

**ACADEMIC PAPER**

# Economic reforms and agriculture in India: A state-wise analysis of post-reforms period

Waseem Khan<sup>1</sup>  | Saghir Ahmad Ansari<sup>2</sup> | Tabassum Ali<sup>3</sup><sup>1</sup>Institute of Business Management, GLA University, Mathura, India<sup>2</sup>Department of Agricultural Economic and Business Management, Aligarh Muslim University, Aligarh, India<sup>3</sup>Department of Business Administration, Khwaja Moinuddin Chishti Urdu, Arabi-Farsi University, Lucknow, India**Correspondence**Waseem Khan, Institute of Business Management, GLA University, Mathura 281 406, Uttar Pradesh, India.  
Email: waseemdbf42@gmail.com

This study analyses the performance of agriculture sector including the dynamics of gross and net cropped area, cropping intensity, yield of major crops, cropping pattern, use of consumable and durable agricultural inputs, and institutional credit at state and overall India level since the economic reforms by collecting data from published sources. Post-reforms period has been divided into two phases: The first phase from 1990–1991 to 2000–2001 and the second phase from 2000–2001 to 2014–2015. Findings of the study show acceleration in the growth of most of the states in the second phase (TE 2003–2004 to TE 2014–2015), particularly in those states that showed a decline in their growth rates in the first phase. Moreover, the use of durable and consumable inputs has increased in the second phase with a moderate level of diversification towards non-food crops in some states.

**JEL CLASSIFICATION**

Q1; P21; R11

## 1 | INTRODUCTION

Agricultural transformation in India can be categorized into three distinct stages. The first stage covers a period from independence to green revolution period, second, from green revolution to economic reforms period and the third stage covers the post-reforms period. It has been more than 25 years since the economic reforms were introduced in India, which brought about many macroeconomic policy changes in the economy. These policy changes have led to significant structural changes in the Indian economy and have also helped manufacturing and services sectors to grow faster, but agriculture did not get any direct benefit from the economic reforms. In fact, direct reforms in the agriculture sector were mostly avoided due to political reasons. Moreover, it was expected that agriculture will indirectly benefit due to changes in the exchange and trade policies. Abolition of industrial licensing system and reduction in industrial protection and WTO commitment were expected to benefit agricultural trade and improve the terms of trade in its favour (Sen, 1992; Kalirajan and Sankar, 2001; Mahadevan, 2003; and Bhalla & Singh, 2009). But against this notion, De Roy (2017) found that the agricultural sector could not perform remarkably as compared to pre-reform period. Post-liberalization, the growth rate of food grain production has

declined below the population growth, which has happened for the first time since independence. Cases of farmers' suicide have been recorded continuously due to high agricultural distress. The institutional support structure has weakened in agriculture sector, lowering import protection, which has led to a fall in the prices of many agricultural commodities (Nagaraj, Sainath, Rukmani, & Gopinath, 2014; Ramakumar, 2009). However, Mahadevan (2003) stated that there have been no considerable effects of liberalization on the Indian economy, although he added that it was too early to raise this argument. However, in the post-reforms period, India has remained the net exporter of agriculture commodities (Ansari & Khan, 2015). By using econometric model, Mythili (2008) found that economic liberalization did not make any impact on the acreage response for some commercial crops like sugarcane, groundnut and cotton, while the yield response improved significantly for staple crops, such as wheat and rice. The growth of agriculture sector has declined over the years, coupled with increased disparity in income across the economic sectors. Capital formation in agriculture, rural credit and research and extension have not been given due attention in the post-reforms period. Public expenditure in agriculture sector declined and resources were relocated away from agriculture after the economic reform. Only 4.9% of the total outlay was allotted to agriculture sector in the ninth

plan. However, in the mid of the year 2000, some policy measures were taken and national agricultural policy was designed to achieve better economic growth.

There had been a decline in the institutional credit for agriculture sector after the economic reform (Khan, Fatima, & Jamshed, 2017) for fiscal stabilization in the early 1990s. Consumable and durable agricultural input industry was regulated before liberalization. Farmers got seeds from government institutions or highly regulated markets. Similar was the case with several other input industries. Liberalization opened the gateway for agribusiness industries. As far as the labour dynamics of agriculture sector since economic reform is considered, a significant transfer of labour from agriculture to non-agriculture sector has been recorded, especially during 2004–2014. However, this was the expected result of liberalization (Sharma, 2015). Several studies have discussed the impact of economic reforms on agriculture sector (Bhalla & Singh, 2009; Byerlee, Diao, & Jackson, 2005; Chand, 2004; De Roy, 2017; Mahadevan, 2003; Misra, 1998; Moni, 2001), but most of the studies have been done in the early stages of the reform and recent studies do not include the basic indicators of agriculture such as area, cropping pattern and intensity, input use dynamics and credit disbursement. To examine the impact of liberalization on rural areas, understanding of agrarian structure and class character of Indian states is a prerequisite (Ramachandran & Rawal, 2010). After 25 year of the economic reforms, there is a need to measure the impact of these reforms on agriculture sector through a comprehensive study. This study attempts to analyse the agriculture sector's growth, gross and net cropped area, cropping intensity, yield of major crops, cropping pattern, use of consumable and durable agricultural inputs, and institutional credit at the state and country level as basic indicators since economic reforms.

## 2 | MATERIALS AND METHODS

This study is based on secondary data. Data were collected from the published sources of national accounts statistics of Central Statistical Organization, Agricultural census, Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India. Data were collected for the period 1991–2016. GSDP data have been prepared on 2004 constant price. Spacing method has been used to make series on 2004 constant price.

Triennium ending (TE) values have been used in order to avoid inter-year fluctuations (Kannan, 2012). The whole time-period has been divided into two sub-periods. The first sub-period, from TE 1992–1993 to TE 2002–2003, has been termed as first phase, and the second sub-period, from TE 2003–2004 to TE 2014–2015, has been termed as second phase. To examine the growth, compound annual growth rate has been used. CAGR is examined by the following equation:

$$\text{CAGR} = \left[ \left( \frac{V_n}{V_0} \right)^{\frac{1}{n-1}} \right] - 1, \quad (1)$$

where  $V_0$  is the base year value,  $V_n$  is the value in the last year and  $n$  is the number of year.

