

AGRICULTURE GROWTH AND DEVELOPMENT INDIA

D. Anjaneyulu

Lecture in Economics

Govt Junior College, Mothkur

Yadadri Bhuvanagiri.

Abstract

The agricultural sector is a central pillar of the Indian economy, employing 60 percent of the nation's workforce and contributing to about 17 percent of its GDP this paper : AGRICULTURE GROWTH AND DEVELOPMENT INDIA" deals with Agricultural system, growth & Development, fields, farming styles & marketing of agricultural products also discussed

Key Words: Indian Economy, Agricultural, Fields & Yields

Introduction

Agriculture plays a significant role in India's economic growth. With around 54.6% of the total workforce involved in agriculture and allied sector activities, the sector contributes 17.8% to the country's Gross Value Added (GVA). During 2021-22, in the country's total exports agricultural exports contributed of to the tune of US \$ 50.2 billion with a 20% increase from US \$ 41.3 billion in 2020-21. In FY 2023, it is projected that the Indian agriculture sector will grow at the rate 3.5%.

Agricultural productivity depends on several factors. These include the availability and quality of agricultural inputs such as land, water, seeds and fertilizers, access to agricultural credit and crop insurance, assurance of remunerative prices for agricultural produce, and storage and marketing infrastructure, among others. This report provides an overview of the state of agriculture in India. It discusses factors related to the production and post-harvest activities in agriculture.

The agricultural sector is a central pillar of the Indian economy, employing 60 percent of the nation's workforce and contributing to about 17 percent of its GDP. Productivity remains a challenge, however, and poverty and malnutrition in rural areas remain high. Water shortages, a changing climate, and fragmented land holdings make it difficult for millions of smallholder farmers to feed their families, much less earn a profit from their labor

As of 2009-10, more than half of the total workforce (53%) of the country, i.e. 243 million persons were employed in agriculture. The share of population depending on agriculture for its livelihood consists of landowners, tenant farmers who cultivate a piece of land, and agricultural labourers who are employed on these farms. Agricultural output has been volatile over the past 10 years, with annual growth ranging from 8.6% in 2010-11, to -0.2%



in 2014-15 and 0.8% in 2015-16. Figure 3 shows the trend in the growth of agricultural sector over the past 10 yea

The use of conventional farming methods in India had traditionally led to comparatively less improvement in efficiency and agricultural yields resulting in low productivity of agriculture. Taking note of this, the government has initiated the **4**th **wave of revolution in the agricultural sector** to introduce technological advancement in the sector to improve yields.

India's agricultural sector today is said to be on the verge of a **breakthrough technological transformation**. After decades of evolution, starting from Mechanisation and the Green Revolution, **disruptive technologies** are said to have ushered in **Precision Agriculture**. The new farm management approach uses Geopolitical Systems (GPS) and Artificial Intelligence-enabled software for **precise mapping of farmlands, ensuring that individual fields or crops get precisely the inputs they need for optimum productivity.**

Agriculture 4.0 is said to be a considerably advanced version of precision farming methods with the potential to transform the existing methods of farming. Precision farming focuses on a comprehensive approach towards maintaining the well-being of the field and the soil with a focus on improving the quality and quantity of yield with minimum environmental harm according to experts.

The idea of **4th Revolution in agriculture** according to experts involves:

- 1. Use of the Internet of Things (IoT), that **connects billions of physical devices around the world to the internet, all collecting and sharing data**;
- 2. Big data, providing farmers granular data on rainfall patterns, water cycles, fertilizer requirements, and more;
- 3. Artificial intelligence to improve crop production and real-time monitoring, harvesting, processing, and marketing, and;
- 4. Robotic system that can perform tasks like ploughing, sowing seeds, applying fertilisers, and spraying pesticides with precision to accelerate and improve the efficiency of the activities throughout the entire production chain.

According to experts, Precision farming has the potential to transform the conventional farming industry. While the Conventional farming practices control watering of crops and spraying pesticides or fertilisers uniformly across the field, the farmers under Precision farming will need to be more targeted and data-driven in the context of farming according to them.

Future farms therefore will be more productive according to experts owing to:

1. The employment of robotics,



- 2. Temperature and moisture sensors,
- 3. Aerial photos, and;
- 4. GPS technology.

