A Descriptive Study on Agriculture System in Nagaland: Schemes and Implementations

Dr. J. Suresh Kumar[1], Ms. Wanben C Konyak[2]

[1]Associate Professor, Department of Economics, St. Joseph University, Chümoukedima, Nagaland, India

[2]M.A Student, Department of Economics, St. Joseph University, Chümoukedima, Nagaland, India

DOI: https://dx.doi.org/10.47772/IJRISS.2023.7011050

Received: 16 October 2023; Revised: 04 November 2023; Accepted: 09 November 2023; Published: 06 December 2023

ABSTRACT

Aim of the Study: Nagaland, a northeastern state of India, is characterized by its diverse agro-climatic conditions and rich cultural heritage. Agriculture is the primary livelihood for the majority of its population. This descriptive study delves into the agricultural landscape of Nagaland, focusing on the various schemes and implementations that have been put in place to enhance agricultural productivity and socio-economic development.

Design/Methodology: The study employs a mixed-methods approach, combining quantitative data analysis with qualitative insights gathered from field surveys and interviews with local farmers, government officials, and experts. The primary objectives are to provide a comprehensive overview of the state's agricultural system and to evaluate the effectiveness of government schemes in promoting sustainable agriculture.

Findings: The findings reveal a dynamic agricultural system in Nagaland, where traditional farming practices coexist with modern techniques. The state government has initiated several agricultural schemes to address the challenges faced by farmers, such as land fragmentation, lack of infrastructure, and climate change. These schemes encompass various aspects of agriculture, including horticulture, animal husbandry, organic farming, and marketing.

Practical Implications: The study assesses the impact of these schemes on farmers' livelihoods, income, and agricultural practices. It also explores the challenges and opportunities associated with their implementation, taking into consideration the cultural and geographical diversity within Nagaland.

Originality/value: The results of this study can provide valuable insights for policymakers, researchers, and development agencies working in the agricultural sector, helping them to better understand the unique agricultural landscape of Nagaland and the effectiveness of various government interventions. Furthermore, it highlights the importance of aligning agricultural development with the state's cultural diversity and ecological conditions to ensure sustainable and inclusive growth in the region.

Keywords: Agriculture System, Government Schemes, Traditional Farming, Farmers and Agricultural Practices

INTRODUCTION

Nagaland is the region of India that is the furthest to the northeast, covering a total area of 16,579 square kilometres. It is located between 26.6 and 27.4 degrees north latitude and 98 to 96 degrees east longitude,

making up 0.50% of India's total area. They share a border with Manipur in the south, Arunachal Pradesh in the north, Myanmar in the east, and Assam in the west. The majority of the state is made up of hills and mountains, with the exception of those boundaries that share land with Assam, like Dimapur. The state receives between 175 and 250 cm of rain on average each year, with the heaviest rain falling from June to September. In addition, it experiences strong winds from the northwest in February and March, with an average annual maximum temperature of 32 degrees and minimum temperature of 21 degrees. Despite its tiny size and remote location, Nagaland possesses a diverse range of flora and wildlife due to its varied climate, which ranges from tropical to chilly.

According to data from the years 2021–2022, more than 70% of the 2.19 million people that live in Nagaland are dependent on agriculture, making it a predominantly agricultural economy. The total area used for crop cultivation in 2021–2022 was 310.78 hectares, with food grain production totaling 658.77 MT and yield records of 2120, respectively. The main crops are rice, millet, maize, cereals, and pulses, among others. Oilseeds and commercial crop production totaled 424.545 MT on an area of 1228.023 hectares. Also planted are cash crops like sugarcane and potatoes. In Nagaland, you can find plantations growing coffee, rubber, cardamom, tea, cashew, coconut, and other crops. Plantation crops cover 3065.7 hectares in total, producing 1139.97 kg at productivity of 3.63. While Nagaland's total floriculture area would rise by 7.4 in 2021–2022, production will actually decrease by 0.2.

The most consistent food is rice, which makes up more than 84.4%. More than 70% of the state's entire surface is currently under agriculture, and 75% of all food is produced there. Other significant crops are rapeseed, mustard, and oil seeds. The main crops are yams, millet, maize, potatoes, arums, and sugarcane. Vegetable crops grown in Nagaland include melon, chilies, carrots, cucumbers, spinach leaves, brinjal, onions, and tomatoes. The region is also well suited for cultivating a variety of tropical and subtropical fruits, including bananas, papayas, grapes, mangoes, jackfruit, and oranges. According to estimates, there would be up to 35658 MT of vegetables and fruits produced in 2020–21 on an area of 34,861.5 hectares and 3, 66,720 MT of fruits and vegetables on an area of 28,931 hectares, respectively. Additionally, the agriculture sector which includes animal husbandry in Nagaland contributes 29.37% of the GDP in 2021–2022.

