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Abstract

This paper looks at some key entry points for agriculture to influence nutrition and suggests policies for nutrition-sensitive agricultural development, within the current policy framework. In addition, it reviews three key agriculture-food programs for their nutrition sensitivity at the policy level, using a convergence framework. The three key entry points for agriculture-nutrition linkages are: inclusive agriculture growth, food prices, and women in agriculture. It provides policy options for strengthening the linkages between agriculture and nutrition.

Keywords:

Agricultural growth, nutrition, women empowerment, food prices, convergence

JEL Code:

Q10, Q11, Q18, I10, J16

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S. Mahendra Dev[1]

Introduction

By now the paradox is well recognized, of high economic growth accompanied by a much slower decline in undernutrition in India. One part of this paradox relates to the role of agriculture sector. The importance of agriculture for inclusive growth is well known. The 12th Five Year Plan Approach Paper, for example, indicates that agricultural development is an important component of a faster, more inclusive and sustainable growth approach. Although the share of agriculture in GDP has declined significantly, to around 14 percent in 2010, agriculture's share in employment is still high, at 56 percent in 2004–2005. In other words, food security—and the livelihoods of the majority of households in India—depend on the performance of the agriculture sector.

The agriculture sector has many challenges. Green Revolution technology mainly benefited high-potential and irrigated areas, and had less impact on dry land and rainfed areas. With urbanization and income growth, consumption patterns have shifted from cereals to non-cereal food (pulses, edible oils, fruits, vegetables, dairy, meat, and fish). Supply of these commodities is lagging compared to demand, resulting in increased food inflation in recent years. Agricultural growth decelerated from 3.5 percent during 1981–1997 to 2 percent during 1997–2005. Further scope for increase in net sown area is limited. Land degradation has increased, in the form of depletion of soil fertility, erosion, and waterlogging. Long-term factors, such as steeper decline in per capita land availability and shrinking farm size, are also responsible for the slow performance of agriculture. Thus, there is a need for a "second green revolution," to revive agricultural growth and increase farmers' incomes. Importantly, if agricultural development is to ultimately affect human welfare, the policies to improve agricultural development have to take into account nutrition considerations.

This paper looks at some key entry points for agriculture to influence nutrition and suggests policies for nutrition-sensitive agricultural development, within the current policy framework. In addition, it reviews three key agriculture-food programs for their nutrition sensitivity at the policy level, using a convergence framework.

The paper is organized as follows. The next section deals with three key entry points for agriculture-nutrition linkages: inclusive agriculture growth, food prices, and women in agriculture. It provides policy options for strengthening the linkages between agriculture and nutrition. The third section looks at the nutrition sensitivity of selected key agriculture and food security programs in the framework of convergence, covering programs such as the National Horticulture Mission, Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), and the Public Distribution System. The last section provides conclusions.

[1] The author is grateful Suneetha Kadiyala and Stuart Gillespie for useful comments on an earlier draft. One version of this will appear in a book edited by both of them at IFPRI. I also thank Andaleeb for computing the food price inflation.

Key entry points and policy options for nutrition-sensitive agricultural development

A multi-sectoral approach is needed to tackle the problem of nutrition. However, agriculture is perhaps the single most important sector that influences nutritional levels in India, because of several linkages. The key entry points discussed in this section flow from the agro-nutrition pathways identified by the TANDI initiative.[2] As that project notes, "agricultural initiatives alone cannot solve the nutrition crisis in India but they can play much bigger role toward that end than they have done thus far."

In this section, we discuss (a) inclusive growth in agriculture; (b) food prices and policies; (c) women in agriculture, with a focus on policies.

Inclusive growth in agriculture

At the policy level, achieving inclusive growth in agriculture is important for strengthening the linkages between agriculture and nutrition. Agriculture development is part of any inclusive growth strategy in India (Dev 2008), as the majority of the population depends on agriculture for their livelihoods. However, inequalities in agriculture can weaken the agriculture-nutrition linkages. "Inclusiveness and equity in agriculture can be achieved by increasing agricultural productivity in rainfed and resource poor areas, thereby raising the productivity and income of small and marginal farmers" (Dev and Kadiyala 2011). The bulk of the rural poor, as well as small and marginal farmers, live in such resource-poor areas, where undernutrition is concentrated as well. The fact that consumption patterns have been changing towards non-cereals presents a good opportunity for small farmers to diversify their cropping patterns in order to improve both incomes and nutrition.

The share of small and marginal farmers in landholding is 41 per cent at the all India level (Tabl 1) with eide variations across states. Small and marginal farmers occupied 70 to 80 percent of the area in West Bengal, Bihar, and Kerala, and between 50 and 65 percent in Himachal Pradesh, Orissa, Tamil Nadu, and Uttar Pradesh. Rural poverty is more than 50 percent in Bihar, Chattisgarh, Orissa, and Madhya Pradesh. The percentage of children suffering from undernutrition is also high in these poorer states. There is a need to improve agricultural productivity in these states, to drive inclusive growth in agriculture.

Fortunately, the growth rate of agricultural GDP has been high during the period 1990-00 to 2008-09 in poorer states like Bihar, Orissa, Chattisgarh, Madhya Pradesh, and Maharashtra, where rural poverty and malnutrition are high (Table 1). Gujarat recorded the highest growth in agriculture; however, poverty and undernutrition rates remained high. There is still a need to improve agriculture growth in other states, such as Uttar Pradesh and West Bengal.

[2] Gillespie and Kadiyala (2011) similarly provide seven pathways that link agriculture with nutrition.

Table 1
Agricultural growth and area occupied by small holders

State	1 Agricultural growth, 1999-00 to 2008-09 (%)	2 Area occupied by small and marginal farmers, 2005-06 (%)	3 Incidence of rural poverty, 2004-05 (%)	4 Underweight, 2005-06 (%)
Andhra Pradesh	6.27	48	32.3	32.7
Bihar	4.38	73	55.7	56.1
Chattisgarh	6.60	37	55.1	47.6
Gujarat	11.61	27	39.1	44.7
Haryana	3.86	22	24.8	39.7
Himachal Pradesh	5.42	52	25.0	36.0
J&K	3.81	70	14.0	29.0
Karnataka	0.12	37	37.5	37.6
Kerala	0.55	76	20.2	22.7
M.P.	3.45	29	53.6	59.8
Maharashtra	5.76	40	47.9	36.7
Orissa	3.67	58	60.8	40.9
Punjab	2.62	9	22.1	24.6
Rajasthan	4.89	14	35.8	40.4
Tamil Nadu	2.77	59	37.5	30.0
U.P.	2.18	63	42.7	42.3
West Bengal	2.27	80	38.2	38.5
All India	2.68	41	41.8	42.5

Source: Pal et al. (2011) for columns 1 and 2; Planning Commission (2007) for column 3; NFHS III for column 4.

Changes in consumption patterns. Consumption patterns are changing towards non-cereal food. Diet diversification needs to be achieved, particularly in high undernutrition states. The recent NSS consumer expenditure survey shows that the share of cereals in total consumption declined further to 2009-10, when it was only 15.6 percent in rural areas and 9.1 percent in urban areas (Table 2). In spite of the decline in the share of food expenditure in the total over time, the decline in the share of non-cereal foods has been lower that of cereals.

Composition of food expenditures for the year 2009-10 show that, in rural areas, cereals constitute only 29 percent of the total expenditure (Table 3). The rural expenditure on milk and vegetables together is nearly equal to that of cereals; expenditure on eggs, fish, meat, pulses, and fruits is also high. The recent food inflation in non-cereal food is therefore a serious concern. It should be noted, however, that the Indian poor still get more than 55 percent of daily calories from cereals, and there is still a need for diet diversification to improve nutrition among the poor. This requires diversification of agriculture, particularly among small and marginal farmers and in resource-poor areas.