These cutting-edge methods will improve farm profitability, efficiency, safety, and environmental friendliness according to them. These together are referred to as **advanced or high-tech precision farming**.

Prospects of Indian Agriculture

The continuous technological innovation in the Indian agriculture sector can play a critical role in the growth and development of the sector crucial for ensuring:

- 1. Increased agricultural production;
- 2. Generating employment, and;
- 3. Reducing poverty to promote equitable and sustainable growth.

Various **Constraints** to the achievement of this goal include:

- 1. Diminishing and degraded land and water resources;
- 2. Drought;
- 3. Flooding, and;
- 4. Global warming.

These constraints, generating unpredictable weather patterns, present a significant barrier to India's agriculture to growing sustainably and profitably according to experts.

Under these circumstances, the future of agriculture seems to depend on the involvement of much-developed technologies like robotics, temperature and moisture sensors, aerial images, and GPS technology. Use of these, in the opinion of experts will make farms more productive, efficient, safe, and environmentally sustainable owing to the cutting-edge equipment, robotic systems, and precision agriculture.

Epilogue

Recent Trends in Agriculture

India's agriculture mainly depends on the nature. However changing climate and global warming are making farming unpredictable. The need to use modern technologies to increase productivity and profitability has therefore led to the adoption of Agriculture 4.0 in India.



There have been significant changes in India in the context of agriculture over the decades with development of many new technologies. Several new-age farmers are now using soil mapping software to determine the optimum level of fertilizers used in the farms.

Application of these emerging technologies in farming and agriculture has paved the way for more opportunities. The Agro-tech Start-ups and traditional farmers are now said to be using the latest solutions and trends to improve production in the food value chain, including the adoption of new technologies, such as **cloud-based solutions which offer widespread access to weather forecasts and other critical information and other relevant advanced agricultural management techniques to increase farmer efficiency and produce more crops.**

Some Examples include:

- 1. Grape farmers in India have begun spotting and geo-locating crop diseases or pestilence, allowing them to control infestations earlier and in a more precise manner leading to lower use of harmful pesticides on the crop.
- 2. Soil mapping software is used by several new farmers to determine the optimum level of fertiliser use in their farms.
- 3. They are also using drones which allow spraying pesticides in a more targeted manner.
- 4. Sugarcane farmers in India have started using technology to gauge the most appropriate time to harvest their crops, which allows them to better plan their harvest and maximise output.
- 5. Several Indian farmers have also begun to use AI/ML-powered technologies to forecast crop yield, weather conditions and price trends in mandis.
- 6. A few farmers have also begun testing self-driving tractors and seed-planting robots to free their farms from the vagaries of labour shortages.

Emerging trends in the agricultural sector that are quite prominent in the post-liberalization era include increased production, increased investment, diversification of the sector, use of modern techniques, development of horticulture and floriculture, increasing volume of exports and development of the food processing industry.

The farmers must advantage of these technologies to productivity on their farms

Farmer suicides

In 2012, the National Crime Records Bureau of India reported 13,754 farmer suicides. Farmer suicides account for 11.2% of all suicides in India. Activists and scholars have offered a number of conflicting reasons for farmer suicides, such as monsoon failure, high debt burdens, genetically modified crops, government policies, public mental health, personal issues and family problems.



Marketing

Agro marketing is poorly developed in India

Diversion of agricultural land for non-agricultural purpose

Indian National Policy for Farmers of 2007 stated that "prime farmland must be conserved for agriculture except under exceptional circumstances, provided that the agencies that are provided with agricultural land for non-agricultural projects should compensate for treatment and full development of equivalent degraded or wastelands elsewhere". The policy suggested that, as far as possible, land with low farming yields or that was not farmable should be earmarked for non-agricultural purposes such as construction, industrial parks and other commercial development

Amartya Sen offered a counter viewpoint, stating that "prohibiting the use of agricultural land for commercial and industrial development is ultimately self-defeating." He stated that agricultural land may be better suited for non-agriculture purposes if industrial production could generate many times more than the value of the product produced by agriculture Sen suggested India needed to bring productive industry everywhere, wherever there are advantages of production, market needs and the locational preferences of managers, engineers, technical experts as well as unskilled labour because of education, healthcare and other infrastructure. He stated that instead of government controlling land allocation based on soil characteristics, the market economy should determine productive allocation of land.