## 3 | RESULTS AND DISCUSSION

### 3.1 | State-wise gross state domestic product of agriculture and growth

TE values and CAGR of Gross State Domestic Product for all states are given in Table 1. At the time of liberalization, Uttar Pradesh was the top income-generating state from agriculture in India, followed by the Maharashtra, MP and West Bengal. In the TE 2014–2015, Uttar Pradesh was still at the top position in income generation from agriculture, followed by Madhya Pradesh. After the economic liberalization, greater focus has been put on industrialization. Therefore, resources were shifted away from agriculture to non-agricultural sector in the first phase after liberalization. In this phase, 7 out of 17 states showed the compound annual growth rate of less than 1%, and only four states indicated CAGR more than 3%. In the second phase, GSDP of agriculture showed a good improvement. Major improvement was shown by MP, Gujarat, Rajasthan and Himachal Pradesh. However, the performance of some states like West Bengal, Punjab, Karnataka and Maharashtra showed declining trends. In the second phase, most of the states showed significant compound annual growth. For Gujarat, Madhya Pradesh and Rajasthan, the agricultural sector's growth rate was more than 6% per annum in the second phase. This was because, in the 10th plan, Rajasthan government stressed on agricultural development, especially on the development of horticulture sector, marketing infrastructure and post-harvest management. In Madhya Pradesh, the government did tremendous work for the development of agricultural infrastructure, including areas of irrigation, electricity delivery at subsidized rate to agriculture sector and increasing road connectivity. Adoption of GM crops, diversification towards high-value crops and power sector reforms have been the major drivers of growth in Gujarat. In this phase, the growth of GSDP from agriculture in Punjab was only 1.8% per annum. While Kerala indicated negative growth, since people of Kerala had been diversifying their livelihood sources towards non-agriculture sector from agriculture sector (Khan, Tabassum and Ansari, 2017).<sup>1</sup>

### 3.2 | State-wise food grain output per hectare and growth

Productivity is the key indicator for understanding the agricultural situation in any region. It is one of the key contributors in output growth (Bhalla & Singh, 2009). At the time of liberalization, foodgrain output per hectare was very low. Only Punjab and Haryana showed good productivity. Rajasthan, Orissa and Maharashtra showed very poor yield of food grains (Table 2). In the second phase, in the TE 2002–2003 to TE 2014–2015, data show tremendous improvement in productivity per hectare in most of the states.

**TABLE 1** GSDP of agricultural and compound annual growth (Rs. In lakhs)

	TE-1992–1993	TE-2002–2003	TE-2014–2015	CAGR	
				TE 1992–1993/ TE 2002–2003	TE 2002–2003/ TE2014–2015
Andhra Pradesh	2,643,318	3,664,376	5,958,861	3.32	4.14
Arunachal Pradesh	110,878	121,781	178,505	0.94	3.24
Assam	1,220,553	1,342,318	1,797,163	0.96	2.46
Bihar	2,614,879	3,166,734	5,379,315	1.93	4.51
Gujarat <sup>a</sup>	2,166,296	2,352,131	5,339,605	0.83	7.74
Haryana	1,624,275	1,959,615	3,014,174	1.89	3.65
Himachal Pradesh <sup>a</sup>	446,054	507,219	828,323	1.29	4.56
Karnataka	2,465,091	3,566,509	4,777,769	3.76	2.47
Kerala <sup>a</sup>	2,116,642	2,047,144	2,010,904	−0.33	−0.16
Maharashtra	3,539,672	4,889,756	6,571,238	3.28	2.49
MP	3,302,328	3,516,436	8,336,592	0.63	7.46
Orissa	1,439,334	1,553,276	2,336,794	0.76	3.46
Punjab	2,322,138	2,941,859	3,678,515	2.39	1.88
Rajasthan	2,429,179	2,537,297	5,111,122	0.44	6.01
TN	2,150,618	2,582,706	3,476,811	1.85	2.51
UP and UA	6,093,751	7,822,389	11,003,106	2.53	2.88
WB	3,021,155	4,729,080	6,081,477	4.58	2.12

Note: Author's calculation based on Central Statistical Office (MoSPI, Government India) data.

<sup>a</sup>Data are not available for the year 2014–2015.

**TABLE 2** State-wise food grain yield and growth (Kgs./Hect)

State/UT	Value of food gain output per hectare			CAGR	
	TE 1992–1993	TE-2002–2003	TE-2014–2015	TE 1992–1993/ TE 2002–2003	TE 2002–2003/ TE 2014–2015
Andhra Pradesh	1,456.8	1,961.8	2,661.3	3.02	2.57
Arunachal Pradesh	1,128.8	1,175.9	1,790.0	0.41	3.56
Assam	1,234.4	1,444.7	1,963.3	1.59	2.59
Bihar	1,144.8	1,378.9	1,992.3	1.88	3.11
Gujarat	1,009.3	1,118.4	2,007.3	1.03	5.00
Haryana	2,475.2	3,097.0	3,772.0	2.27	1.66
Himachal Pradesh	1,590.7	1,567.0	1,941.0	−0.15	1.80
Jammu & Kashmir	1,506.4	1,412.3	1,752.0	−0.64	1.81
Karnataka	995.6	1,190.9	1,597.3	1.81	2.48
Kerala	1,861.2	2,114.0	2,627.3	1.28	1.83
Madhya Pradesh	906.0	899.2	1,576.8	−0.07	4.79
Maharashtra	788.2	825.7	1,291.8	0.47	3.80
Orissa	978.4	1,021.7	1,650.0	0.43	4.08
Punjab	3,429.0	3,966.5	4,330.3	1.47	0.73
Rajasthan	749.7	951.7	1,449.7	2.41	3.57
Tamil Nadu	1,828.1	2,093.8	2,404.7	1.37	1.16
Uttar Pradesh	1,709.8	1,871.0	2,154.0	0.91	1.18
West Bengal	1,861.9	2,343.1	2,709.7	2.33	1.22
All India	1,323.4	1,631.5	2,106.3	2.11	2.15

Note: Source: Directorate of Economics & Statistics, MoAC & FW, Government of India.