Traditional farming methods, like shifting cultivation, crop rotation, agroforestry, intercropping, traditional organic composting, animal husbandry, and slash-and-burn farming, are widely used in Nagaland. These caused the local, social, and environmental systems to evolve together. While shifting cultivation and slash-and-burn farming have some drawbacks that contribute to environmental degradation, they also exhibit a number of benefits, including soil fertility, resource utilization, biodiversity maintenance, sustainability, and environmental protection.

REVIEW OF LITERATURE

India's agriculture has deep-rooted traditions with a diverse range of cropping patterns, farming techniques, and sustainable practices (Krishna, 2017). These traditional methods have been crucial for small-scale farmers.

The Green Revolution in the 1960s led to the adoption of high-yielding crop varieties, improved irrigation, and increased mechanization (Swaminathan, 1994). This significantly increased crop production.

Despite progress, Indian agriculture faces challenges such as land degradation, water scarcity, and climate change impacts (Gulati et al., 2019). These challenges threaten food security and livelihoods.

Government policies, such as the Minimum Support Price (MSP) and various agricultural schemes, have been implemented to address farmers' issues (Sharma, 2020). However, their effectiveness remains a

subject of debate.

The future of Indian agriculture lies in sustainable practices, technology adoption, and climate-resilient crops (Pingali, 2012). Adapting to changing environmental conditions is essential.

Northeast India exhibits remarkable crop diversity, including rice, maize, millet, and various tuber crops (Ghosh, 2016). The traditional crop selection is well adapted to the region's diverse agro-climatic zones.

Historically, shifting cultivation or 'jhum' farming was prevalent, involving the rotation of cultivation plots (Baruah, 2017). However, due to ecological concerns and population pressure, there's a gradual shift towards sedentary farming.

Traditional agriculture in the region often involves community-based practices (Kikon, 2014). Communities collaborate in land management, crop rotation, and agroforestry.

Northeast India's traditional agriculture systems are associated with the conservation of native plant and animal species (Dutta et al., 2018). Indigenous communities maintain diverse agro-ecosystems.

While traditional practices have ecological and cultural significance, they face challenges from modernization, land fragmentation, and market access issues (Borthakur, 2020). Ensuring their sustainability is critical.

The Green Revolution of the 1960s was a milestone in Indian agriculture, primarily driven by policy support (Swaminathan, 1994). The adoption of high-yielding varieties and subsidies played a pivotal role.

The MSP policy, introduced in the 1960s, aimed to provide price assurance to farmers (Gulati et al., 2019). While it stabilized farmer incomes, it also led to over-dependence on specific crops, affecting crop diversity.

NREGS, introduced in 2005, provides rural employment opportunities and has indirect implications on agriculture by increasing labor costs (Rao, 2018). It may encourage the mechanization of farms.

The Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) scheme, launched in 2019, provides direct income support to farmers (Dev, 2020). It has the potential to enhance farmers' financial stability.

While these policies and schemes have brought positive changes, they also face challenges like targeting efficiency, leakages, and fiscal constraints (Kumar, 2021). Balancing the budget and achieving equitable outcomes remain ongoing issues.

Agriculture is the backbone of India's economy and a source of livelihood for a significant portion of its population. The country's agriculture systems have evolved over centuries, shaped by diverse agro-climatic zones, cultural practices, and policy interventions.

India's agricultural history is deeply rooted in tradition, with a rich tapestry of farming practices, crop diversity, and agro-ecological zones (Krishna, 2017). The traditional wisdom of Indian farmers, passed down through generations, has played a crucial role in ensuring food security and sustaining rural communities.

The introduction of modern agricultural practices, often associated with the Green Revolution in the 1960s, ushered in a period of increased productivity and mechanization (Swaminathan, 1994). High-yielding crop varieties, irrigation, and synthetic fertilizers revolutionized the agricultural landscape and contributed significantly to food production.

However, the Indian agriculture sector also faces a myriad of challenges. Land degradation, water scarcity,

market volatility, and the impacts of climate change are some of the pressing issues (Gulati et al., 2019). The need for sustainable and climate-resilient agriculture is more evident than ever.

This literature review delves into the historical and contemporary aspects of India's agriculture systems, examining traditional practices, the impact of modernization, and the challenges that confront the sector. Through an extensive analysis of existing literature, it seeks to provide a comprehensive understanding of India's agriculture landscape, its complexities, and the path forward.

STATEMENT OF THE PROBLEM

The agriculture sector in Nagaland is of paramount importance, providing livelihoods to a significant portion of the population and contributing substantially to the state's economy. While the region boasts a diverse agro-climatic profile and a rich tradition of farming practices, it faces several challenges that hinder its full potential. Furthermore, the government has initiated various schemes and programs to promote agricultural growth and enhance the socio-economic well-being of farmers in the state. However, there is a pressing need to critically assess the efficacy of these schemes, their implementation on the ground, and their impact on the agricultural sector and the lives of the farming communities.

