

Crop Diversification, Value of Output, Input and Crop Credit - An Exploration

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Indian agriculture has been growing and diversifying due to several factors. The new seed-irrigation-fertiliser technology of 1970s and 1980s accompanied by substantial growth in rural infrastructure, mainly through public investments accentuated the growth. In the later part, the growth stimulus spread into rain-fed agricultural production beginning in the 1980s with the rapid adoption of high-yielding varieties of coarse cereals, oilseeds, pulses, and cotton. Rising yield growth and cropping intensities greatly contributed to buoyant agricultural growth. In the present issue of Rural Pulse, we explore the trends in the main components of diversification in Indian agriculture in terms of area, value of output, commercialization of inputs and its relation with crop credit and a few policy pointers drawn from such trends.

Indian Agriculture - Structural Changes

Though the relative contribution of agriculture to the national economy has been declining, the basic characteristics of Indian agriculture have not changed drastically. Indian agriculture continues to be dominated by smallholders and their number has risen much faster. As a result, there has been a significant reduction in the average size of a farm holding, from 2.30 ha. in 1970 to just above 1 ha. at present (Table 1). The output of foodgrains has registered a two-fold increase since the early green revolution period (1970) and has in recent years, reached 264 million tonnes. Over these years, there has been diversification in agriculture in terms of area under different crops, value of output generated by crops and input commercialization through credit support.

Changes in Cropping Pattern

As the cultivated area remains more or less constant, the increase in population and urbanisation puts agricultural land under stress resulting in crop intensification and changed consumption habits resulted in substitution of food crops with commercial crops. In fact, it is striking to observe that area under food grains in gross cropped area (GCA) declined by 11.94 per cent mainly due to fall in area under coarse cereals by 14.90 per cent between triennium ending (TE) 1970-71 and TE 2012-13 (Chart 1). Wheat has gained

importance with area allocation of only 10.42 per cent in TE 1970-71 and it steadily increased to 15.20 per cent in TE 2012-13. Interestingly, area lost by foodgrains was mostly used for cultivation of oilseeds, fruits and vegetables and cotton.

It is also observed that among the high value crops, the share of area under fruits & vegetables has increased from 2.24 per cent to 8.03 per cent, a more than three times increase in absolute terms which is concomitant to the substantial growth in demand for fruits & vegetables as a result of shift in consumption habits of people. The percentage of consumption expenditure on fruits & vegetables has gone up from 6.5 per cent to 14.5 per cent in rural areas and from 9.8 per cent to 15.8 per cent in urban areas during the last three decades (Gandhi & Zhou, 2010)¹. Increase in area under total oilseeds is quite substantial. However, India still imports edible oils in substantial terms.

Value of Crop Output

It is understandable from the above discussion that commercial crops are taking the lead in terms of area share. However, it would be interesting to analyse the contribution of different crops in total Value of Output (VoO). Among the crop groups, cereals accounted for the largest share of the total output followed by fruits and vegetables, oilseeds and fibres (Chart 2). The contribution of