**TABLE 3** State-wise level and compound annual growth of net sown area (In '000 Hectare)

	Net Sown Area			CAGR	
	TE-1992–1993	TE-2002–2003	TE-2013–2014	TE-1992–1993/ TE-2002–2003	TE-2002–2003/ TE-2013–2014
Andhra Pradesh	10,842.8	10,380.0	11,228.8	−0.44	0.72
Arunachal Pradesh	149.5	164.0	218.5	0.93	2.64
Assam	2,705.8	2,773.3	2,812.9	0.25	0.13
Bihar	7,526.4	7,317.7	6,696.6	−0.28	−0.80
Gujarat	9,390.2	9,512.0	10,301.8	0.13	0.73
Haryana	3,519.0	3,516.7	3,507.5	−0.01	−0.02
Himachal Pradesh	576.6	550.0	550.0	−0.47	0.00
Jammu & Kashmir	731.7	743.0	744.1	0.15	0.01
Karnataka	10,626.1	10,093.0	9,885.9	−0.51	−0.19
Kerala	2,248.3	2,195.3	2,046.4	−0.24	−0.64
Madhya Pradesh	19,487.9	19,452.7	20,015.0	−0.02	0.26
Maharashtra	18,159.8	17,548.3	17,365.7	−0.34	−0.10
Orissa	6,315.0	5,784.7	4,425.1	−0.87	−2.41
Punjab	4,190.2	4,235	4,143.2	0.11	−0.20
Rajasthan	16,268.1	14,479	17,927.0	−1.16	1.96
Sikkim	94.9	108.7	77.2	1.37	−3.06
Tamil Nadu	5,705.8	5,021.7	4,748.0	−1.27	−0.51
Uttar Pradesh	17,258.2	17,513.0	17,284.7	0.15	−0.12
West Bengal	5,434.9	5,431.0	5,212.3	−0.01	−0.37
India	142,382.3	138,187.3	140,781.1	−0.30	0.17

Note: Source: Directorate of Economics & Statistics, MoA & FW, Government of India.

Productivity has been highest for Punjab, Haryana and West Bengal. As far as compound annual growth rate is concerned, Andhra Pradesh, Haryana, Rajasthan and West Bengal show more than 2% growth in productivity in the first phase, while Himachal Pradesh, Jammu Kashmir and Madhya Pradesh indicated negative growth. However, during TE 2002–2003 to TE 2014–2015, like agricultural GSDP, most of the states have been showing impressive productivity growth. Only two states, West Bengal and Andhra Pradesh, experienced decline in the growth of foodgrain yield in the second phase. Another important correlation found is that most of the states, which have shown substantial growth in food grain yield in the second phase, have also indicated good growth in GSDP.

### 3.3 | State-wise dynamics of net sown area

India is the second largest populated country in the world. Increasing population calls for urbanization, industrialization and expansion of the rural habitats, which take away land from agriculture. From Table 3, it reflects that, in the first phase after liberalization, most of the states as well as overall India recorded negative growth in the net sown area. However, a marginal increase in the growth of net sown area has been recorded in the second phase for overall India because some states, such as Andhra Pradesh,

Arunachal Pradesh, Rajasthan and Gujarat, recorded very low positive growth.

### 3.4 | State-wise dynamics of gross cropped area

In addition to yield growth, gross cropped area (GCA) has been a significant source of output growth in some states in India (Bhalla & Singh, 2009). State-wise GCA is given in Table 4, like net sown area, most of the states and overall India showed negative growth in GCA in the first phase. West Bengal, Haryana and Punjab recorded moderate growth in GCA. However, during TE 2003–2004 to TE 2013–2014, a slightly positive improvement has been registered in the growth of gross cropped area (GCA) of Gujarat, MP, Rajasthan and Andhra Pradesh. UP and Maharashtra showed very low but stable growth in GCA in both the phases. For overall India, GCA growth was positive in the second phase as compared to the first phase when it was negative.

### 3.5 | State-wise cropping intensity

Net sown area is limited in any geographical region in India. To cater the demand for agricultural product of the rising population, increase in the cropping intensity on the given area is one of the best possible

**TABLE 4** State-wise level and compound annual growth of gross cropped area (In '000 Hectare)

	Gross Cropped Area			CAGR	
	TE-1992-1993	TE-2002-2003	TE-2013-2014	TE-1992-1993/ 2002-2003	TE-2002-03/ 2013-2014
Andhra Pradesh	13,046.1	12,620.0	13,941.5	-0.33	0.91
Arunachal Pradesh	251.6	248.7	287.1	-0.12	1.31
Assam	3,836.1	4,011.3	4,116.5	0.45	0.24
Bihar	9,995.8	9,996	9,254.6	0.00	-0.70
Gujarat	10,695.1	10,601.7	12,724.3	-0.09	1.67
Haryana	5,780.2	6,155.0	6,445.2	0.63	0.42
Himachal Pradesh	979.2	949.7	944.9	-0.31	-0.05
Jammu & Kashmir	1,073.4	1,099.7	1,159.6	0.24	0.48
Karnataka	12,187.7	11,828.7	12,024.7	-0.30	0.15
Kerala	3,029.4	2,994.7	2,623.4	-0.12	-1.20
Madhya Pradesh	23,592.2	23,786.7	28,915.1	0.08	1.79
Maharashtra	21,053.9	21,665.7	22,450.2	0.29	0.32
Orissa	9,608.0	8,176.667	5,066.9	-1.60	-4.26
Punjab	7,523.7	7,885.0	7,874.2	0.47	-0.01
Rajasthan	19,213.3	17,748.7	24,859.5	-0.79	3.11
Sikkim	134.5	119.7	142.7	-1.16	1.61
Tamil Nadu	6,891.8	5,918.3	5,642.3	-1.51	-0.43
Uttar Pradesh	25,478.4	26,240.3	27,003.6	0.30	0.26
West Bengal	8,623.1	9,468.7	9,476.7	0.94	0.01
India	184,533.7	183,068.7	196,897.7	-0.08	0.66

Note: Source: Directorate of Economics & Statistics, MoA & FW, Government of India.

ways to grow more crops. From Table 5, it is revealed that most of the states are indicating improvement in cropping intensity, particularly in the second phase. Cropping intensity is highest in Punjab, Haryana, West Bengal and Himachal Pradesh. Uttar Pradesh and Andhra Pradesh have shown relative stability in cropping intensity over time. During the last 25 years, India has also shown marginal improvement in overall cropping intensity. It was 132.5 in TE during 2002-2003, which improved to 139.9 in TE during 2013-2014. From the above discussion, it can be concluded that, currently, more area is being utilized for cultivation and farmers are growing more crops in the area available.