Climate change

This section is an excerpt from Climate change in India § Reduced crop yields.Climate Change in India will have a disproportionate impact on the more than 400 million that makeup India's poor community. This is because so many depend on natural resources for their food, shelter and income. More than 56% of people in India work in agriculture, while many others earn their living in coastal areas.

The impact of climate change on Indian agriculture was investigated through the National Innovations in Climate Resilient Agriculture (NICRA) study. The findings indicate that rainfed rice yields in India are expected to experience a marginal reduction of less than 2.5% in the years 2050 and 2080. On the other hand, irrigated rice yields are projected to decline by 7% in 2050 and 10% in 2080 scenarios. Moreover, the study forecasts a decrease in wheat yield ranging from 6% to 25% in the year 2100, while maize yields are estimated to decrease by 18% to 23% during the same period. However, there is a potential positive impact on chickpea, with anticipated productivity increases of 23% to 54% in the future climates

Initiatives

Viticulture farms in Maharashtra



Tea plantation in Tamil Nadu

The required level of investment for the development of marketing, storage and cold storage infrastructure is estimated to be huge. The government has not been able to implement schemes to raise investment in marketing infrastructure. Among these schemes are 'Construction of Rural Godowns', 'Market Research and Information Network', and 'Development / Strengthening of Agricultural Marketing Infrastructure, Grading and Standardisation'.

The Indian Council of Agricultural Research (ICAR), established in 1905, was responsible for the search leading to the "Indian Green Revolution" of the 1970s. The ICAR is the apex body in agriculture and related allied fields, including research and education. The Union Minister of Agriculture is the president of the ICAR. The Indian Agricultural Statistics Research Institute develops new techniques for the design of agricultural experiments, analyses data in agriculture, and specialises in statistical techniques for animal and plant breeding.

Recently (May 2016) the government of India has set up the Farmers Commission to completely evaluate the agriculture programme.

In November 2011, India announced major reforms in organised retail. These reforms would include logistics and retail of agricultural produce. The announcement led to major political controversy. The reforms were placed on hold by the government in December 2011.

In the summer of 2012, the subsidised electricity for pumping, which has caused an alarming drop in aquifer levels, put additional strain on the country's electrical grid due to a 19% drop in monsoon rains and may have contributed to a blackout across much of the country. In response the state of Bihar offered farmers over \$100 million in subsidised diesel to operate their pumps In 2015, Narendra Modi announced to double farmer's income by 2022

Startups with niche technology and new business models are working to solve problems in Indian agriculture and its marketing. Kandawale is one such e-commerce website which sells Indian red onions to bulk users direct from farmers, reducing unnecessary cost escalations.

Agriculture and Indian economy

The contributions of agriculture in the Indian economy have been increasing over the years. According to the economic survey, the share of agriculture in gross domestic product (GDP) reached almost 20% for the first time in 17 years, making a sole bright spot in performance during financial year 2020–2021.

Modern farms and agriculture operations have changed over the years primarily because of advancements in technology, including sensors, devices, machines, and information technology.



Personalized e-commerce stores and market places have brought farming products like fertilizers, seeds, machines and equipment that help farmers grow quality products. Educational portals let farmers know innovative things about farming that increase the contributions of agriculture to the economy.

State	Area (mha)	Share (%)	Production (mt)	Share (%)	Yield (kg ha ⁻ⁱ)
Andhra Pradesh	0.01	0.03	0.01	0.01	1000.00 He
Assam	0.05	0.17	0.06	0.06	1134.62
Bihar	2.17	7.26	4.79	5.10	2206.00
Chhattisgarh	0.11	0.36	0.13	0.14	1185.50
Gujarat	1.35	4.52	4.10	4.37	3034.79
Haryana	2.52	8.43	12.68	13.51	5029.50
Himachal Pradesh	0.36	1.19	0.60	0.63	1670.85
Jammu & Kashmir	0.29	0.97	0.41	0.43	1404.24
Jharkhand	0.18	0.60	0.34	0.36	1876.29
Karnataka	0.23	0.77	0.19	0.21	843.48
Madhya Pradesh	4.89	16.35	10.58	11.27	2164.00
Maharashtra	0.84	2.82	1.31	1.40	1557.53
Orissa	0.00	0.01	0.00	0.00	1551.72
Punjab	3.51	11.75	17.21	18.32	4898.00
Rajasthan	2.94	9.82	9.32	9.92	3175.00
Uttar Pradesh	9.73	32.54	30.29	32.26	3113.00
Uttarakhand	0.37	1.23	0.87	0.93	2368.56
West Bengal	0.32	1.06	0.88	0.94	2800.49
Others	0.04	0.13	0.13	0.14	3470.60
India	29.90	100.00	93.90	100.00	3140.35