Table 1: Major Trends in Indian Agriculture

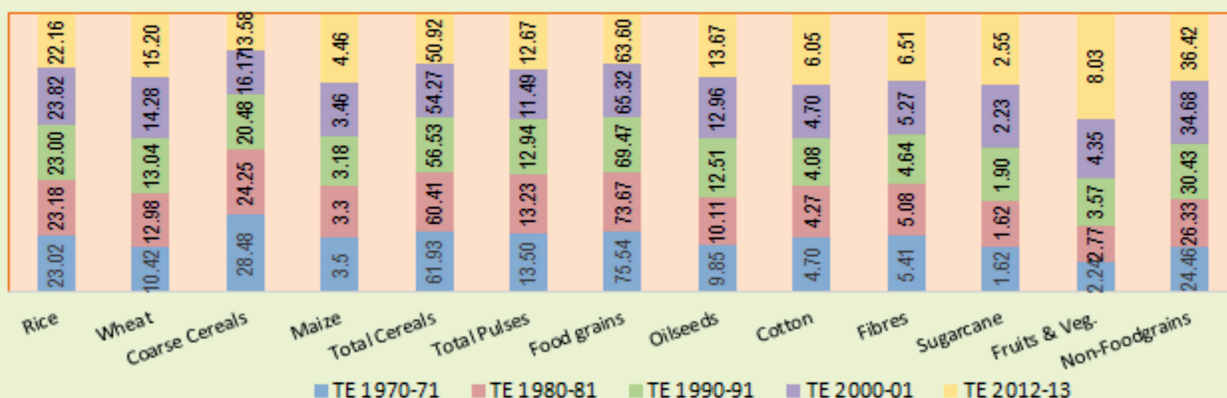
No.	Indicator	1971	1981	1991	2001	2010	2013
1	Average land holding size (ha.)	2.30	1.84	1.57	1.33	1.16	---
2	Net cultivated area (mln. ha.)	140.80	140.29	143.00	141.34	139.18	141.58
3	Total cropped area (mln. ha.)	165.79	172.63	185.74	185.34	188.99	198.97
4	Total irrigated area (mln. ha.)	38.43	49.18	63.20	76.19	85.09	89.36
5	Share of rural population (%)	80.1	76.7	74.3	72.2	68.84	---
6	Share of exports in Agri-GDP (%)	2.7	3.9	4.4	6.1	14.6	14.10
7	Share of Agri-GDP to Total GDP (%)	40.6	34.4	29.6	23.2	18.2	13.9
8	Total foodgrain production (mln. tonnes)	105.17	133.30	168.38	212.85	244.50	264.40
9	Food grain yield (metric tons/ha)	0.85	1.03	1.38	1.73	1.93	2.13

Source: Compiled from Ministry of Agriculture (MoA) and Central Statistical Office (CSO), various years.

¹Gandhi, Vasant P and Zhou, Zhang-Yue (2010), "Rising Demand for Livestock Products in India: Nature, Patterns and Implications", *Australasian Agribusiness Review*, Vol. 18, Paper 7

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Chart 1: Share (%) of Area under Major Crops in India (% of GCA)



Source: Compiled from DoES, MoA (various years).

cereals declined from 35.02 per cent in TE 1970-71 to 29.9 per cent in TE 2010-11, as against which the share of fruits and vegetables increased considerably from 15.88 per cent to 27.20 per cent during the same period. Pulses registered a decline from 8.42 per cent in TE 1970-71 to 4.30 per cent in TE 2010-11. However, even though there was increase in price of pulses, output did not keep pace due to low level of net income and subsequent allocation of smaller area for cultivation. Cotton, however, experienced an increase in VoO on account of widespread cultivation of Bt cotton. It was observed by Narayanamoorthy & Kalamkar (2006)² that productivity and profit from Bt cotton cultivation was substantially higher than the conventional hybrid cotton varieties.

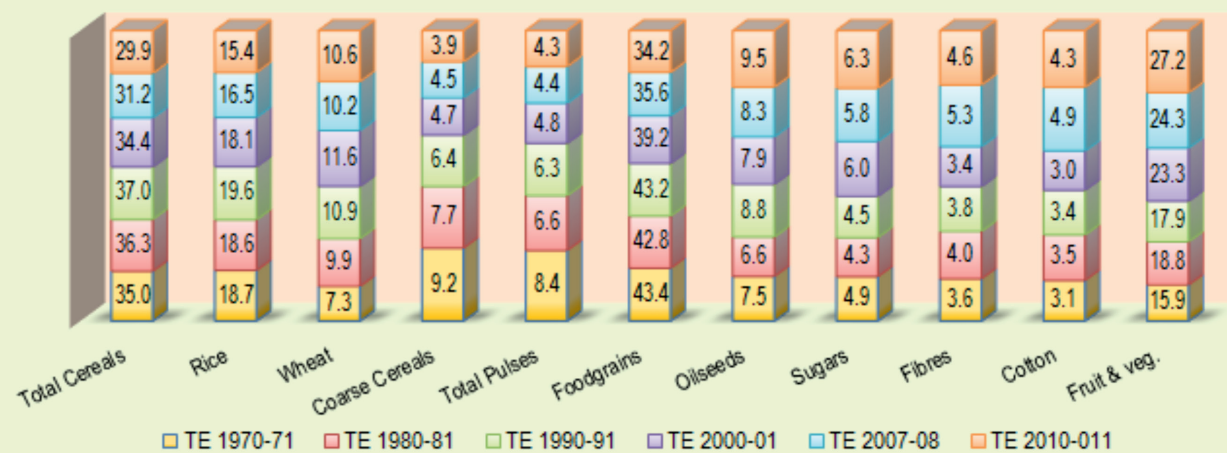
Overall, the analysis of the data clearly indicated that there was broad-based agricultural production in the 1980s but the

