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Presidential Address

Pathways to Improve Food Security and Reduce Poverty in Emerging India[§]

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“Food insecurity is the worst kind of violence”
– *Mahatma Gandhi*

I express my sincere thanks to all the esteemed members of Agricultural Economics Research Association-India (AERA) for electing me the President of 2015 Conference. I am so fortunate to have continuous encouragement, motivation and support from all the members in shaping my professional journey. I consider myself so fortunate to serve the Association in different capacities and got overwhelming support from all the members, colleagues and my seniors. I feel proud that I am associated with AERA since its formation, and got wonderful opportunity to work with all the past presidents, namely Dr A S Sirohi, Dr V Rajagopalan, Dr Dayanatha Jha, Dr S S Acharya, Dr Mruthyunjaya and presently Dr P G Chengappa. I salute Dr Praduman Kumar for his untiring and concerted efforts for nurturing and strengthening the Association, and making it a large family of professionals and students in agricultural economics.

Professionally, I got outstanding opportunities to contribute in diverse areas with a large number of colleagues from disciplines of agricultural economics and agro-biological sciences in different national and international research organizations. Over the years, I have been engaged in working on technology assessment, land degradation, watershed development, natural resource management, agricultural

diversification, institutional innovations, and agricultural marketing.

Recently, I was co-leading a project with Wageningen UR on food security, international trade and future of Indian agriculture. The project covers a range of issues related to food security. Therefore, I thought to choose the topic, ‘Pathways to Improve Food Security and Reduce Poverty in Emerging India’ for my address at this Conference. The topic is important because food insecurity and poverty are always cited as India’s policy failures despite phenomenal achievements in other areas. The topic is also important in view of the recent announcement by the United Nation on ‘Sustainable Development Goals’. The two goals to be achieved by 2030 are directly related to the topic (i) end poverty in all its forms everywhere, and (ii) end hunger, achieve food security and improve nutrition and promote sustainable agriculture. The Sustainable Development Goals also commit for zero hunger in next fifteen years.

In my address, I shall be covering five broad areas: (i) problems of poverty and food insecurity in India, (ii) a flavour of existing government programs for improving food security, (iii) opportunities beyond social programs to augment income of the poor and improve their food security, and (iv) discuss some examples of best practices to enhance food security and reduce poverty, and (v) actions needed to achieve the sustainable development goals with respect to food security and poverty alleviation.

Problems of Poverty and Food Insecurity

Globally, about 868 million people are poor, earning less than US\$ 1.25 per day. The available estimates reveal that about 25 per cent (217 million)

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of all the world's poor live in India. It is more than the population of Brazil, which is 207 million. It is a paradox that emerging India has the largest concentration of poor people in the world. India is now the fastest growing economy in the world with more than 7 per cent annual economic growth rate. Among BRICS nations, India has now surpassed China, Brazil and South Africa. But poverty and food insecurity remain high on policy agenda in India among BRICS nations.

Poverty in Asia has declined but unevenly across nations. There were 739 million poor people in Asia in 1990-92, which declined to 565 million in 2010-12. China has done remarkably well, where poverty declined from about 60 per cent in 1990 to less than 10 per cent in 2008. Other East Asian and Pacific countries have also done remarkably well. But within Asia, South Asia has the largest concentration of poor, which is housing nearly 304 million poor. And in South Asia, India is the hub of poor and food-insecure population. As high as 71 per cent of the poor in South Asia, live in India.

Like other countries, India met the millennium development goals well before 2015, but the pace was

too slow as compared to China and many countries in Southeast Asia. Also, the progress in some of the development goals has been inconsistency. The official estimates reveal that while India has achieved the target of reducing poverty by half, it is falling short of achieving the target of reducing hunger (UNDP, 2015). Besides the problem of poverty, undernourishment is a serious challenge in India. Our dietary pattern is diversifying and changing due to rising incomes, expanding urbanization, unfolding globalization, and changing taste and preferences for food. Though, calorie consumption remains around 2100 kcal/day, we consume more of fat and less of protein. The per-capita protein consumption has declined marginally from about 60 grams/day in 1983 to 57 grams/day in 2011-12, while fat intake has increased substantially from 30 to 50 grams/day/cap (Table 1).

The consumption of many essential nutrients, like iron, zinc and vitamin A, is also declining and leading to several nutrition-related diseases. Despite high economic growth, India still has 22 per cent of undernourished population (Table 2). In some states, like Bihar and Odisha, this percentage is much higher. More than 40 per cent of our children are underweight

Table 1. Trends in consumption of calories, protein and fats in India 1983–2011-12

(per capita/day)

Year	Calories (kcal)		Protein (grams)		Fats (grams)	
	Rural	Urban	Rural	Urban	Rural	Urban
1983	2240	2070	63.5	58.1	27.1	37.1
1993-94	2153	2073	60.3	57.7	31.1	41.9
2004-05	2047	2021	55.8	55.4	35.4	47.4
2011-12	2165	2140	58.5	57.4	43.7	54.2

Source: NSSO reports (various rounds)

Table 2. Undernourishment in South Asian countries

(in per cent)

Country	Under-nourished population	Child malnourishment		Low birth weight	Anemic children
		Underweight	Stunted		
Bangladesh	26.0	41.3	43.2	22.0	47.0
India	22.0	43.5	47.9	28.0	74.0
Nepal	16.0	38.8	49.3	21.0	48.0
Pakistan	23.0	31.1	41.5	32.0	51.0
Sri Lanka	21.0	21.1	17.3	18.0	30.0
South Asia	22.0	41.1	46.4	27.0	74.0

and stunted. We have the largest number of anaemic children in the world. This is a reflection that our high economic growth has not been inclusive and nutrition-sensitive.