Comparison of wheat area, production and yield in different states (2011-12)

Organic farming

Paramparagat Krishi Vikas Yojana (PKVY) was launched in 2015 by the Narendra Modi regime to promote organic farming, under which farmers form organic farming clusters of 50 or more farmers with a minimum total area of 50 acres to share organic methods using traditional sustainable methods, costs, and marketing, etc. It initially aimed to have 10,000 clusters by 2018 with at least 500,000 acres under organic farming and government "cover the certification costs and promote organic farming through the use of traditional resources." Government provides INR 20,000 per acre benefit over three years.

Other techniques of organic farming like zero budget natural farming (ZBNF) have been implemented by many small-scale farmers in Wayanad, Kerela. In this process they implement more natural and ecological methods of farming that decrease or completely cease use of pesticides and damaging chemicals, allievating the damage that, "Decades of overuse of chemicals and mono cropping and lack of management of soil fertility have depleted the formerly fertile forest-land" in the area.



Along with progression with organic farming methods, new technologies in the form of moisture sensors and artificial intelligence are also being implemented in the Indian farming sector. Farmers are using moisture sensors to ensure that different crops have the exact amount of water that they need, which ensures that farmers can maximise crop yield.long with this, artificial intelligence techniques are being implemented in food processing plants across India, where "AI provides more efficient ways to produce, harvest, and sell crops products as well as an emphasis on checking defective crops and improving the potential for healthy crop production" that further helps maximise crop yield as Rayda Ayed describes in her research on the impact of artificial intelligence in India.

		45110 4-4 1	-12. 1	CI STORES			101	111 - 1		
	2002 02	2012 14			-			(Kg.7.	Hectare)	
Grouper on monity	2012-13	2013-14	2014-12	2010-10	2009-17	2017-18	20129-129	2019-20	pup + ri	4941-64
(1)	(2)	(3)	(4)	(2)	(0)	(7)	(8)	(9)	. (19)	(11)
Foodgrains.	2019	2120	2018	2042	2129	1235	2.280	2345	2594	2419
Kaarif	1892	1804	1862	1805	1890	1951	1927	2029	2079	2138
Rabi	2451	2435	2232	2342	2441	2003	2740	2738	2793	25775
Cereals"	2449	2462	2331	2,393	1313	2657	2752	2772	2824	2895
Khurif	2110	2049	2081	2065	2188	2259	2320	2370	2406	2513
Natri	2932	2995	2081	2862	3010	3240	: 3403	3325	3412	3446
Nutri / Coarse Cereals*	1617	1212	1203	1579	1750	1934	1944	1991	2128	2247
Kharif	1583	1019	1633	1544	1708	1817	1790	1836	1970	2034
Rahi	1725	2034	1915	1686	1885	2322	2532	2491	2667	3000
Pubes*	789	764	728	656	786	853	757	823	885	892
Khurif	594	580	573	489	667	668	546	585	642	589
Rabi	934	. 891	843	796	902	1014	976	1045	1097	1149
Rice	2462	2416	2391	2400	2494	2576	2638	2722	2717	2809
Kharif	2374	2319	2295	2305	2417	2469	2553	2622	2607	2718
Rabi	3353	3232	3291	3382	3230	3534	3444	3569	3541	3521
Wheat	3117	3145	2750	3034	3200	3368	3533	3440	3521	3507
Jowar	850	957	884	697	812	960	849	989	1099	1310
Kharif	1171.	1050	1014	850	954	1102	989	967	1210	1086
Rahi	644	896	808	015	730	855	744	1002	1033	1125
Bajra	1198	1184	1255	1132	.1305	1231	1219	1374	1420	1436
Maize	2566	2676	2632	2563	2689	3065	.3070	3006	3199	3349
Tur	776	813	.720	646	913	966	729	859	914	859
Gram	1036	960	889	840	974	1078	1041	1142	1192	1260
Oilseeds*	1168	1168	1075	968	1195	1284	1271	1224	1247	1292
Kherif	1135	1151	1055	884	1153	1219	1168	1154	1133	1204
Rabi	1240	1207	1125	1186	1300	1435	1531	1397	1547	1479
Groundnut	995	1764	1552	1465	1398	1892	1422	2063	1703	1759
Kharif	811	1735	1478	1399	1321	1833	1304	2016	1649	1714
Rahi	1910	1919	1948	1801	1861	2222	2238	2352	2034	2015
Rapeseed and Musterd	1262	1185	1083	1183	1304	1410	1511	1331	1524	1458
Surprease (toppes/hert.)	68	71	71	71	64			30	8.0	8.1
Cottee	485	\$10	462	415	512	443	378	455	451	445
Jute and mesta	2281	2512	2473	2421	2585	2440	2508	2641	2542	2709
hute	2396	2610	2440	2452	2660	3517	7460	2206	2491	2224
Mesta	1237	1718	1575	1944	1664	1420	1471	1728	1782	1730
Plantation Crops	teres a	1000	100	-	1000			1140	10000	
Tes	2022	2170	2170	2170	2165	2210	1000	2138	2012	2112
Coffice	765	212	766	746	361	74.0	747	712	200	202
Rubber	1305	000	911	602	946	915	909	0.00	260	019
Builder	1200	200	20	099	015	015	101	000	009	908

