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An assessment of major agricultural crop production in Nagaland

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Abstract

The study analyzes the trends in area, production, and productivity of main agricultural crops in Nagaland from 2008-09 to 2020-21. For the purpose of the study, secondary data were collected to assess its output. Compound Annual Growth Rate (CAGR) analysis and Percentage were used for study. The study shows the growth in area, production and productivity are 1.48%, 2.1% and 0.61% CAGR respectively. The CAGR findings reveal a significant increase in both area and production for cereals (1.42%) and commercial crops (3.41%), while oilseeds experienced negative growth (-0.71%) and pulses maintained stable productivity (0%). District-level analysis indicates considerable disparities, Tuensang and Wokha shows significant productivity growth while some districts recorded declines in productivity. The study shows that state's productivity has increased from 2.68 MT/H to 2.90 MT/H. The results provide valuable insights for policymakers to prioritize interventions that enhance productivity, reduce regional disparities, and ensure sustainable agricultural development in Nagaland.

Keywords: Agricultural crops, trend, production, productivity, CAGR and sustainable agricultural

Introduction

In Nagaland, agriculture is largely practiced and forms the most substantial part of livelihood for earning an income. The state follows traditional farming systems such as Jhum cultivation, Wet Terrace Rice Cultivation (WTRC), Alder tree-based farming, and the Zabo farming technique, which together sustain the agrarian communities and meet the food requirements of the population. Nearly 70% of the population depends on agriculture and allied sectors, and about 45.47% of the working population is actively engaged in agricultural activities (Government of Nagaland, 2022) [5]. In 2008-09, the share of agriculture in Nagaland's Net State Domestic Product (NSDP) at constant prices was 22.68%, which increased to 23.58% in 2020-21 (Quick Estimates, February 2022) [6], signifying that agriculture continues to be a major contributor to the state's economy.

Despite its economic significance, the agricultural sector in Nagaland faces challenges such as limited irrigation facilities, poor infrastructure, and dependence on rain-fed farming. Understanding the trend in area, production, and productivity of agricultural crops is essential for identifying growth patterns, regional disparities, and policy needs. Using trend analysis and the Compound Annual Growth Rate (CAGR) method, this study evaluates agricultural performance across different crop groups and districts from 2008-09 to 2020-21, providing insights for sustainable agricultural development and planning.

Literature Review

Research on agriculture in Northeast India, and Nagaland in particular, has emphasized the region's distinct agro-ecological conditions, traditional farming systems, and the socio-economic role of agriculture for rural livelihoods. Several studies have documented that agriculture in Nagaland is dominated by subsistence-oriented practices notably jhum (shifting) cultivation, wet terrace rice cultivation, alder-based systems, and local integrated systems such as zabo which shape cropping patterns, land use, and productivity (Government of Nagaland, 2022) [5]. These traditional systems, while adapted to local topography and culture, often limit productivity and market orientation without complementary technological and institutional support (FAO, 2018) [3].

Crop-wise analyses across India and the Northeast show persistent cereal dominance in area and production, with gradual but uneven growth in commercial and high-value crops where market access and infrastructure permit (Dev, 2017; Ministry of Agriculture & Farmers Welfare, 2020) [2, 8]. Studies focusing on pulses and oilseeds report slower expansion and stagnant yields, attributable to limited adoption of improved varieties, inadequate input use, and weak post-harvest systems (Sharma & Kumar, 2019) [12]. These findings parallel the trends observed in Nagaland's statistical handbooks, which document greater area and production growth in cereals and commercial crops, and stagnation or decline in oilseed productivity.

District-level investigations highlight substantial spatial heterogeneity within the state. Dimapur and other relatively accessible districts show higher area and production growth and faster adoption of market-oriented crops, whereas remote districts lag in productivity and infrastructure (Lal & Zhimomi, 2015) [7]. This spatial disparity is often linked to

differences in irrigation coverage, road connectivity, extension services, and access to input and output markets (Rai & Longkumer, 2016) [10].

Interventions to improve productivity in hill agriculture emphasize integrated approaches improved seed varieties, micro-irrigation, integrated nutrient and pest management, and strengthening farmer institutions and market linkages. Empirical studies from the region indicate that targeted extension, value-chain development, and agro-processing can substantially raise incomes and encourage crop diversification (Singh & Das, 2020; World Bank, 2019) [13, 15]. Similarly, research on adaptive practices suggests that blending traditional knowledge with modern agronomy (e.g., improved terrace management, soil conservation in jhum fallows) yields better ecological and economic outcomes (Ramakrishnan, 1992) [11].