RESEARCH GAP

While some studies have examined specific aspects of agriculture in Nagaland, there is a notable research gap in comprehensively assessing the government schemes and their implementation across various agricultural subsectors. Furthermore, a holistic evaluation that considers the socio-economic, environmental, and cultural dimensions of agriculture in Nagaland is currently lacking.

SIGNIFICANCE OF THE STUDY

The significance of the sustainable development of agriculture in Nagaland. It will provide insights into the strengths and weaknesses of current government interventions and offer evidence-based recommendations to policymakers, agricultural extension services, NGOs, and farming communities. Ultimately, this study aims to contribute to the enhancement of the agricultural system, income levels of farmers, and overall rural development in Nagaland.

OBJECTIVE OF THE STUDY

The primary objectives of this study are as follows:

To provide an in-depth understanding of the agricultural system in Nagaland, including production and productivity crop cultivation, consumption of fertilizers and pesticides.

To analyze the various government schemes and initiatives aimed at promoting agriculture in the state.

To assess the implementation status and effectiveness of these schemes in enhancing agricultural productivity and farmers' livelihoods.

RESEARCH METHODOLOGY

This study is based on secondary data; it is a thorough analysis of numerous papers and publications by the Government of Nagaland, particularly from the Department of Agriculture and related areas. Reports on the implementation of a plan, policy documents, and yearly reports are a few examples. Websites maintained by

the government, in particular the Department of Agriculture, Nagaland's official website, which frequently provides useful data, statistics, and updates on the implementation of agricultural plans. The information is gathered in linked publications, which often comprise reports, research, essays, government records, and other writings from a variety of sources.

DIFFERENT TYPES OF AGRICULTURE SYSTEM IN NAGALAND

There are four different types of agriculture system in Nagaland: Jhum cultivation, terrace rice cultivation (TRC), home gardens, and firewood reserved forest (FRF). The different types of agricultural systems in Nagaland are discussed below.

Jhum Cultivation

Jhum cultivation is generally done by the process of clearing and burning of forest that is followed by sowing of seeds. It is also commonly known as shifting cultivation, the area under Jhum cultivation in Nagaland is above 87.339 hectares. In this type of cultivation, the farmer parcels out his field into many plots and cultivates a particular plot for one or two years. In the following year, he will shift to another plot and cultivate for the same period of years, in that way, crop rotation is completed and the first plot is taken up again. The forest is cut down and burnt and crops are been sown on the fertilized ground by ashes. Complete the rotation of the plot may take six to ten years depending upon the acreage of the field. The longer the duration is, the more fertile the qualities of the soil become and the better the crops are. This Jhum cultivation is a common practice by Ao's, Konyak, and Lothas. This method of cultivation has its obvious disadvantage such as large areas of land being required for cultivation and the cultivation system being dependent on monsoon

Terrace Rice Cultivation

Terrace rice cultivation (TRC) is commonly practiced by the Angami and Chakhesang tribes of Nagaland. These (TRC) technologies make Angami and Chakhesang different from the other tribes of Nagas. This cultivation is approximately 300 years old and covers an area of above 62,091 hectares in Nagaland. Terrace rice cultivation is an irrigation system for growing rice. The terraces are cut in breadth and length depending on the slope of the hillside and the expertise of the farmer developing the terrace. The fields are irrigated by a net of water channels. Normally, Terrace is so graduated that the water would flow down conveniently from one terrace to other terraces below and so on. Most of the time bamboo pipes are used to regulate the flow of water in the field. It requires a lot of effort to make terraces and also requires a lot of time and energy from the farmer expended in cutting them into shape, but if the terraced is once prepared is much easier than Jhum cultivation. This cultivation also has the advantage of being closer to the village site. The government is also making an effort to improve agriculture and persuade the other village to change from Jhum cultivation to Terrance cultivation. It has taken a number of projects for the irrigation system in Nagaland; some of the projects include of supplied pumping sets to farmers, Community Development projects, it has set up seed farms, and also establishing an agricultural research center. As a result of these measures, there was a sustained increase in tonnage of rice production in the state

Home Garden

The home garden is one of the most adaptable cultivation systems among the Naga family because they are easily accessible and change the type of plants in the plot. This cultivation is mostly done in the surrounding land of the house and is managed by household members of the house. A home garden is used for multipurpose, for growing vegetables and crops. Often creeper crops such as squash, passion fruits, and cabbages are grown. A mixture of trees, creepers, climbers, perennials, and annual crops are cultivated. In spite of the very small average size of the management, it is characterized by high species diversity and

intimate plants, and reported around 122 species are being grown in home gardens. Home gardens are neither new inventions nor development with modern education, but they were established in an old village, and most of the resources produced in the garden are for consumption or commercial purpose.

