *anganwadi*, identify and provide meals, free of charge, to children who suffer from malnutrition, so as to meet the nutritional standards specified in Schedule II.

The nutritional standards for children in the age group of 6 months to 3 years, age group of 3 to 6 years and pregnant women and lactating mothers required to be met by providing "Take Home Rations" or nutritious hot cooked meal in accordance with the Integrated Child Development Services Scheme and nutritional standards for children in lower and upper primary classes under the Midday Meal Scheme are as follows:

The provisions of Schedule II are given in the following table

Table

Serial number	Category	Type of meal	Calories (Kcal)	Protein (g)
1	2	3	4	5
1.	Children (6 months to 3 years)	Take Home Ration	500	12-15
2.	Children (3 to 6 years)	Morning Snack and Hot Cooked Meal	500	12-15
3.	Children (6 months to 6 years) who are malnourished	Take Home Ration	800	20-25
4.	Lower primary classes	Hot Cooked Meal	450	12
5.	Upper primary classes	Hot Cooked Meal	700	20
6.	Pregnant women and Lactating mothers	Take Home Ration	600	18-20

The above provisions, if implemented properly, would certainly help to mitigate the problem of under nutrition.

CONCLUSION

A new paradigm for agricultural development is needed, whereby agricultural growth leads not only to increased production and reduced poverty but also to improved nutrition. The question facing many developing countries is how to set priorities and sequence interventions to maximize the benefits from the dynamic and nonlinear relationship between growth and nutrition while also paying attention to the role of conditional factors.

Growth alone, however, is not sufficient to address under-nutrition. Other complementary interventions, such as targeted nutrition programs for women and children, as reflected in recently passed National Food Security Act, 2013, will be needed. It is also important to identify the likely trade- offs between implementing pro-nutrition growth strategies, pursuing other objectives such as poverty reduction, and using other instruments such as targeted nutrition programs.

Finally, strong institutions and governance, as well as monitoring and transparency, are vital to ensure that nutritional objectives are not left out of the development process and that pro-nutrition growth strategies and investment policies are effective.

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