### 3.6 | Growth in area, production and yield of major crops in India

Dietary pattern of Indian consumers has transformed significantly in India. It may have led to change in the pattern of area used and production of different crops. Growth of area, production and yield are presented in Table 6. A considerable difference has been observed in the growth of area, production and yield in most of the crops such as cotton, rice, coarse cereals and pulse in the given two phases. In the first phase, most of the crops indicated negative growth in area and production. However, yield was positive for all crops except cotton. In the second phase, majority of the crops exhibited tremendous performance in

production and yield growth. A significant growth in area has been found for pulses, rapeseed, mustard and cotton. Sugarcane indicated a little decline in the compound annual growth in area and production while the yield increased in the second phase. As far as wheat is concerned, growth in the area has been seen in the second phase. Cotton reveals a magnificent growth in area, production and yield, and the growth has been 3.28, 12.75 and 9.16% per annum, respectively, during the TE 2002-2003 to TE 2013-2014. This is due to the sharp increase in the productivity, due to adoption of BT Cotton.

### 3.7 | State-wise shift in cropping pattern

Cropping patterns in any region may have significant implications for supply and demand structure of agricultural products in that particular region (Rao & Parwez, 2005). The area occupied by the different crops in the post-reforms period did not show many fluctuations, although some states indicated a passive diversification towards high-value crops. Most of the area is occupied by foodgrains. It varies from 50 to 80% in different states. This indicates that staple crops are the major cultivated commodities.

For the first decade after the reforms, a marginal change has been recorded for overall India. Food grains occupied 67.9% of the GCA in TE 1992-1993, which declined to just 66.2% at aggregate India level

in TE 2002–2003. A considerable decline has been found in the area occupied by food grains in Gujarat, West Bengal, Madhya Pradesh and Maharashtra. Farmers of these states shifted towards high-value crops like cotton and fibres in Gujarat, fruits and vegetable and plantation crops in West Bengal, oilseed in MP and fruits and vegetable and cotton in Maharashtra during TE 1992–1993 to TE 2002–2003. Karnataka and Punjab showed an increase in the area occupied by food grains, while for Uttar Pradesh, no significant change was recorded.

**TABLE 5** State-wise cropping intensity

	Cropping intensity		
	TE-1992–1993	TE-2002–2003	TE-2013–2014
Andhra Pradesh	120.32	121.5	124.2
Arunachal Pradesh	168.23	151.6	131.4
Assam	141.77	144.6	146.3
Bihar	132.81	1.4	138.2
Gujarat	113.90	111.5	123.5
Haryana	164.25	175.0	183.8
Himachal Pradesh	169.81	172.7	171.8
Jammu & Kashmir	146.70	148.0	155.8
Karnataka	114.70	117.2	121.6
Kerala	134.74	136.4	128.2
Madhya Pradesh	121.06	122.2	144.5
Maharashtra	115.94	123.5	129.3
Orissa	152.15	141.3	114.5
Punjab	179.55	186.2	190.1
Rajasthan	118.10	122.5	138.7
Sikkim	141.81	110.1	184.8
Tamil Nadu	120.79	117.7	118.8
Uttar Pradesh	147.63	149.8	156.2
West Bengal	158.66	174.3	181.8
India	129.60	132.5	139.9

Note: Author's calculation based on Data from Directorate of Economics & Statistics, MoA & FW, Govt. of India.

Western UP and Punjab adopted green revolution based cultivation practices extensively that were favourable for the cultivation of wheat and rice, which are the major crops of these two states. Therefore, the area occupied by food grains did not decline in these two states.

In the second phase (TE 2002–2003 to TE 2013–2014), the process of diversification took place, but the pace was still slow. Foodgrain still accounted for more than 60% area in many states, as well as overall India. States like Gujarat, MP, Maharashtra and Rajasthan were moderately adopting the cultivation of high-value agricultural crops in this phase. A significant increase in the area occupied by cotton has been recorded in AP, Gujarat and Maharashtra. In these states, the area covered by fibre crops has also increased.

The perusal of Table 7 reveals that the overall cropping pattern has been shifting since economic reforms. In Andhra Pradesh, Gujarat, Maharashtra and Rajasthan, cropping pattern has shifted from traditional agriculture to high-value agriculture; although the pace has been slow, states like Punjab and UP are still rigid on their cropping pattern. In these states, traditional crops, such as wheat and rice, are the major crops, and the area occupied by these crops is stagnant. Another remarkable fact is that the area occupied by oilseed in Andhra Pradesh, Gujarat and Karnataka has significantly come down. This decline in the area of oilseed cultivation has led to the import of edible oils. A noticeable jump in the area under fruits and vegetables is seen in the case of West Bengal. In TE-1992–1993, the area under fruits and vegetables was 10.4% and it increased to 16.6% in TE 2013–2014. At the aggregate India level, low level of diversification has taken place. Wheat, rice and pulses are the major crops that have occupied the highest area. In non-food crops, cotton and fibres indicate a slight increase.

### 3.8 | State-wise consumable and durable agricultural input use dynamics

#### 3.8.1 | Consumable agri-input

In India, cultivable land is limited, which has even shrunk over time. Productivity growth is the only option to increase production. The use

	TE-1992–1993 to TE-2002–2003			TE-2002–2003 to 2013–2014		
	A	P	Y	A	P	Y
Rice	0.29	1.21	0.90	0.01	2.18	2.20
Wheat	0.71	2.17	1.44	1.43	2.87	1.42
Course cereals	–1.81	–0.51	1.32	–1.15	3.00	4.22
Total pulse	–1.01	–0.94	0.06	1.36	3.98	2.62
Nine oilseed	–1.17	–0.61	0.54	1.74	5.13	3.35
Ground nut	–2.90	–2.73	0.10	–1.72	1.80	3.49
Rapeseed and Mustered	–2.70	–1.87	0.81	2.71	5.01	2.25
Cotton	1.13	–0.95	–2.06	3.28	12.75	9.16
Sugarcane	1.79	1.99	0.21	1.15	1.65	0.49

Note: Author's calculation based on Data from Directorate of Economics & Statistics, MoA & FW, Govt. of India.