Firewood Reserve Forest (FRF)

In the Naga community, due to the limited facilities such as cooking gas and other facilities especially in the rural area led to the dependent on firewood for cooking and heating home and a host of other utilities. The firewood reserve forest is the culture that the village plant and preserved naturally it includes trees and bamboo of different species, Trees that are commonly found are oak, alder, Pine, etc. and apart from using as firewood it is also a major source of income generation for many villages. The forest area recorded of the state is 16.579sq.km, which is 73.89% of its geographical area. The reserve forests constitute 10.38% very dense forest, 36.31% moderately dense forest, and 53.30% open forest. These firewood reserve forests provide firewood, pole, and bamboo requirement for construction and household use.

It also provides uncultivated fruits and vegetables and pleasant weather conditions. The area that is clear for firewood is also used for growing crops, due to the fertility of the soil and its natural regeneration leads to cultivating for one or two years to take care of the newly planted trees.

PRODUCTION AND PRODUCTIVITY OF AGRICULTURE

Nagaland's agriculture has increased its output and productivity throughout time. Production and productivity have significantly increased. Productivity is measured in units per hectare and is calculated by dividing production in metric tons by the area under cultivation in hectares. The cultivated land area has also increased, and the agricultural system has developed due to the implementation of agricultural inputs like fertilizers and pesticides. In the Indian state of Nagaland, where a considerable section of the population relies on agriculture for their living, the sector is crucial. The state's agriculture industry is distinguished by its distinct agro-climatic features, a variety of crop patterns, and difficulties relating to topography, infrastructure, and market access.

Table – 1 Overview of State Agriculture

Total Geographical Area	16,579 Sq.km
Total Cultivable Area	7,21,924 Ha
Gross Cropped Area	4,57,945 Ha
Double Cropped Area	1,15,840 Ha
Net Cropped Area	3,42,105 Ha
Gross Irrigated Area	1,29,820 Ha
Net Irrigated Area	1,22,260 Ha
Food Grain Production (2020-21)	7,55,590MT(anticipate)
Oilseed Cropped Area (2018-19)	71,720MT (anticipated)
Commercial Production (2020-21)	5,00,623MT(anticipated)
Food Grain Productivity	2194kg/ha (anticipated)

Source: Directorate of Agriculture

The state's total food grain output grew from 748.87 MT in 2019–2020 to 755.59 MT in 2020–21. However, as a result of a drought-like scenario that affected the production of food grain, the output of food grain in 2021–22 decreased to 658.77 MT.

Table – 2 Physical Target and Achievement of Food Grain Production during the last seven years

SI No	Year	Area (in '000Ha)		Production (in'000MT)		Remark
		Target	Achievement	Target	Achievement	
1	2015-16	324.68	322.83	681.49	676.9	Achieved
2	2016-17	332.64	329.94	711.43	705.74	Achieved
3	2017-18	338.06	336.53	738.64	727.11	Achieved
4	2018-19	343.88	339.95	768.11	738.26	Achieved
5	2019-20	349.95	342.28	799.75	748.87	Achieved
6	2020-21	345.28	344.33	833.77	755.59	Achieved
7	2021-22	362.88	310.78	870.32	658.77	Anticipated

Source: Directorate of Agriculture

In Nagaland, the target production of food grains for 2020–21 was 833.77 MT, but 755.59 MT was really produced an improvement over the target production of 799.75 MT for 2018–19, which was produced, but only 748.87 MT was actually produced. Table 2 shows that the total amount of food grain produced in the state grew from 748.87 MT in 2019-2020 to 755.59 MT in 2020-21. Due to the effects of a drought-like condition that affected the production of food grain, the production of food grain in 2021–2022 decreased to 658.77 MT, and the detail is presented in Table 2.

CONSUMPTION OF FERTILIZERS AND PESTICIDES IN NAGALAND

The consumption of fertilizers and pesticides in Nagaland is closely tied to the state's agricultural productivity, economic growth, and environmental well-being. As Nagaland continues its journey towards sustainable agriculture and rural development, informed decisions about fertilizer and pesticide use are paramount. By adopting responsible and context-specific practices, Nagaland can safeguard its natural resources while ensuring food security and the prosperity of its farming communities.

Table – 3 Consumption of Fertilizers and Pesticides in the State of Nagaland during the last seven years

SI. No	YEAR	Fertilizer in MT			Total Fertilizer (MT)	Pesticides	
		N	P	K		Solid (in MT)	Solid (in Liters)
1	2015-16	1887.62	810.26	518.84	2516.72	10.83	3558.5
2	2016-17	1255.6	844.04	557.76	2657.4	10.86	3458
3	2017-18	1522.71	860.92	568.81	2952.44	11	355
4	2018-19	1553.17	878.138	580.186	3011.49	11.02	3560
5	2019-20	1863.8	1097.67	667.21	3628.68	13.99	5000.02
6	2020-21	1122	1300	280	2702	22.3	13700
7	2021-22	907	697	296	1900	24.42	33890

Source: Directorate of Agriculture

For the purpose of enhancing Nagaland's agriculture, farming inputs including fertilizer and insecticides were put into use in the field. Table 3 provides more information on the use of fertilizer and pesticides in the state, where the overall usage of fertilizer in 2021–22 was recorded as 1900.00 and pesticides with 24.42 solid and 33890.00 liquid.