Table 2
Changes in consumption patterns: All-India, 1987–88 to 2009–10

Food item	Rural (% share of consumption)					Urban (% share of consumption)				
	1987-88	1993-94	1999-2000*	2004-05	2009-10	1987-88	1993-94	1999-2000	2004-05	2009-10
Cereals	26.3	24.2	22.2	18.0	15.6	15.0	14.0	12.4	10.1	9.1
Grain	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1
Cereal substitutes	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0
Pulses & products	4.0	3.8	3.8	3.1	3.7	3.4	3.0	2.8	2.1	2.7
Milk & products	8.6	9.5	8.8	8.5	8.6	9.5	9.8	8.7	7.9	7.8
Edible oil	5.0	4.4	3.7	4.6	3.7	5.3	4.4	3.1	3.5	2.6
Egg, fish & meat	3.3	3.3	3.3	3.3	3.5	3.6	3.4	3.1	2.7	2.7
Vegetables	5.2	6.0	6.2	6.1	6.2	5.3	5.5	5.1	4.5	4.3
Fruits & nuts	1.6	1.7	1.7	1.9	1.6	2.5	2.7	2.4	2.2	2.1
Sugar	2.9	3.1	2.4	2.4	2.4	2.4	2.4	1.6	1.5	1.5
Salt & spices	2.9	22.7	3.0	2.5	2.4	2.3	2.0	2.2	1.7	1.5
Beverages etc.	3.9	4.2	4.2	4.5	5.6	6.8	7.2	6.4	6.2	6.3
Food Total	64.0	63.2	59.4	55.0	53.6	56.4	54.7	48.1	42.5	40.7
Non-food total	36.0	36.8	40.6	45.0	46.4	43.6	45.3	51.9	57.5	59.3
Total Expend.	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: NSS 66th Round on Consumer Expenditure 2009-10.

*URP estimates shown except for 1999-00, for which only MRP estimates are available.

Table 3
Composition of food expenditure, 2009-10

	Rural	Urban
Cereals	29.2	22.3
Gram	0.3	0.2
Cereal substitutes	0.1	0.1
Pulses & products	6.9	6.5
Milk & products	16.1	19.1
Edible oil	6.9	6.3
Egg, fish & meat	6.5	6.6
Vegetables	11.5	10.5
Fruits, fresh and dried	3.0	5.1
Sugar	4.6	3.8
Salt & spices	4.5	3.8
Beverages etc.	10.5	15.5
Food total expenditure	100.0	100.0

Source: NSS 66th Round on Consumer Expenditure 2009-10.

Small farmers and diversification. Do small and marginal farmers grow high-value and protein-rich crops? Table 4 shows cropping patterns by size of farms. Birthal et al. (2011) provide four conclusions from these cropping patterns. 1) Small and marginal farmers allocate a larger proportion of their cultivated land to high-value crops like fruits and vegetables. 2) Small and marginal farmers seem to have a comparative advantage in growing vegetables rather than fruits, because of quick returns in vegetables. 3) Small and marginal farmers allocate a larger proportion of land to rice and wheat than other farmers. 4) Small and marginal farmers allocate a smaller proportion of land to pulses and oilseeds.

In terms of production, small and marginal farmers also have a larger share in the production of high-value crops. They contribute around 70 percent to the total production of vegetables and 55 percent to fruits, against their share of only 44 percent of total land area (Birthal 2011). Their share in cereal production is 52 percent and in milk production 69 percent. Thus, small farmers contribute to both diversification and food security. Only for pulses and oilseeds is their share in production lower than other farmers.

Table 4
Cropping patterns by farm size, 2003

Crop	Small	Medium	Large	All
Paddy	35.0	24.7	13.4	25.8
Wheat	19.0	15.6	12.8	16.3
Coarse Cereals	16.5	19.4	18.3	17.7
Pulses	8.0	11.0	14.6	10.8
Oilseeds	7.2	12.0	14.0	10.4
Fruits	1.2	1.4	0.9	1.2
Vegetables	3.5	2.0	1.0	2.4
Condiments and spices	1.0	1.2	1.0	1.1
Sugarcane	2.6	3.5	2.5	2.8
Cotton	2.1	4.8	15.4	6.9
Other crops	3.9	4.4	6.0	4.7
Total	100.0	100.0	100.0	100.0

Source: Birthal et al. 2011.

Small-scale farmers will remain an important part of Indian agriculture for years to come. Numerous institutional and policy reforms are needed to increase production and improve food security and nutrition of small farmers, underlining the differences between the earlier Green Revolution and this "Second Green Revolution." It is known that these farmers find it difficult to access inputs, credit, extension, and marketing opportunities for their output (GOI 2008). Policies and programs that focus on reducing poverty and increasing food security need to take a broad-based approach to agricultural development, by focusing on smallholder agriculture. For example, the National Commission on Enterprises for Unorganized Sector (NCEUS 2009) suggests special programs for small and marginal farmers. Principal activities proposed include: promotion of marginal and small farmers' groups; enabling greater access to institutional credit, training, and capacity building; support for strengthening non-farm activities; gender-focused activitie;s and planning for development of marginal and small farmers.

Food prices and policies

This subsection describes trends in food prices in recent years and their implications for diet diversification. Then it examines how food prices affect other basic and underlying determinants of

well being, including the pathways of the effects of food price inflation on the nutrition of households (particularly of women and children). It also discusses the food management and price policies needed to lower food inflation and raise nutrition levels in India.

Trends in food prices in recent years

The increase in food prices is a significant negative feature of India's economic environment in recent years. This trend has a tremendous impact on the quality of life, as people struggle to maintain the nutritional standards they had previously achieved, possibly giving up some other forms of consumption to keep themselves well-fed.

As shown in Table 5, food prices were very high in the past two years, before declining moderately in the first quarter of the financial year 2011–12. The inflation for food articles rose from around 7 percent in 2006–07 to 9 percent in 2008–09, 15 percent in 2009–10, and 2010–11, before declining to 9 percent in the first quarter of 2011–12.

Food consumption patterns have diversified in recent years. The predominance of cereals in the typical household diet has given way to greater balance, with a consequent increase in the demand for proteins—pulses, milk, meat, fish, and eggs—and for vegetables and fruit. It is no surprise that these items have been the primary causes of food inflation in the recent period. Table 5 shows that inflation for three major pulses (urad, arhar, and moong) was nearly 50 percent, although they showed negative inflation in recent months. Similarly, inflation for milk, eggs, meat, fish, fruits, and vegetables was very high. However, food inflation showed negative growth in December 2011.

Table 5
Food inflation for major groups and subgroups, 2007–08 to 1st Quarter of 2011–12 (Year on Year changes)

	2007-08	2008-09	2009-10	2010-11	2011-12 (Average of April-July
All Commodities	4.7	8.0	3.8	9.6	9.5
Primary (non-food) items	8.3	11.1	12.7	17.7	12.9
Food items	7.0	9.1	15.3	15.6	8.9
Foodgrains	6.9	11.0	14.5	4.8	2.3
Cereals	9.5	11.9	12.6	5.3	5.0
Rice	11.02	14.8	12.3	5.9	2.6
Wheat	7.3	9.9	12.8	3.0	0.4
Maize	6.3	6.8	10.2	10.1	1.9
Pulses	-2.8	7.5	22.4	3.2	-8.18
Urad	-16.5	0.0	43.0	19.0	-9.23
Arhar	16.4	14.4	48.8	-4.5	-16.3
Moong	-11.9	6.1	55.4	19.9	-21.4
Fruits & vegetables	11.5	8.2	9.7	16.4	16.0
Milk	5.1	7.6	18.8	20.1	8.0
Eggs, meat & fish	3.2	7.7	20.8	25.5	9.1

Source: Ministry of Finance, Government of India.