**TABLE 6** Compound annual growth in area, production and yield of major crops in India

**TABLE 7** State-wise share of gross cropped area across various crops

States	TE	Rice	Wheat	Pulse	Total Food		Sugarcane	Spices	Condiment and	Fruits and Veg.	Total Food	Oilseed	Cotton	Fibres	Plantation
					Grain	Crops									
Andhra Pradesh	1993	29.6	0.1	12.4	56.7	1.9	2.6	4.2	65.4	25.1	5.5	6.2	1.6		
	2003	28.6	0.1	15.8	55.5	3.1	2.8	6.8	68.2	20.7	7.7	8.4	1.2		
	2014	29.4	0.1	13.3	52.6	2.6	2.3	7.4	65.0	15.1	16.4	16.6	1.1		
Bihar	1993	50.0	19.8	10.8	89.5	1.4	0.2	4.5	95.7	2.3	0.0	1.7	0.2		
	2003	50.3	21.7	8.2	88.7	1.1	0.1	5.1	95.0	2.2	0.0	1.7	0.2		
	2014	46.7	24.1	7.3	87.4	2.6	0.1	5.6	95.7	2.1	0.0	1.5	0.1		
Gujarat	1993	6.1	5.4	8.6	44.0	1.6	1.5	1.9	49.0	26.8	10.7	10.8	1.7		
	2003	6.3	4.0	7.1	35.4	2.4	1.9	2.9	42.7	27.1	16.0	16.0	1.6		
	2014	6.4	10.1	6.8	36.2	1.9	3.0	3.8	44.9	24.8	20.9	20.9	1.2		
Karnataka	1993	10.3	1.7	13.8	59.0	2.2	2.3	2.3	66.9	24.7	5.0	5.1	2.1		
	2003	11.3	2.2	16.8	61.5	3.4	3.3	4.2	72.4	18.9	4.3	4.4	2.4		
	2014	11.1	1.8	19.5	61.3	5.5	3.4	5.2	75.3	15.3	4.8	4.8	3.0		
Madhya Pradesh	1993	21.6	15.6	20.2	73.2	0.3	0.8	0.9	75.3	18.7	2.3	2.4	0.1		
	2003	23.1	14.9	19.9	68.6	0.3	0.8	1.2	71.0	23.9	2.2	2.3	0.1		
	2014	19.9	19.9	19.3	65.8	0.4	1.2	1.7	69.1	27.1	2.1	2.1	0.2		
Maharashtra	1993	7.5	3.5	15.4	65.6	2.6	0.8	2.4	71.4	12.1	12.8	13.0	0.1		
	2003	7.2	3.6	17.0	61.7	3.1	0.7	4.3	69.8	11.7	14.1	14.3	0.0		
	2014	7.0	4.0	15.6	48.8	4.3	0.6	4.8	58.6	18.2	18.5	18.6	0.1		
Punjab	1993	27.3	43.4	1.6	75.4	1.4	0.1	1.3	78.3	1.9	9.4	9.4	0.0		
	2003	32.3	43.1	0.7	78.6	1.8	0.0	1.9	82.3	1.1	6.5	6.5	0.0		
	2014	36.0	44.7	0.3	82.8	1.1	0.0	2.2	86.1	0.7	6.1	6.1	0.2		
Rajasthan	1993	0.7	10.1	17.2	63.8	0.1	1.7	0.4	66.0	17.4	2.4	2.5	0.3		
	2003	0.7	12.2	14.0	61.9	0.1	3.4	0.6	65.9	15.7	2.7	2.8	0.7		
	2014	0.5	12.3	15.9	54.6	0.0	3.5	0.7	58.8	19.9	2.0	2.1	0.9		
Uttar Pradesh	1993	21.6	34.2	11.7	79.7	7.4	0.3	3.5	91.2	4.4	0.1	0.1	0.3		
	2003	22.9	36.6	10.5	79.9	8.2	0.3	3.8	92.4	3.2	0.0	0.0	0.7		
	2014	23.0	37.5	9.1	78.0	8.4	0.3	4.3	91.1	4.2	0.0	0.0	1.5		
West Bengal	1993	66.6	3.1	3.3	74.0	0.2	1.0	10.4	85.5	6.5	0.0	6.2	1.5		
	2003	61.0	4.5	2.7	68.8	0.2	1.1	13.7	83.9	6.5	0.0	6.8	2.4		
	2014	57.7	3.4	2.3	64.8	0.2	1.4	16.6	83.0	7.9	0.0	6.2	2.6		
All India	1993	23.0	13.0	12.8	67.9	2.2	1.3	3.7	75.2	14.2	4.2	4.8	0.9		
	2003	23.9	14.1	12.0	66.2	2.6	1.6	4.8	75.3	13.3	4.6	5.2	1.2		
	2014	22.2	15.6	11.7	62.5	2.8	1.7	4.9	72.0	14.8	6.1	6.6	1.4		

Note: Author's calculation based on Data from Directorate of Economics &amp; Statistics, MoA &amp; FW, Govt. of India.



**TABLE 8** State-wise consumable agricultural input

States	Fertilizers (10 <sup>5</sup> metric tonnes)			FYM (10 <sup>5</sup> metric tonnes)			Pesticides area treated (Mh)		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
Andhra Pradesh	15.7	21.1	25.8	280.5	274.8	157.7	5.2	9.0	7.7
Arunachal Pradesh	0.0	0.1	0.0	0.0	0.3	0.2	0.1	0.0	0.0
Assam	0.1	0.8	1.8	12.7	92.8	6.8	0.1	0.5	0.8
Bihar	6.2		11.3	13.8		51.5	0.0	0.0	2.8
Gujarat	5.0	7.2	17.3	191.6	259.9	25.5	2.5	4.8	5.5
Haryana	6.6	7.8	12.8	40.1	134.5	21.0	1.7	3.4	4.3
Himachal Pradesh	0.6	0.6	0.5	38.3	45.7	36.5	0.0	0.1	0.6
J&K	1.3	1.2	1.1	64.8	8.3	39.9	0.1	0.3	0.8
Karnataka	7.7	13.2	17.5	270.8	293.1	171.1	2.6	2.7	3.7
Kerala	1.3	2.2	1.1	1.0	12.0	9.8	0.3	0.3	0.2
Madhya Pradesh	4.9	5.2	24.6	38.0	19.7	111.8	0.4	1.5	10.8
Maharashtra	8.2	18.9	29.9	5.5	195.8	167.3	4.1	8.0	16.0
Orissa	1.5	3.3	4.0	110.9	85.1	70.2	0.8	1.4	1.4
Punjab	11.3	13.1	19.1	278.3	107.0	72.1	5.0	6.8	7.1
Rajasthan	3.7	6.5	10.2	113.0	260.8	108.3	1.6	2.9	7.2
Tamil Nadu	9.8	8.7	11.7	510.8	236.8	83.6	1.7	3.4	2.9
Uttar Pradesh	14.8	30.5	42.8	637.0	146.4	60.8	1.6	1.7	5.5
West Bengal	3.9	11.8	16.1	27.6	94.6	138.6	3.3	6.2	5.6
All India	103	157	248	2,647	2,384	1,346	31.6	54.6	82.9

