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A STUDY ON HISTORICAL TRENDS IN GROUNDNUT CULTIVATION IN INDIA

Dr. J. Suresh Kumar[1], Dr. D. Shobana[2]
[1]*Associate Professor, Department of Economics, St. Joseph University, Chümoukedima, Nagaland, India*
[2]*Assistant Professor, Department of Management Studies, St. Joseph University, Chümoukedima, Nagaland, India*
[1]*Corresponding Author: ORCID ID: 0000-0002-9659-4813)*

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ABSTRACT----------
This study explores the historical trends in groundnut cultivation in India, tracing its evolution from the early 20th century to the present day. Groundnut, also known as peanut, is a vital oilseed crop that has significantly contributed to India's agricultural economy. The research delves into the major milestones, including the introduction of groundnut during the colonial period, the impact of the Green Revolution, and subsequent technological advancements that have shaped its cultivation practices. The analysis highlights the fluctuations in the area under cultivation, production levels, and yield per hectare over different periods, emphasizing the role of climatic conditions, market dynamics, and policy interventions. By examining regional disparities and the influence of state-specific agricultural practices, the study provides a comprehensive overview of the factors contributing to the diverse patterns of groundnut farming across India. Additionally, it addresses the challenges faced by groundnut farmers, including climate change, pest infestations, and economic constraints, while also identifying opportunities for sustainable growth and development. The results highlight the necessity of sustained research and development, government backing, and the implementation of sustainable techniques in order to guarantee the sustainability and financial viability of groundnut farming in India.

KEYWORDS: *Groundnut cultivation, Historical trends, Agricultural productivity, Yield analysis, Technological advancements and Agricultural policy*----------

INTRODUCTION

Arachis hypogaea, also known as groundnut or peanut, is an important crop in India's agricultural landscape that supports millions of farmers' livelihoods as well as the nation's economy (FAO, 2020). There have been several stages of development in India's history of groundnut farming, each shaped by historical, technological, and socioeconomic variables.

Portuguese traders brought groundnut farming to India in the early 16th century, which is where it all began (Nagaraj, 2002). Because it can grow in a variety of soil types and climates, groundnuts have become one of the main oilseed crops in the nation over time. The crop's importance increased, especially in the 1960s and 1970s during the Green Revolution, which drastically altered Indian agriculture (Swaminathan, 2006). Groundnut production was greatly increased by the introduction of high-yielding varieties, increasing use of chemical fertilisers, and improvements in irrigation (Chandrasekaran et al., 2010).

Despite these advancements, groundnut farming in India faces several challenges. Climatic variability, including erratic monsoon patterns, droughts, and floods, has led to fluctuations in production (Reddy et al., 2013). Additionally, pest infestations and diseases pose ongoing threats to crop yield (Sharma & Ortiz, 2000). Market dynamics, including price volatility and competition from other oilseeds, also impact the profitability of groundnut farming (Acharya & Agarwal, 2006).

This study aims to explore the historical trends in groundnut cultivation in India, focusing on the evolution of area under cultivation, production levels, and yield per hectare from the early 20th century to the present day. By analyzing these trends, we seek to understand the factors that have influenced groundnut farming over the decades and identify opportunities for sustainable growth and development.

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The subsequent sections will delve into the specific phases of groundnut cultivation, examining regional variations and the impact of government policies, technological innovations, and climatic conditions. In addition to offering suggestions for improving peanut farming's resilience and sustainability going forward, our thorough analysis seeks to provide light on the historical background of the practice in India.

REVIEW OF LITERATURE

Groundnut (Arachis hypogaea), a major oilseed crop, has played a vital role in India's agricultural sector. This review of literature delves into the historical trends in groundnut cultivation in India, focusing on various phases of development, technological advancements, and the challenges faced by the sector.

Portuguese traders brought groundnut farming to India in the early 16th century (Nagaraj, 2002). The crop was originally farmed in tiny regions, but because of its nutritional and economic worth, as well as its tolerance to varied agro-climatic conditions, it progressively acquired significance. Groundnut production has been steadily expanding, according to historical records, especially in key producing regions like Gujarat, Andhra Pradesh, Tamil Nadu, and Karnataka (Nagaraj, 2002). The 1960s and 1970s Green Revolution was a pivotal period in Indian agriculture, especially groundnut farming. Groundnut production increased significantly as a result of the use of chemical fertilisers, high-yielding varieties (HYVs), and better irrigation methods (Swaminathan, 2006). According to Swaminathan (2006), these technological advancements revolutionised groundnut farming, increasing its output and resilience to external shocks.

Chandrasekaran, Annadurai, and Somasundaram (2010) highlighted the impact of agronomic practices and technological advancements on groundnut yield. Their research indicated that the adoption of HYVs and improved crop management practices significantly enhanced groundnut productivity. Moreover, the introduction of pest and disease-resistant varieties helped mitigate losses due to biotic stresses (Chandrasekaran et al., 2010).
Groundnut cultivation in India is highly sensitive to climatic conditions. Reddy, Bantilan, and Kumar (2013) examined the impact of climate change on groundnut production, noting that erratic rainfall patterns, temperature fluctuations, and extreme weather events have led to significant yield variability. Their simulation study projected a decline in groundnut yield under future climate scenarios, underscoring the need for adaptive strategies to sustain production (Reddy et al., 2013).

Sharma and Ortiz (2000) discussed the challenges posed by pests and diseases in groundnut cultivation. They highlighted that despite the availability of resistant varieties, pest infestations and diseases such as aflatoxin contamination continue to affect groundnut yield and quality. The study called for integrated pest management (IPM) practices to address these challenges effectively (Sharma & Ortiz, 2000).