Source: Directorate of Economies & Statistics, Department of Agriculture and Farmers Welfare.

^ 2021-22 : Provisional: Notes:

a Includes cereals and pulses;

b Includes rice and whent and natri coarse cereals;
c Includes maize, jowar, ragi, bajra, small millets and barley;

d Includes tur, urad, moong, gram, lentils and other pulses;

Includes grounduat, rapeseed & mustack seamum, inseed, castorseed, nigerseed, saffower, sunflower and soyabean.
* Agricultural Crops as per 4* Advance estimates and Horticultural Crops as per 3* Advance Estimates.

Government schemes

Anveshana's International Journal of Research in Regional Studies, Law, Social Sciences, Journalism and Management Practices EMAILID:anveshanaindia@gmail.com,WEBSITE:www.anveshanaindia.com



This is a dynamic list and may never be able to satisfy particular standards for completeness. You can help by adding missing items with reliable sources.

- ➢ 2020 Indian agriculture acts
- Atal Bhujal Yojana
- E-NAM for online agrimarketing
- Gramin Bhandaran Yojana for local storage
- Micro Irrigation Fund (MIF)
- National Mission For Sustainable Agriculture (NMSA)
- National Scheme on Fisheries Training and Extension
- National Scheme on Welfare of Fishermen
- > Pradhan Mantri Kisan Samman Nidhi (PMKSN) for minimum support scheme
- > Pradhan Mantri Krishi Sinchai Yojana (PMKSY) for irrigation
- > Paramparagat Krishi Vikas Yojana (PKVY) for organic farming
- > Pradhan Mantri Fasal Bima Yojana (PMFBY) for crop insurance

References

- 01. <u>https://www.business-standard.com/article/economy-policy/mgnregs-funds-fast-drying-up-as-demand-surges-amid-covid-19-pandemic-120091100035_1.html</u> (Accessed on 7 December 2020)
- 02. <u>https://www.cbgaindia.org/opinion/rural-infrastructure/</u> (Accessed by 7 December 2020)\
- 03. <u>https://economictimes.indiatimes.com/news/economy/agriculture/agriculture-exports-may-grow-to-100-billion-by-2022-experts/articleshow/60197117.cms</u> (Accessed by 7 December 2020
- 04. <u>https://economictimes.indiatimes.com/news/economy/policy/nabards-rural-infrastructure-</u> <u>development-fund-needs-a-relook-says-rbi-official/articleshow/40928706.cms</u> (Accessed on 7 December 2020)
- 05. <u>https://eprawisdom.com/jpanel/upload/articles/1131pm19.Dr.%20P.C.%20Jose%20Paul.pdf</u> (Access ed on 7 December 2020)
- 06. <u>https://rural.nic.in/press-release/training-and-employment-rural-youth</u> (Accessed on 7 December 2020)
- 07. <u>https://www.dailypioneer.com/2019/columnists/thrust-on-rural-india-must.html</u> (Accessed on 7 December 2020)
- 08. <u>https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf</u> (Accessed_on_7 December