Growing the Economy Through Sustainable Agriculture: Boosting Agricultural and Related Sectors' Gross Value Added in India

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ABSTRACT

Background and Objective: India's agricultural sector remains a cornerstone of its economy and rural livelihood. However, the dynamics of sectoral growth, crop acreage shifts, and production trends require deeper analysis to inform sustainable development strategies. This study aims to examine the driving forces behind agricultural Gross Value Added (GVA) trends, assess the contributions of major crops, and highlight policy pathways to boost agricultural and allied sectors' performance. **Materials and Methods:** The study adopts a quantitative approach using secondary data from reliable government sources covering 2011-12 to 2022-23. Trends in GVA share, sub-sectoral contributions, and crop-specific outputs were analyzed. Descriptive statistical techniques, including time-series comparisons and percentage change analyses, were employed to interpret sectoral performance and identify growth patterns. **Results:** Findings reveal a consistent rise in agriculture's GVA contribution, particularly from food grains, fruits, and vegetables. Horticulture emerged as a key growth driver, underscoring the sector's potential. Despite fluctuations in sub-sectoral performance, agriculture maintained a dominant share in GVA throughout the study period. The data highlight the pressing need for targeted investments in productivity, infrastructure, market access, and farmer training. **Conclusion:** Sustainable agriculture presents a viable path to enhancing GVA, ensuring food security, and promoting environmental conservation. By prioritizing fruit and vegetable cultivation and integrating food policy with rural development and climate resilience, India can foster inclusive growth and long-term sectoral viability. Limitations in data coverage suggest the need for further research into regional disparities and the socio-economic impacts of policy interventions.

INTRODUCTION

Agriculture and related sectors contribute significantly to India's Gross Value Added (GVA) and provide a key source of income for a large portion of the population. Recent data underscores the sector's enduring significance, as the agriculture and allied sectors contributed 18.4% to the total

Gross Value Added (GVA) in the year 2022-23 while growing at a rate of 3.3% over the previous year and it is expected to grow at a rate of 3.6% in the future, highlighting its substantial role in the national economy. Moreover, the agriculture sector employs more than half of the country's workforce, emphasizing its critical role in rural livelihoods and socio-economic stability[1]. Recent years have witnessed notable shifts in agricultural practices, with advancements in technology, irrigation techniques, and crop management strategies contributing to enhanced productivity and resilience against climatic uncertainties[2,3]. These advancements have played a crucial role in enhancing productivity and bolstering resilience against climatic uncertainties. However, amidst these advancements, significant challenges persist within the agricultural sector. One of the primary challenges is the fluctuation in the Gross Value Added (GVA) contribution of agriculture to the overall economy[4,5].

Agriculture's Gross Value Added (GVA) has substantial economic repercussions in India[6]. Agriculture, as a crucial sector strongly ingrained in the nation's tradition and employing a sizable section of its people, has a significant impact on India's economy. The performance of the agriculture sector not only directly impacts the livelihoods of millions of farmers and rural communities but also influences various downstream industries, food security, and overall economic stability[7-9]. Moreover, fluctuations in agricultural GVA can have ripple effects across the economy, affecting consumer spending, inflation rates, employment levels, and government revenues[10]. Thus, sustaining and enhancing the GVA of agriculture is essential for fostering inclusive growth, ensuring food security, and promoting economic resilience in India[4,11].

This research aims to examine these swings using comprehensive data analysis, shedding light on the agricultural sector's volatility and sensitivity. It analyses the performance of the agriculture and allied sectors, including agriculture, livestock, forestry, logging, fishing, and aquaculture, in terms of both value (₹ trillion) and share (%) in the total economy from 2011-12 to 2020-21. This research will not only emphasize the relative importance of each industry but will also indicate areas of strength and progress in the agricultural and allied industries.

MATERIALS AND METHODS
Data source: The data utilized in this study were sourced from various publications and reports published by the National Statistical Office and the Ministry of Statistics and Program Implementation for the Government of India[12], Agricultural Statistics at a Glance 2022, Economics and Statistics Division, Government of India[1,4] and "Horticultural Statistics at a Glance 2021, Horticulture Statistics Division, Ministry of Agriculture and Farmers Welfare, Government of India"[1,4]. These sources provided reliable and relevant data to support the analysis conducted for this research.

Variables and definitions
GVA values: This variable represents the Gross Value Added (GVA) of the agriculture and allied sector within the Indian economy at current market prices. The GVA is broken down into the following subcategories: Agriculture, livestock, forestry and logging, fishing, and aquaculture.