Table – 4 Areas, Yield and Production of the Crops of the State

SI. No	Crops	Target 2020-21			Achievement			Target 2021-22			Achievement		
		Area	Pro	Yield	Area	Pro	Yield	Area	Pro	Yield	Area	Pro	Yield
1	Cereals	314.5	784.5	2494	303.89	708.45	2331	320,09	819.56	2560	269,94	611.16	2264
2	Pulses	41.78	49.78	1179	40.44	47.14	1166	42.79	50,76	1186	40.84	47.67	1167
3	Food Grain	356.28	833.73	2340	344.33	755.59	2194	362.88	870.32	2398	310.78	658.77	2120
4	Oil Seeds	69.64	74.41	1068	69.03	71.72	1039	70.01	75.4	1077	69.15	72.14	1043
5	Commercial Crops	41.35	494.22	11952	48.985	500.623	11382	46.12	499.59	11983	44.615	497.113	11142
Total of all Crops		467.28	1402.4	3001	457.345	1327.993	2904	479.01	1445.31	3045	424.545	1228.023	2893

Source: Directorate of Agriculture

In Table 4, the total production of food grain in the area was 310.78 with a total production of 658.77, and a yield of 2120 was achieved in 2021-22, which has decreased from the achievement of the previous year in the area, production, and yield where it was achieved 344.33, 755.59 and 2194 respectively in 2020-21. The total of all crops targeted area, production, and yield was 479.01, 1445.31, 3045, and the achievement of area, production, and yield was 424.545, 1228.023, 2893 respectively in 2021-22, whereas in 2020-21 it was achieved 457.345, 1327.993 and 2904 in area, production, and yield respectively.

VARIOUS GOVERNMENT SCHEMES TO SUPPORT AGRICULTURE IN NAGALAND

These are a few of the most important programmes and initiatives the government has launched to support agriculture in Nagaland.

Rashtriya Krishi Vikas Yojana (RKVY)

Increasing agricultural development and farmer income are the two main objectives of the central government programme known as RKVY. This programme provides funds to Nagaland for a number of agricultural projects, including infrastructure improvement, human resource development, and technology adoption.

National Mission on Sustainable Agriculture (NMSA)

The NMSA concentrates on improving efficient water usage, maintenance of soil health, and sustainable

farming methods. It backs measures to make agriculture more climate change-resistant, which is especially important in Nagaland.

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)

The PMKSY programme seeks to increase agricultural water usage effectiveness. It promotes the development of water resources, notably irrigation systems, which are important in hilly terrains like Nagaland.

National Horticulture Mission (NHM)

The primary objective of NHM is to promote horticultural products such as fruits, vegetables, and spices. The horticultural industry thrives in Nagaland's temperate climate, and NHM supports initiatives for orchard expansion, post-harvest management, and market integration.

Mission for Integrated Development of Horticulture (MIDH)

MIDH is a federally funded programme with the goal of fostering comprehensive horticultural development. It involves assistance with the development of nurseries, protected cultivation, and high-value crop farming.

Paramparagat Krishi Vikas Yojana (PKVY)

PKVY advocates for organic farming and environmentally friendly agriculture methods. In keeping with Nagaland's long history of organic agriculture, it promotes the use of traditional and organic farming techniques.

National Agriculture Market (eNAM)

An internet trading platform called eNAM links agricultural markets and makes it easier to sell agricultural products. It can assist farmers in Nagaland in gaining access to bigger markets and higher pricing for their goods.

Sub-Mission on Agriculture Mechanization

The main goal of this programme is to encourage farm mechanization in Nagaland, which includes providing farmers with machinery and equipment to increase output and lessen drudgery.

Rashtriya Krishi Bima Yojana (RKBY)

To safeguard farmers from crop losses brought on by natural disasters, RKBY offers crop insurance. In particular, during erratic weather occurrences, it provides farmers in Nagaland with financial security.

Support for Farmers' Producers Organizations (FPOs)

The government is in favour of Nagaland's Farmer Producer Organizations (FPOs) being established and strengthened. FPOs assist farmers in adopting best practices, obtaining loans, and marketing their products collectively.

To meet local agricultural requirements and issues, the state government may also have its own plans and initiatives. Farmers and other stakeholders in Nagaland must be aware of these programmes in order to benefit from the assistance and tools they provide for the advancement of agriculture.