The economic viability of groundnut farming is influenced by market dynamics, including price volatility and competition from other oilseed crops. Acharya and Agarwal (2006) provided a comprehensive analysis of agricultural marketing in India, noting that fluctuations in groundnut prices impact farmers' income and decision-making processes. They suggested that stable pricing mechanisms and better market access could enhance the profitability of groundnut cultivation (Acharya & Agarwal, 2006).

India's groundnut industry has benefited greatly from government support programs and legislation. A number of programs, including input subsidies and the Minimum Support Price (MSP), have been implemented in an effort to stabilise output and guarantee farmers get fair prices (Reddy et al., 2013). Research and discussion on these measures' efficacy in resolving the various difficulties encountered by groundnut growers is still ongoing. The literature on historical trends in Indian groundnut production shows how historical advances, technological breakthroughs, climatic difficulties, and economic variables interact in a complex way. Even though groundnut productivity has increased significantly, more work is still required to solve the issues brought on by pest infestations, market dynamics, and climate change. Subsequent investigations have to concentrate on formulating robust and sustainable agricultural methods to guarantee the sustained prosperity of groundnut growing in India.

STATEMENT OF THE PROBLEM

Groundnut (*Arachis hypogaea*), or peanut, has been vital to India’s agriculture, significantly boosting the economy and supporting millions of farmers (FAO, 2020). Despite its importance, groundnut cultivation faces challenges that threaten its sustainability. Climatic changes, such as erratic rainfall and extreme weather, cause yield variability (Reddy et al., 2013). Pest infestations and diseases further reduce yield quality (Sharma & Ortiz, 2000). While the Green Revolution increased production through high-yield varieties, benefits are uneven

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due to regional disparities (Swaminathan, 2006). Market volatility and competition from other crops also impact profitability (Acharya & Agarwal, 2006). Thus, understanding historical trends and technological impacts is crucial for future improvements.

SIGNIFICANCE OF THE STUDY

The cultivation of groundnut (Arachis hypogaea) is crucial for India's economy and nutrition, supporting millions of farmers (FAO, 2020). This study is significant as it examines the historical trends in groundnut farming, highlighting the impact of the Green Revolution on yield improvements (Swaminathan, 2006). It addresses climatic challenges like erratic rainfall and temperature variations affecting yields (Reddy, Bantilan, & Kumar, 2013) and explores the economic factors, including market dynamics and policy interventions (Acharya & Agarwal, 2006). Additionally, it identifies regional disparities in productivity and emphasizes sustainable practices (Sharma & Ortiz, 2000), offering recommendations to enhance the resilience and sustainability of groundnut cultivation in India.

OBJECTIVE OF THE STUDY

To analyse the historical progression and significant milestones in groundnut farming in India.
To assess the impact of policy actions and government support programs.
To provide recommendations for enhancing the sustainability and profitability of groundnut cultivation.

RESEARCH METHODOLOGY

The study examines past patterns in India's groundnut production and area, highlighting significant shifts and determining variables during the previous several decades. It draws historical data from a range of secondary sources, such as academic journals, government publications, reports from the Food and Agriculture Organisation, research articles, and agricultural records. Contextualizing findings within broader agricultural and economic trends will need a thorough examination of the literature. Economic policies, technical developments, the effects of climate change, and socioeconomic variables will all be included in this assessment. The quantitative findings will be supported and explained by qualitative data from reports, publications, and expert opinions, giving rise to a comprehensive knowledge of the trends that have been noticed.

RESULT AND DISCUSSION

Although groundnut production in India has made substantial advancements, persistent obstacles necessitate focused endeavours to tackle climatic, economic, and regional differences. Future policies should prioritise the enhancement of resilience through technological innovation, the improvement of market stability, and the promotion of equitable distribution of resources and benefits across all locations where groundnuts are grown.

Table 1 All-India Area, Production and Yield of Total Groundnut over the years

YEAR	AREA	PRODUCTION	YIELD	AREA UNDER IRRIGATION (%)
1950-1951	4.49	3.48	775	-
1951-1952	4.92	3.19	649	-
1952-1953	4.80	2.93	611	1.23
1953-1954	4.25	3.45	811	1.54
1954-1955	5.54	4.25	766	1.67
1955-1956	5.13	3.86	752	1.70
1956-1957	5.53	4.37	783	1.79
1957-1958	6.42	4.71	734	2.85
1958-1959	6.25	5.18	828	2.51
1959-1960	6.44	4.56	708	2.47
1960-1961	6.46	4.81	745	3.02
1961-1962	6.89	4.99	725	3.35
1962-1963	7.28	5.06	695	2.64
1963-1964	6.89	5.30	769	3.03
1964-1965	7.38	6.00	814	2.94
1965-1966	7.70	4.26	554	3.37
1966-1967	7.30	4.41	604	4.78
1967-1968	7.55	5.73	759	5.36