The month-wise inflation for food groups.sub-groups are given in Table 6 for the years 2009-10, 2010-11 and upto July 2011. It shows that inflation for food articles started rising from June 2009. It rose from 11% in June 2009 to 20% by December 2009. The 20% food inflation continued till June 2010. Only in recent months in 2011, the inflation for food articles was less than 10%. Regarding sub-groups, the price rise for pulses was the highest in the financial year 2009-10. It reached peak of 38% in January 2010. Inflation for Moong was more than 90% in the months of January, April and May in 2010. Similarly increase in prices of fruits, vegetables, milk, egg, meat and fish was high for most of the months in the years 2009-10 and 2010-11.

Table 6: Inflation (yoy % increase)

	All	Primary Articles	Food Articles	Foodgrains	Cereals	Rice
Apr-09	1.21	6.59	8.69	10.90	10.88	13.80
May-09	1.45	6.78	8.91	12.30	11.75	13.79
Jun-09	-0.39	5.93	11.28	12.62	12.26	14.48
Jul-09	-0.31	5.81	12.74	12.46	11.15	13.07
Aug-09	0.54	9.84	14.36	12.50	11.23	13.49
Sep-09	1.40	10.63	13.92	14.59	13.36	16.14
Oct-09	1.79	10.30	12.47	13.31	11.56	10.48
Nov-09	4.73	14.29	16.73	17.06	14.29	11.14
Dec-09	7.15	17.96	20.76	19.47	16.45	12.44
Jan-10	8.68	20.19	20.19	19.49	15.36	12.04
Feb-10	9.65	21.73	21.85	15.33	12.72	9.91
Mar-10	10.36	22.16	20.65	13.21	10.48	8.07
Apr-10	10.88	21.45	20.49	11.05	8.04	8.35
May-10	10.48	20.45	21.37	10.31	7.07	8.28
Jun-10	10.25	20.14	20.97	10.38	7.43	8.23
Jul-10	9.98	19.09	18.48	9.63	8.35	9.58
Aug-10	8.87	15.96	14.96	8.26	8.49	7.38
Sep-10	8.98	18.17	16.29	6.03	6.68	5.71
Oct-10	9.08	18.09	14.64	3.89	4.84	5.31
Nov-10	8.20	14.67	10.14	0.46	3.19	4.74
Dec-10	9.45	18.37	15.07	-1.18	1.59	4.01
Jan-11	9.47	18.44	16.68	-1.45	1.76	3.58
Feb-11	9.54	15.89	10.95	1.65	3.43	3.84
Mar-11	9.68	13.44	9.41	1.97	3.48	2.27
Apr-11	9.74	15.09	10.66	2.15	4.42	2.32
May-11	9.56	12.92	8.25	2.61	5.76	3.79
Jun-11	9.44	12.22	8.38	1.61	4.63	1.89
Jul-11	9.22	11.30	8.19	2.64	5.32	2.47

Table 6: contd.

	Wheat	Pulses	Arhar	Moong	Urad	Fruits & Vegetables	Milk	Eggs, Meat and Fish
Apr-09	6.13	10.79	23.52	21.98	20.34	4.68	11.74	5.84
May-09	7.92	14.60	31.15	28.23	23.80	5.26	11.49	2.50
Jun-09	8.79	14.12	37.41	32.83	24.37	10.19	12.56	8.42
Jul-09	7.07	18.12	49.53	34.23	27.28	11.50	14.27	14.93
Aug-09	6.46	17.44	50.58	27.89	31.37	15.49	14.30	18.72
Sep-09	8.53	19.52	50.44	39.80	31.82	7.63	16.78	19.87

Oct-09	12.78	20.54	50.91	47.66	42.50	2.64	19.02	19.29
Nov-09	19.26	29.11	59.84	65.86	60.97	5.07	22.12	27.62
Dec-09	22.99	32.07	59.16	86.07	66.30	14.72	21.87	29.37
Jan-10	20.84	38.06	76.66	91.44	70.75	7.89	26.59	31.60
Feb-10	17.79	26.93	50.20	83.11	57.83	15.89	28.55	34.31
Mar-10	14.66	25.02	40.73	89.92	49.82	16.25	24.87	35.51
Apr-10	8.48	24.08	36.02	95.67	46.39	14.32	27.91	38.61
May-10	6.39	24.52	34.39	92.66	53.17	15.80	28.38	45.52
Jun-10	6.57	23.02	24.57	84.65	56.77	18.86	26.21	38.99
Jul-10	6.54	14.40	7.74	63.07	49.80	13.22	26.06	31.42
Aug-10	10.22	7.75	-9.49	53.96	39.17	3.32	26.89	26.99
Sep-10	7.86	3.86	-8.18	21.55	35.84	12.19	24.11	29.52
Oct-10	3.00	0.21	-12.37	8.61	22.17	12.39	21.04	27.37
Nov-10	-0.75	-10.00	-21.75	-8.87	-1.25	7.86	18.05	18.93
Dec-10	-4.15	-11.74	-23.07	-14.97	-6.72	25.79	18.34	19.42
Jan-11	-3.79	-13.33	-27.52	-14.34	-10.95	39.97	13.77	15.69
Feb-11	-1.28	-5.24	-12.21	-12.11	-6.01	16.10	12.54	12.74
Mar-11	0.17	-3.97	-9.40	-16.39	-1.53	18.92	4.43	13.54
Apr-11	0.18	-6.37	-11.77	-19.43	-1.83	26.48	2.87	11.14
May-11	-0.42	-9.21	-16.27	-22.21	-6.46	15.23	6.11	6.59
Jun-11	-0.06	-9.72	-18.40	-24.05	-12.33	10.46	12.51	9.55
Jul-11	1.91	-7.43	-18.85	-20.06	-16.28	11.73	10.77	9.25

Source: Ministry of Finance

Food prices and diet diversification

The trends in food prices by groups and subgroups for the period April 2005 to April 2011 are shown in Figures 1 to 6. The trends in prices for food items charted in Figure 1 show that inflation was highest during the period December 2009 to July 2010. Of course, the period of high inflation differs across subgroups and crops.

Figure 1
Year to Year changes in Wholesale Price Index (WPI)