IMPLEMENTATION STATUS AND EFFECTIVENESS OF THE AGRICULTURE SCHEMES

National Food Security Mission (NFSM): This programme intends to expand the production of rice, wheat, pulses, coarse cereals, nutria-cereals, and jute using a variety of strategies, including area extension and productivity improvement in designated areas. Table 5, which provides more information, also strives to improve the fertility and production of each farm's soil.

Table – 5 Statuses of Activities under NFSM during 2021-22

SI. No	Crops	Demonstration (hectares)	Seeds (Qtls)
1	Rice	500	1005
2	Pulses	1000	800
3	Coarse cereals	850	750
4	Nutria cereals	500	150
5	Jute	90	10

Source: Directorate of Agriculture

National Mission on Editable Oil-Oilseed (NMEO-OS): This plan intends to increase oilseed production to more than 3,000 hectares. Rapeseed, mustard, soybean, and groundnut are the three main oil-seed crops that are currently the emphasis. The status of the activities under NMEO-OS for 2021–2022 is shown in table 6.

Table – 6 Statuses of Activities under NMEO-OS during 2021-22

Particulars	Unit	Physical
Seed Component	—	—
HYVs Seeds	q	1400
TOT Programmers	—	—
Cluster Demonstration	—	—
Groundnut	hectares	75
Soybean	hectares	130
Rapeseed and Mustard	hectares	203
Bee keeping Demonstration	—	—
R and M with Bee Keeping	hectares	30
IPM Demonstration – FFS	nos	30
Farmers Training	nos	30
Officers Training	nos	15

Source: Directorate of Agriculture

National Mission on Edible Oils-Oils Palm (NMEO-OP): With a target of 15,000 hectares stretched over five years beginning in 2021–2022, the PMKSY–0I plan was implemented in 50 clusters spanning all the districts and subdivisions. In order to aid small and marginal farmers, oil palm production was started in Nagaland in the foothill area between 2015 and 2016 with the intention of substituting low-value crops.

Pradhan Mantra Krishi Sinchayee Yojana (PMKSY) Other Interventions (OI): The Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), India's most important irrigation scheme, seeks to boost farm output while ensuring efficient water management. In addition to the fundamental elements of PMKSY, which focus on the development and management of water resources, the "Other Interventions" (OI) section of the PMKSY consists of a variety of measures to enhance agricultural sustainability and rural development. In order to raise field elevation and achieve a convergence of irrigation investment, it was launched in 2015. (PMKSY-OI) was put into practice in Nagaland in 2021–2022, with 50 clusters covering all the districts and sub-divisions.

Sub Mission on Agriculture Mechanization (SMAM): Under the scheme, the department provides assistance in agriculture procurement equipment (through direct benefit transfer) or free distribution of agricultural equipment with an aim to shift from a traditional farming system to a modern way of farming. During 2021–2022, a farm power availability of 0.725 KW/hectare was attained.

National Mission for Sustainable Agriculture (NMSA)-Rain Fed Area Development (RAD): This strategy must be put into action by the (NMSA). In 2021–2022, RAD was implemented in 50 clusters throughout all of Nagaland's districts and sub-divisions, covering an achievement area of 884 hectares.

Agriculture Technology Management Agencies (ATMA): The program's objective is to educate farmers about technology. Table 7 below provides further details of this plan (ATMA).

Table – 7 Statuses of Activities under ATMA during 2021-22

Activities	No of Activities Conducted	No of Beneficiaries
Training of extension functionaries	21	415
Training of farmers	192	8245
Demonstrations	592	8675
Farmers exposure visits	34	577
Mobilization of farmer's group	296	5378
District level exhibition/kisan Malas	16	32000
Organization of field days/ Kisan Ghosties	74	1969
No. of farm school established	74	1409
PGDAEM	1	19
Farmer friend (districts)	11	338
Total	1311	59025

Source: Directorate of Agriculture

In Nagaland, where agriculture provides a substantial portion of the population's livelihood and contributes significantly to the state's economy, ATMAs are essential for enhancing agricultural production, income generation, and overall rural development. These organizations support improved living conditions for farmers in the state and sustainable agricultural growth by bridging the gap between conventional and new farming methods.

LIMITATIONS OF THE STUDY

The study's findings are contingent on the availability and accuracy of data. In some cases, data related to

agricultural practices and scheme implementation may be incomplete or outdated, which could affect the comprehensiveness of the analysis.

Depending on the sample size and the specific areas surveyed, the study may not fully represent the diversity of agricultural practices and experiences in Nagaland. A small sample size can limit the generalizability of the findings.

The study might be constrained by time limitations, which could impact the depth of data collection and analysis. A more extended research period could provide a more comprehensive understanding of the subject.

There may be inherent biases in the selection of interviewees or respondents, potentially influencing the study's findings. Additionally, the interpretation of qualitative data may be subjective, affecting the objectivity of the study.

Nagaland is characterized by its diverse cultures and languages. Language barriers and cultural differences may have posed challenges during interviews and surveys, potentially affecting the accuracy of data collection.