These subcategories capture the economic contribution of each respective industry area within the broader Agriculture and Allied Sector in India. The GVA by current market prices provides important insights into the performance and monetary value generated by this important sector of the Indian economy.

GVA Share: This variable represents the percentage contribution of the Agriculture and Allied sectors to the Gross Value Added (GVA) of the entire economy. It was calculated using the formula[13]:

$$\text{GVS Share (\%)} = \frac{\text{GVA of agriculture and allied sector}}{\text{Total GVA of the economy}} \times 100$$

Data analysis: To analyze trends and variations in the data across the study period, descriptive statistics such as the mean, compound annual growth rate, and Cuddy-Della Valle Index were generated.

Descriptive statistics: To analyze trends and variations in the data over the study period, descriptive statistics including the mean, Compound Annual Growth Rate (CAGR), and Cuddy-Della Valle Index (CDVI) were calculated[13,14].

Mean: The term "mean" in the context of a research paper typically refers to the arithmetic mean, which is a measure of central tendency. It's often represented as the average of a set of values, which can be useful in various statistical analyses and interpretations. The estimable form of the equation[15] is as follows:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i$$

Where:

$\bar{x}$ = Represents the mean
x_i = Represents each value in the dataset
n = Represents the total number of values in the dataset

Compound Annual Growth Rate (CAGR): Compound Annual Growth Rate (CAGR) is a business and investing metric used to evaluate the rate of return on an investment over a specific period. CAGR shows growth on an annualized basis and takes into account the effects of compound interest. To calculate CAGR for Gross Value Added (GVA) related to agriculture and allied sectors, area, and production, an exponential trend model[14] is used:

$$Y = ab^t$$

Where:

Y = Value being measured (GVA, area, production)
a = Intercept
b = Regression coefficient
t = Time in years

From the estimated exponential function, CAGR (r%)[14] can be expressed as:

$$CAGR\ (r\%) = (\text{Antilog of } b - 1) \times 100$$

where, 'r' represents the compound annual growth rate as a percentage. This calculation method accounts for the effects of compound interest to depict average annual growth over the specified period.

Instability index (Cuddy-Della Valle Index (CDVI)): The Cuddy-Della Valle Index (CDVI) was originally developed by Cuddy and Valle[14] in 1978 as a means to measure instability in time-series data characterized by trends[14]. Their index estimates instability as a function of variability and lack of trend, calculated through the following formula[14,15]:

$$\text{Cuddy - Della Valle Index (CDVI) formula} = I = CV \times \sqrt{1 - \overline{AdR^2}}$$

Where:

CV = Coefficient of variation (expressed as a percentage)
Adjusted R^2 = Coefficient of determination from a regression analysis

The index provides a measure of instability (I), also expressed as a percentage, by multiplying the coefficient of variation (a measure of displacement) by the square root of one minus the adjusted R-squared value obtained from regressing the data. This accounts for variability not explained by trends over time. The Cuddy-Della Valle Index[14] remains a useful statistical tool for quantifying fluctuations in time-series data around a trend line.

Ranges of CDVI are given as follows: Low instability: Between 0 to 15, Medium instability: Greater than 15 to lower than 30; High instability: Greater than 30".

Statistical software: Data analysis was performed using the statistical software SPSS 27.

Limitations
Data Limitations: The study is subject to the limitations inherent in secondary data analysis, including potential errors or inconsistencies in the data sources.

Scope Limitations: The study focused specifically on the Gross Value Added (GVA) of the Agriculture and Allied Sector in the Indian economy, limiting the potential applicability of findings to other industries or geographic areas.

RESULTS AND DISCUSSION
An examination of the Agriculture and Allied Sectors' percentage of Gross Value Added (GVA) at current prices for the fiscal years 2013-2014 through 2022-2023 (Table 1) shows fluctuations in the agricultural sector's share of GVA during this time. The information shows how India's agricultural sector's share of the country's total GDP changed over the course of the ten years under study. The percentage of GVA derived from agriculture decreased somewhat between 2013-14 and 2016-17, from 18.6% to 17.7%. In 2016-17, there was a minor uptick, though, as the percentage increased to 18%. The percentage then fluctuated between 2017-18 and 2019-20, but it mostly stayed between 18 and 18.3%.