Every year, the International Food Policy Research Institute constructs 'Global Hunger Index' (GHI) to rank different countries in terms of their performance on nutrition outcomes. The 2015 Global Hunger Index has rated India under 'serious' category with respect to undernutrition, child stunting, and child birth weight (IFPRI, 2015). The only consoling factor is that GHI of India has improved to 29.0 in 2015, which was 38.5 in 2005 and 38.2 in 2000. India is ranked 80 in 104 countries for which GHI was constructed. All South Asian countries, except Sri Lanka, has high GHI, indicating serious undernourishment problem. China, Brazil, Malaysia and many Southeast Asian countries have very low GHI, showing better off with respect to nutrition outcomes.

Climate Change and Agricultural Production

Besides several challenges, climate change is also posing serious threat to food security in India. It has now become a reality as we are experiencing extreme climate events more frequently now than before. The intensity and extent of extreme climate events, such as droughts, floods, untimely and uneven rainfall, high rise and fall in temperature, are adversely affecting agricultural production, farm incomes and food security. All estimates, including of IPCC, show that majority of the agricultural commodities will have diverse and unfavourable impact in most of the areas. The available estimates reveal a loss of 10-40 per cent in food production due to rise in temperature (Aggarwal, 2009; Nelson *et al.*, 2010; Knox *et al.*, 2012). Cline (2007) has projected 30-40 per cent loss in agricultural production due to climate change by 2030. The livestock sector will also be not untouched by the climate change. The global warming will reduce milk production by 1.6 million tonnes by 2020 and by more than 15 million tonnes by 2050 (Upadhyaya *et al.*, 2009). The production of capture and inland fisheries will also be adversely affected by the climate change (INCCA, 2010; Easterling *et al.*, 2007). The rainfed areas, where poor and smallholders depend on agriculture, are more vulnerable. The estimates show rice yield loss of 30-40 per cent under rainfed condition and to 4-20 per cent in irrigated environment by 2030.

Climate change is already showing its adverse impact on food production and consequently, on food prices. At global level, the recent price spikes negatively affected about 77 per cent of the world poor. The estimates in India show that a 10 per cent increase in drought will raise rice prices by 23 per cent and thereby its demand will fall by 5.5 per cent (Kumar *et al.*, 2014). The projections further show that India might import 15 million tonnes of rice due to drought by 2030. The poor are more vulnerable to such shocks and would not have purchasing power to buy food at higher prices and would be pushed into poverty trap.

The global estimates show that 600 million smallholders would face serious malnourishment by 2080 due to climate change. It is clear that climate change will seriously affect the concerns of food security from different angles. This will mar or neutralize many government programs for increasing food production and ensuring food security.

Existing Programs to Improve Food Security

Food security has four pillars — production, availability, access and affordability. One more pillar of food assimilation can also be added to ascertain that the food we take is digested well and absorbed in our body. The Government of India has been making concerted efforts to strengthen all the four pillars through (i) making investment to increase food production, (ii) providing subsidies to incentivize use of key inputs to increase food production, (iii) enacting social protection programs to make food available, accessible, and easily affordable, and (iv) permitting free trade of agricultural commodities across the country to increase supply and stabilize prices of food commodities.

Agricultural diversification and market linkages are the opportunities for improving farm incomes and food security in the long-run. On the other hand, resource degradation and climate change are the factors posing serious threats to food security and poverty alleviation efforts. Non-farm employment opportunities, and taking people out from agriculture to non-agriculture sector are the lasting solutions to reduce livelihood dependency on agriculture and enhance income opportunities.

A perfect symphony of technologies, policies, institutions, governance and infrastructure is needed