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1968-1969	7.09	4.63	653	5.14
1969-1970	7.13	5.13	729	5.75
1970-1971	7.33	6.11	834	7.55
1971-1972	7.51	6.18	823	7.28
1972-1973	6.99	4.09	585	6.64
1973-1974	7.02	5.93	845	9.13
1974-1975	7.06	5.11	724	8.20
1975-1976	7.22	6.76	935	6.87
1976-1977	7.04	5.26	747	5.90
1977-1978	7.03	6.09	866	8.11
1978-1979	7.43	6.21	835	9.59
1979-1980	7.17	5.77	805	12.05
1980-1981	6.80	5.01	736	13.30
1981-1982	7.43	7.22	972	14.24
1982-1983	7.22	5.28	732	14.84
1983-1984	7.54	7.09	940	16.04
1984-1985	7.17	6.44	898	16.05
1985-1986	7.12	5.12	719	14.79
1986-1987	6.98	5.88	841	15.10
1987-1988	6.84	5.85	855	19.01
1988-1989	8.53	9.66	1132	18.59
1989-1990	8.71	8.10	930	16.96
1990-1991	8.31	7.51	904	18.63
1991-1992	8.67	7.09	818	19.14
1992-1993	8.17	8.56	1049	19.71
1993-1994	8.32	7.83	941	19,39
1994-1995	7.85	8.06	1027	19.82
1995-1996	7.52	7.58	1007	18.11
1996-1997	7.60	8.64	1138	17.53
1997-1998	7.09	7.37	1040	19.45
1998-1999	7.40	8.98	1214	19.92
1999-2000	6.87	5.25	764	18.69
2000-2001	6.56	6.41	977	16.89
2001-2002	6.24	7.03	1127	17.07
2002-2003	5.94	4.12	694	15.98
2003-2004	5.99	8.13	1357	16.82
2004-2005	6.64	6.77	1020	17.03
2005-2006	6.74	7.99	1187	18.36
2006-2007	5.62	4.86	866	20.87
2007-2008	6.29	9.18	1459	22.24
2008-2009	6.16	7.17	1163	21.24
2009-2010	5.48	5.43	991	23.99
2010-2011	5.86	8.26	1411	23.86
2011-2012	5.26	6.96	1323	27.04
2012-2013	4.72	4.70	995	28.51
2013-2014	5.51	9.71	1764	28.85
2014-2015	4.,77	7.40	1552	28.94
2015-2016	4.60	6.73	1465	32.52
2016-2017	5.34	7.46	1398	34.67
2017-2018	4.89	9.25	1893	36.33
2018-2019	4.73	6.73	1422	36.65
2019-2020	4.83	9.95	2063	36.09
2020-2021	6.01	10.24	1703	-
2021-2022*	5.75	10.11	1759	-

*Source: E&S Division, DA &FW *4th Advance Estimates*

NOTE: Area – Million Hectares Production – Million Tonnes Yield – Kg/ Hectares

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Table 1 shows that the data on groundnut cultivation in India from 1950-2022 reveals significant trends in area, production, and yield, reflecting both advancements and challenges in the sector.

The area under groundnut cultivation showed a gradual increase, from 4.49 million hectares in 1950-1951 to 7.51 million hectares by 1971-1972. Production followed a similar upward trajectory, reaching 6.18 million tonnes by 1971-1972, driven by improved agricultural practices and expanding cultivation areas. This era saw substantial growth, with the area peaking at 8.71 million hectares in 1989-1990 and production reaching 9.66 million tonnes. Technological advancements during this period, including high-yielding varieties and better irrigation practices, contributed to these gains. From the 1990s, production and yield began to fluctuate, with notable peaks in production, such as 10.24 million tonnes in 2020-2021, despite a slight decrease in the area under cultivation. This suggests that while the area under cultivation has become more variable, advancements in technology and agronomy have enabled higher yields per hectare.

Yields were relatively low, averaging around 700-800 kg/ha. The early adoption of improved varieties and practices contributed to an increase in yield, reaching 1,132 kg/ha in 1988-1989. The yield showed significant improvements, peaking at 1,764 kg/ha in 2013-2014. This peak highlights the effectiveness of modern agricultural practices and technologies in enhancing productivity. Yields have remained high, with fluctuations, peaking at 2,063 kg/ha in 2019-2020. However, variability in yield from year to year suggests sensitivity to climatic and economic factors, which must be addressed to maintain consistent productivity.

Data on the area under irrigation indicates a gradual increase over time, from less than 2% in the early years to around 36% in recent years. This increase underscores the role of irrigation in boosting groundnut productivity, though data gaps in earlier years limit comprehensive analysis. The variability in production and yield, particularly in recent decades, reflects the impact of climatic changes. Erratic weather patterns and extreme events have influenced groundnut farming, emphasizing the need for climate-resilient practices.

Market dynamics, including price fluctuations and competition from other oilseeds, also affect groundnut farming. Despite high yields, economic pressures and market instability impact farmers' incomes and cultivation decisions. The data highlights the progress made in groundnut cultivation in India, which is driven by technological advancements and increased irrigation. However, challenges such as climatic variability and economic factors continue to influence productivity and sustainability, necessitating ongoing adaptations and policy interventions.

Table 2- Groundnut- Area, Production and Yield During 2020-21 and 2021-22 in Major Producing States Along with Coverage Under Irrigation

	2021 – 2022 #					2020-2021					Area under Irrigation (%) 2019-20*
State /UTs	Area	% to all India	Production	% to all India	Yield	Area	% to all India	Production	% to all India	Yield	
1	2	3	4	5	6	7	8	9	10	11	12
Gujarat	1.99	34.59	4.49	44.48	2262	2.16	35.96	4.13	40.35	1911	21.93
Rajasthan	0.80	13.89	1.70	16.83	2131	0.86	14.23	1.93	18.85	2256	87.86
Tamil Nadu	0.37	6.45	0.95	9.36	2553	0.41	6.80	1.02	9.99	2502	38.17
Madhya Pradesh	0.39	6.81	0.67	6.66	1722	0.29	4.87	0.52	5.11	1786	6.78
Karnataka	0.63	11.02	0.55	5.41	863	0.72	11.99	0.72	7.03	999	26.22
Andhra Pradesh	0.82	14.32	0.52	5.13	630	0.87	14.46	0.78	7.57	891	18.28
Maharashtra	0.30	5.14	0.38	3.72	1273	0.31	5.14	0.41	3.98	1318	20.80
Others	0.45	7.78	0.85	8.41	1902	0.39	6.56	0.73	7.13	1852	-
All India	5.75	100.00	10.11	100.00	1759	6.01	100.00	10.24	100.00	1703	36.09

*Source: E&S Division, DA & FW # Fourth Advance Estimates *Provisional*
NOTE: Area – Million Hectares; Production – Million Tonnes; Yield – Kg/Hectare

Table 2 provides a detailed analysis of groundnut cultivation data across major producing states in India for the years 2020-21 and 2021-22, shedding light on regional contributions, productivity, and irrigation coverage.