commercialization of agricultural production seems to have gained momentum since early 1990s. There is a definite shift from food grains to fruits and vegetables, oilseeds, fibres whose share in both area and in value of output has been increasing over time. Commercialisation of output is also observed from the growth in value of exports of major agri-commodities. As observed from Chart 3, the value of exports of major agri-commodities like, rice, cotton, fruits & vegetables, spices, tea, coffee, tobacco, etc. increased significantly in 2012-13 as compared to 2004-05.

What Drives the Value of Crop Output?

The changing share in VoO was largely determined by commodity price, which rose proportionately higher for fruits and vegetables rather than cereals during the recent decade (Chand et al., 2011)³. The growth in minimum support prices (MSPs) compared with the

Chart 2: Share (%) of Various Crops in Value of Output

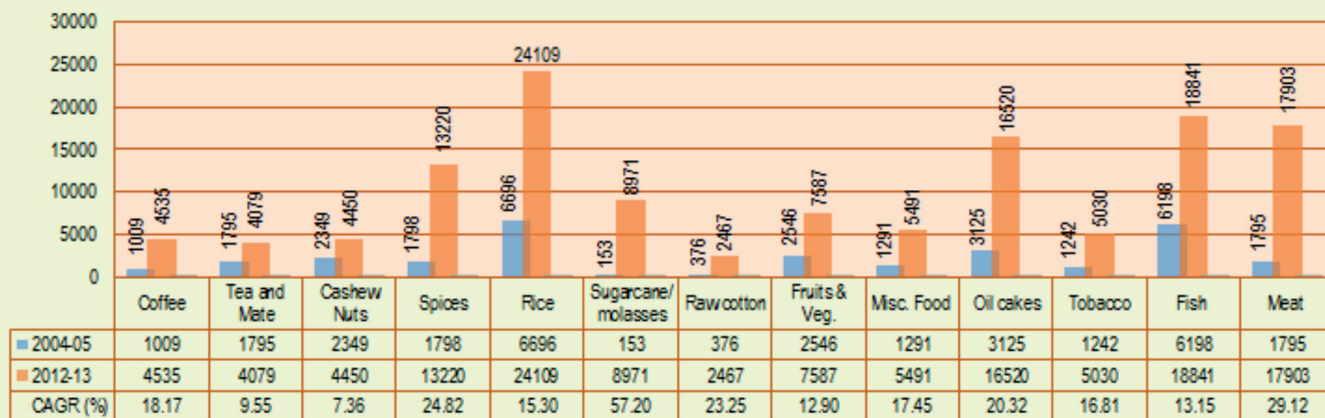


Source: Compiled from CSO Publication (various issues).

²Narayanamoorthy, A., and Kalamkar, S. S. (2006), "Is Bt Cotton Cultivation Economically Viable for Indian Farmers? An Empirical Analysis," *Economic and Political Weekly*, 30 June, pp. 2716-24

³Chand, Ramesh, Shenoy, P & Gulati, Ashok & Ganguly, Kaveri (2011) "Managing Food Inflation in India: Reforms and Policy Options, Policy Brief-35, National Centre for Agricultural Economics and Policy Research

Chart 3: Agri Exports in value terms (₹ crore)



SOURCE: ECONOMIC SURVEY, VARIOUS ISSUES

growth of production and VoO revealed that the growth in MSP is much higher than the growth in production, and VoO of major cereals, pulses & oilseeds during the period 2004-2012 (Chart 4). It is to be noted that the changing share in value of output was largely determined by producers' commodity price (farm gate price).