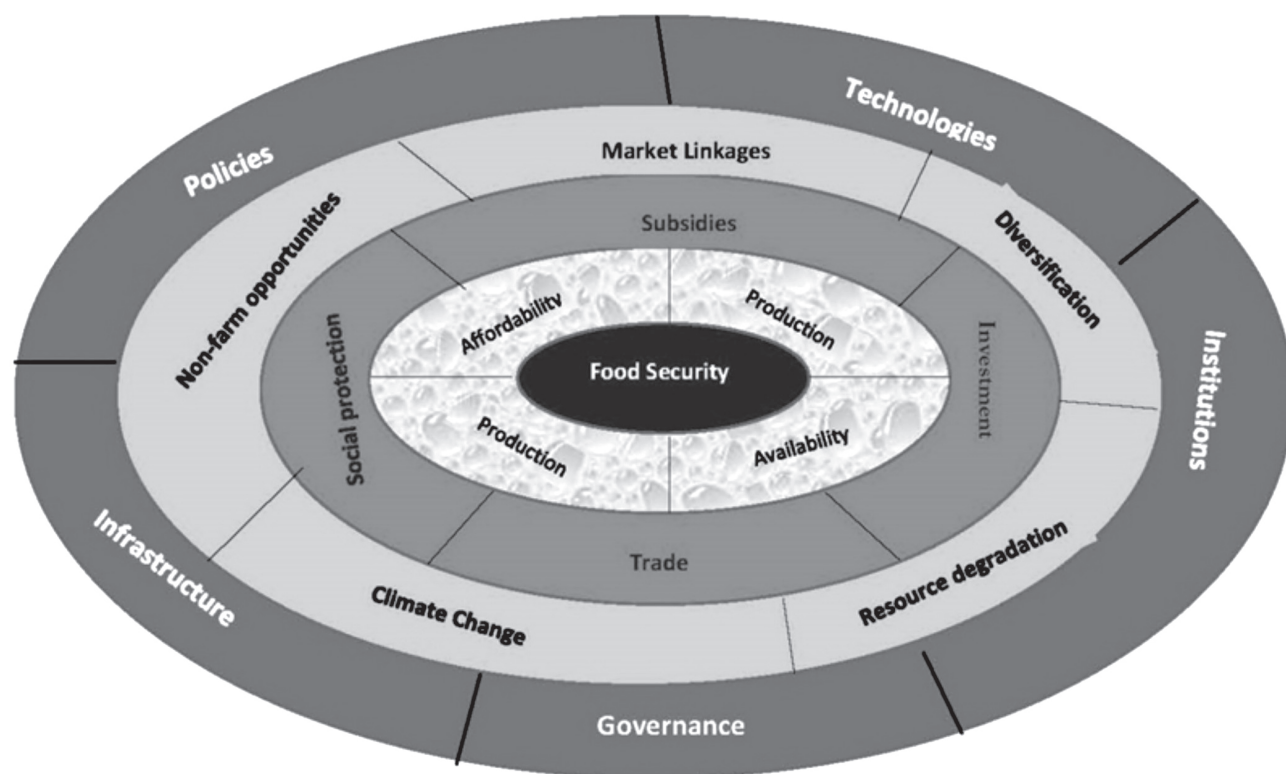


Figure 1. Food security framework

to address the problem of food insecurity and poverty alleviation (Figure 1). In recent years, the government has made concerted efforts to increase food production in the country through several programs, such as *Rashtriya Krishi Vikas Yojana* (RKVY), National Food Security Mission (NFSM), Bringing Green Revolution in Eastern India (BGREI), National Horticulture Mission (NHM), schemes for irrigation development, and so on. The government incurred approximately ₹ 610 billion on agriculture in 2013, but emphasis was more on agricultural subsidies. There are huge subsidies on fertilizers, power, irrigation, and credit (Bathla *et al.*, 2015). The estimated subsidies in agriculture sector were about ₹ 1063 billion in 2013. The subsidies on fertilizers and power accounted for a major share of about 80 per cent in the total subsidies (Figure 2). Over the years, subsidies have outpaced investment in agriculture.

The government not only launched the scheme of Minimum Support Prices (MSP) but increased these prices also over the years to ensure farmers for assured procurement and remunerative prices of produce, especially rice and wheat. All these initiatives have

significantly contributed to increasing food production and making India a food-secure country.

In India, the foodgrain production increased from 176 Mt in 1990-91 to 264.7 Mt in 2013-14 from almost stagnating crop area. The average yields increased from 1.38 t/ha in 1990-19 to 2.1 t/ha in 2013-14. The per capita availability of rice and wheat increased due to their higher production. For rice, it increased from 80 kg in 1991 to 85 kg in 2013, and for wheat from 60 to 67 kg in the same years.

Now turning to discuss two flagship programs of the government. These are Public Distribution System (PDS) and Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA). These programs were implemented to ensure availability, access and affordability of food, as mere production is not sufficient, it has to reach also to the poor for consumption.

Public Distribution System

The Public Distribution System (PDS) is the backbone of Indian food system for ensuring food security. For making food available, the government