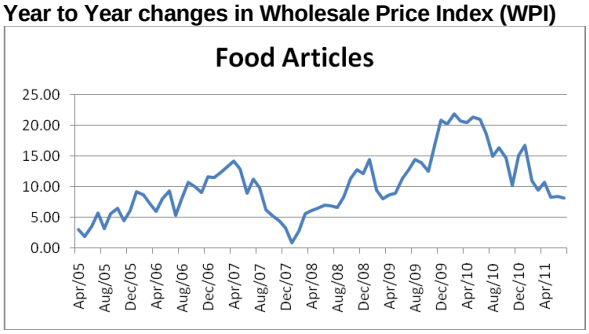


Figure 2
Year to Year changes in (WPI): Foodgrains

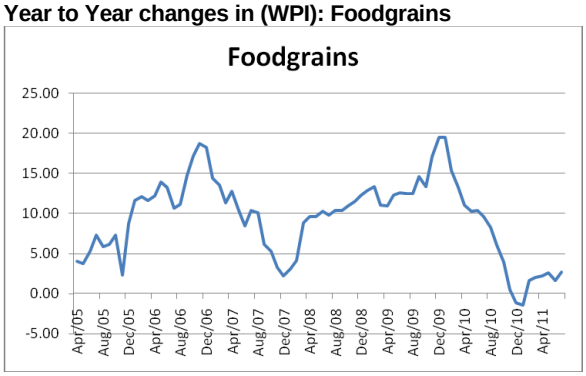


Figure 3
Year to Year changes in WPI: Pulses

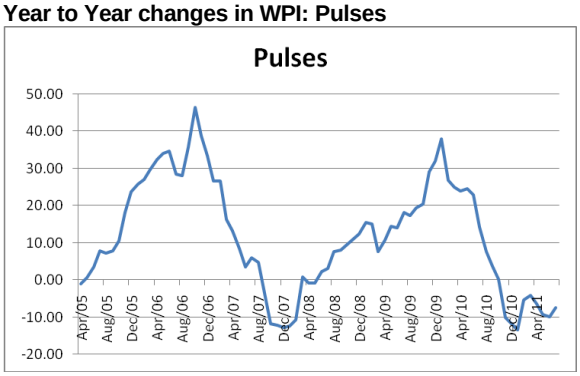


Figure 4
Year to Year changes in WPI: Fruits & vegetables

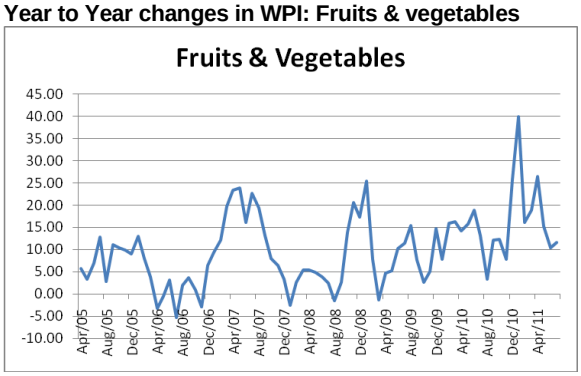


Figure 5
Year to Year changes in WPI: Milk

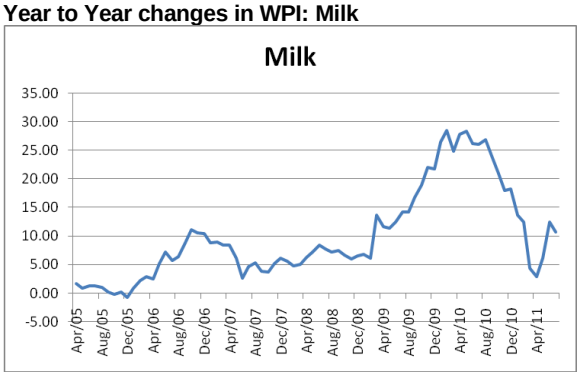
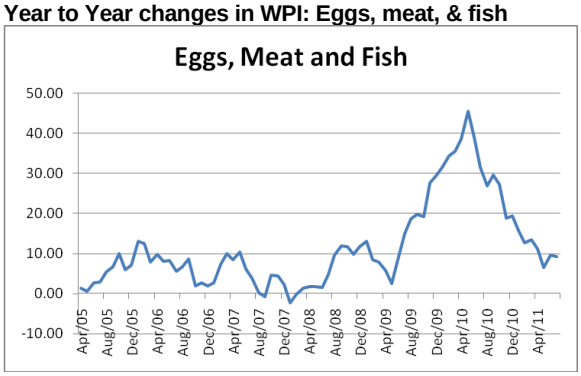


Figure 6
Year to Year changes in WPI: Eggs, meat, & fish



What are the drivers of higher food inflation in India in the past two-and–a-half years? Both global factors and domestic factors are involved, but domestic factors—including supply shortages—play a greater role than global factors (RBI 2011). Food inflation does not seem to be a transitory phenomenon; in fact, it appears to be becoming a structural problem, especially in *protein inflation* (for pulses, milk, eggs, meat, and fish) (RBI 2011). Agricultural policies are needed that improve the supply of protein-rich foods and further diversify the diet. (For more on this see Dev and Kadiyala 2011.)

Pathways of food prices and nutrition

The significant increase in food prices in recent years tends to further undermine the food security and livelihoods of the most vulnerable, by eroding their already limited purchasing power. Poor people spend a large proportion of their income on food, and they have little capacity to adapt as prices rise and wages fail to adjust accordingly. Thus, the situation in India can pose a threat to the country's food and nutrition security.

There are four main pathways that lead to poor outcomes in nutrition, health, and education of children, arising from the increase in food prices: impact on poverty; macro-economic impact and its effect on employment and the social sector; impact on nutrition and social protection programs; and women's well-being and intra-household decision making.

Impact on poverty

A recent study in eight countries estimates that the rise in food prices between 2005 and 2007 increased poverty by 3 percentage points on average. Extrapolating these results globally suggests that as a result of the rise in food prices, total world poverty may have increased by 73–105 million people (World Bank 2008).

High food prices would have different effects on net sellers and net buyers. However, in India, net buyers are large in number and include all urban poor and a majority of rural poor. NSS 59th Round data indicate that only about a quarter of all rural households and only 44 percent of farming households were net sellers of main crops, such as rice, wheat, maize, and other cereals (Viswanathan and Serajuddin 2010). And while it is true that net sellers are likely to benefit from rising food prices, the constraints on agriculture may prevent farmers' responding in the short run. Some of the small producers with a marketable surplus could in fact become worse off with higher prices. This is because a small producer typically sells the surplus immediately in the post-harvest season, when prices are low, and buys food when prices are high.

In India, rising food prices would have an adverse impact on the poor, because (a) the poor have a large share of expenditures on food, and (b) most poor households are net buyers of staple food rather than net sellers. The impact on poverty would have four damaging effects on the poor, through (a) impaired nutrition status of pregnant and lactating women and of pre-school children; (b) impaired health status of women and children; (c) an increase in child labor and withdrawal of children from school; and (d) the distress sale of productive assets.[3]

Macroeconomic impact and the effect on employment and the social service sector

Rising food, commodity, and oil prices have increased general inflation. Apart from the food price rise, an increase in general inflation would also hurt the poor and vulnerable sectors of the population.
Reduced economic activity due to rise in food prices and general inflation would affect the social sector, especially education and health. At the macro level, reduction in economic growth would lead to a reduction in the tax/GDP ratio. This would have an adverse impact on employment and social sector expenditures. Even if growth does not decline, an increase in food prices would occasion an increase in subsidies, tax concessions and so forth, reducing government's ability to increase social sector expenditures. This may adversely affect women and children in terms of nutrition and health outcomes.[4]

Impact on nutrition and social protection programs

A rise in food prices would worsen nutrition, especially among infants (0–24 months) and pregnant and lactating mothers. Children suffer long-term consequences from short-term shocks. The countries hit by the food crisis already have the highest preexisting rates of malnutrition. The malnutrition situation would worsen further with an increase in food prices.

The food price rise would affect the overall food consumption of households, in turn reducing food consumption by women and children. Also, households may spend more on cheaper, high-calorie staples and less on foods rich in protein and vitamins, such as meat, fish, dairy, fruit, and vegetables, reducing the quality of their diet. This will have significant negative consequences for nutrition.

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[3] For evidence, see Viswanathan and Serajuddin 2010.

[4] See Dev and Mooij 2004.

Bouis (2008) cites four basic factors supporting this conclusion.

I. Expenditures on non-staple foods by poor consumers comprise 40-60% of total expenditures on food.

II. Demand for food staples (rice, wheat, maize etc. depending on the geographical region and culture) is highly inelastic. Income and price elasticities for food staples in the aggregate are low.

III. In diets, minerals and vitamins are concentrated in non-staple foods; energy is concentrated in staple foods.

IV. Current intakes of vitamins and minerals are already too low, resulting in high prevalence rates of micronutrient deficiencies. Modest decrease in current intakes of minerals and vitamins will drive these prevalence rates significantly higher, with severe consequences for the nutritional status of the poor and public health. (Bouis et al. 2008: 1.)

Increased micronutrient malnutrition is one likely health consequence of high food prices. According to Klotz et al. (2008), increased staple food prices around the world are forcing households to reduce their consumption of micronutrient rich foods, which will have a range of health consequences depending on the pre-existing nutritional status of a given population.

A rise in food prices would affect social protection programs, particularly the food-based schemes. For example, India has food supplementation programs such as ICDS and midday meal for primary school children. The government of India provides subsidized food grains and bears the cost of converting food grains into hot cooked meals with the addition of pulses, oils, and vegetables. The cost of these programs would increase with higher food inflation.