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Gujarat continues to dominate groundnut production, contributing 34.59% of the total cultivation area and 44.48% of production in 2021-22. The yield in Gujarat increased from 1,911 kg/ha in 2020-21 to 2,262 kg/ha in 2021-22, indicating a significant improvement in productivity. The state also boasts a relatively high irrigation coverage of 21.93%, which likely contributes to its high yield.

Rajasthan also exhibits substantial groundnut cultivation figures, accounting for 13.89% of the area and 16.83% of production in 2021-22. The yield improved from 2,131 kg/ha in 2020-21 to 2,256 kg/ha in 2021-22. With an irrigation coverage of 87.86%, the state's efficient water management practices appear to significantly boost productivity. Tamil Nadu contributes 6.45% of the total area and 9.36% of production, with a yield of 2,553 kg/ha in 2021-22. Despite a slight decrease in both area and production, Tamil Nadu maintains high yields, supported by an irrigation coverage of 38.17%.

Madhya Pradesh, however, saw a decline in area under cultivation, production, and yield, despite a minor increase in yield from 1,722 kg/ha to 1,786 kg/ha. With an irrigation coverage of only 6.78%, the state faces challenges in water availability. Karnataka experienced an increase in both area and production, with yield rising from 863 kg/ha to 999 kg/ha. The state's irrigation coverage of 26.22% supports these gains but remains lower compared to other states.

Nationally, the data indicates a slight increase in both area and production from 2020-21 to 2021-22, with yield improving from 1,703 kg/ha to 1,759 kg/ha. The overall irrigation coverage stands at 36.09%, underscoring its importance in enhancing productivity. The data reveals significant regional disparities in yield and irrigation coverage, emphasizing the role of irrigation in improving groundnut yields. Additionally, it highlights the influence of factors such as technology, soil quality, and climate on farming outcomes, suggesting that targeted interventions could further boost productivity in regions with lower irrigation coverage.

Table 3 CAGR (in %) of All-India Area, Production and Yield of Total Groundnut over the Years

YEAR	AREA	PRODUCTION	YIELD	AREA UNDER IRRIGATION (%)
1950-1951	-	-	-	-
1951-1952	9.58	-8.33	-16.26	-
1952-1953	-2.44	-8.15	-5.86	-
1953-1954	-11.46	17.75	32.73	25.20
1954-1955	30.35	23.19	-5.55	8.44
1955-1956	-7.40	-9.18	-1.83	1.80
1956-1957	7.80	13.21	4.12	5.29
1957-1958	16.09	7.78	-6.26	59.22
1958-1959	-2.65	9.98	12.81	-11.93
1959-1960	3.04	-11.97	-11.49	-1.59
1960-1961	0.31	5.48	5.23	22.27
1961-1962	6.66	3.74	-2.68	10.93
1962-1963	5.66	1.40	-4.14	-21.19
1963-1964	-5.36	4.74	10.65	14.77
1964-1965	7.11	13.21	5.85	-2.97
1965-1966	4.34	-29.00	-31.94	14.63
1966-1967	-5.19	3.52	9.03	41.84
1967-1968	3.42	29.93	25.66	12.13
1968-1969	-6.09	-19.20	-13.97	-4.10
1969-1970	0.56	10.80	11.64	11.87
1970-1971	2.81	19.10	14.40	31.30
1971-1972	2.46	1.15	-1.32	-3.58
1972-1973	-6.92	-33.82	-28.92	-8.79

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1973-1974	0.43	44.99	44.44	37.50
1974-1975	0.57	-13.83	-14.32	-10.19
1975-1976	2.27	32.29	29.14	-16.22
1976-1977	-2.49	-22.19	-20.11	-14.12
1977-1978	-0.14	15.78	15.93	37.46
1978-1979	5.69	1.97	-3.58	18.25
1979-1980	-3.50	-7.09	-3.59	25.65
1980-1981	-5.16	-13.17	-8.57	10.37
1981-1982	9.26	44.11	32.07	7.07
1982-1983	-2.83	-26.87	-24.69	4.21
1983-1984	4.43	34.28	28.42	8.09
1984-1985	-4.91	-9.17	-4.47	0.06
1985-1986	-0.70	-20.50	-19.93	-7.85
1986-1987	-1.97	14.84	16.97	2.10
1987-1988	-2.01	-0.51	1.66	25.89
1988-1989	24.71	65.13	32.40	-2.21
1989-1990	2.11	-16.15	-17.84	-8.77
1990-1991	-4.59	-7.28	-2.80	9.85
1991-1992	4.33	-5.59	-9.51	2.74
1992-1993	-5.77	20.73	28.24	2.98
1993-1994	1.84	-8.53	-10.30	-1.62
1994-1995	-5.65	2.94	9.14	2.22
1995-1996	-4.20	-5.96	-9.95	-8.63
1996-1997	1.06	13.98	13.01	-3.20
1997-1998	-6.71	-14.70	-8.61	10.95
1998-1999	4.37	21.85	16.73	2.42
1999-2000	-7.16	-41.54	-37.07	-6.17
2000-2001	-4.51	22.10	27.88	-9.63
2001-2002	-4.88	9.67	15.35	1.07
2002-2003	-4.81	-41.39	-38.42	-6.39
2003-2004	0.84	97.33	95.53	5.26
2004-2005	10.85	-16.73	-24.83	1.25
2005-2006	1.51	18.02	16.37	7.81
2006-2007	-16.62	-39.17	-27.04	13.67
2007-2008	11.92	88.89	68.48	6.56
2008-2009	-2.07	-21.90	-20.29	-4.50
2009-2010	-11.04	-24.27	-14.79	12.95
2010-2011	6.93	52.12	42.38	-0.54
2011-2012	-10.24	-15.74	-6.24	13.33
2012-2013	-10.27	-32.47	-24.79	5.44
2013-2014	16.74	106.60	77.29	1.19
2014-2015	-13.43	-23.79	-12.02	0.31
2015-2016	-3.56	-9.05	-5.61	12.37
2016-2017	16.09	10.85	-4.57	6.61
2017-2018	-8.43	23.99	35.41	4.79
2018-2019	-3.27	-27.24	-24.88	0.88