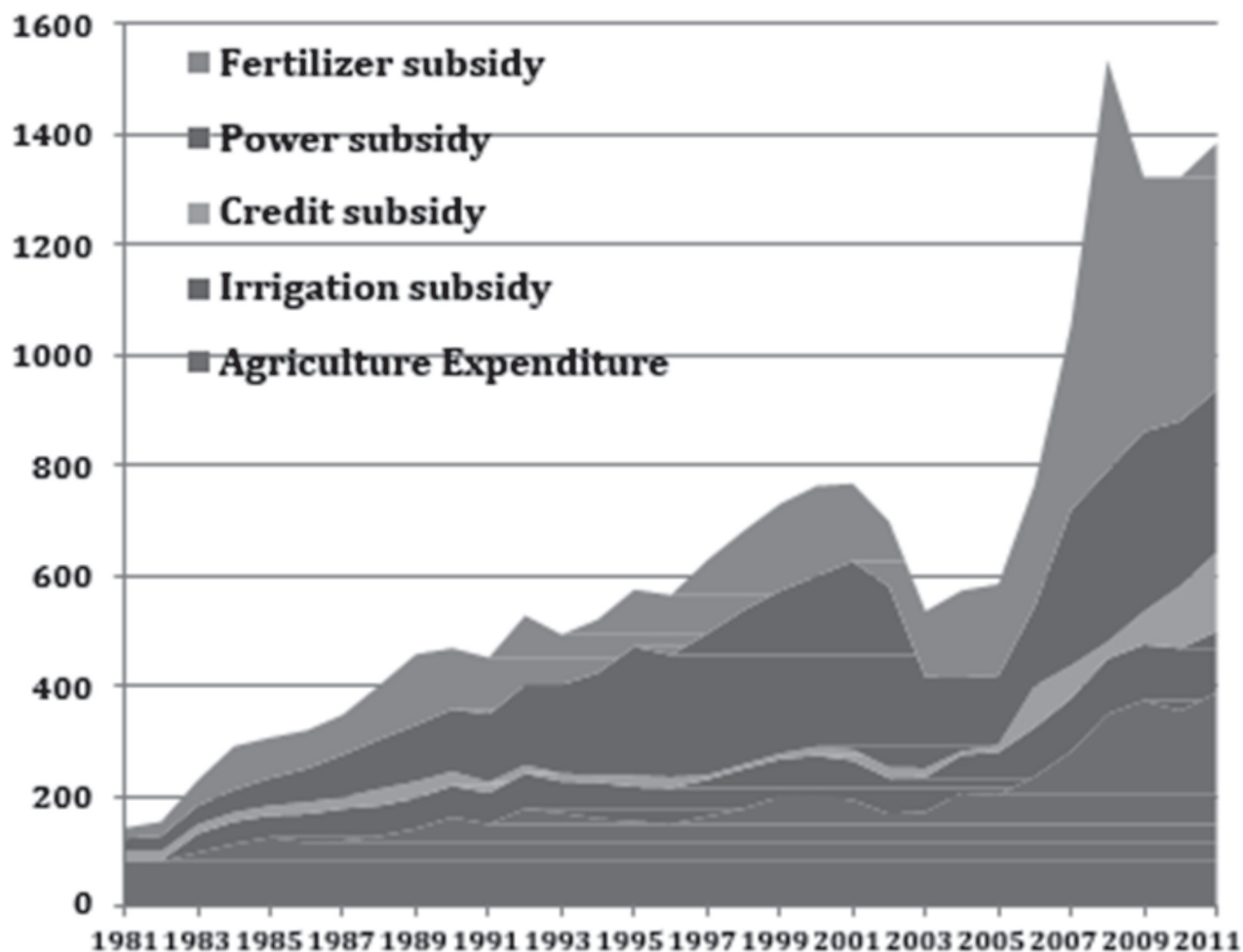


Figure 2. Agricultural expenditure and input subsidies in India: 1981-2011 (in crore ₹)

Source: Bathla *et al.* (2015)

procures food, stocks and distributes it to the poor in rural and urban areas. The Indian government maintains bufferstock of both rice and wheat to ensure their regular supply to the state governments for distribution at the fair price shops (FPS) under Public Distribution System. There are about 500 thousand fair price shops in the country for distribution of subsidized food commodities. A bufferstock of 80.32 million tonnes was built in 2012-13, which was 151 per cent more than the norms set by the government. In 2013, the Government of India enacted ‘right-to-food’ and approved the National Food Security Act to provide food at a highly subsidized rates (₹ 1/kg for coarse cereal; ₹ 2/kg for wheat and ₹ 3/kg for rice). This program will cover 75 per cent of the rural poor and 50 per cent of the urban poor families. This is considered to be the largest social protection program

launched by a country in the world. While the minimum support prices for procuring these commodities were kept more than ₹ 10/kg, the economic cost exceeded ₹ 16/kg. The wide gap between issue prices under PDS and economic cost of different commodities leads to huge food subsidies. The food subsidy has exceeded ₹ 1 lakh 20 thousand crore (about USD 20 billion), which is a significant part of our annual budget.

It is disappointing that in the past only about 45 per cent of the population could access foodgrains from PDS despite food security being a high priority for all the successive central governments. On the positive side, the access to PDS has improved over the past two decades. At all-India level, the access to PDS has increased from 27 per cent of the population in 1993-94 to 45 per cent in 2011-12 (Kumar *et al.*, 2014). In

the rural areas, it has gone up from less than 30 per cent of the population in 1993-94 to more than 50 per cent in 2011-12. The share of cereals supply has also increased from 8.5 per cent to 20 per cent during this period. On the implementation of PDS, some states like Andhra Pradesh, Himachal Pradesh, Jammu & Kashmir, Kerala, Mizoram, Tamil Nadu and Tripura have done remarkably well wherein more than 75 per cent households are accessing food commodities from PDS. In Himachal Pradesh, Jammu & Kashmir, Mizoram, Tamil Nadu and Tripura, the share of cereals supply from PDS was as high as 40 per cent in 2011-12 (Kumar *et al.*, 2014). Some of the lagging states in eastern India (namely, Chhattisgarh, Jharkhand, Odisha, West Bengal and Uttar Pradesh), have depicted impressive improvement in providing access to PDS, but are yet to reach the national average.