Women's well-being and intra-household decision making

High food prices have differing impacts on women consumers and producers. The rise of food prices could increase incentives for producers. However, due to constraints on input supplies and other factors, past evidence suggests that higher prices may not necessarily stimulate production by female farmers (Quisumbing 2008). At the household level, women's time burden may increase with a rise in food prices, as they try to manage the household budget by reducing expenditures on food or by finding paid employment, or both—affecting children's nutrition and reducing childcare time. Intra-household dynamics are key to determining the impact on children of a rise in food prices. The intra-household allocation of resources to children depends on several factors, including women's empowerment and education, the household wealth and asset base, and social protection measures reaching the household (Plan and ODI 2008). One household coping mechanism relates to decisions about children's activities. In some cases, children may be withdrawn from school to take up paid work activities. In other cases, children may have less study and leisure time because of their increased involvement in paid or unpaid economic activities.

Impacts of higher food prices on children

The effect of rising food prices is felt most strongly by the most vulnerable, including children. A study based on Young Lives, an international study of childhood poverty in India and three other countries, indicates that high food prices will have an impact on children in two ways (Dercon 2008). First, it has a short-run impact on the family budget, leading not only to less food being available, or

cheaper food being purchased, but also to reduced funds for non-food items such as health and education. Second, it may have long-term impact on children's health, psychosocial well-being, and educational achievements.

The Young Lives project reveals interesting results regarding the impact of poverty and stunting on children, showing a significant impact on children's learning and achievements in India. A comparison of educational and psychosocial indicators for average children, comparing the poorest quintile with the richest quintile, shows that writing skills were substantially lower for India's poor children compared to the rich (Table 7). Similarly, reading skills and grade aspiration are lower for the poorest quintile, while educational and psychosocial indicators are also lower for stunted children as compared to non-stunted children in India (Table 8).

Table 7
Educational and psychosocial indicators, comparing average children from poorest and richest quartiles*

	India	Ethiopia	Peru	Vietnam
Grade deficit (in years) between poorest and richest quartile	-0.3**	-0.8**	-0.9**	-0.6**
Writing skills: % of children that write without difficulty (deficit in percentage points)	-24.7**	-10.7**	-14.2	-14.3**
Reading skills: % of children that read without difficulty (deficit in percentage points)	-11.2	-10.8	-7.1**	-9.3
Sense of shame/ embarrassment index (deficit in percentage points)	-5.1**	-4.3**	-18.8**	-9.4**
Grade aspiration gap (in years)	-1.2**	-0.7**	-0.7**	-1.4**

*Richest and poorest 25 percent of households, defined in terms of household total consumption per capita.

**Denotes statistical significance of spending power to explain outcomes, at 10 percent or less.

Source: Table modified from Dercon 2008.

Table 8
Educational and psychosocial indicators, comparing (average) stunted and non-stunted children

	India	Ethiopia	Peru	Vietnam
Grade deficit (in years) between stunted and non-stunted children	-0.3*	-0.9	-0.5	-0.4
Writing skills: % of children that write without difficulty (deficit in percentage points)	-7.0	-18.1	-13.4	-6.8
Reading skills: % of children that read without	-2.5	-15.6	-2.3	-5.4

difficulty (deficit in percentage points)				
Sense of shame/ embarrassment index (deficit in percentage points)	-3.0*	-0.6	-10.3*	-2.4
Grade aspiration gap (in years)	-0.4	-0.4*	-0.4	-0.7*

*Denotes statistical difference at 5 percent.

Source: Table modified from Dercon 2008.

A Rapid Price Impact Survey 2008 in Bangladesh provides additional evidence of the overall impact of price inflation on children's well-being. The study, conducted by the World Bank, investigated household responses to rising prices (Viswanath and Serajuddin 2010). Around 1200 rural and 800 urban households were interviewed in this survey; the results are given in Table 9. Around 43 percent of rural households had reduced their educational expenditures, while 9 percent of rural households had taken children out of school.

Table 9
Household responses to the food price increase (%): Bangladesh

	Urban	Rural	Total
Reduce quantity of food intake	72.3	77.9	75.7
Switch to lower quality food	86.9	87.8	87.5
Reduce non-food expenditures	86.0	86.5	86.3
Spend savings/sell belongings	43.5	46.5	45.3
Take out loans	46.3	59.9	54.5
Gift/help from community members	0.9	9.3	6.0
Take children out of school	6.5	8.8	7.9
Decrease education expenses	32.5	43.2	39.0
Work more/increase production	24.6	39.8	33.8
Stop loan payment	3.1	6.1	4.9

Source: Viswnathan and Serajuddin 2010.

Food management, price policy, and nutrition

Food policy in modern India has had two primary objectives, ever since the Bengal famine of 1943: a large *public distribution system*, supplemented by arrangements for moderating prices in the open market; and concerted efforts for achieving *self-sufficiency in foodgrains*, coupled with measures for maximizing procurement from surplus areas (GOI 2002). These objectives have held sway over the last 68 years, with changes in emphasis and varying degrees of rigidity depending upon the prevailing situation and assessment at a given time. Currently, the food security system and the price policy basically consist of three instruments: procurement and minimum support prices (MSP); buffer stocks; and the public distribution system (PDS). Here we will focus on the price policy, and particularly the MSP.

Price policy

The Agricultural Prices Commission (APC) was established in 1965 to recommend remunerative prices to farmers. Later it was renamed the Commission for Agricultural Costs and Prices (CACP). The aim is to evolve a balanced and integrated price structure in the perspective of the overall needs of the economy and with due regard to the interests of producer and consumer. Assurance of a remunerative and stable price environment is essential for increasing agricultural production and productivity, since the marketplace for agricultural produce tends to be inherently unstable, which often inflicts undue losses on growers. This is also important for inducing farmers to raise productivity through higher investment and use of modern inputs.

Minimum support prices (MSP) for major agricultural products are fixed by the government each year, taking into account recommendations of the CACP. At present, 25 items are covered under the MSP regime, including all important cereals as well as pulses, oilseeds, cotton, jute, and sugarcane.

For any improvement in farm income, it is necessary to keep in check the cost of production. To facilitate this, there should be continuous upgrading of technologies in agricultural operations. India's crop production should be made competitive with that of major producing countries. The cost of cultivation—one important determinant for setting MSP—has been registering increases, particularly for diesel (used for irrigation) and human labor. As the labor component constitutes a sizeable portion of the total input cost of production, the increase in wage rates affects the overall cost. In particular, the implementation of the National Rural Employment Guarantee Act (NREGA) has raised the cost and curtailed the availability of agricultural labor, especially during peak season. Many laborers previously engaged in farming operations are switching to work provided under NREGA.[5] This trend necessitates increasing use of farm implements and machinery in crop production. In view of the predominance of small and marginal farm holdings, agricultural policy needs to support provision of small farm implements and tools, elevating farm production and productivity.

There has been significant increase in MSP between 2004–05 and 2011–12. MSP has increased for all the major crops, with the highest increase being for pulses (Table 10). Note that the impact of price policy on nutrition depends on the net effect of positive and negative impacts. An increase in the price of pulses, for example, would increase the production of pulses, potentially increasing consumption of proteins. In fact, pulses production increased from 14 million tons in 2009–10 to 18 million tons in 2010–11 (an increase of about 4 million tons). There could also be a negative effect, however—an increase in market prices, due to increase in MSP for pulses. But, on balance, one can expect an increase in consumption of pulses as the availability increases.

[5] These observations are based on field-level visits by the author as chairman of CACP.

Table 10
Increase in Minimum Support Prices for kharif crops and wheat (Rs.)