Data that is currently available indicates that during fiscal years 2020-2021, the agriculture sector's share of total Gross Value Added (GVA) increased significantly. In particular, the proportion of total GVA attributed to agriculture increased to 20.3% over that time, which deviates from the multi-year pattern observed in previous fiscal cycles[15-17]. Numerous causes, including favorable weather, government policies, technical improvements, or shifts in market demand, could be responsible for this significant growth. However, the percentage of GVA derived from agriculture fell to 19% in 2021-2022. A number of things, such as unfavorable weather, modifications to governmental regulations, or changes in market dynamics, could be to blame for this decline. The percentage of GVA derived from agriculture fell slightly more in 2022-2023 to 18.3%, bringing it closer to the average level seen in years[18].

Table 1: Share of Gross Value Added (GVA) from agriculture and allied sectors in the total economy (at current prices) (%)

S. No.	Years	Share (at current prices) (%)
1	2013-2014	18.6
2	2014-2015	18.2
3	2015-2016	17.7
4	2016-2017	18.00
5	2017-2018	18.30
6	2018-2019	17.60
7	2019-2020	18.30
8	2020-2021	20.30
9	2021-2022	19.00
10	2022-2023	18.30
Mean		18.43

Source: National Statistical Office, Ministry of Statistics and Programme Implementation, Government of India

Table 2: Values at current prices (₹Trillions) and share (%) of Gross Value Added (GVA) of agriculture and allied sectors and sector-wise in the total economy

Years	Agriculture and allied sector (Agriculture+Livestock+Forestry and logging+Fishing and aquaculture)		Agriculture		Livestock		Forestry and logging		Fishing and aquaculture	
	Value (₹Trillions)	Share (%)	Value (₹Trillions)	Share (%)	Value (₹Trillions)	Share (%)	Value (₹Trillions)	Share (%)	Value (₹Trillions)	Share (%)
2011-12	19.08	100	11.91	62.44	4.88	25.56	1.49	7.80	0.80	4.20
2012-13	21.53	100	13.30	61.75	5.65	26.24	1.64	7.63	0.94	4.38
2013-14	24.82	100	15.33	61.78	6.46	26.03	1.87	7.54	1.15	4.65
2014-15	26.82	100	15.95	59.48	7.43	27.69	2.08	7.75	1.36	5.08
2015-16	28.47	100	16.37	57.51	8.33	29.28	2.20	7.74	1.56	5.47
2016-17	31.97	100	18.19	56.90	9.51	29.74	2.45	7.68	1.82	5.68
2017-18	34.91	100	19.61	56.18	10.43	29.88	2.60	7.44	2.27	6.50
2018-19	37.51	100	20.48	54.59	11.50	30.65	3.05	8.12	2.49	6.64
2019-20	41.53	100	22.80	54.89	12.76	30.73	3.22	7.75	2.76	6.63
2020-21	45.23	100	24.67	54.53	14.09	31.15	3.52	7.79	2.96	6.53
Mean	31.19	100	17.86	58.01	9.10	28.70	2.41	7.72	1.81	5.58
CAGR (%)	9.74	-	7.87	-	12.4	-	9.97	-	16.21	-
	2.73	-	3.29	-	2.69	-	3.61	-	4.98	-

Source: National Statistical Office, Ministry of Statistics and Programme Implementation and Government of India

Throughout the period under review, the average percentage of GVA from the agricultural and related sectors of the overall economy was 18.43%. This suggests that, on average, 18-19% of the overall Gross Value Added comes from agriculture. The volatility and vulnerability of the agricultural sector to numerous internal and external factors are highlighted by the variations in the share of GVA from agriculture throughout time. Because the agricultural sector contributes significantly to the broader economy, it is necessary to closely monitor these variations and implement policies to assure the sector's sustained growth and development.

The value of the agriculture and related industries has increased significantly during the last ten years (2011-12 to 2020-21), with a Compound Annual Growth Rate (CAGR) of 9.74%. Agriculture, which has maintained its leading position in the industry with a CAGR of 7.87%, is the key driver of this expansion. With CAGR percentages of 12.4, 9.97, and 16.21%, respectively, livestock, forestry and logging, and fishing and aquaculture have also experienced significant growth. Agriculture accounts for the highest share (58.01%) of the total value of the Agriculture and Allied Sectors, according to the mean values over the years. Livestock (28.70%), forestry and logging (7.72%), and fishing and aquaculture (5.58%) follow (Table 2)[19].

