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Sustaining Agricultural Growth – Some Perspectives

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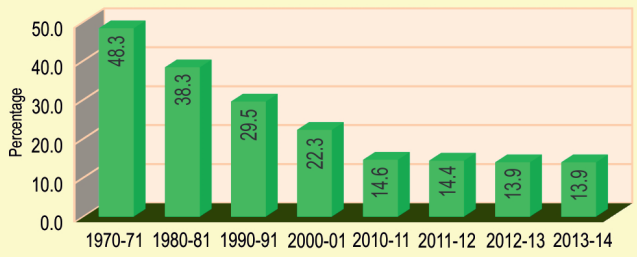
The Indian economy is inherently agrarian in nature. However, with small and marginal holdings constituting 85 per cent of total holdings, the consequent unsustainability of agriculture has major ramifications for the growth prospects of the economy. The goal of long term food security can be attained only if agriculture is made sustainable. A major concern at the farmers' level is that the input levels have to be continuously increased in order to maintain the yield at the existing level. This poses a threat to the economic viability and sustainability of crop production. The present issue of 'Rural Pulse' focuses on reforms in agricultural policies and agronomic practices which could make agriculture sustainable in India.

Chart - 1
Share of Agriculture Sector in GDP



Source : Author's calculations based on data sourced from Handbook of Statistics on the Indian Economy 2013-14, Reserve Bank of India, 2014

Introduction

The share of agriculture in the GDP has been declining over the years in India, having fallen steadily from 48.3 per cent in 1970-71 to reach 13.9 per cent in 2013-14 (Chart 1). However, there is no corresponding decline in the share of population dependent on agriculture. Further, average annual growth rate in the agriculture and allied sector stood at 3.3 per cent during the period 1990-91 to 2013-14 (Chart 2), a development that is viewed as a constraint to sustaining high rates of overall economic growth. The ultimate goal of policy interventions in the agriculture sector is to increase the incomes of farmers on a sustainable basis. Thus, policy interventions should lead to raising farm productivity and at the same time ensuring remunerative prices to the farmers, especially small and marginal farmers.

Area under Cultivation, Production and Productivity

Area under cultivation of food grains has remained stagnant during the past more than four and a half decades, ever since the Green Revolution years (1968-69) when it stood at 120.4 million ha. In the year 2012-13, the same recorded 120.8 million ha (Chart 3). While the area under cultivation of rice recorded an increase from 37.0 million ha to 42.8 million ha during the period under review, the same in respect of wheat increased from 16.0 million ha to 30.0 million ha. Pulses experienced a meagre increase in area under cultivation from 21.3 million ha to 23.2 million ha. However, the area under cultivation of coarse cereals witnessed a steady decline form 46.2 million ha to 24.8 million ha.

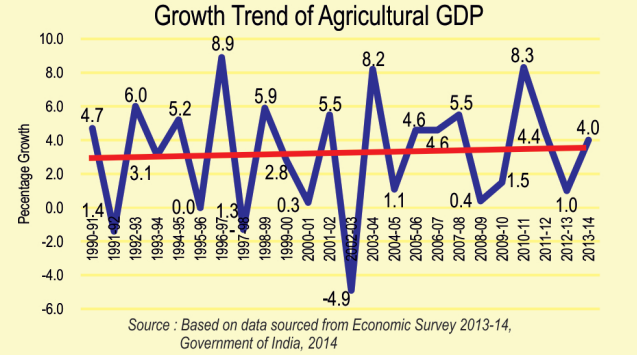
Due to limited scope for increasing area under cultivation, only an improvement in yield can result in long term growth in output. However, average annual growth in production and yield of foodgrains have stagnated (Table -1). While rice and wheat have witnessed decline in the average annual growth rate of production, the growth rate in yield increased in case of rice but declined in case of wheat. Coarse cereals and pulses, however, experienced

Table - 1
All-India Average Annual Growth Rates (%) of Production and Yield of Foodgrains

	1990-91 – 1999-00		2000-01 – 2012-13	
	Production	Yield	Production	Yield
Rice	2.09	1.40	1.90	2.00
Wheat	4.52	2.90	1.80	1.00
Coarse cereals	-0.08	2.00	3.60	4.30
Pulses	1.05	1.80	3.50	2.10
Total foodgrains	2.19	2.40	2.00	1.90