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2019-2020	2.11	47.85	45.08	-1.53
2020-2021	24.43	2.91	-17.45	-
2021-2022*	-4.33	-1.27	3.29	-
TOTAL	0.34	1.49	1.14	5.09

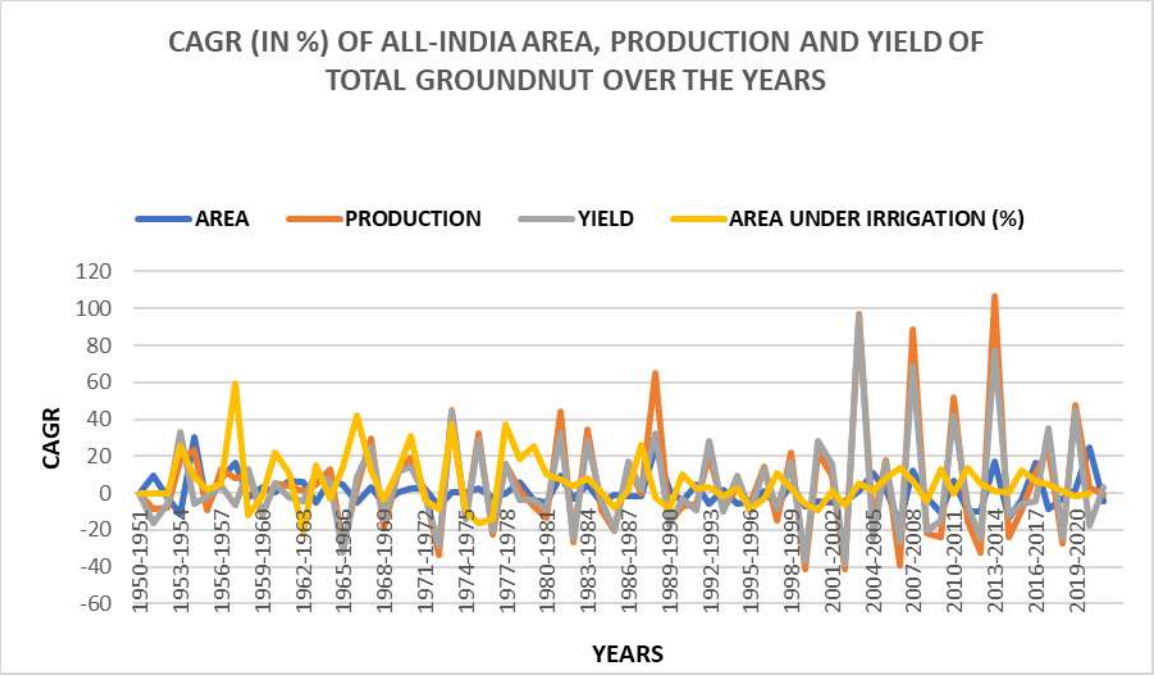
Source: author research
*E&S Division, DA &FW *4th Advance Estimates*
NOTE: Area – Million Hectares; **Production** – Million Tonnes; **Yield** – Kg/ Hectares

Table 3 shows that the Compound Annual Growth Rate (CAGR) data from 1950-51 to 2021-22 provides an in-depth view of the long-term trends in groundnut cultivation in India.

The CAGR for area under groundnut cultivation shows considerable fluctuation over the decades. Early periods, such as 1950-51 to 1953-54, experienced both high growth rates and sharp declines. For example, 1953-54 saw a dramatic increase of 30.35%, reflecting a period of expansion in groundnut farming. Conversely, the years from 1960-61 to 1971-72 saw inconsistent growth, with occasional spikes such as 24.71% in 1988-89 and declines like -16.62% in 2006-07.

In recent years, the CAGR for area has been variable. The growth rate peaked at 24.43% during 2019-20, indicating significant expansion, but declined sharply to -4.33% in 2021-22. This volatility suggests fluctuations in the area of groundnut cultivation in response to various factors, including market dynamics and environmental conditions.

Production growth has experienced significant variability. For instance, in the early 1950s, production showed a negative CAGR, indicating a period of stagnation or decline. However, certain periods such as 1973-74 and 2003-04 exhibited substantial growth rates of 44.99% and 97.33%, respectively, indicating phases of rapid expansion.