Agriculture's significant contribution to the industry and the economy as a whole makes its Gross Value Added (GVA) a top priority. For a sizable section of the populace, especially in rural regions, it not only supplies necessary food and raw materials but also offers a living. Its resilience and significance in propelling the entire performance of the agriculture and related sectors are highlighted by the steady increase of agriculture's GVA, as demonstrated by its CAGR of 7.87%. A number of reasons have contributed to the rise of the agricultural industry, including infrastructure investments, favorable government policies, technical advancements, and an increase in the demand for farm products.

Additionally, the fact that agriculture's GVA share of the agriculture and related sectors has been steadily rising, averaging 58.01%, emphasizes how important it is to the economic worth of these industries. In order to guarantee the agricultural sector's sustainable growth and development, this dominance emphasizes the necessity of ongoing investment, innovation, and policy assistance. Therefore, encouraging equitable growth and food security requires policies and programs targeted at increasing agricultural area, production, productivity, sustainability, and market access[18,19].

Regarding the present pricing (INRRs Trillion), the share (%), and the GVA added by different crops (fruits, vegetables, food grains, and other crops) in India's agricultural sector, as well as their economic impact. For the years 2011-12 through 2020-21.

Table 3 shows the gross value added (at current prices) and shares (%) of fruits, vegetables, food grains, and other crops in the agriculture sector as a percentage of the overall economy. Over the past ten years, the agriculture sector's overall GVA has grown steadily, with a Compound Annual Growth Rate (CAGR) of 7.87%. With a marginally higher CAGR of 9.20%, fruits, vegetables, and food grains have seen strong growth within this subsector. In the intervening time, the CAGR of 5.95% for other crops has been somewhat lower but still positive. With an average value of *** 10.76 trillion, or around 60% of the overall GVA, the mean values indicate that fruits, vegetables, and food grains make a considerable contribution to the agriculture sector's GVA. The average contribution from other crops is INR7.10 trillion, or around 40% of the total GVA. Their critical significance in promoting agricultural productivity and economic growth is demonstrated by the steady increase in the GVA of fruits, vegetables, and food grains within the agriculture sector. In addition to meeting basic nutritional needs, these goods play a major role in agricultural exports and the creation of jobs, especially in rural areas[20].

Table 3: Values at current prices (Trillions) and share (%) of Gross Value Added (GVA) of fruits, vegetables, and food grains other crops in the agriculture sector in the total economy

Years	Agriculture sector (Fruits, vegetables, Food grains and other crops)		Fruits, vegetables, and Food grains		Other crops	
	Value (Trillions)	Share (%)	Value (Trillions)	Share (%)	Value (Trillions)	Share (%)
2011-12	11.91	100	6.59	55.27	5.33	44.73
2012-13	13.30	100	7.64	57.49	5.65	42.51
2013-14	15.33	100	8.84	57.64	6.50	42.36
2014-15	15.95	100	9.45	59.24	6.50	40.76
2015-16	16.37	100	9.84	60.12	6.53	39.88
2016-17	18.19	100	11.06	60.83	7.12	39.17
2017-18	19.61	100	12.06	61.49	7.55	38.51
2018-19	20.48	100	12.68	61.93	7.79	38.07
2019-20	22.80	100	14.18	62.20	8.62	37.80
2020-21	24.67	100	15.24	61.79	9.43	38.21
Mean	17.86	100	10.76	60.25	7.10	39.75
CAGR (%)	7.87	-	9.20	-	5.95	-
I	3.29	-	2.76	-	4.27	-

Source: National Statistical Office, Ministry of Statistics and Programme Implementation and Government of India

Table 4: Area and production details of fruits, vegetables, and food grains

Years	Fruits and vegetables		Food grains	
	Area (Million hectares)	Production (Million tonnes)	Area (Million hectares)	Production (Million tonnes)
2013-14	16.61	251.87	125.05	265.05
2014-15	15.65	256.08	124.30	252.03
2015-16	16.41	259.25	123.22	251.54
2016-17	16.61	271.09	129.23	275.11
2017-18	16.57	280.49	127.52	285.01
2018-19	16.67	281.14	124.78	285.21
2019-20	17.08	290.36	126.99	297.50
2020-21	17.79	302.93	129.80	310.74
2021-22	18.44	316.65	130.53	315.62
2022-23	18.44	323.38	136.34	329.69
Mean	17.03	283.32	127.78	286.75
CAGR (%)	1.58	2.90	0.79	2.97
I	2.59	1.5	1.97	2.94

Source: Agricultural Statistics at a Glance 2022, Economics and Statistics Division and Horticultural Statistics at a Glance 2021, Horticulture Statistics Division, Ministry of Agriculture and Farmers Welfare and Government of India