Despite progress, literature identifies persistent constraints: small and fragmented landholdings, limited formal credit, low mechanization, and vulnerability to climatic variability. Several authors call for policy measures integrating infrastructure development, tailored extension services, and incentives for diversification toward high-value crops and agro-enterprises (NITI Aayog, 2020; Government of Nagaland, 2011[9, 4]). Overall, the literature corroborates the empirical trends from Nagaland's statistical data: modest gains in area and production concentrated in cereals and selected commercial crops, mixed productivity outcomes, and clear district-level disparities that require context-specific policy and technological responses.

Objective of the Study

The main objective of this study is to examine the trend in area, production, and productivity of major agricultural crops in Nagaland from 2008-09 to 2020-21. It aims to assess crop-wise and district-wise growth performance, identify regional disparities, and provide insights for improving productivity, promoting crop diversification, and achieving sustainable agricultural development in the state.

Materials and Methods

The present study adopts a descriptive and analytical research design to analyze the trend in area, production, and productivity of major agricultural crops in Nagaland. It is based entirely on secondary data collected from the Statistical Handbook of Nagaland (2011 and 2022) [4, 5] and other official sources. The study covers a twelve-year period from 2008-09 to 2020-21, focusing on cereals, pulses, oilseeds, and commercial crops across all eleven districts of the state. Analytical tools such as trend analysis and Compound Annual Growth Rate (CAGR) were employed to assess growth performance. The CAGR was calculated using the formula:

$$\text{CAGR} = \left(\frac{EV}{BV}\right)^{1/n} - 1$$

Where *n* represents the number of years. Graphical methods such as bar and line diagrams were used to represent changes visually. The study aims to evaluate agricultural growth patterns, regional variations, and productivity trends to support evidence-based policy formulation for sustainable agricultural development in Nagaland.

Results and Discussion

The analysis reveals that agricultural growth in Nagaland showed a positive trend from 2008-09 to 2020-21. The area and production of cereals and commercial crops increased significantly, while pulses and oilseeds recorded slower growth. Productivity improved moderately overall, indicating better farming practices, though regional disparities and limited diversification remain key challenges for sustainable agricultural development.

Table 1: Trend in Area, Production, Productivity of Agricultural Crops in Nagaland

Sl. No	Crops	Factors	Years		Carg
			2008-09	2020-21	
1.	Cereals	Area	244940 (64.86)	303890 (66.45)	1.67
		Production	475520 (46.92)	708450 (53.35)	3.11
		Productivity	1.94	2.33	1.42
2.	Pulses	Area	33960 (8.99)	40440 (8.84)	1.35
		Production	39590 (3.9)	47140 (3.55)	1.35
		Productivity	1.16	1.16	0
3.	Oilseeds	Area	63620 (16.85)	69030 (69030)	0.63
		Production	72240 (7.13)	71720 (5.40)	-0.04
		Productivity	1.13	1.03	-0.71
4.	Commercial crops	Area	35140 (9.30)	43985 (9.62)	1.74
		Production	426140 (42.05)	500623 (37.70)	5.20
		Productivity	12.12	11.38	3.41

Source: Statistical Handbook of Nagaland 2011 & 2022 [4, 5]

The analysis of Table 1 reveals a clear trend in the area, production, and productivity of major agricultural crops in Nagaland between 2008-09 and 2020-21. The data indicate that cereals remain the dominant crop group, occupying the largest share of cultivated land and recording consistent growth in both area and production. The compound annual growth rate (CAGR) of cereals was 1.67% for area and 3.11% for production, reflecting steady improvement in productivity from 1.94 MT/ha to 2.33 MT/ha. Pulses, on the other hand, showed only marginal growth in area and production, both at 1.35% CAGR, while productivity remained stagnant at 1.16 MT/ha, highlighting limited technological progress and low farmer adoption. Oilseeds showed a slight expansion in area but a decline in productivity (-0.71%), suggesting challenges related to crop management and climatic variability. Commercial crops performed better, with notable growth in production (5.20% CAGR), although productivity slightly declined from 12.12 to 11.38 MT/ha. Overall, the agricultural sector in Nagaland continues to be cereal-based, with slow diversification toward pulses and oilseeds. The findings underline the need for enhanced research support, improved farming practices, and policy initiatives to promote balanced crop diversification and sustainable agricultural growth in the state.