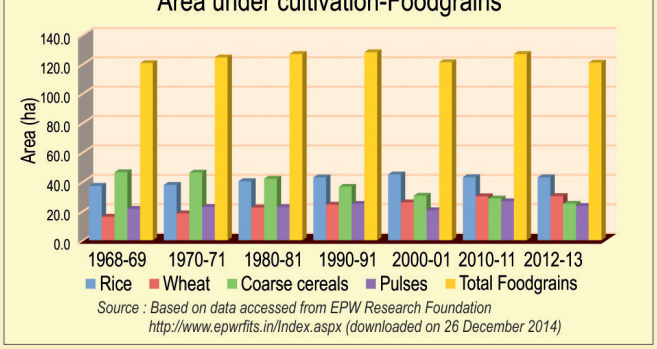
Source: Author's calculations based on data accessed from EPW Research Foundation http://www.epwrfits.in/Index.aspx (downloaded on 26 December 2014)

Chart - 2
Growth Trend of Agricultural GDP



Source : Based on data sourced from Economic Survey 2013-14, Government of India, 2014

Chart - 3
Area under cultivation-Foodgrains



Source : Based on data accessed from EPW Research Foundation http://www.epwrfits.in/Index.aspx (downloaded on 26 December 2014)

increase in the production and yield. Total foodgrains have, nevertheless, witnessed decline in average annual growth rate of both production and yield. Sluggish yield and output growth in agriculture have been associated with relatively low levels of investment compared with other sectors of the economy.

Table - 2
Changes in the Share of Smallholders in Number and Area of Operational Holdings at All India Level (%)

Year	Share in Number of Landholdings			Share in Operational Area		
	Marginal (<1 ha)	Small (1-2 ha)	Sub-total (<2 ha)	Marginal (<1 ha)	Small (1-2 ha)	Sub-total (<2 ha)
1970-71	51	19	70	9	12	21
2000-01	63	19	82	19	20	39
2005-06	65	18	83	20	21	41
2010-11	67	18	85	22	20	42

Source: Agriculture Census 2010-11, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, 2014

Farm income vis-à-vis Farm Size

The average size of operational holding in India has declined from 1.23 ha in 2005-06 to 1.15 ha in 2010-11. Small and marginal holdings constituted 85 per cent of total holdings in 2010-11 compared to 83 per cent in 2005-06 and 70 per cent in 1970-71 (Table 2).

There has been an intense debate in India about the relationship between farm size and productivity. Studies have revealed that crop productivity per unit of land declined with an increase in farm size. However, while smallholdings in Indian agriculture still exhibit higher productivity than large holdings, the former show lower per capita productivity, which leads to widespread incidence of poverty.

Tables – 3 (a) and (b), based on the Key Indicators of Situation of Agricultural Households in India (NSS 70th Round) display average monthly income from different sources, total consumption expenditure, net income, and net investment in productive assets per agricultural household during the agricultural year July 2012 - June 2013 for each size class of land possessed. It is observed that agricultural households in the lower size classes of land possessed were mostly dependent on wage/ salary employment than farm business (cultivation and farming of animals) for their income. For the households belonging to the lowest size class, farming of animals fetched more income than cultivation. Percentage share of income from cultivation/ farm business in the average monthly income increased with increase in land possession. Share of income from non-farm business in the average monthly income decreased with increase in land size. Similarly net investment in productive assets per agricultural household increased with increase in land size. Further, net monthly income (farm and non-farm) in respect of size classes up to 1 ha was negative. However, net income increased steadily with the increase in size class. Foster and Rosenzweig[1] observed that small-scale farming is inefficient in India. Strategies for Indian agriculture and smallholding households should include reducing the inequality in land distribution and promoting off-farm work in the rural areas itself. The strategy of improving the crop land-man ratio by facilitating migration from rural India has not worked. The lives of smallholding families can be improved only by building on their higher per acre agricultural productivity and by promoting off-farm rural employment[2].

Enhancing Farm Productivity and Market Access for Sustainable Agriculture

Stagnation in productivity improvement has been observed in agricultural crops in India due to the following factors: (i) decline in farm size and income; (ii) depleting natural resources base; (iii) increasing input costs, and adverse economics of farming; (iv) deficiency of micronutrients in the soil and deteriorating soil health; (v) inadequate post-harvest technology; (vi) uncertain market prospects; and (vii) high indebtedness of farmers. Sustainable agriculture, to a great extent, depends on the following factors:

- **Quality Seeds**

It is estimated that quality of seed accounts for 20-25 per cent of productivity (State of Indian Agriculture 2012-13). Hence timely availability of quality seeds at affordable

Table – 3 (a)
Average monthly income from different sources, consumption expenditure and net investment in productive assets per agricultural household during July 2012- June 2013 for each size class of land possessed
(Amount in ₹)