The key factors documented for increasing access of households to food from PDS in the lagging states are: (i) strong political will, (ii) effective governance, (iii) more awareness about PDS among the poor, (iv) falling leakages and divergence of food commodities from PDS, (v) widening gap between market and PDS prices of food commodities (Kumar *et al.*, 2015). Despite several flaws in functioning of PDS, the program has made a significant contribution to poverty reduction (Kumar *et al.*, 2014). Figure 3 shows that the prevalence of poverty among the beneficiaries of schemes like *Antyodaya* and Below Poverty Line (BPL) was lower than among non-beneficiaries. The reduction in poverty was also faster among these beneficiaries compared to non-beneficiaries. It is expected that as

the access to PDS improves, the poverty will reduce faster than before.

Mahatma Gandhi National Rural Employment Guarantee Act

The second flagship social program emanated from the enactment of Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) by the Government of India. The program was initially launched in 2006 in 200 backward districts, and later in 2008, it was extended to all the districts of the country. The aim was to trickle down some of the gains of high economic growth to the poor people and improve their food and livelihood security by ensuring them employment during slack agricultural seasons. This program is a sort of conditional cash transfer, which guarantees hundred days of wage-employment to a rural household in a year. It also mandates minimum 30 per cent participation of women in the program. In 2015-16 national budget, ₹ 34,699 crore was allocated to this program with an assurance to add ₹ 5000 crore more, if needed. The cost of providing employment through this program was approximately ₹ 198/day/person in 2015-16, which has increased from ₹ 170/person/day in 2012-13.

The program is largely aimed for landless labourers and marginal farmers. Kumar and Joshi (2016), using the NSSO data, revealed that of all the beneficiaries, 66 per cent were landless labourers and farmers having land less than 1 ha. There were about 20 per cent beneficiaries having land more than 2 ha. But it is very

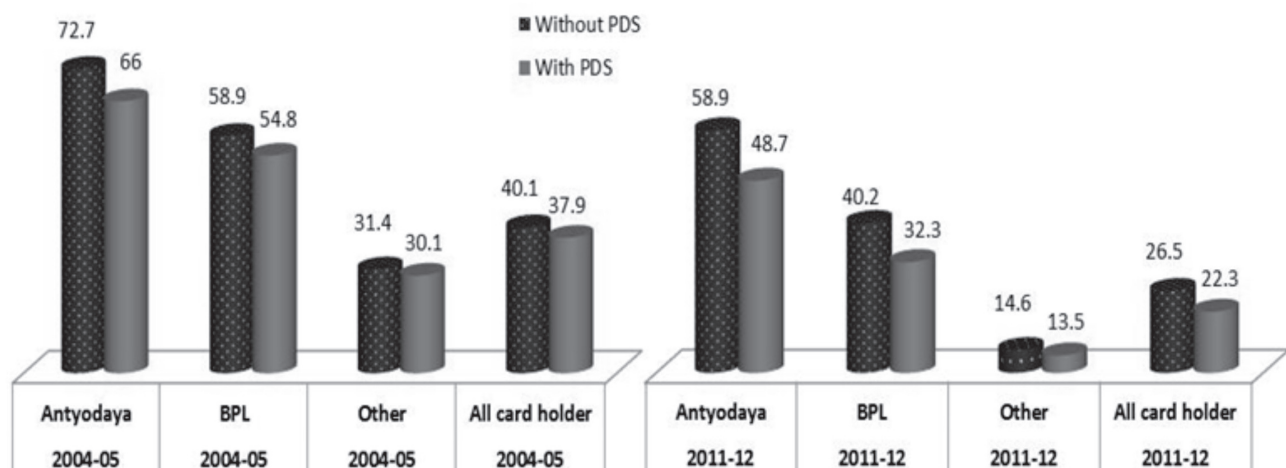


Figure 3. Impact of PDS on poverty reduction across beneficiary households in India

Source: Kumar *et al.* (2014a)

strange that better-off people are getting more employment than poor people under this program. The large farmers, having job cards, could get 67 days of work compared to only 41 days of work to landless labourers and 43 days to farmers having less than 0.5 ha land (Kumar and Joshi, 2016). This shows a clear bias in favour of better-off and influential people in the villages and rural areas. Despite several discrepancies, the program has contributed to improving livelihood and food security and reducing poverty. Kumar and Joshi (2016) have estimated that the program was able to reduce poverty by 4 per cent of MGNREGA beneficiaries. It was also estimated that the non-food expenditure (e.g., on health care, transport, services) was more of MGNREGA beneficiaries than of non-beneficiaries in 2009. There was very little change in per capita food consumption, but, there was marginal increase in the consumption of cereals, milk, vegetables, meat, and eggs (Kumar and Joshi 2016).