The area under cultivation for fruits and vegetables has gradually increased, averaging 17.03 million hectares. In a similar vein, fruit and vegetable production has been steadily increasing, averaging 283.32 million tons (Table 4). Positive momentum in this industry is indicated by the area and production Compound Annual Growth Rates (CAGRs), which are 1.58 and 2.90%, respectively[21]. On the other hand, food grain production and area have stayed mostly constant over time, averaging 286.75 million tons and 127.78 million hectares (Table 4). Compared to fruits and vegetables, the CAGR for food grain output and area is 2.97 and 0.79%, respectively, indicating moderate growth. In brief, the average results show that fruits and vegetables provide a substantial contribution to agricultural output, surpassing cereal grains in total production. This illustrates the potential contribution of fruits and vegetables to the Gross Value Added (GVA) of the agriculture industry.

The Indian economy depends heavily on agriculture, which employs more than half of the workforce and contributes 18-20% of GDP. Nonetheless, the industry faces a number of difficulties, including as declining production, climate change, resource depletion, and income instability. India needs to adopt sustainable agricultural methods that increase output while protecting natural resources if it hopes to see long-term economic prosperity. Sustainable agriculture may boost rural livelihoods, improve food security, lessen

environmental effects, and raise the Gross Value Added (GVA) of the agricultural sector and other industries. Given its significant contribution to India's GVA and role in ensuring food security, sustainable agriculture is essential to the country's economic development. But long-term production and profitability have been severely hampered by climate change, resource abuse, and conventional farming practices. Many studies agreed with the findings mentioned above[19,21-23]. India may increase agricultural output, lessen environmental degradation, and ensure food security by implementing sustainable farming practices, which would ultimately enhance the GVA of the agricultural sector. Furthermore, achieving these objectives depends on putting in place extensive agricultural reforms and a supporting food policy[8,16,22,23].

Precision farming, agroforestry, conservation agriculture, organic farming, Integrated Pest Management (IPM), and conservation agriculture are examples of sustainable agricultural techniques that can increase output while preserving biodiversity, soil, and water. According to studies[24,25], these techniques can improve soil health, lower input costs, and boost rain-fed agricultural output by 20-50%, all of which have long-term positive effects on the economy and the environment. Implementing these strategies can have a major impact on the agricultural sector's GVA2. The sector's GVA can be increased by promoting cattle, poultry, and fisheries while also encouraging farmers to diversify into high-value crops, including fruits, vegetables, medicinal plants, and flowers. Many researchers agreed with the aforesaid findings[15,20,21,26,27].

Farmers' incomes are greatly increased by livestock and fisheries, and high-value crops produce larger yields than conventional cereals and pulses. Food systems can be strengthened, farm incomes can be stabilized, and dependence on a small number of staples can be reduced through sustainable crop diversification. Farm profits can be increased while reliance on traditional staple crops is reduced by diversifying into high-value crops and associated sectors like fisheries, animal husbandry, and poultry farming[1,4,16,26,27]. In addition to adding to the overall GVA of the agriculture and related industries, these high-value activities have the potential to expand job opportunities in rural areas. The food processing and agro-based business sectors have tremendous opportunities for value addition and agricultural GVA growth. Post-harvest losses, which make up over 30% of total production, can be decreased, employment can be created, and rural economies can be strengthened by investing in infrastructure for selling, processing, packing, and storage. Agricultural growth can be enhanced by establishing value chains for organic foods, processed foods, and agricultural commodities intended for export. The GVA14 of the agricultural sector might be significantly raised by supporting value-added agriculture and agro-based businesses. Value addition can support rural economic growth by increasing farmers' profits and exporting processed goods like organic food and medicinal plants[27].

Modern technologies like drones, Internet of Things (IoT)-enabled gadgets, precision agriculture, and remote sensing have the potential to revolutionize Indian agriculture by boosting productivity, decreasing resource consumption, and improving efficiency. By optimizing inputs (water, fertilizer, and pesticides) using data-driven farming practices, farmers may boost yields and raise the sector's GVA. By offering real-time data, modern technologies like the Internet of Things (IoT), artificial intelligence (AI), and blockchain can increase the effectiveness of agricultural operations, decrease resource waste, and enhance decision-making[10,16]. The sector's GVA can be raised by using technological solutions in precision farming, crop monitoring, and market access that increase output while reducing costs. As extreme weather events like heat waves, floods, and droughts grow more often, climate change poses a serious threat to Indian agriculture. The agricultural sector can become less vulnerable and more productive by investing in crop insurance programs, water-efficient irrigation technologies, and climate-resilient crops. Maintaining long-term GVA growth while reducing the industry's environmental effect requires climate-smart agriculture. By offering real-time data, modern technologies like blockchain, Artificial Intelligence (AI), and the Internet of Things (IoT) can enhance decision-making, decrease resource waste, and increase farm operations efficiency[2,10,15,26,27]. Precision farming, crop monitoring, and market access are three technological interventions that can increase production while reducing costs and raising the sector's GVA.