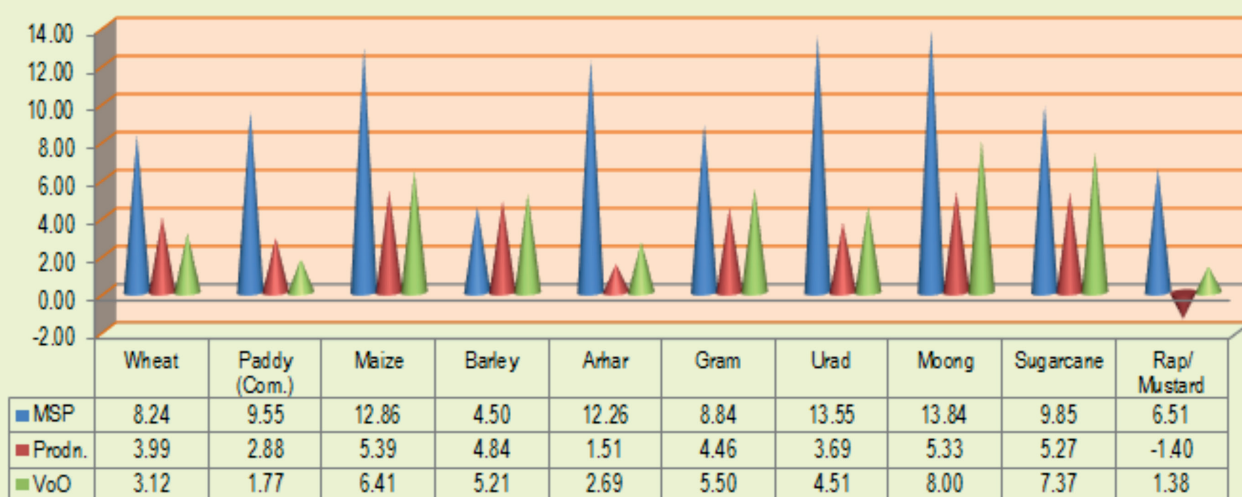
Commercialisation of Inputs and Crop Credit

The compound growth rates of crop credit, VoO (in current and real terms) and fertiliser consumption during the period 2004-05 to 2011-12, revealed that the crop credit increased at the compound growth rate of 26.6 per cent in nominal terms and 15.11 per cent in real terms (Table 2). The Value of Inputs (VoI) in general has gone up by 6.5 per cent and value of fertilizer in particular has gone up by 5.8 per cent during the same period. The index of agricultural production showed a growth rate of 3.8 per cent against the growth rate of about 4.4 per cent in fertiliser consumption. Thus, in the light of above

trends it could be inferred that increased credit needs to be provided to support growing value of output and its increased commercial orientation. The period of 1990s and after has witnessed increased commercialization of agricultural inputs. The proportion of the value of inputs (excluding the value of feed of livestock) covered by the institutional credit which was 27.2 per cent in 1981-82, increased to 38.6 per cent in 1999-2000, reflecting credit deepening.

In the last few years, many initiatives like introduction of KCC, doubling of credit, interest subvention scheme, Agriculture Debt Waiver and Debt Relief Scheme (ADWDRS), etc. implemented by Government have enhanced the commercialization of inputs manifold. As a result, the proportion of the value of inputs covered by the institutional credit went up to 57.5 per cent in 2004-05, 67.9 per cent in 2005-06 and reached 86.5 per cent in 2011-12, indicating further credit deepening.