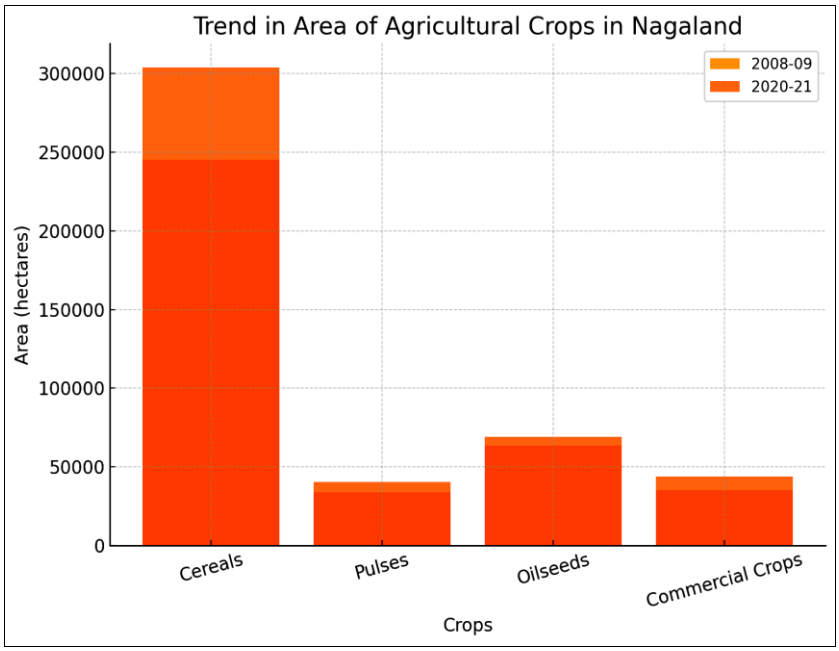

Fig 1: Trend in Area of Agricultural Crops in Nagaland (2008-09 and 2020-21)

The diagram 1 shows that cereals occupy the largest cultivated area in Nagaland, increasing notably from 2008-09 to 2020-21. Pulses and oilseeds show only slight growth, while commercial crops record a moderate rise. Overall, agriculture in Nagaland remains cereal-dominated with limited crop diversification.

Table 2: Districts- Wise Trend in Area, Production and Productivity of Agricultural Crops

Sl. No.	District	Factors	Years		CARG
			2008-09	2020-21	
1.	Kohima	A	28550 (7.5)	37233 (8.1)	2.06
		P	92130 (9.1)	114062 (8.6)	1.28
		P	3.22	3.06	-0.39
2.	Phek	A	37780 (10.0)	43931 (9.6)	1.17
		P	97690 (9.6)	127517 (9.6)	2.07
		P	2.58	2.90	0.90
3.	Mokokchung	A	32520 (8.6)	37350 (8.2)	1.07
		P	93780 (9.3)	115059 (8.7)	1.59
		P	2.88	3.08	0.52
4.	Tuensang	A	43070 (11.4)	47964 (10.5)	0.83
		P	100760 (9.9)	131377 (9.9)	2.06
		P	2.33	2.73	1.23
5.	Mon	A	35950 (9.5)	47360 (10.4)	2.14
		P	95730 (9.5)	134458 (10.1)	2.65
		P	2.66	2.83	0.48
6.	Dimapur	A	62670 (16.6)	79115 (17.3)	1.81
		P	184260 (18.1)	256678 (19.3)	2.58
		P	2.94	3.24	0.75
7.	Wokha	A	38000 (10.0)	41708 (9.1)	0.72
		P	96700 (9.5)	121312 (9.1)	1.76

		P	2.54	2.90	1.02
8.	Zunheboto	A	37110 (9.8)	40726 (8.9)	0.72
		P	79940 (7.9)	99516 (7.5)	1.70
		P	3.19	2.44	-2.04
9.	Peren	A	22180 (5.8)	32129 (7.0)	2.89
		P	70760 (7.0)	99696 (7.5)	2.67
		P	3.19	3.10	-0.22
10.	Kiphire	A	23760 (6.0)	29560 (6.5)	1.69
		P	58520 (5.8)	74296 (5.6)	1.85
		P	2.46	2.51	0.15
11.	Longleng	A	18410 (4.8)	20269 (4.4)	0.74
		P	43220 (4.3)	53962 (4.1)	1.72
		P	2.34	2.66	0.99
	Nagaland	A	377660	457345	1.48
		P	1013490	1327933	2.1
		P	2.68	2.90	0.61

Source: Statistical Handbook of Nagaland 2011 & 2022 [4, 5]