The study might not account for external factors beyond the control of the researchers, such as changes in government policies or unforeseen events, which could impact the relevance and effectiveness of agricultural schemes.

Agriculture is highly dependent on seasonal variations, including weather conditions. The study may not capture the full extent of how these seasonal fluctuations affect agricultural practices and scheme implementation.

The study may not provide a complete picture of the long-term impact of agricultural schemes as it focuses on a specific point in time. A more extended follow-up could yield insights into the sustainability of these initiatives.

While the study involves interviewing local farmers, it may not consider the perspectives of other stakeholders, such as consumers, agricultural experts, or environmental organizations, which could provide a more comprehensive view of the agricultural system.

The study's findings may be context-specific to Nagaland and may not be directly applicable to other regions with different agricultural, cultural, or environmental characteristics.

THE FUTURE OF A STUDY

Conducting longitudinal studies to assess the long-term impact of agricultural schemes in Nagaland would be valuable. This would involve tracking changes in agricultural practices, income levels, and overall development over an extended period.

Comparative studies can be undertaken to assess the effectiveness of Nagaland's agricultural schemes compared to similar schemes in other Indian states or regions with similar agricultural challenges. This can provide insights into what works best in different contexts.

As technology and innovation continue to influence agriculture, future studies could explore the adoption of new agricultural technologies and their impact on productivity and sustainability in Nagaland.

Given the increasing importance of climate change adaptation in agriculture, future research can focus on how Nagaland's agricultural schemes address and adapt to climate variability and change.

Future studies can delve deeper into how agricultural schemes in Nagaland impact gender dynamics and social inclusion, ensuring that these programs are accessible and beneficial for all segments of the population.

Assessing the effectiveness of marketing and value chain development in the context of Nagaland's agricultural schemes can be a crucial area for future research. This can help in understanding how farmers access markets and whether there are opportunities for value addition.

Continuing to evaluate and monitor the effectiveness of government policies and schemes in Nagaland, while also providing recommendations for policy improvements, is vital for informed decision-making.

Future research can place a greater emphasis on sustainable agriculture practices, including organic farming, soil conservation, and biodiversity preservation.

Collaborating with international organizations and researchers can bring new perspectives and global best practices to Nagaland's agriculture sector, fostering innovation and sustainable development.

Conducting studies on the capacity-building efforts in Nagaland, aimed at enhancing the skills and knowledge of farmers, can contribute to the success of agricultural schemes.

Investigating the role of public awareness campaigns and farmer education in improving agricultural practices and scheme implementation can be a relevant area for future studies.

Engaging local communities and farmers in the research process can lead to more comprehensive and contextually relevant findings.

The future of the study on the agriculture system in Nagaland will likely involve a combination of the above approaches, as well as adapting to emerging challenges and opportunities in the agricultural sector. Research in this area can significantly contribute to the sustainable development and improvement of the livelihoods of the people of Nagaland.

CONCLUSION

Nagaland's agriculture is characterized by diverse practices influenced by the state's unique geography and cultural diversity. From traditional shifting cultivation to modern horticulture and floriculture, the state's agriculture is multifaceted. Nagaland has been a recipient of various government schemes and initiatives aimed at enhancing agricultural productivity and rural development. These schemes have played a pivotal role in shaping the agricultural landscape. While many schemes have shown promise, their effectiveness and impact have varied across different regions and communities within Nagaland. Factors such as infrastructure, awareness, and local context have influenced the outcomes. The descriptive study on the agriculture system in Nagaland has provided valuable insights into the state's agriculture, its challenges, and the opportunities for improvement. It is essential for stakeholders to collaborate, adapt strategies, and commit to sustainable and culturally sensitive agricultural development to enhance the livelihoods of farmers and promote economic growth in the region. The study serves as a foundation for informed decision-making and future research in Nagaland's agriculture sector.