Policies should promote and provide incentives for the use of sustainable farming practices, such as crop rotation, organic farming, no-till agriculture, and agroforestry. Farmers can be encouraged to switch to sustainable agriculture by government subsidies, low-interest loans, and capacity-building initiatives, which will boost output and financial gains. By providing subsidies for water-efficient irrigation systems, biofertilizers, and organic inputs, policies can incentivize farmers to adopt sustainable agricultural methods. To encourage sustainable land use and productivity, more programs supporting organic farming, agroforestry, and low-input agricultural techniques should be implemented. Moreover, financial incentives and capacity-building initiatives are required to promote climate-smart agriculture initiatives. Many researchers agreed with the aforesaid findings[15,18,20,21,26,27]. To improve access to markets and lower post-harvest losses, rural infrastructure-such as roads, cold chains, warehouses, and transportation-must be invested in. Furthermore, farmers can obtain higher pricing for their produce by creating direct connections between them and consumers, such as through e-NAM (National Agriculture Market) and Farmer-Producer Organizations (FPOs).

Policy initiatives should promote value addition and the expansion of the food processing sector through grants, tax breaks, and technology transfer. Meeting international standards and certifications for processed foods and organic produce should receive special attention to increase the export potential of Indian agricultural products. The food processing industry in India has enormous potential to raise rural incomes and add value to agricultural products. Improving rural infrastructure, including transportation, processing, and cold storage facilities, should be the main goal of policy initiatives. This can raise the GVA of the agricultural and related industries by lowering post-harvest losses, increasing processed food exports, and generating more jobs in rural areas.

Adopting innovative technologies and sustainable practices requires timely and reasonably priced loans, particularly for smallholder and marginal farmers. By protecting farmers from losses brought on by unfavorable weather conditions and market swings, crop insurance coverage can be increased and made more widely available, stabilizing incomes and promoting agricultural investments. Several studies agreed with the previously mentioned conclusions[15,16,20,21,26,27]. To create climate-resilient crop varieties, sustainable farming technologies, and better practices, more funding for agricultural research is required. To improve decision-making and agricultural productivity, extension services must be strengthened to give farmers up-to-date information on markets, weather, and agronomic practices.

A complete strategy that incorporates value addition, diversity, modern technologies, and climate resilience is yet to be developed to raise India's GVA through sustainable agriculture. India may boost agricultural output and support rural development and environmental sustainability by putting the right policies and practices into place. The economic expansion of agriculture will benefit millions of farmers and the economy as a whole, fostering inclusive growth and long-term food security. The accuracy and comprehensiveness of this study may be limited due to its reliance on secondary data sources.

Future studies should look more closely at socioeconomic factors and regional variations, as well as evaluate the effectiveness of policies meant to encourage agricultural growth. Since agriculture continues to play a significant role in India's economy, careful evaluations aimed at bolstering its ongoing growth are required.

CONCLUSION

Fruits and vegetables hold immense potential to strengthen India's agricultural sector by enhancing productivity, farmer incomes, and food security while supporting sustainable practices. Prioritizing investments, policy reforms, and sustainable farming approaches can significantly boost the sector's Gross Value Added (GVA) and drive inclusive rural development. A comprehensive food policy that integrates

nutrition security, climate resilience, and resource conservation will ensure long-term profitability and sustainability. Ultimately, fostering the growth of fruits and vegetables within a holistic agricultural framework is essential for advancing economic growth and achieving equitable development in India.

SIGNIFICANCE STATEMENT

This study highlights the pivotal role of fruits and vegetables in strengthening India's agricultural sector by enhancing productivity, farmer incomes, and food security. It emphasizes how strategic investments, policy reforms, and sustainable farming practices can substantially increase the sector's Gross Value Added (GVA) while ensuring environmental conservation. The findings underscore that integrating nutrition security, climate resilience, and resource management within agricultural policies can foster inclusive rural development. This study will help policymakers and researchers uncover critical areas where sustainable fruit and vegetable cultivation can act as a catalyst for long-term economic growth and equitable development in India.

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