The table 2 district-wise analysis shows a positive trend in both area and production of agricultural crops across Nagaland from 2008-09 to 2020-21. The total cultivated area increased from 3.77 lakh hectares to 4.57 lakh hectares**,** with a CAGR of 1.48%**,** while total production rose from 10.13 lakh MT to 13.27 lakh MT**,** marking a 2.10% growth rate**.** Productivity also improved slightly from 2.68 MT/ha to 2.90 MT/ha, showing an overall growth of 0.61%**.**

Among districts, Dimapur recorded the highest area and production growth**,** indicating its agricultural advancement and favorable infrastructure. Mon, Tuensang, and Phek also performed well in both production and productivity, reflecting better adoption of improved farming practices. Peren showed the highest growth in cultivated area (2.89%), whereas Zunheboto registered a decline in productivity (-2.04%), likely due to soil degradation or shifting cultivation practices.

Districts like Kohima, Mokokchung, and Wokha showed moderate progress, while Longleng and Kiphire recorded the lowest area expansion. Overall, the trend suggests steady agricultural improvement in Nagaland, with certain districts leading in modernization and productivity gains, though regional disparities persist in crop performance and yield efficiency.

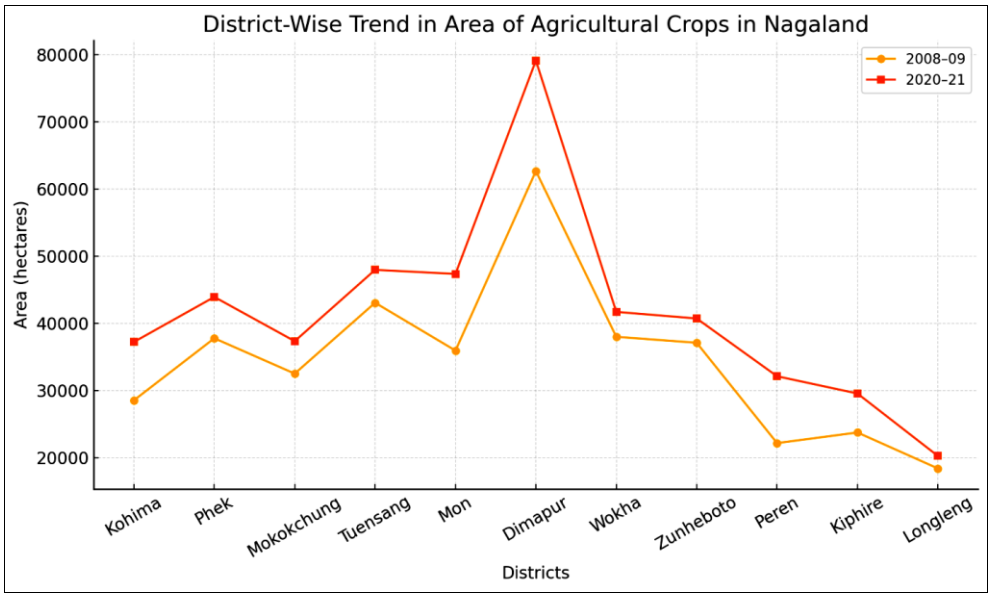

Fig 2: District-Wise Trends in Area of Agricultural Crops in Nagaland (2008-09 and 2020-21)

The figure 2 shows that the cultivated area of agricultural crops in all districts of Nagaland increased from 2008-09 to 2020-21. Dimapur recorded the largest cultivated area, followed by Mon and Tuensang**,** showing strong growth trends. Overall, the chart indicates steady agricultural expansion across districts, though with regional variations in

growth levels.

Findings and Conclusion

The study found that agriculture in Nagaland continues to be dominated by cereal cultivation, which showed steady growth in both area and production between 2008-09 and 2020-21. Commercial crops also exhibited notable progress, reflecting farmers' gradual shift toward market-oriented farming. However, pulses and oilseeds recorded minimal improvement, with stagnant or declining productivity, indicating low technological adoption and poor resource utilization. District-wise analysis revealed that Dimapur, Mon, and Tuensang achieved higher growth, while Zunheboto and Longleng performed relatively poorly. Overall, agricultural productivity in Nagaland showed moderate improvement, suggesting gradual advancement in crop management practices. The findings highlight the need for greater diversification, better access to improved inputs, irrigation facilities, and market infrastructure to enhance crop performance. Strengthening policy support and introducing modern agricultural techniques can help bridge regional disparities and ensure more sustainable and balanced agricultural growth in the state.

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