More recent years reflect a slowdown in production growth. The CAGR for production was 2.91% during 2020-21 but turned negative at -1.27% in 2021-22. This indicates a potential stabilization or decline in production, possibly due to challenges such as climatic variability, pest infestations, and market conditions.

Yield growth has shown substantial variation. Significant increases were observed in periods such as 1973-74 (44.44%) and 2013-14 (77.29%), reflecting improvements in agricultural practices and technology. Conversely, years like 1965-66 and 1999-2000 experienced negative yields, indicating challenges in sustaining productivity.

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Yield trends in recent years also show variability. The CAGR for yield was -17.45% in 2020-21, improving to 3.29% in 2021-22. This shift indicates potential improvements in yield efficiency, possibly due to better agronomic practices or crop varieties, but also suggests ongoing volatility.

The area under irrigation has increased over time, reflecting improved water management. The significant impact of irrigation is evident, particularly in the high-yielding years where irrigation coverage contributed to improved production and yield. For instance, higher irrigation coverage in Rajasthan correlates with increased yield and production.

The CAGR data reveals that groundnut cultivation in India has experienced periods of both expansion and contraction in area, production, and yield. While there have been notable periods of growth, recent years have seen fluctuations, suggesting challenges in maintaining steady progress. Key factors influencing these trends include climatic conditions, technological advancements, and market dynamics. The recent decline in CAGR for production and yield suggests a need for strategic interventions to stabilize and enhance groundnut farming in India.

Table 4- CAGR (in %) of Area, Production and Yield during 2020-21 and 2021-22 in Major Producing States coverage under Irrigation.

FROM 2020 -21 TILL 2021-22 #					
State	**Area**	**% to all India**	**Production**	**% to all India**	**Yield**
1	2	3	4	5	6
Gujarat	-7.87	-3.81	8.72	10.24	18.4
Rajasthan	-6.98	-2.39	-11.92	-10.72	-5.54
Tamil Nadu	-9.76	-5.15	-6.86	-6.31	2.04
Madhya Pradesh	34.48	39.84	28.85	30.33	-3.58
Karnataka	-12.50	-8.09	-23.61	-23.04	13.61
Andhra Pradesh	-5.75	-0.97	-33.33	-32.23	-29.29
Maharashtra	-3.23	0.00	-7.32	-6.53	-3.41
Others	15.38	18.60	16.44	17.95	2.70
All India	-4.33	0.00	-1.27	0.00	3.29

Source: author research
*E&S Division, DA & FW; # Fourth Advance Estimates; *Provisional*
NOTE: Area – Million Hectares; Production – Million Tonnes; Yield – Kg/Hectare

Table 4 outlines the Compound Annual Growth Rate (CAGR) for groundnut cultivation across major Indian states from 2020-21 to 2021-22, focusing on the area, production, yield, and irrigation coverage. A significant decline was observed in both area and production, with a notable reduction of 7.87% in area and 3.81% in production. Despite this, yield improved dramatically by 18.4%, indicating enhanced productivity per hectare even as overall cultivation contracted.

Another state experienced reductions in both area and production, with decreases of 6.98% and 2.39%, respectively. The yield also declined by 5.54%, reflecting difficulties in sustaining productivity during this period. A different state saw a reduction in area by 9.76% and production by 5.15%, though yield slightly increased by 2.04%. This suggests a general decline in groundnut farming activities, despite some efficiency gains per hectare.

In contrast, a particular state witnessed a substantial growth in area (34.48%) and production (28.85%). However, yield decreased by 3.58%, indicating that while cultivation expanded, efficiency per hectare declined. Another state experienced sharp declines in both area (12.50%) and production (8.09%), yet yield increased by 13.61%, highlighting improved productivity despite reduced overall cultivation.

A state faced a decline in both area and production by 5.75% and 0.97%, respectively, accompanied by a steep decrease in yield by 29.29%. This points to severe challenges in maintaining yield and overall production levels.

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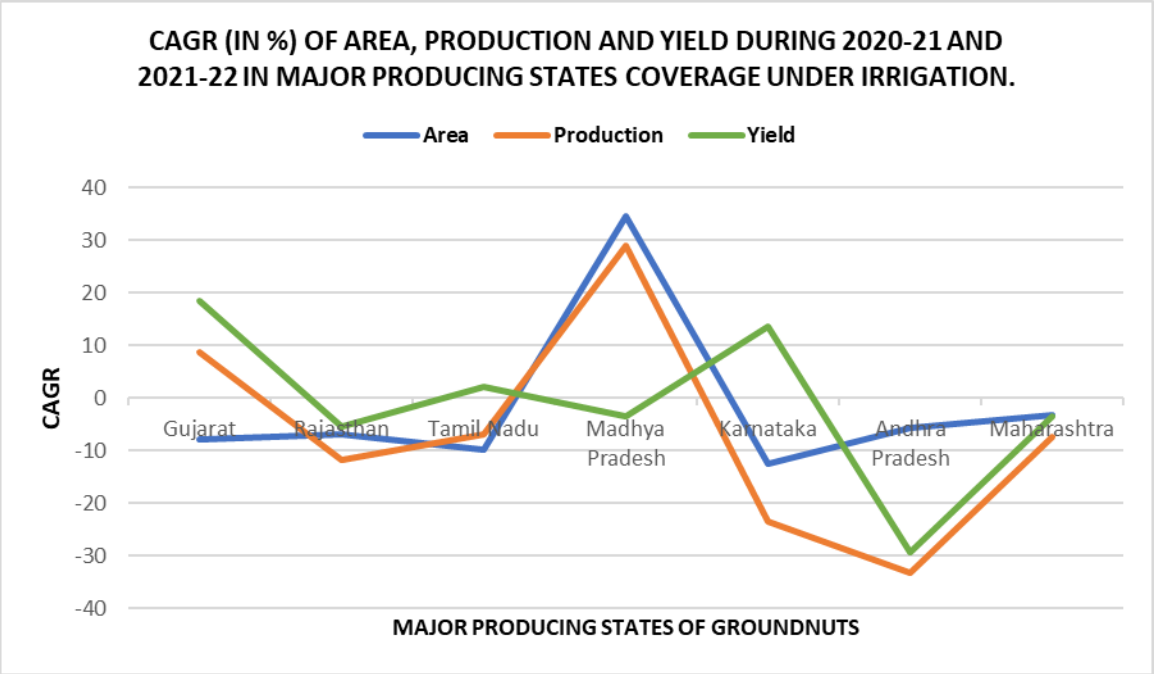
Another region showed minimal changes in area but saw a slight decrease in production by 3.23%, with yield declining marginally by 3.41%, indicating stable yet slightly diminishing productivity.