Crops	2004–05	2011–12	Change (%)
Paddy common	560	1080	92.9
Paddy (Grade A)	590	1110	88.1
Wheat	630	1120	77.8
Maize	525	980	86.7
Tur (arhar)	1390	3200	130.0
Moong	1410	3500	148.0
Urad	1410	3300	134.0
Groundnut	1500	2700	80.0
Soyabean (black)	900	1650	83.3

Source: CACP reports

Summary of food management and price policy

Buffer stock and public distribution are the other instruments of the food management system. India has nearly 60 million tons of rice and wheat in buffer stock. However, there are storage problems, as there are storage facilities for only 30 million tons. The public distribution system (PDS) partly takes care of cereals like rice and wheat. Regarding pulses, fruits and vegetables, and other protein foods, marketing reforms are needed to increase the price for producers and reduce the price for consumers—for example, the amendment to Agriculture Produce Marketing Committees (APMCs), development of value chains, and contract farming.

What should be the role of price policy for increasing nutrition? Price policy needs to balance the needs of producers against those of consumers. A minimum-support policy has long been in favor for cereals like rice and wheat; corrections have been made in recent years by increasing MSP for protein-rich crops like pulses. As a result, production has increased. Similar incentives must be given for other nutrient-rich foods, like fruits, vegetables, milk, meat, and fish, to increase supply. On the other hand, consumers have to have access to these foods at reasonable prices to increase consumption.

Global food prices also have an impact on domestic prices. The G20 discussions of the issue of price volatility and food security concluded that, in the short run, information sharing and transparency in markets should be improved, for better international coordination among governments. Newer financial instruments and risk management tools need to be found to ensure steady prices to producers (G20 2011). In the long run, agriculture production and productivity must increase in a sustainable manner to match the increasing demand. Investment was recommended in research and development and extension services for better farm management, as a way to significantly increase production levels. Most of the G20 members agreed that increasing agriculture production was the key to the control of price volatility (G20 2011).

2.3. Women in agriculture

As mentioned in Dev and Kadiyala (2011), "realigning agriculture policy to empower women in agriculture is essential for accelerating reduction in under nutrition in India." Table 11 shows that, in rural areas, the share of total labor that is applied to agriculture declined by 14 percentage points for males and only 6 percentage points for females between 1977 and 2005. In 2004-05, the share of rural females in agriculture was around 83 percent, compared to 67 percent for rural men, showing the increasing importance of women in agriculture in rural areas.

Table 11
Distribution of workers in rural areas, 1977–78 to 2004–05

	Agriculture	Rural Non-Farm	Total
Rural Male			
1977-78	80.6	19.4	100.0
1983	77.5	22.5	100.0
1987-88	74.5	25.5	100.0
1993-94	74.1	25.9	100.0
1999-00	71.4	28.6	100.0
2004-05	66.5	33.5	100.0
Rural Female			
1977-78	88.1	11.9	100.0
1983	87.5	12.5	100.0
1987-88	84.7	15.3	100.0
1993-94	86.2	13.8	100.0
1999-00	85.4	14.6	100.0
2004-05	83.3	16.7	100.0

Source: NSS Employment and Unemployment Surveys.

Agriculture is becoming increasingly feminized as men migrate to the rural non-farm sector, as shown in Table 11. Women work in "land preparation, seed selection and seed production, sowing, in applying manure, fertilizer and pesticides, weeding, transplanting, threshing, winnowing and harvesting etc., as well as in animal husbandry and dairying, fish processing, collection of non timber forest produces (NTFPs), back yard poultry, and collection of fuel wood, fodder and other products for family needs" (GOI 2007).

Despite their importance, women are continually denied their property rights and access to other productive resources. Policies that protect women's rights in land, enhance infrastructure support to women farmers, and give them legal adviceon existing laws, will facilitate recognition of women's role as farmers and enable them to access credit, inputs, and marketing outlets. Women's names should be recorded as cultivators in revenue records, for family farms where women operate land that is registered under male ownership. There needs to be a comprehensive national directive to the effect that, in all government land transfers, women's claims are directly recognized, including transfers for poverty alleviation, income generation (crop cultivation, fish cultivation), and resettlement. Urgent correction is needed in the existing profound gender bias in institutions for information, extension,

credit, inputs, and marketing; such institutional processes need to take into account women's mobility, domestic responsibilities, and social constraints.

Women are predominant also in allied activities such as livestock, fisheries, horticulture, plantation, and nursery. Growth of these activities will be important for diversification of agriculture and improving diets. But although women play a critical role in the care and management of livestock, they may not have ownership rights. Women in fact contribute 50 to 90 percent of the labor inputs, but livestock development, training and extension programs are designed primarily for men (GOI 2007).

Improving the productivity of women farmers as well as income levels of women agricultural laborers is crucial for contributing to improved nutrition. There is increasing recognition of the role of women in agriculture. Women's cooperatives, producer women's groups, and other forms of group efforts should be promoted, to overcome the constraints of small and uneconomic land holdings, to disseminate agricultural technology and other inputs, and for marketing of produce (Agarwal 2010).

There has also been greater emphasis on women's collectives. The NGO Deccan Development Society (DDS), for example, enables women from landless families to access various government programs to establish claims on land, through purchase and lease. Krishnaraj (2006) gives a summary:

> Four critical steps … ensured local food security in an experiment by the Deccan development society in Andhra Pradesh where the 'sangams' – women's collectives (i) improved 6,000 acres of degraded land, (ii) dalit women took cultivable land on lease, (iii) organised their own public distribution of grains with accent on coarse cereals consumed by 65 per cent of our rural population; built grain banks at village level, and (iv) made systematic collection and preservation of seed varieties. (Krishnaraj 2006.)

Policy initiatives are critically needed to address the conditions under which women are employed (prolonged exposure to fertilizers and pesticides, long working hours) and to create support systems to strengthen women's capacity to care for themselves and their children. Easy access to maternity entitlements, as well as optimum quality daycare facilities—either within the community or at place of work—are also critical for strengthening families' caring capacity and translating higher incomes into health and nutrition benefits (Dev and Kadiyala 2011).

Convergence of agriculture with other sectors at the policy level

It is well known that for reducing malnutrition, India requires multi-sectoral inputs—that is, convergence and inter-sectoral actions involving the fields of nutrition, health, agriculture, livelihoods, and women's empowerment (Ved and Menon 2011).

One can look at this convergence at the policy level in two ways. First, we can ask whether agricultural policies directly discuss nutrition. Second, we can identify potential pathways between agriculture and nutrition. For example, in a discussion on diversification of crops, women's role in agriculture can be one element in agriculture's convergence with nutrition. Another example is to examine the impact of agriculture and food security programs on nutrition. This section examines the extent of policy convergence, using the limited information that is available.

Ved and Menon (2011) provide the framework for analyzing convergence at the policy level (Table 12).

Table 12
Policy: agenda-setting, commitment, and policy formulation

Action	Level
Articulated commitment to undernutrition and the recognition of intersectoral collaboration by senior political leaders, including those in charge of the individual department or Ministry	National/state
Content of commitment with regard to convergence: vision, goals, targets, strategies—harmonizing policy across sectors towards reducing undernutrition	National/state
Leadership within a high level political body—setting up Council/body for oversight and review, including all stakeholders	National/state
Budgetary commitment: To what extent are policies for convergent action supported by financial commitments? .	National/state
Is there an articulation of shared vision, processes, and outcomes in policy documents and implementation plans—such as project implementation plans	National/state
Modification of policies: institutional arrangements, organizational modifications, alignment of HR, incentives to accommodate convergence	
Awareness of causes, determinants, consequences of undernutrition among policy makers and implementers, including mid-level and street bureaucrats	

Convergence in policy documents

Convergence in agriculture-nutrition is a new element of policy design in India. The agriculture and food security sectors are mainly oriented toward ensuring availability and access; they deal essentially with production (supply) and livelihoods, although in discussions of food security, nutrition is mentioned.