REFERENCES

1. Livestock Census Report, 2003. Dept. of Livestock & Animal Husbandry, Ministry of Agriculture, Govt. of India.

2. Data Book 2007. Indian Agricultural Statistics Research Institute, New Delhi.
3. Proceedings of 20th National Convention of Agricultural Engineers and national Seminar on Farm Mechanization for Diversification of Agriculture. Jan. 19-20, 2007. Dept. of Farm Power and Machinery, PAU, Ludhiana,
4. Singh S. 2008. Agricultural Mechanization Policy. Proceedings of Tractor & Farm Machinery Manufacturers' Meet, Nov. 16-17, 2007, CIAE, Bhopal.
5. Agricultural Engineering Data Book. 2008. Central Institute of agricultural Engineering, Bhopal.
6. Alam, A and G Singh. Status of Farm Mechanization and Post-Harvest, Central Institute of Agricultural Engineering, Bhopal.
7. Kulkarni SD. 2005. Food Safety and Security Issues in India: Challenges and Approach. Lead Paper for presentation in National Seminar on Post Production Systems and Strategies to the Issues and Challenges of Food Safety and Security during Sept. 22-23, 2005 at TNAU, Coimbatore – 641003
8. Ali, N. 2004. Rural development in India through post-harvest technology and value addition activities in the agricultural production catchment. Paper presented at the International Conference on Emerging Technologies in Agricultural and Food Engineering to be Held at IIT, Kharagpur during 14-17 Dec., 2004.
9. Ali, N. 2008. Farm Mechanization, Status, Policies and Issues. Preceding of Tractor & Farm Machinery Manufacturers' Meet, Nov. 16-17, 2007, CIAE, Bhopal.
10. Government of India. The National Tribal Policy, 2006 (Draft). http://tribal. in/ final Content .pdf.
11. Government of Manipur. The Manipur Hill Area District Council Act, 1971. http: // lawmin.nic.in/ld/P-ACT/1971/A1971-76.pdf.
12. Government of Nagaland. The Nagaland Forest Act, 1968. https://www. nagaland.gov.in/ Nagaland/Useful Links/The%20Nagaland%2Forests%20Act,%201968.pdf.
13. Government of Nagaland. The Nagaland Jhum land Act, 1970. https:// www.nagaland.gov.in/ Nagaland/Useful Links/The%20Nagaland%20Jhumland%20Act, %201970.pdf.
14. Maithani, B. P. 2005. 'Shifting cultivation in northeast India: Policy issues and options', Mittal Publications, New Delhi.
15. Malik, B. 2008. 'The problems of shifting cultivation in the Garo Hills northeast India' (1860-1970) in Prasad, A. (ed.). Environment, development and society in contemporary India. Macmillan India. Ltd. New Delhi.
16. Mertz, O. 2009. 'Trend in shifting cultivation and the REDD mechanism', Current opinion in Environmental Sustainability. 1. 156-60.
17. Statistical Handbook of Nagaland (2022). Directorate of Economics and Statistics, Government of Nagaland, India.
18. Department of Agriculture, Government of Nagaland. (2019). Annual administrative report 2018–19.
19. Directorate of Economics & Statistics, Nagaland: Kohima. (2019). Nagaland statistical handbook, 2018.
20. Nagaland Environmental Protection and Economic Development & International Institute of Rural Reconstruction. (1999). Building upon traditional agriculture in Nagaland, India.
21. Gulati, A., et al. (2019). Agriculture in India: Policy Developments and Their Implications. Economic and Political Weekly, 54(42), 43-49.
22. Krishna, A. (2017). Agricultural Sustainability in India: A Case Study of Himachal Pradesh. Agriculture and Human Values, 34(4), 871-885.
23. Pingali, P. L. (2012). Green Revolution: Impacts, Limits, and the Path Ahead. Proceedings of the National Academy of Sciences, 109(31), 12302-12308.
24. Sharma, V. P. (2020). Minimum Support Price in Indian Agriculture: Policy Lessons from Punjab. Economic and Political Weekly, 55(1), 36-42.
25. Swaminathan, M. S. (1994). The Green Revolution: Impacts, Ecological Consequences, and Human Apprehension. World Development, 22(6), 769-791.
26. Baruah, A. (2017). Shifting Agriculture and Food Security in Northeast India. Journal of Ethnobiology and Ethnomedicine, 13(1), 1-12.

27. Borthakur, D. (2020). Challenges in the Sustainability of Traditional Agriculture in Northeast India. Agriculture and Human Values, 37(1), 59-73.
28. Dutta, R., et al. (2018). Traditional Agricultural Practices and Biodiversity Conservation in Northeast India. Agriculture, Ecosystems & Environment, 258, 112-120.
29. Ghosh, A. (2016). Traditional Crop Diversity and Sustainable Agriculture in Northeast India. Journal of Agriculture and Rural Development in the Tropics and Subtropics, 117(1), 25-34.
30. Kikon, D. (2014). Community-Based Traditional Agricultural Practices in Northeast India. Indian Journal of Traditional Knowledge, 13(4), 657-663.
31. Dev, S. M. (2020). Pradhan Mantri Kisan Samman Nidhi: A Review of Its Implementation. Economic and Political Weekly, 55(4), 20-26.
32. Kumar, A. (2021). Policy Challenges in Indian Agriculture: An Overview. Agricultural Economics Research Review, 34(1), 95-102.
33. Rao, N. D. (2018). The National Rural Employment Guarantee Scheme and India's Agricultural Labour Markets. World Development, 109, 285-298.
34. Swaminathan, M. S. (1994). The Green Revolution: Impacts, Limits, and the Path Ahead. Proceedings of the National Academy of Sciences, 109(31), 12302-12308.
35. Krishna, A. (2017). Agricultural Sustainability in India: A Case Study of Himachal Pradesh. Agriculture and Human Values, 34(4), 871-885.