Mythili (2016) has projected long-term impact of MGNREGA on the performance of different sectors, namely agriculture, industry and services, assuming that the program will continue till 2020. The model results show that there will be a setback to agriculture sector due to rise in wages. But, it will help the industrial sector through increasing demand for industrial goods. Since agriculture is likely to be affected due to rise in wages, there is a need to strategically plan for farm mechanization in the country, especially in the labour-scare areas. There is also a need to revisit the program to learn lessons from the past and target it in the areas where labour is surplus and poverty is high. The program also needs to be tuned to support agriculture and allied activities.

Income Augmenting Opportunities

There are ample opportunities to improve food security and reduce poverty by augmenting incomes. In this paper, I am covering only two areas: (i) agricultural diversification, and (ii) agricultural trade. There are other opportunities as well, like raising agricultural productivity, increasing investment in agriculture, creating farm-driven opportunities in rural areas and shifting people from farm to non-farm sector. I am not dwelling on these as literature is replete on these topics.

Agricultural Diversification

Structural changes are taking place in production and consumption of agricultural commodities. There is a shift in food consumption pattern, from cereals to high-value commodities (HVCs), such as fruits, vegetables, milk, meat, poultry and fish. It has been well established that the per-capita consumption of cereals is declining with time and that of high-value commodities is increasing. On production side also, the contribution of HVCs is increasing. Their contribution in the value of agricultural output has increased from 10 per cent in 1980s to 30 per cent 2010-11. The share of livestock has reached about 25 per cent in the gross value of agriculture & allied sector. These commodities provide higher, faster and regular incomes to the smallholders, thus suit the needs of smallholders (Joshi *et al.*, 2006).

At the macro-level, the high-value food commodities contribute significantly to the agricultural growth (Table 3). During the past three decades, agricultural growth was between 3.1 and 3.7 per cent. But, the contribution of high-value commodities to agricultural growth was much higher than of cereals and pulses. During the 2000-10 decade, horticultural commodities contributed around 60 per cent to agricultural growth. On the contrary, the share of cereals in agricultural growth has declined from 30 per cent during the decade of 1980s to only 7 per cent in the decade of 2000 (Birthal *et al.*, 2014). Some micro-level studies show that net income was much higher from different vegetables than from rice or wheat (Joshi *et al.*, 2006). The vegetable crops also provide more employment opportunities to the small and marginal farmers.

The high-value commodities are raising farm incomes and taking the poor out of poverty domain. Birthal *et al.* (2015) have measured the relationship between agricultural diversification and poverty reduction. The study finds that poverty is 6 per cent higher among those households who allocate the entire area to cereals than to high-value commodities. The study further shows that marginal farmers need to increase area under HVCs from 37 per cent to 50 per cent to escape poverty. Some earlier studies had also reported a strong relationship between HVCs and poverty (Ali and Abedullah, 2002; Barghouti *et al.*, 2004).

Table 3. Contribution of high-value crops to overall growth in crop sector: 1980s-2000s

Item	Compound growth in real value (per annum)			Share in overall growth (%)		
	1980s	1990s	2000s	1980s	1990s	2000s
Cereals	2.0	3.6	0.7	30.7	43.0	6.9
Pulses	2.0	1.0	3.0	4.6	0.3	4.8
Oilseeds	6.9	-0.7	5.4	21.4	-2.6	13.0
Fibres	1.7	2.6	9.9	4.8	1.8	14.7
Sugarcane	1.2	5.0	0.0	3.8	13.1	-1.3
Horticultural products	4.6	6.3	5.8	33.9	44.6	60.0
Other products	0.9	1.0	6.8	0.8	-0.1	2.0
All products	3.1	3.7	3.3	100	100	100

Source: BIRTHAL *et al.* (2014)

Agricultural Trade

Agricultural trade plays an important role in improving food security and reducing poverty if strategically designed. The Indian agricultural exports increased rapidly and reached US\$ 44.7 billion, compared to imports of US\$ 17 billion. The share of agricultural export in total exports was around 15 per cent compared to 3.8 per cent of imports. The modelling exercise has shown that trade in agriculture may increase its production by 13 per cent and raise rural income by 3 per cent (Woltjer and Rutten, 2016).

The agricultural imports benefit consumers and those farmers who do not cultivate the commodities being imported. The benefits also depend on price transmission from border to local markets (Hertel, 2006). The strategic trade policy should ensure that the farmers, especially smallholders, are not affected adversely.

The agricultural trade should be more inclusive to share benefits with the farmers. It is possible if the trade is organized and linked with farmers' innovative institutional arrangements. Here comes the role of institutions like self-help groups, contract farming, cooperatives and farmer-producer organizations, in sharing trade benefits with farmers, especially smallholders.