Plan documents and agricultural policies, particularly in earlier periods, do not address nutrition. Fortunately, the proposed National Food Security Bill talk about nutrition apart from providing rice, wheat and coarse cereals. The first National Agricultural Policy, in 2000, did not mention nutrition at all. Similarly, the 11th Five-Year Plan has no mention of nutrition. The Plan's chapter on agriculture presents strategies to accelerate annual agricultural growth to 4 percent during the Plan period, addressing the following areas: technology, irrigation, natural resources management and watershed development, strengthening input and support services, food security, diversification, contract farming, food processing, livestock, fisheries development, equity issues, restructuring agricultural planning, and financing. There was no mention of nutrition under these strategies. Under food security, for example, only the National Food Security Mission is discussed; under financing, there is no allocation for nutrition-related issues. The Plan documents also overlook the impact of agriculture on health.

However, the Plan documents do discuss inclusive growth, diversification, and the role of women in agriculture, which are some of the pathways for improving nutrition. For example, the discussion of equity issues includes small farmers' needs, managing vulnerabilities, and gender equity. There is also discussion of rainfed farming, diversification, livestock, and fisheries. Regarding diversification, the 12th Five Year Plan Approach Paper indicates that output of fruits, vegetables, and protein-rich food items needs to grow at a faster pace than production of cereals, to meet the rising demand in these items. This may be the first official recognition of the need to increase the supply of protein-rich foods.

There is more discussion of convergence in the nutrition chapter, which includes some discussion of agricultural policies (11th Five Year Plan). In its discussion of food and nutritional security, the chapter gives a conceptual and empirical analysis of malnutrition (including consumption patterns) and more specifically problems with child malnutrition, as well as a summary of the current situation. It goes on to examine agricultural price policies such as minimum support price and food procurement policy,

including stabilization and decentralization procurement. It also discusses food and nutrition programs such as PDS and ICDS midday meal schemes. Micronutrient deficiencies are also elaborately discussed.

The 11th Five Year Plan adopted a five-pronged strategy incorporating some convergence of departments. In nutrition policy, there is thus some convergence—at least on paper—involving the Ministry of Agriculture with the Department of Food and Public Distribution.

Dietary diversification. The range of micronutrient-rich foods consumed has to be improved. One proposed intervention is to improve the production, availability, and access to micronutrient-rich and locally produced foods. Educating people on dietary diversification is also important. These efforts are primarily to be implemented by the Ministry of Health and Family Welfare, Women and Child Department (WCD), and information and broadcasting.

Nutrient supplementation. This is the responsibility of the Ministry of Health and Family Welfare, WCD, and the Department of School Education and Literacy.

Horticulture intervention. This will focus on increasing the supply nutrient-rich crops, in part through the promotion of home gardening. Horticulture intervention will involve the Ministry of Agriculture for the supply of seeds, extension, and storage support.

Public health measures. This is the responsibility of the Ministry of Health and Family Welfare, WCD, and the Ministries of Commerce, Rural Development, and Urban Development.

Food fortification. Fortified foods are needed to address micronutrient deficiencies. This is the responsibility of the Ministries and the Departments of Health, as well as food processing industries, the public distribution system, Ministries of finance and consumer affairs, panchayati raj (local government), and state governments.

Views of policymakers

There is hardly any discussion regarding convergence of agriculture with other sectors like nutrition and health in the discussions of policy makers. For example, planning commission officials talks about agricultural growth but they do not talk about its links with nutrition. Although Prime Minister has started a nutrition mission, there is no headway in convergence of departments. Similarly, agricultural ministry speaks about mainly agricultural production. Department of food and PDS is concerned with PDS which mainly gives rice and wheat.

Indian Council of Agriculture Research (ICAR) is talking about bio-fortification in some of the crops. Earlier quality protein maize (QPM) is considered as a significant nutritional breakthrough that could be a cheap and natural source of quality protein for the masses. But, there seems to be some intellectual property rights issues which stalled private participation.

Convergence at state level

As agriculture is a concern of the states, there needs to be convergence of programs at state level. Some states do have nutrition missions (for example, Karnataka and Maharashtra), which involve agricultural departments as well.

Maharashtra's Nutrition Mission has been active for five years. An initiative currently in planning is a nutrition budgeting study for Maharashtra. IGIDR (Indira Gandhi Institute of Development Research), Mumbai will develop a framework for tracking the flow of funds from multiple sectors, based on the following documents: Maharashtra government's Annual Plan and District Plan: The Civil Budget Estimates of the Department of Women and Child Development, the Department ofAgriculture, the Tribal Dpartment, and the Food and Civil Supplies, and Consumer Protection Department. The documents also provide information on allocations from the central government.

A study by Parikh et al. (2004) examines budgeting in Maharashtra agriculture, and specifically its impact on women. It finds that the crop programs appear to be gender-blind in Maharashtra. The study examined data for the period 1998 to 2002 from six departments relating to agriculture and rural development: agriculture, animal husbandry, rural development and water conservation, planning, irrigation, and tribal development. It found only the following budget shares allocated for programs specifically benefiting women farmers in 2003-04: for the agriculture department, 0.05 percent; and for the rural development department, 5.81 percent.

The study concludes that "most policies described in the plans and budgets of agriculture and allied sectors do not give positive boosts to women workers (creating special opportunities for women, designing gender sensitive policies that ensure equitable intra-household distribution of benefits, etc). Thus, surely, women are being left behind in these policies." (Parikh et al. 2004: 4829.)

Selected agriculture programs and impact on nutrition

Government has introduced several agricultural programs, such as the National Food Security Mission (NFSM), National Horticulture Mission (NHM), and Rashtriya Krishi Vikas Yojana (RKVY). Other programs, like the Mahatma Gandhi National Rural Employment Guarantee Act (NREGA), also have an impact on nutrition of women and children. We examine here the possible convergence and linkages of some of these programs with nutrition.

Agricultural programs

The National Food Security Mission (NFSM) was introduced in August 2007. The major objective of this program is to increase production and productivity of wheat, rice, and pulses on a sustainable basis in order to ensure India's food security. The National Horticulture Mission (NHM) was launched with the objective of providing holistic growth of the horticulture sector and enhancing horticulture production. RKVY, a flagship program of the government in the agriculture and allied sectors, was launched in August 2007 to reorient agricultural development strategies to meet the need of farmers and to rejuvenate agriculture. RKVY also incentivizes states to allocate more for agriculture and allied sectors in their budgeting plans.

There is a need for evaluation of these programs on their nutrition impacts. The TANDI II project, funded by the Bill and Melinda Gates Foundation (BMGF) and planned to start in 2012, is expected to contribute to fill this gap.

One of the conditions for accessing resources from RKVY is that states should prepare district-level agricultural plans. This district plan should (1) include resources from other existing programs, such as the Backward Regional Grant Fund (BRGF), SGSY (Swarna Jayanti Swarojgar Yojana), MGNREGS, and Bharat Nirman, and (2) integrate the various programs relating to crop and animal husbandry, fisheries, minor irrigation projects, rural development works, and agricultural marketing. Convergence and comprehensiveness were at the core of the guidelines for preparing these plans at the district level.

There are very few evaluations of the government's agricultural programs. Raturi (2011) provides an evaluation of these schemes in four states: Andhra Pradesh, Gujarat, Uttar Pradesh, and Uttarakhand. The evaluation shows a mixed picture on the growth of agriculture. Of the four states, Gujarat and Andhra Pradesh have shown high growth, while Uttar Pradesh and Uttarakhand recorded less than 3 percent growth. While these programs certainly contribute a transfer of resources to states, it is less clear that they have improved agricultural performance. The study indicates that most states lack an appropriate institutional environment to enable the needed agricultural growth; Gujarat and Andhra Pradesh have better institutional structures. There are also problems in funding delays and absence of monitoring and evaluation activities.

Raturi's study advocates a four-pronged institutional approach to improve the performance of these programs, including: (a) a credible institutional platform at the local (village and block) level, to serve as a link between the ultimate beneficiaries, the farming community, and the government agencies; (b) greater institutional focus on making available improved agricultural technology and on improving rural infrastructure; (c) a watershed program, partnering with rural communities to deal with upland, degraded, and desertified areas; (d) more explicit partnership with the private sector at the state level.

