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Production and productivity of spices in dimapur and kohima districts of nagaland

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Abstract

With the increasing population of Nagaland, the demand and supply for consumption had also increased. The population of Nagaland in 2020 was recorded as 2.19 million. Also, Nagaland been in a mountainous side with a very good climatic conditions to grow diversified crops and plants among them are also spices. With the growing of spices, it can also generate employment opportunities. The study had revealed that the spices grown are not only used for flavoring and seasoning of food but also used as home remedies for different purposes. It had shown that in Dimapur district among the major spices grown the production of turmeric had a very good increase in production of 4555 MT in 2010-2018. Followed by garlic 130 M. T in 2010-2018. Likewise in Kohima district cardamon and Naga king chili had a very good production. The production of cardamom had increased by 70 M T in 2010 to 2013 and Naga king chili to 513 M.T in 2010 to 2013. The Net area sown had also increased by 21363 hectares in between 2010 to 2018. The paper has tried to find production, productivity, and trends of growth of major spices in Dimapur and Kohima districts of the State. *Keywords:* Naga King Chilli; Naga jolokia; Ghost Pepper.

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Introduction

The word spice is derived from the Latin word spices which mean 'kinds of goods. Spices have been cultivated and used since ancient times from the beginning of human civilization in India, China, Babylon, Egypt, Greece, and Rome [1]. India has a well-known reputation as the land of spices from time immemorial. Indian spices are popularly known for their flavor in both domestic and foreign markets. Spices are widely used indifferent medicines because of their carminative, preservative, and simulative properties [2]. Within India Kerala is known as the spice garden. It was the search of spices which tempted the mariners like Vasco de Gama of Portugal, Christopher Columbus of Spain, and many others to undertake hazardous voyages to the East [3].

Nagaland which is among the 16th state of India which has a good agro-climatic condition in which it grows diversified spices like Naga King Chilli which is also known as the world's hottest chilli, Garlic turmeric, Cardamon is known as Queen of spices and Black Pepper known as 'King of spices'. Horticulture crops are a significant part of total agricultural produce. It has assumed importance as an indispensable part of agriculture with the varied agro climate regions that Nagaland has a variety of horticultural crops which can offer a wide range of choices to farmers for crops diversification. It has proved to be the best diversification option for agricultural land use because of assured and the remarkable returns to farmers

Objectives

The objectives of the study are.

- To analyze the production and productivity of major spices and trend of growth.
- > To study the land use statistics in production of spices in the districts.

➤ To study the problem of spices cultivation and suggest policy implication.

Research Methodology

The study is descriptive based on observation and secondary sources.

Result and Discussion

Spices are constituted as an important group of agricultural commodities and primarily used for seasoning goods to give its taste, flavor, and aroma. Spices are also used in different ways like flavoring agents in beverages, ayurvedic medicines, and coloring textiles and in beauty products.

Cardamon

Cardamon is an important spice known as 'Queen of Spice'. The seeds and the oil from the seeds are used to make medicine. Cardamon is used for building fat in liver, diabetes, and high cholesterol to control. Not only that it is also used in soaps, creams, and perfumes [4].

Black pepper

Black pepper is known as the 'King of Spice' which is used to promote weight loss, remove hydrochloric acid, common cold and gives better digestion system. The black pepper has three main functions to remove toxins, heel body and stimulates the body organs [5].

Turmeri

Turmeric is a very well-known spice used as a dye, flavoring, and it has importance in the medicinal field. The two main components that is found in turmeric are volatile and non-volatiles. Turmeric is used as in traditional ways for treatment purposes, therapeutic, skin etc [6].

Naga King chilli

It was once recorded as the world hottest chilli. The Naga king chilli possibly the only chilli that contains genes of both capsicum frutescence and capsicum Chinese is said to be a circulatory stimulate and used in treatment of atherosclerosis, shock, hemorrhagic, heart attack etc. It is used to combine well with many herbal medicinal treatments [7].

Garlic: Garlic is an important cash crop and related to onion, leeks, and chives. It is used for conditions related to heart and blood system. Also, include high cholesterol, high blood pressure, or fats in the blood and hardening of the arteries [8].

Area of the Study

The study covered Dimapur and Kohima districts of the state. Nagaland is an agrarian state located in an altitude ranging from 150 m to 3800 m above sea level. The climate of the state ranges from sub-tropical to temperate with an annual rainfall of 2500 mm and temperature ranging from 4/ to 35/ Celsius. The total geographical area of the state is 16,579 sq kms of which only 8.48 per cent can be considered plain and rest is constituted by undulating and hilly terrain with altitude varies from 200 m to 3840 m. The crop sector in Nagaland has impressive annual growth rate and it is almost five times more than the national growth rate. Similarly, the livestock sector growth rate of 6.63 per cent is higher than NER [9]. The two districts Dimapur and Kohima are selected because there are considerable numbers of spices cultivators in the state.

The following table shows plantation area, production, and trend of growth of major spices in the districts.