Note: Source: Agriculture Census Division, DAC& F, MoA&FW (India).

of modern technology and inputs lead to growth in productivity (Asfaw, Shiferaw, Simtowe, & Lipper, 2012 and McArthur & McCord, 2017). HYVS is highly responsive with the use of modern inputs, like fertilizers, and proper irrigation facilities (Parikh, 1978). Table 8 shows the values of state-wise consumable agricultural inputs such as fertilizers, FYM and pesticides. It can be seen that there has been a good increment in the use of fertilizers in all the states; particularly in Uttar Pradesh, West Bengal and Maharashtra its consumption has increased sharply. Fertilizer consumption has increased more than twofold during 1991–2011 at overall India level. But, on the other hand, farmyard manure's consumption has been declining in many states and overall in India, and a huge downfall has been recorded for Uttar Pradesh, Punjab and Tamil Nadu. These states are dependent on fertilizers for productivity growth. Only West Bengal and Maharashtra have shown increment in FYM consumption. As far as pesticide consumption is concerned, it has been found that its uses have increased more than double at India level. During the phase 1991–2001, the uses of pesticides were commonly not in practice, but in the second phase, a high jump has been seen particularly in UP, Rajasthan, Maharashtra and MP.

### 3.8.2 | Durable agricultural input

Traditionally, Indian agriculture has been labour intensive. But after the green revolution, technology based inputs have been mainly adopted by large farmers. To fulfil the increasing demand, farm

mechanization was the best strategy that could be adopted. Farm mechanization is needed for improving farm productivity (Sims & Kienzle, 2016). In the first phase (1991–2001), the use of electric pump sets in India increased to 18,448 thousand in 2001 from 9,324 thousand in 1991. West Bengal, Maharashtra, Tamil Nadu, Kerala and Andhra Pradesh indicate a high jump in the use of electric pump sets. Uttar Pradesh showed an unexpected decline in the use of electric pump sets for agriculture purposes. During 2001–2011, the use of electric pump sets did not increase as much as in the first phase, although positive improvement was recorded in WB, Jammu & Kashmir, Rajasthan, AP and MP. However, the largest agricultural productive states, Punjab and UP, were not using electric pump sets in agricultural production.

As far as power tillers are concerned, their uses have increased threefold in India during the first phase. Increasing trends have been found in using power tillers in the states of West Bengal, Andhra Pradesh, Maharashtra, Karnataka and Odisha during 1991–2001. West Bengal used the highest number of power tillers in 2001. A perusal of Table 9 reveals that, in 2011, the use of power tillers had increased more than twofold. The highest increase was found to be in Maharashtra, MP, West Bengal and AP. While in the case of UP and Punjab, no improvement has been seen.

Regarding the number of tractors used for agricultural purposes, about four times increment has been recorded for the period 1991–2001 at aggregate India level. In 1991, there were 3,764 thousand tractors in India being used for agricultural purposes, which increased to 15,463 thousand in 2001. The highest increase has been



**TABLE 9** State-wise durable agricultural input no. in thousand unit

	Electric pump set			Power tiller			Tractor used for agri. purposes		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
Andhra Pradesh	1,340	2,793	3,512	80	283	764	1,040	3,412	6,723
Assam	0	10	90	0	216	347	0	21	97
Bihar	0	0	683	0	0	196	0	0	12,626
Gujarat	598	808	618	76	48	110	445	655	1,002
Haryana	303	664	646	82	240	189	174	786	891
Himachal	1	3	5	1	1	8	2	8	15
Jammu	1	20	238	0	6	165	1	170	629
Karnataka	790	1,014	1,293	30	128	310	57	555	1,671
Kerala	260	786	765	42	115	18	160	149	80
Madhya	789	1,914	2,807	51	81	603	106	987	2,716
Maharashtra	752	3,485	3,941	18	96	1,070	45	462	2,462
Odisha	33	49	220	14	112	221	28	601	1,510
Punjab	496	946	686	151	111	100	217	700	768
Rajasthan	917	1,001	1,879	56	96	122	856	1,935	5,213
Tamil	966	3,667	3,390	23	641	978	241	2,973	3,641
Uttar Pradesh and Uttarakhand	1,492	896	986	411	299	293	287	1,237	16,975
West Bengal	13	211	936	1	725	2,243	39	614	3,009
India	9,324	18,448	22,761	1,071	3,261	7,954	3,764	15,463	61,133

Note: Source: Agriculture Census Division, DAC& F, MoA&FW (India).

seen in West Bengal, Orissa, Tamil Nadu and Karnataka. However, Andhra Pradesh, Tamil Nadu, Rajasthan and Uttar Pradesh were the top tractor using states for agriculture purposes. During 2001–2011, there were about fourfold overall increment in the number of tractors used for agricultural purposes in India. Uttar Pradesh, Andhra Pradesh and Rajasthan were the top tractor using states in 2011. The highest jump during the second phase has been found in UP, Maharashtra, West Bengal and Rajasthan.

From the above observations, it is revealed that, during 1991–2011, consumption of durable agricultural inputs increased sharply in West Bengal, Andhra Pradesh, Maharashtra, Rajasthan and Tamil Nadu, and it can be clearly seen in Table 1 that the growth of AGDP was good in these states. It reveals that AGDP is responsive to the use of durable agricultural inputs. Thus, there has been a clear association between the use of durable agri-inputs and the growth of AGDP at the state-level.