The evaluation shows that convergence across departments and allied sectors has not generally received much attention at the district level. In Uttarakhand, there is a problem of multiple departments responsible for the agriculture sector: the Agricultural Department implements 31 programs of its own and 7 centrally sponsored programs; the Horticulture division has 40 programs, while animal husbandry has 32. There is also duplication of efforts across departments. The multiplicity of departments also creates confusion among staff.

Raturi's study shows that Gujarat and Andhra Pradesh have tried to make fundamental changes in the institutional arrangement supporting rural development and the agriculture sector. The Gujarat state government introduced Krishi Mohatsav, involving a month-long intensive campaign launched during May each year. "Over 100,000 government officials from the Chief Minister down to staff at the taluka level from over 15 departments of the government, and over 1500 scientists, are involved in the program" (Raturi 2011). This event serves as an institutional platform at the village level and has proved to be an important support for farmers.

An initiative in Andhra Pradesh, based on the Self Help Group (SHG), is another example of an institutional platform for agriculture. The Community Managed Sustainable Agriculture (CMSA) program was initiated by the Society for Elimination of Rural Poverty (SERP) in Andhra Pradesh in 2004. The mandate of the program is to eradicate poverty and to improve the livelihoods of the poor, which may also improve nutrition. The initiative aims to address the major causes of agriculture distress and helps farmers in adopting sustainable agricultural practices. CMSA has now reached 8033 villages in 503 mandals of all 22 districts (Raturi 2011). It covers about 2.7 million acres and benefits about 1.05 million farmers.

Impact of MGNREGA on nutrition

NREGA was introduced in 2006 to provide 100 days of employment to rural workers. This program has had significant impact on the well-being of women and children. Using the Young Lives project data, Uppal (2009) examines whether NREGS is effective as a safety net for children. The study found that, in general, a self-targeting strategy seems to be working: disadvantaged workers do participate in the program. Moreover, there seems to be a positive correlation between program participation and anthropometric indicators of health outcomes, although this correlation does not remain robust across

all the specifications. Importantly, the study finds robust and positive results on reducing child labor, a trend which is likely to positively impact nutrition.

The income from MGNREGS made a very significant contribution to children's well-being, through reducing hunger and improving health and education.[6] For example, in a survey of six North Indian states (Bihar, Chattisgarh, Jharkhand, M.P., Rajasthan, and U.P.), around 69 percent of the workers sampled reported that it helped them avoid hunger, and 47 percent said it helped them cope with illness. Around 38 percent of the workers mentioned that it helped with sending children to school. Based on field surveys, NCEUS (2009) identifies several positive externalities created by NREGS, including "reduction in distress out-migration, improved food security with wages being channeled into incurring expenses on food, health, education and repaying of loans, employment with dignity, greater economic empowerment of women workers, and sustainable asset creation" (NCEUS 2009: 219).

One of the successes of NREGS is that the participation of women is in fact higher than the stipulated proportion of 33 percent: the share of women in the program increased from 41 percent in 2006–07 to 49 percent in 2009–10. Empowerment of women is also improved by NREGS. Field surveys show that the share of NREGS income in the total earnings of women workers was around 18 percent (based on four states—Rajasthan, Bihar, Jharkhand, and Himachal Pradesh). The majority of women collect their own wages. NREGS has accordingly broadened the choices and capabilities of the participating women; the additional income helpedm improve their education, health, and nutrition. However, the worksite facilities are in many cases inadequate; although drinking water and first aid are provided, childcare facilities are not available. As a result, women with small children hesitate to participate in the scheme. This gap in the functioning of NREGS has an adverse effect on child well-being, including nutrition.

A broader problem for NREGS is that it fails to facilitate the creation of productive assets. Convergence of NREGS with agriculture is therefore needed, in order to substantially improve productivity in this sector.

Issues in assessing convergence

Ved and Menon (2011) list some issues for assessing the extent and nature of convergence (Box 1). We briefly examine each of these issues in turn.

Box 1. Some important issues to consider in assessing the extent and nature of convergence

1. What is new and what exists?
2. How much organizational modification is necessary?
3. What actions for convergence will cause what degree of disruption?
4. What are the rewards of convergence and what are the incentives *for* convergent action?
5. Who are the winners and losers?
6. What hierarchies are affected?

Source: Ved and Menon (2011)

1. *What is new and what already exists?*

In agriculture policies, there has been hardly any convergence with other sectors. One finds more convergence between health and nutrition than between agriculture and nutrition. For example, many

[6] For more on this, see Dev 2011.

books on health may include a chapter on nutrition and its links with aspects of health (women's health, hygiene, drinking water, and so forth). As noted in the TANDI project, this is not the case in agriculture literature.

In general, government ministries at both the central and state level work in "silos." The silo mentality works against not only inter-sectoral convergence, but also against intra-sectoral convergence. For example, to fully support the agriculture sector would require coordination among the ministries of agriculture, rural development, and commerce, as well as among the various Ministries and Departments relating to food, irrigation, fertilizer and power.Such coordination is lacking at present. For example, the agriculture ministry might say that we should export foodgrains and increase farmers' prices, but the food ministry says we should *not* export. Similarly, regarding agriculture tariffs there is no coordination between the agriculture ministry and the commerce ministry.

However, in recent years, the thinking on convergence is changing. The nutrition chapter of the 11th Plan envisions convergence of several departments, including the Ministry of Agriculture. The 12th Five Year Plan also mentions increasing the supply of protein-rich foods. As food inflation has become a big issue in recent years, the Reserve Bank of India is also talking about an increase in the supply of protein-rich foods.

2. *How much organizational modification is necessary?*
While the role of the central government is important for both the agriculture and health sectors, it must be remembered that both agriculture and health are "state" issues. States bear the larger part of total health expenditure, as they do also for agriculture and irrigation. Therefore, the need for convergence in policy and programs applies even more at the state level than at the central government level.

Appropriate institutional structures will be important for convergence. As mentioned above, Gujarat and Andhra Pradesh made some progress because of institutional structures which enabled policy convergence. The involvement of civil society and NGOs will also be important for better convergence in policies and programs.

3. *What actions for convergence will cause what degree of disruption?*
Sometimes convergence can be inefficient if it is not properly done and may lead to disruption. For example, multiple departments and multiple schemes in Uttarakhand have caused confusion among staff.

4. *What are the rewards for convergence and what are the incentives for convergence?*
The incentive question is important. In the government, there is no incentive to do anything other than the routine things. Government staff may argue they do not have enough time for routine tasks, and therefore forget about convergence efforts. The need for convergence has to be recognized in policymaking both at center and state levels and in implementation at center, state, and local levels. Appropriate incentives need to be created. For example, the Ministry of Agriculture and the Planning Commission can confer about nutrition in the preparation of plans and programs.

5. *Who are the winners and losers? What hierarchies are affected?*
These are the main obstacles for several of the actors involved in policymaking. Officials think they will lose some of their power, if convergence is pursued with other departments. Moreover, bureaucracy maintains hierarchies. For example, one state government official noted that RKVY

money was going to the rural development ministry in his state. The secretary in agriculture does not attend those meetings, it was reported—because the secretary in rural development is his junior!

Conclusion

Nutrition is not anybody's special responsibility; therefore, much greater efforts are needed for convergence. We can be somewhat optimistic about health and nutrition convergence, but much more needs to be done regarding agriculture-nutrition linkages. A beginning can be made to sensitize policy makers and implementers—and once the need is recognized, once can hope that the results may be faster than over the past 65 years. Ultimately, the success of such an initiative depends on the political commitment. If the central government has a commitment to improve nutrition, it can do much more. State level experiences show that a political commitment at the state level can also play an important role in the success of programs and policies, as in the case of Tamil Nadu.

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