Best Practices in Improving Food Security

In this section, some global and national best practices in improving food security and reducing poverty are discussed.

Brazil's Bolsa Familia Cash Support

This is one of the world's largest cash transfer programs of the Brazilian government to combat hunger through guaranteed access to basic food. The program has three main pillars: (i) offers direct cash to 12.7 million poor and deprived families (about 50 million people) with certain conditions; the cash transfer is linked with basic rights such as education, health and food to reduce poverty, (ii) school meal program which gives 47 million free meals in schools to attract children to regularly attend classes; and (iii) strengthen family farming to support family-based agriculture (especially subsidized credit and training) to enhance food supply on a regular basis. The program is considered to be one of the successful poverty alleviation programs in the world. The World Bank (2010) estimated that the program pulled 20 million people out of poverty trap between 2003 and 2009. And, the poverty was reduced by 15 per cent during the same period. In addition, there was about 20 per cent fall in inequity. The program also helped in increased enrollments in schools and a steep decline in drop-outs (Glewwe and Kassouf, 2012). Oxfam (2010) has highlighted five reasons for the success of the program. These are : (i) high level of political will; (ii) economic growth and labour reforms to create more jobs, and access to pension, health insurance and education; (iii) effective linkage of family agriculture and food procurement program (PAA) with corporate agribusiness; (iv) external support, especially from the World Bank and the FAO; and (v) active civil society support.

Mexico PROGRESA Cash Transfer Program

This is another successful conditional cash transfer program linked through development of human capital. The program gives cash to mothers as an incentive to send their children to schools and health centres, and small group sessions on health and nutrition education. The program started with a small scale pilot in 1990, and later became a major national level program, which covers about 5.8 million families. Gantner (2007) evaluated the program and reported that the school attendance increased by more than 20 per cent for girls and 10 per cent for boys in beneficiary households. There was 12 per cent less incidence of any illness to PROGRESA children than non-beneficiaries. Similarly, food expenditure of PROGRESA beneficiaries was 13 per cent higher than of non-beneficiaries (Gantner 2007) and the former were consuming better quality food and more calories. The World Bank (2014) has also reported that the program contributed in reducing the incidence of anaemia among children under the age of 2 by 11.8 per cent.

The success of the program in Mexico received global attention and was replicated in 52 countries. The reasons for the success of the program were: (i) well-defined target population; (ii) direct cash transfer as an incentive for active participation by beneficiaries; (iii) well laid-out program with strong presence even in remote areas; and (iv) effective M&E mechanism to improve program design over time (The World Bank 2014).

Kudumbashree Poverty Eradication Mission in Kerala

The program *Kudumbashree* (meaning prosperity of family) was launched by the Government of Kerala in 1998 to eradicate poverty. The program was designed to involve the local community through local governance. The program has three pillars: (i) micro credit, (ii) entrepreneurship, and (iii) empowerment. Kudumbashree is considered to be the largest women-empowering program in the country. The program covers about 3.99 million members, which include more than 50 per cent of the households in the state. The micro credit and entrepreneurship development have significantly contributed to income augmentation through anti-poverty activities (John, 2009). The program has also contributed to benefit several social indicators such as health and education.

There are several other successful models in the country. Among others, Tamil Nadu and Chhattisgarh models are well acclaimed for improving food security and reducing poverty (for more details refer: Kishore *et al.*, 2014). The Tamil Nadu model is universal, distributing 12-20 kg of rice per month to all the households at no cost. The Chhattisgarh model, on the other hand, targets the poor and covers about 90 per cent of the state population. Both the models have reduced leakages to a significant extent. In Tamil Nadu, the leakages were only 10-11 per cent against 40 per cent at national level. In Chhattisgarh, a comprehensive survey reported that 92 per cent of the respondents received their full quota of foodgrains. Many states (namely, Karnataka, Madhya Pradesh, Odisha and Rajasthan) are following the Chhattisgarh model. The success of these programs relied heavily on strong political will and effective governance.

Cash versus Kind for Food Security

There are several safety net models across the world on either direct cash transfer or food assistance to reduce poverty. Hoddinott *et al.* (2014) did systematic studies on the impact of various programs on household food security in Ecuador, Niger, Uganda and Yemen. The authors have studied three models: (a) direct cash transfer, (b) food assistance, and (c) food vouchers, at different locations in the selected four countries. The study has found that there was 'no one form' of program that can be considered to be perfect for food assistance. This completely depends on the context, geography, access to markets, etc. The study has revealed that cash transfer was better to improve diet diversity than kind and food voucher in Ecuador, Uganda and Yemen. In Ecuador, the food voucher also performed better. However, in Nigeria, food assistance has higher impact than other means of food security. Contrary to the general perception that direct cash transfer is diverted to non-food items, the study found no evidence of cash transfer for undesirable purposes (Hoddinott *et al.*, 2014).