Chart 4: CAGR (%) of MSPs, Production and VoO of Major Cereals, Pulses & Oilseeds



Sources: Economic Survey, DoES & CSO, various issues

Table 2: Growth in Production credit, Agricultural Output and Fertiliser Use (2004-2012)

₹ Crore										
Year	Total Crop Credit (Current Prices)	Total Crop Credit (at 2004-05 prices)	Consumption & Other Misc. Credit (at 2004-05 prices)*	Only Crop Credit (3-4)	VoO from Agrl.	Vol#	Share of Crop Credit in Vol	Value of Fert.	share of fert. in total input	Fertilizer use per ha.
(1)	(2)	(3)	(4)	(5)			(6)	(7)	(8)	(9)
2004-05	76062	76062	15212	60850	458496	105781	57.5	33607	31.8	104.5
2005-06	105350	98200	19640	78560	484588	115615	67.9	36311	31.4	113.3
2006-07	138455	118578	23716	94862	503122	122374	77.5	37979	31.0	111.8
2007-08	181393	142049	42615	99434	532555	128056	77.6	38675	30.2	116.5
2008-09	210461	146307	43892	102415	524972	135496	75.6	42206	31.1	127.2
2009-10	276656	169810	50943	118867	524119	141654	83.9	44929	31.7	135.8
2010-11	335550	187370	56211	131159	576144	155430	84.4	47569	30.6	144.1
2011-12	396157	203664	61099	142565	599864	164837	86.5	48288	29.3	141.3
CAGR (2004-2012)	26.59	15.11	21.97	12.93	3.91	6.54	--	5.31	--	4.40

*excluding 10% as limit under KCC for consumption purposes & 20% as limit for repairs and maintenance expenses of farm assets + crop insurance, PAIS & asset insurance. Source: compiled from Economic Survey, CSO various issues.
#excludes the value of feed of livestock, but includes the value of market charges and the wages (@ 20% of total input value).

Crop Credit: Linkage with Output and Fertilizer Consumption

The relationship between crop credit, agricultural output and fertiliser consumption has been examined with data for the same for eight years' period from 2004-05 to 2011-12 at all-India level. There exists a positive and significant relationship ($r=+0.98$) between crop credit disbursed on one hand and fertiliser consumption on the other at all India level. The value of agricultural output (at constant prices) and real crop credit in real terms were also found to be significantly correlated ($r=+0.96$).

Policy Pointers

1. Agriculture is becoming increasingly commercialised and is gearing to produce for specific markets both domestic and overseas. Such production systems would demand more inputs in the form of fertilizers, improved seeds, advanced technology and capital investments. There will be resultant increase in the demand for bank credit and the nature of credit demand would be different from the past. The input based financing patterns of agricultural credit need to be supplemented by furthering output based finance where production, processing and marketing become an integrated activity and financed as a package. The challenge before the banks will be to redesign the credit product in a customer friendly way and reduce their own risks by suitable integration of production and marketing cycles.
2. Accelerating the pace of capital formation, ensuring remunerative prices for agricultural produce, infrastructure development with

focus on transportation, marketing and post-harvest facilities, etc., will enable the agricultural sector to absorb more credit. Presently, interest subvention is applicable only for crop credit. With the growth of plantation and horticulture as also other high value crops, judicious subsidisation of long term credit, (one option would be allowing interest subvention) is highly warranted to enhance the credit flow to this segment as also accelerating private capital formation.

3. On fertilizer, its use would enhance only with credit support. Indian agriculture being dominated largely by small and marginal farmers with limited resource base would not be able to use larger doses of fertilizer without credit support. With improved use of modern techniques like tissue culture, biotechnology and genetic engineering, certain crop varieties are accompanied by packages of inputs use, which will boost demand for inputs resulting in further commercialisation of various inputs like seeds, fertilisers, pesticides, etc. in future. Transfer of technology (ToT) through field demonstration and thrust on agri-extension through private corporate bodies, NGOs would be highly effective and utilisation of funds by private corporate bodies need to be considered under their Corporate Social Responsibility (CSR) initiatives.
4. With the increased commercialisation and growing importance of high value and horticulture related crops, supply chain issues need to be given adequate thrust. Designing of standardised credit products by banks for financing supply chain related projects should be adequately addressed.

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