#### 4 | INSTITUTIONAL CREDIT FOR AGRICULTURAL PURPOSES

Credit is one of the critical inputs since, due to the long gestation period of agricultural production, farmers require credit to cater their off-farm and non-farm needs. In 1991, the overall credit disbursement to agricultural sector was only Rs. 4,465.32 crore, but the credit disbursement has increased exponentially during the first phase. Agricultural credit disbursement in Andhra Pradesh in 2001 alone was more

**TABLE 10** Institutional credit for agricultural purposes (Rs in Crores)

	1991–1992	2001–2002	2011–2012
Andhra Pradesh	868.98	6,710.41	22,646.35
Assam	7.70	68.76	393.6012
Bihar	90.84	0.00	15,676.33
Gujarat	650.55	3,412.38	13,528.15
Haryana	620.27	3,450.68	28,648.93
Himachal	0.03	29.75	2,582.345
Jammu	0.00	0.00	161.617
Karnataka	762.34	5,156.17	12,595.47
Kerala	490.18	1,116.37	6,444.468
Madhya	453.84	1,326.34	21,619.36
Maharashtra	0.00	6,976.32	23,686.24
Odisha	112.44	533.731	4,599.145
Punjab	85.41	3,082.72	15,587.84
Rajasthan	91.62	3,254.16	28,128.29
Tamil	0.00	2,969.23	7,196.025
Uttar Pradesh and Uttarakhand	0.73	2,591.46	32,853.25
West Bengal	84.98	679.176	6,593.131
India	4,465.32	41,979.14	243,276.7

Note: Source: Agriculture Census Division, DAC& F, MoA&FW (India).

than the total overall credit in India in 1991. Institutional credit disbursement to agricultural purposes has increased more than ninefold during 1991–2001 (Table 10). The highest institutional credit has been given to AP, followed by Maharashtra and Gujarat in 2001. Similar increasing trends have been continuing till 2011, but the growth rate has been declining. Institutional credit disbursement for agricultural purposes reached Rs 243,276.7 crore in 2011 from Rs. 41,979.14 crore in 2001 for aggregate India level. The highest increase has been observed in Madhya Pradesh, UP and Haryana for the period 2011–2001. Results of credit disbursement in these states have been seen in the growth of AGDP of these states. Despite credit disbursement and improvement in the use of agri-inputs, agriculture in West Bengal could not perform accordingly in terms of production and productivity.

## 5 | CONCLUSION

The growth of GSDP from agriculture does not show region-specific uniform patterns in India. After 2000, most of the states have recorded higher growth in GSDP from agriculture as compared with the previous decade of 1990–2000. However, the point of concern is that better performing states in the first phase like Karnataka, Maharashtra, Punjab and West Bengal have shown a decline in their growth rates. Madhya Pradesh, Gujarat and Rajasthan had been the leaders in agricultural growth over the second phase. Thus, inter-state disparities in agricultural growth rates have declined during the second phase. This is likely to improve the socio-economic conditions of the poor in relatively poorer states. Agricultural policies will have to focus not only on accelerating the growth among relatively slow-performing states but also ensure that better performing states are able to sustain their growth rates. This can be achieved by improving land productivity and diversification from low-value crops to high-value crops. In most of the states, GSDP growth from agriculture has been due to the increase in foodgrain yield. Madhya Pradesh, Gujarat and Rajasthan showed the highest foodgrain yield growth along with Orissa.

Most of the major states recorded negative growth in net sown area in the first phase except Uttar Pradesh, which had some positive growth. But during 2000–2001 to 2013–2014, this trend was reversed in many states with improvement in the growth of NSA, except for Bihar, Kerala, Orissa and West Bengal where it deteriorated further. The effects of afforestation policy in 2000 impacted positively on NSA and GCA at overall India level. All states witnessed positive improvement in cropping intensity, although the degree of improvement has been different across the states. Punjab (190.1), Haryana (183.8) and West Bengal (181.8) indicated the highest cropping intensity among major states in TE-2013–14.

In the early reforms phase, a serious retrogression in both area and production of major crops like coarse cereals, pulses and oilseeds was recorded. Yield growth in this period was almost stagnant, at about 0.1% for pulses and groundnut. Productivity of other crops did not reveal even moderate growth. Bhalla and Singh (2009) argued that decline in public investment in irrigation and water management and scientific research

were the major reasons for this. In the post-2000 period, all the major crops registered unprecedented increase in compound annual growth.

Diversification from low-value to high-value crops has increased over the reforms period but there were wide interstate disparities in the pace of diversification across the states. There has been a moderate level of diversification towards non-food crops in Gujarat, MP, Maharashtra and Rajasthan, reflecting gradual commercialization of Indian agriculture. In Maharashtra and Gujarat, diversification has been towards cotton and fibre, while in MP, diversification was seen in favour of oilseeds. But two major agricultural states, Punjab and Uttar Pradesh, did not show any diversification. Punjab still continues with a very high concentration of food crops because of high yield, subsidized inputs and better prices of these crops due to high administered prices and strong government procurement network. In Punjab and UP, the area occupied by food crops in TE 2013–2014 was 86.1 and 91%, respectively. This is not an encouraging sign as excessive reliance on foodgrains, especially since green revolution, has resulted in undesirable adverse consequences, in the form of soil salinity, because of indiscriminate and unscientific use of highly subsidised cheap chemical fertilisers, depletion of groundwater resources due to availability of free water and power and soil erosion threatening the sustainability of agriculture in these areas. To encourage diversification and changing cropping pattern in these regions, it is essential to reduce input subsidies and increase procurement prices of other crops. Recent agricultural marketing reforms announced by the union government are likely to help in accelerating the pace of diversification.

During economic reforms, the demand for consumable and durable agricultural inputs has increased significantly. Consumption of Fertilizers and pesticides has increased more than twofold since economic reforms. Uttar Pradesh, Punjab, Madhya Pradesh, Maharashtra and Gujarat recorded a high increase in the use of fertilizer consumption by farmers, particularly during 2001–2011. But an interesting feature is that the southern states of India have not indicated an increase in consumption of consumable agri-inputs. As far as durable inputs are concerned, the use of tractors for agricultural purposes has increased sharply in the post-reforms period, particularly since 2000. The major reasons behind the improvement in the use of inputs have been increased farmers' income and subsidized policy for consumable inputs and improved infrastructural facilities for durable inputs. Another important reason is the increase in accessibility to credit and other financial services at a very low cost.

The first decade of economic reforms did not bring about any breakthrough for the agriculture sector. In fact, there has been a deceleration in agricultural growth as well as other indicators like NSA, GCA, public investment and pace of diversification towards non-food crops during the first phase. But from 2000 onwards, agricultural sector's growth has picked up and an increase has been observed in the productivity of major crops due to the increase in the use of consumable and durable inputs and access to agricultural credit in the form of Kisan Credit Card, which has shown an increasing trend since 2000. But growth has been marked by wide interstate disparities. There is a need to take an immediate step to increase the cropping intensity in Orissa, Karnataka, Gujarat and Andhra Pradesh. It is beyond the scope of this study to analyse the

growth drivers empirically. But a state-wise comprehensive study can be done by taking all indicators as a predictor of growth econometrically in the future by researchers.