Size class of land possessed (ha.)	Income from wages/ salary	Net receipt from cultivation	Net receipt from farming of animals	Net receipt from nonfarm business	Total income
<0.01	2902	30	1181	447	4561
0.01 - 0.40	2386	687	621	459	4152
0.41 - 1.00	2011	2145	629	462	5247
1.01 - 2.00	1728	4209	818	593	7348
2.01 - 4.00	1657	7359	1161	554	10730
4.01 - 10.00	2031	15243	1501	861	19637
10.00+	1311	35685	2622	1770	41388
All size	2071	3081	763	512	6426

Source: Key Indicators of Situation of Agricultural Households in India, NSS 70th Round (January – December 2013), NSSO, December 2014

[1] Foster, Andew D and Mark R Rosenzweig (2010): "Is There Surplus Labour in Rural India?" Centre Discussion Paper No 991, Economic Growth Centre, Yale University.

[2] Chand, R., P A Lakshmi Prasanna and Aruna Singh (2011), "Farm Size and Productivity: Understanding the Strengths of Smallholders and Improving their Livelihoods", Economic & Political Weekly June 25, 2011 Vol. XLVI Nos. 26 & 27

Table – 3 (b)
Average monthly income from different sources, consumption expenditure and net investment in productive assets per agricultural household during July 2012- June 2013 for each size class of land possessed
(Amount in ₹)

Size class of land possessed (ha.)	Total income	Total consumpt ion expenditure	Net income	Net investment in productive assets	Estimated no. of agri. households (00)
<0.01	4561	5108	-547	55	23857
0.01 - 0.40	4152	5401	-1249	251	287381
0.41 - 1.00	5247	6020	-773	540	315008
1.01 - 2.00	7348	6457	891	422	154810
2.01 - 4.00	10730	7786	2944	746	83964
4.01 - 10.00	19637	10104	9533	1975	33519
10.00+	41388	14447	26941	6987	3499
All size	6426	6223	203	513	902039

Source: Key Indicators of Situation of Agricultural Households in India, NSS 70th Round (January – December 2013), NSSO, December 2014

prices to farmers, especially small and marginal farmers, is necessary for achieving higher agricultural production and productivity. Further, as hybrid seeds in cross pollinated crops give higher yield, greater emphasis needs to be given to hybrid seeds to improve crop productivity. Priority should be given for seed production so that adequate supply of seeds of relevant major crops and fodder is available at reasonable prices and at the right time. This is necessary to improve seed replacement rates, which help reduce yield gaps.

- **Integrated Nutrient Management**

The all-India average consumption of fertilizers has increased from 105.5 kg per ha in 2005-06 to 144 kg per ha in 2011-12 (State of Indian Agriculture 2012-13). It is observed that while consumption of urea has increased from 16.6 million tonnes in 2010-11 to 17.3 million tonnes in 2011-12, consumption of both phosphatic and potassic fertilizers have declined during 2011-12 over the previous year (ibid.). The obvious reason for the high uses of urea and lower uses of phosphatic and potassic fertilizers are the relative prices of these fertilizers. This has led to an imbalance in the NPK ratio and a decline in the marginal response of agricultural productivity to additional usage of fertilizer in the country. An imbalanced use of fertilizers is one of the reasons for a decline in the crop response ratio. This calls for promoting soil test based balanced and judicious use of chemical fertilizers in conjunction with organic sources of nutrients to sustain and improve soil health and its productivity. Further, intensive agriculture is experiencing widespread deficiency of micronutrients. There is, therefore, a greater need for timely supply of micronutrients to the farmers, which could lead to a significant increase in crop yield.

- **Innovative Technology and Farm Practices**

Dr. M.S. Swaminathan[3] had emphasized the need for developing technology and public policy for an evergreen revolution designed to improve the productivity of crops in perpetuity without associated ecological harm. According to him "evergreen revolution is based on an appropriate blend of different approaches to sustainable agriculture such as organic farming, green agriculture, eco-agriculture and agriculture based on effective micro-organisms." He advocated that biotechnology could play an important role in the following six major components of integrated natural resources management and precision farming for an evergreen revolution: (a) integrated gene management; (b) efficient water management; (c) integrated nutrient supply; (d) soil health care; (e) integrated pest management; and (f) efficient post-harvest management. Eco technology-based precision farming, if adopted by small and marginal farmers can help cut costs, enhance marketable surplus and eliminate ecological risks.