The Government of India is also considering on cash transfers under the National Food Security Act. In 2013, the government announced that subsidized food will be replaced gradually by direct cash transfer to the targeted population. It is due to huge subsidy on food and large leakage or diversion of food from PDS to local markets. The food subsidy in India has gone

up to ₹ 1,05,509.44 crore in 2015-16 from ₹ 23,071.00 crore in 2005-06 (Government of India, 2016). It is around 14 per cent of agricultural GDP. There are reports that approximately 28 per cent is the diversion/leakage of foodgrains meant for the beneficiaries under PDS. The success of direct cash transfer scheme in LPG cylinders is inspiring the government for adopting direct cash transfer scheme in foodgrains as well. For cash transfer, four conditions are necessary: (i) well-defined target population, (ii) well-developed and functional markets, (iii) good network of banks and its access to target population or beneficiaries; and (iv) provision of adding food inflation in cash transfer scheme. It is proposed that the cash transfer scheme can easily be started in well-developed states, like Punjab, Haryana, Uttar Pradesh (western region) and all 46 metropolitan cities, where all the pre-conditions exist. However, the poor and backward states and areas where majority of the population live in rural areas, and markets and banking spread are not well-developed, may continue the food distribution system.

Conclusions and Way Forward

Rising incomes, expanding urbanization, increasing globalization and changing in tastes and preferences for food are diversifying consumption patterns. The consumers, both rural and urban, are consuming more of high-value commodities (such as fruits, vegetables, milk, meat, eggs, and fish) and the per-capita consumption of cereals and pulses is declining with time (Kumar and Joshi, 2016). The projections for 2030 reveal that India would be surplus in wheat and coarse cereals, but deficit in pulses and edible oils. In the case of rice, there may be a deficit, if total factor productivity and irrigated area do not increase. Even in high-value commodities, India may be deficit if post-harvest losses are not managed properly (Kumar and Joshi, 2016). The future strategy should consider the supply-demand situation and the changing tastes and preferences of consumers. Our future policies and programs must focus on increasing agricultural production efficiently. Agricultural trade may also fill the demand-supply gap, but we need to be careful of commodities which are scarce in the global market, such as pulses. There is a need to analyse the commodities where India will have comparative advantage in export and/or import. It must be ensured that trade policy does not adversely affect the small and marginal farmers and also the poor consumers.

The pro-poor technologies, enabling policies and effective institutions will play important roles in meeting the future demand. There is a need to have perfect synchronization of technologies, policies and institutions to increase food supply and ensure food availability at affordable prices. Unless pro-poor and pro-smallholder technologies, policies and institutions are dovetailed and promoted, bridging the future demand-supply gap of food commodities will be a herculean task. At farm level, there is a need to efficiently integrate land, water, energy and genetic resources through appropriate technologies, policies and institutions. Land development, water management and energy-efficient technologies are already available for increasing production efficiently and sustainably. There is also a need to re-prioritize agricultural research agenda to meet the future food requirements in accordance with the structural changes taking place due to growing incomes, urbanization, globalization, increasing middle-income groups, and changes in tastes and preferences.

Accessibility is another issue for ensuring food security. A well-net public distribution system and right targeting of beneficiaries are the pre-conditions for accessibility of food to the poor. There are several best practices to deliver food or cash to the poor. The situation-specific programs may be designed for providing food and/or cash to the beneficiaries. The global and national studies on best practices suggest that 'every model does not fit in each situation'. Therefore, situation-specific models would be the foundation for the success of any food security program. Several options are available, and some important ones are: (i) direct cash transfer, (ii) food vouchers or coupons, (iii) giving in kind, and (iv) conditional cash transfer. In all these programs, targeting beneficiaries is critical. Simple tools and transparent indicators will be required to identify the beneficiaries for getting support from the government. For example, employment guarantee program is self-targeting as only the poor and needy join this scheme. The success of any model will depend on the political will, economic feasibility, ease to access food, governance structure, required infrastructure, enabling institutional arrangements, socio-economic profile of beneficiaries, etc. The final criterion for deciding any model should be 'ensuring access to food efficiently and at affordable prices to the poor'.

The ultimate goal should be to empower the poor to buy his/her own food. It will require exploring employment generating and income augmenting options in the farm and non-farm sectors. In the agriculture sector, producing efficiently for raising crop productivity and reducing production cost, bridging yield gaps, diversifying production portfolio in favour of more profitable crops, linking producers with remunerative markets, and facilitating primary and secondary processing for value addition, will offer opportunities to raise farm incomes. Since holding-sizes are too small, farmers may be encouraged and facilitated to form cooperatives, self-help groups, and farmer producer companies to take advantage of economies-of-scale and reduce production and marketing risks. Marketing arrangements and Acts need to be streamlined so that farmers and farmers associations can participate in e-NAM (e-National Agricultural Market), futures markets, and warehouse receipts scheme to avoid middle-men and take advantage of getting right prices. The private sector needs to be attracted for promoting contract farming to directly deal with the framers to deliver inputs and procure outputs. The traditional wisdom of 'agriculture as a way of life' needs to be transformed to 'make agriculture as agribusiness profession' to empower farmers to ensure food security. The lasting solution lies how poor people depending on low wage agriculture sector are transferred to more remunerative non-farm sector.

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