The "Others" category, which includes various minor states or regions, showed an increase in both area (15.38%) and production (18.60%), with a small yield increase of 2.70%. Nationally, there was a decline in area and production by 4.33% and 1.27%, respectively, but yield improved by 3.29%. These trends highlight a reduction in cultivation area and production, coupled with increased productivity per hectare, reflecting diverse impacts across different states. Some states experienced growth in groundnut farming, while others faced significant declines, with yield changes underscoring varying productivity improvements or challenges.

Impact of Policy Actions and Government Support Programs on Groundnut Farming in India

Groundnut, scientifically known as Arachis hypogaea, is a crucial agricultural crop in India that plays a pivotal part in the country's agricultural economy and food security. The Indian government has implemented various policy actions and support programs aimed at enhancing groundnut production, improving farmer incomes, and ensuring sustainability. This section evaluates the impact of these policy actions and support programs on groundnut farming in India.

Policy Actions and Support Programs

- **Subsidies and Price Support:** The government offers subsidies for essential inputs, like as fertilisers, seeds, and insecticides, that are vital for groundnut cultivation. The Minimum Support Price (MSP) policy ensures that farmers receive a guaranteed price for their produce, which helps stabilize their income and reduce market risk (Government of India, 2020).
- **Impact:** These initiatives have resulted in a higher rate of acceptance and implementation of enhanced agricultural methods and technologies. The MSP, in particular, provides a safety net for farmers, encouraging them to invest in better inputs and practices.
- **Research and Development (R&D) Initiatives:** The Indian Council of Agricultural Research (ICAR) and state agricultural institutions perform research to cultivate groundnut cultivars that are both high-yielding and resistant to diseases. Government-funded research programs focus on improving crop genetics, pest management, and soil fertility (ICAR, 2022).
- **Impact:** Advances in crop varieties and farming practices have led to increased yields and reduced vulnerability to pests and diseases. This research contributes to higher productivity and better resilience against climatic challenges.
- **Irrigation and Infrastructure Development:** The Pradhan Mantri Krishi Sinchai Yojana (PMKSY) and similar initiatives have the objective of enhancing irrigation infrastructure and offering financial assistance for irrigation systems (Ministry of Agriculture & Farmers Welfare, 2021). In addition, the construction of rural infrastructure, such as roads and storage facilities, aids in mitigating post-harvest losses.

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- **Impact:** Enhanced irrigation facilities and better infrastructure have improved water availability for groundnut farming and reduced post-harvest losses. This has led to increased productivity and profitability for groundnut farmers.
- **Crop Insurance Schemes:** The Pradhan Mantri Fasal Bima Yojana (PMFBY) is a crop insurance policy aimed at offering monetary assistance to farmers in the event of crop failure caused by unfavourable weather conditions or natural calamities (Ministry of Agriculture & Farmers Welfare, 2019).
- **Impact:** Crop insurance provides a safety net for farmers against climatic uncertainties and losses, thereby reducing financial risk and encouraging them to adopt modern farming techniques.
- **Training and Capacity Building:** Government programs often include training and extension services to educate farmers on best practices, pest management, and efficient use of inputs. These programs are typically delivered through agricultural extension officers and local institutions (Department of Agriculture, Cooperation & Farmers Welfare, 2020).
- **Impact:** Training and capacity building have improved farmers' knowledge and skills, leading to better management practices, increased yields, and enhanced overall farm productivity.

Challenges and Areas for Improvement

- **Implementation Gaps:** Despite the availability of support programs, there are often gaps in implementation, such as delays in subsidy distribution, inadequate reach of extension services, and limited access to insurance schemes for small and marginal farmers (Reddy, 2021).
- **Regional Disparities:** The effectiveness of policies and programs can vary significantly across regions. Farmers in less developed or remote areas may face challenges in accessing government support and infrastructure (Srinivasan, 2020).
- **Climate Change and Environmental Concerns:** Groundnut farming is vulnerable to climate change, with impacts on yield and quality. Government policies need to address climate resilience and sustainability more comprehensively (Kumar et al., 2021).

The implementation of policy measures and government support programs has greatly benefited groundnut farming in India, resulting in enhanced production, greater income stability, and increased resilience. However, addressing implementation gaps, regional disparities, and environmental challenges remains crucial for sustaining and enhancing the benefits of these programs. Continued investment in research, infrastructure, and farmer support will be key to the long-term success of groundnut farming in India.