- **Irrigation**

There are three ways in which irrigation impacts agricultural production, viz. it increases cropping intensity; brings about changes in crop patterns; and in combination with improved varieties and more intensive fertilizer use, increases individual crop yields. The ultimate irrigation potential in India is estimated at about 140 million hectares. The widening gap (about 15 per cent) between irrigation potential created and that being utilized is a matter of concern. Micro-irrigation, minor irrigation, rainwater harvesting and groundwater recharging are vital in utilising the existing resources and expanding the irrigation system in a viable manner.

- **Crop Diversification**

Studies have shown that smallholders are likely to benefit more from technological change and diversification towards higher-value crops than from other drivers of growth. Hence, diversification-led growth is expected to benefit small and marginal farmers and enable them to escape poverty.

- **Research and Development**

According to Swaminathan (2010) the research strategy should be pro-nature and pro-small farmer oriented. As 80 per cent of the seeds used in agriculture come from farmer seed systems, these will have to be strengthened and supported through infrastructure for community managed seed villages and seed technology training centres. There is a need to refocus Research and Development agenda

[3] Swaminathan, M.S. (2010), From Green to Evergreen Revolution- Indian Agriculture: Performance and Challenges, Academic Foundation, New Delhi

from crop centric research in irrigated areas to location specific cropping systems in dry lands, hills and tribal areas. Greater attention needs to be directed towards horticulture crops which are land and water saving. Efforts may also be made for harnessing remote sensing technologies to optimise application of inputs and exploring areas in emerging capital-intensive biotechnology.

- **Agriculture Prices and Market Reforms**

Minimum Support Price (MSP) policy, particularly for wheat and rice, has remained de-linked from domestic and international market realities, creating significant budgetary costs and market distortion. In order to protect farmers from national and international price volatility, there is a need for creating a price stabilisation fund. High food inflation with an inadequate supply response, aggravated by logistic and market-related constraints are other areas requiring adequate attention. Small and marginal farmers lack proper access to markets. They can enter into the agri-marketing space through producer organisations, collectives, small producer cooperatives and contract farming. The real challenge lies in organising the small and marginal farmers for marketing and linking them to high value agriculture. The amendment in the APMC Act has paved the way for contract farming in some states. It is, therefore, necessary to complete the process of market reforms early in order to provide farmers an alternative competitive marketing channel for transaction of their agricultural produce at remunerative prices. Commodity exchanges through derivatives trading can lead to efficient price discovery and effective price signals. Further, commodity exchanges also provide a specialised risk management tool for the producers, traders and consumers encompassing the entire ecosystem.

- **Rural Infrastructure and Efficient Value Chain Management**

The Indian farmer has suffered not only from restrictions on marketing and processing, but also from poor infrastructure. The greatest challenge lies in reducing the transaction costs of the farmers by providing them with world class physical infrastructure. A comprehensive value chain model covering innovations in farming, transportation, storage, processing, value addition, and marketing can help farmers earn profit in a sustainable manner.

Policy options for promoting sustainable agriculture

- Policy interventions by the central and state governments to promote evergreen revolution by incentivising small and marginal farmers, need to be given high priority. There is also a need to incentivise the scaling up of low cost input supply, water saving agronomic and management practices like system of rice intensification (SRI) and energy saving irrigation methods.
- While almost all states are in various stages of amending their respective State APMC Acts so as to bring in holistic changes, farmer friendly APMCs catering to the much needed grouping of farmers into Producer Organisations and Farmer Clubs would enable them, especially the small and marginal farmers to strike a better bargain and sell their produce profitably, directly to organised retailers, agri/ food processors or consumers. Further, participation of farmers in futures trading in agricultural commodities could lead to better and efficient price discovery. Prices of commodities not traded in any commodity exchange, e.g. urad is more volatile than that of its close substitute chana, which is traded. Besides reducing price volatility, futures exchanges have also provided an effective tool for the management of risks for the entire ecosystem players by hedging and sharing their risk with other ecosystem players.
- Rural infrastructure and scientific value chain management need to be put in place for linking wholesale processing, logistics and retailing with agriculture production activities. Policy environment to enable commercial banks, RRBs and cooperative banks to finance private companies and producer organisations for creating value chain infrastructure, need to be created.
- For smallholder farmers with profit potential, their ability to be successful is hampered by such challenges as climate change, price shocks, limited financing options, and inadequate access to healthy and nutritious food. By overcoming these challenges, smallholders can move from subsistence to commercially oriented agricultural systems – by forming producer organisations - and operate at an efficient scale to increase their profits. This requires a policy and investment environment that: (a) promotes context-specific farm size; (b) supports productive social safety nets; (c) improves risk-mitigation and adaptation strategies; (d) links agriculture, nutrition, and health; (e) promotes pro-smallholder value chains; and (f) increases smallholder-friendly financing and investment.

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