## ORCID

Waseem Khan  <https://orcid.org/0000-0003-1641-6249>

## ENDNOTE

<sup>1</sup> Three Indian states, namely Uttar Pradesh, Madhya Pradesh and Bihar were divided and three new states were created from these states in the year 2000. Uttarakhand was created from Uttar Pradesh, Chhattisgarh from Madhya Pradesh and Jharkhand from Bihar. For the analysis, data were summed up for these states after 2000 for adjustment.

## REFERENCES

- Ansari, S. A., & Khan, W. (2015). India's agricultural trade potential in post-WTO period. *Agricultural Economics Research Review*, 28, 93–100.
- Asfaw, S., Shiferaw, B., Simtowe, F., & Lipper, L. (2012). Impact of modern agricultural technologies on smallholder welfare: Evidence from Tanzania and Ethiopia. *Food Policy*, 37(3), 283–295.
- Bhalla, G. S., & Singh, G. (2009). Economic liberalisation and Indian agriculture: A statewise analysis. *Economic and Political Weekly*, 44(52), 34–44.
- Byerlee, D., Diao, X., & Jackson, C. P. (2005). Agriculture, rural development, and pro-poor growth: Country experiences in the post-reform era. Agriculture & Rural Development Department, World Bank.
- Chand, R. (2004). Impact of trade liberalization and related reforms on India's agricultural sector, rural food security, income and poverty. Global Development Network.
- De Roy, S. (2017). Economic reforms and agricultural growth in India. *Economic and Political Weekly*, 52(9), 67.
- Kalirajan, K. P. & Sankar, U. (2001). Agriculture in India's economic reform program. *Journal of Asian Economics*, 12(3), 383–399.
- Kannan, E. (2012). Trends in India's agricultural growth and its determinants. *Asian Journal of Agriculture and Development*, 8(2), 79.
- Khan, W., Fatima, S., & Jamshed, M. (2017). Agricultural credit-led agricultural growth: A VECM approach. *Asian Journal of Agricultural Extension, Economics & Sociology*, 19(1), 1–16.
- Khan, W., Tabassum, S. & Ansari, S. A. (2017). Can diversification of livelihood sources increase income of farm households?—A Case Study in Uttar Pradesh. *Agricultural Economics Research Review*, 30(conf), 27–34.
- Mahadevan, R. (2003). Productivity growth in Indian agriculture: The role of globalization and economic reform. *Asia Pacific Development Journal*, 10(2), 57–72.
- McArthur, J. W., & McCord, G. C. (2017). Fertilizing growth: Agricultural inputs and their effects in economic development. *Journal of Development Economics*, 127, 133–152.
- Misra, V. N. (1998). Economic reforms, terms of trade, aggregate supply and private investment in agriculture: Indian experience. *Economic and Political Weekly*, 33, 2105–2109.
- Moni, M. (2001). Impact of economic reforms on Indian agricultural sector: Application of geomatics technology to reduce marginalization and vulnerability of small farmers in India. National Informatics Centre, Ministry of Information Technology, New Delhi. Retrieved from <http://www.gisdevelopment.net/application/agriculture/production/agric0003pf.htm>
- Mythili, G. (2008). Acreage and Yield Response for Major Crops in the Pre- and Post-Reform Periods in India: A Dynamic Panel Data Approach. IGIDR – ERS/USDA Project: Agricultural Markets and policy.
- Nagaraj, K., Sainath, P., Rukmani, R., & Gopinath, R. (2014). Farmers' suicides in India: Magnitudes, trends, and spatial patterns, 1997–2012. *Review of Agrarian Studies*, 4(2), 53–83.

- Parikh, K. S. (1978). HYV fertilisers: Synergy or substitution: Implications for policy and prospects for agricultural development. *Economic and Political Weekly*, 13, A2–A8.
- Ramachandran, V. K., & Rawal, V. (2010). The impact of liberalization and globalization on India's agrarian economy. *Global Labour Journal*, 1(1), 56–91.
- Ramakumar, R. (2009). Indian Agriculture under Economic Reform: A Preliminary Review. Retrieved from <http://www.networkideas.org/ideasact/jan09/PDF/Ramakumar.pdf>
- Rao, D., & Parwez, S. (2005). Dynamics of cropping pattern in sorghum growing states of India. *Indian Journal of Agricultural Economics*, 60(4), 644.
- Sen, A. (1992). Economic liberalisation and agriculture in India. *Social Scientist*, 20(11), 4–19.
- Sharma, A. K. (2015). Transformation in Indian agriculture, allied sectors, and rural India: Is there less krishi in bharat. NCAER, New Delhi.
- Sims, B., & Kienzle, J. (2016). Making mechanization accessible to small-holder farmers in sub-Saharan Africa. *Environments*, 3(2), 11.

## AUTHOR BIOGRAPHIES

**Dr. Waseem Khan** is Assistant Professor at GLA University, Mathura. He holds Master's and Ph.D. in Agricultural Economics and Business Management. His area of interest includes Managerial Economics, Agricultural Economics and Agribusiness.

**Dr. Saghir Ahmad Ansari** is M.A. and Ph. D. in Economics from Aligarh Muslim University, Aligarh. He started teaching Economics in 1986 at AMU. Dr. Ansari has been serving as Professor of Economics. Dr. Ansari served as Professor of Economics, under United Nations Development Programme at Ethiopian Civil Service University, Addis Ababa, Ethiopia. His main area of interest is Indian Economy, Indian Agriculture, Economic Theory, International Trade and Finance. Dr. Ansari published a number of research papers in refereed journals of national and international repute which includes Foreign Trade Review, Journal of Social and Economic Development, and Asian Economic Review, etc. He has attended a number of national and international conferences and also chaired technical sessions.

**Dr. Tabassum Ali** has teaching and research interests in the area of marketing with focus on food marketing, consumer behaviour and retail management. She has been working as a faculty member since 2014, before which she has also worked in corporate sector for about four years in the area of international marketing. Dr Ali has published several research papers in referred journals and has many conference presentations to her credit.

**How to cite this article:** Khan W, Ansari SA, Ali T. Economic reforms and agriculture in India: A state-wise analysis of post-reforms period. *J Public Affairs*. 2020;e2390. <https://doi.org/10.1002/pa.2390>