Recommendations for Enhancing the Sustainability and Profitability of Groundnut Cultivation

To enhance the sustainability and profitability of groundnut cultivation, a multi-faceted approach addressing agricultural practices, policy support, and market dynamics is essential. The following recommendations are aimed at improving the overall efficiency, environmental sustainability, and economic viability of groundnut farming:

1. Adoption of Improved Agricultural Practices

- **Diversified Crop Rotation:** Promote the adoption of crop rotation and intercropping techniques among farmers to enhance soil health and mitigate the negative impact of pests and diseases. Intercropping groundnuts with other crops can improve soil fertility and decrease reliance on artificial fertilisers (Reddy, 2021).
- **Integrated Pest Management (IPM):** Advocate for the adoption of Integrated Pest Management strategies that integrate biological, cultural, and chemical measures to efficiently control pests while minimising harm to the environment (ICAR, 2022).
- **Soil Health Management:** Adopt soil health management techniques, such as the application of organic fertilisers, planting cover crops, and minimising tillage, to sustain soil fertility and structure (Kumar et al., 2021).

2. Enhancement of Irrigation and Water Management

- **Efficient Irrigation Systems:** Optimise water usage and minimise wastage by investing in effective irrigation systems such as drip and spray irrigation. The Ministry of Agriculture & Farmers Welfare (2021) states that government programs can offer incentives for the installation of these systems.
- **Rainwater Harvesting:** Promote rainwater harvesting methods to collect and store water for use during droughts, thus decreasing dependence on outside water sources and improving water accessibility (Department of Agriculture, Cooperation & Farmers Welfare, 2020).

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3. Strengthening Research and Development

- **Development of Resilient Varieties:** Support research into developing drought-resistant, disease-resistant, and high-yielding groundnut varieties that can adapt to changing climatic conditions (ICAR, 2022).
- **Technology Transfer:** Facilitate the transfer of technology and best practices from research institutions to farmers through extension services and farmer training programs (Lozano et al., 2013).

4. Policy and Financial Support

- **Subsidies and Financial Assistance:** The Government of India should enhance the subsidies for inputs such as premium seeds, fertilisers, and pesticides, and offer financial aid for the implementation of sustainable farming technology (Government of India, 2020).
- **Crop Insurance:** Expand coverage and improve the accessibility of crop insurance schemes to protect farmers against crop losses due to natural disasters and adverse weather conditions (Ministry of Agriculture & Farmers Welfare, 2019).
- **Minimum Support Price (MSP):** Ensure the effective implementation of the MSP policy to provide a stable income for farmers and incentivize the cultivation of groundnuts (Government of India, 2020).

5. Market Access and Value Addition

- **Market Linkages:** Improve market linkages by establishing better infrastructure for transportation, storage, and processing of groundnuts. This can help reduce post-harvest losses and ensure better prices for farmers (Sharma & Sharma, 2017).
- **Value Addition:** Encourage value addition through processing groundnuts into products such as peanut butter, oil, and snacks. Support initiatives that promote processing and branding at the local and national levels (Srinivasan, 2020).

6. Education and Capacity Building

- **Farmer Training Programs:** Implement comprehensive training programs to educate farmers about sustainable farming practices, efficient resource use, and market strategies. Extension services should be strengthened to deliver timely and relevant information (Department of Agriculture, Cooperation & Farmers Welfare, 2020).
- **Community Engagement:** Foster community-based approaches to sustainability by engaging local organizations and stakeholders in groundnut cultivation initiatives and decision-making processes (Lozano et al., 2013).

7. Environmental and Climate Adaptation

- **Climate-Resilient Practices:** Promote climate-resilient practices such as soil conservation techniques, appropriate planting dates, and the use of climate forecasts to adapt to changing weather patterns (Kumar et al., 2021).
- **Sustainable Resource Management:** Encourage sustainable management of natural resources such as water and soil to ensure long-term productivity and environmental health (Reddy, 2021).

By implementing these recommendations, stakeholders can enhance the sustainability and profitability of groundnut cultivation in India, benefiting both farmers and the broader agricultural sector.

CONCLUSION

The study on historical trends in groundnut cultivation in India highlights the sector's evolution driven by economic, environmental, and policy factors. Groundnut farming has been pivotal in India's agriculture, supporting farmers' livelihoods and food security. Over time, practices have shifted from traditional methods to modern techniques, including high-yield varieties and advanced pest management. Government policies like subsidies, Minimum Support Prices (MSP), and irrigation investments have bolstered growth and sustainability, though challenges in implementation and regional disparities persist. Technological advancements and improved infrastructure have further supported productivity and market stability, addressing issues like fluctuating prices and climate vulnerability.

Implications and Recommendations

The historical patterns in groundnut agriculture highlight the significance of ongoing adjustment and ingenuity. In order to guarantee the enduring viability and financial success of groundnut farming, it is imperative to focus on the following aspects:

- **Enhancing Policy Support:** Strengthen and streamline policy support to address implementation challenges and regional disparities. Ensure that subsidies, MSP, and crop insurance schemes are effectively administered and accessible to all farmers.

- **Promoting Sustainable Practices:** Encourage the adoption of sustainable farming practices, including efficient irrigation systems, soil health management, and climate-resilient techniques. Support research and development to provide farmers with innovative solutions to environmental challenges.
- **Investing in Infrastructure:** Sustain investments in rural infrastructure, including as irrigation, transportation, and storage facilities, to diminish post-harvest losses and enhance market accessibility.
- **Supporting Farmers' Capacities:** Extend training and extension services to augment farmers' expertise and proficiency in contemporary agricultural methodologies and market tactics.

By addressing these recommendations, stakeholders can build on the historical successes and lessons learned in groundnut cultivation, ensuring that the sector remains resilient, productive, and economically viable for future generations.

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