Table 01: Production of Major Spices in Dimapur (Production in M.T., Area in Hectares)

	2010-11		2013-14		2018-19	
Spice	2(710-11	2015 14		2010-17	
s	Ar	Produc	Ar	Produc	Ar	Produc
	ea	tion	ea	tion	ea	tion
Carda mon	0	0	0	0	0	0
Black	50	5	40	5	25	3
pepper	30	7	70	7	2	7
Turme	5	45	21	2865	21	4600
ric	``	13	7	2003	0	1000
Naga			13			
king	65	260	2	686	25	65
chilly						
Garlic	10	20	10	25	17	150

Sources: Nagaland statistical handbook

Table 01 shows the Dimapur district of Nagaland had never grown cardamon but had grown spices like black pepper, turmeric, Naga king chilli, and garlic. Though the production of black pepper and Naga king chilli were not much but the production of turmeric had been increasing significantly. It is observed that the production of turmeric increase from 45 M.T in 2010-11 to 4600 M.T in 2018-19 with area expansion from 5 hectare to 210 hectare in the period. The product of garlic increases from 20 M.T in 2010-11 to 150 M.T in 2018-19 with area expansion from 10 hectare to 17 hectare in the same period.

From Table 1 it is observed that the average productivity of turmeric is 9 M.T per hectare in 2010-11 which increases to 21.90 M.T per hectare in 2018-19. The growth rate of production is found 101.22 per cent and growth rate of area expansion is 41 per cent of that period.

The average productivity of garlic is 10 M.T per hectare in 2010-11 which decreases to 2.60 M.T per hectare in 2018-19. The growth rate of production is found 6.50 per cent and growth of areas expansion is 0.70 per cent.

The average productivity of Naga king chilli is 4 M.T per hectare in 2010-11 which decreases to 8.82 M.T per hectare in 2018-19. The growth rate of production is found -0.75 per cent and growth of areas expansion is -0.62 per cent.

The average productivity of black pepper is 0.1 M.T per hectare in 2010-11 which increases to 0.12 M.T per hectare in 2018-19. The growth rate of production is found -0.40 per cent and growth of areas expansion is -0.50 per cent.

Table 02: Production of Major Spices in Kohima (Production in M.T, Area in Hectares)

Spice	20)10-11	2013-14		2018-19	
S	Ar	Produc	Ar	Produc	Ar	Produc
	ea	tion	ea	tion	ea	tion
Carda mon	60 0	270	54 6	230	62 5	300
Black pepper	20	2	11	3	0	0

Turme ric	20	80	23	352	25	360
Naga king chilly	90	360	12 0	873	67 0	470
Garlic	10	20	10	25	39	361

Sources: Nagaland statistical handbook

The Kohima district of Nagaland had good climatic condition to grow spices like cardamon, black pepper, turmeric, Naga King chilli and garlic. Unlike Dimapur, Kohima had a very good production of cardamon. In the year 2010-11 the production of cardamon was 270 M.T which had increased to 300 M.T in 2018-19. Black pepper had a very less production. Turmeric also had an increase in production from 80 M.T in 2010-11 to 360 M.T in 2018-19. Naga King chilli also had an increase of 513 M.T from 2010-11 to 2013-14. But in 2018-19 it had decrease by 403 M.T from 2013-14.

From Table 02 it is observed that the average productivity of cardamon is 0.45 M.T per hectare in 2010-11 which increases to 0.48 M.T per hectare in 2018-19. The growth rate of production is found 0.11 per cent and growth rate of area expansion is 0.04 per cent of that period.

It is observed that the average productivity of black pepper is 0.1 M.T per hectare in 2010-11 which increases to 0.27 M.T per hectare in 2013-14. In the year the 2018-19 the production of black pepper was nil. Therefore, the growth rate of production is found 0.5 per cent and growth rate of area expansion is -0.45 per cent of that period.

It is observed that the average productivity of turmeric is 4 M.T per hectare in 2010-11 which increases to 14.40 M.T per hectare in 2018-19. The growth rate of production is found 3.5 per cent and growth rate of area expansion is 0.25 per cent of that period.

The average productivity of Naga king chilli is 4 M.T per hectare in 2010-11 which decreases to 0.7 M.T per hectare in 2018-19. The growth rate of production is found 0.30 per cent and growth of areas expansion is 6.4 per cent.

The average productivity of garlic is 2 M.T per hectare in 2010-11 which increases to 9.26 M.T per hectare in 2018-19. The growth rate of production is found 17.05 per cent and growth of areas expansion is 2.9 per cent.

Table 03: Production of Major Spices in Nagaland (Production in M.T, Area in Hectares)

Spice	2010-11		2013-14		2018-19	
S	Ar	Produ	Ar	Produ	Are	Produ
	ea	ction	ea	ction	a	ction
Carda	26	1125	30	1300	4093	2302
mon	20	1123	00	1300	.50	2302
Black	19		14		115	
peppe	_	18		22	115.	27
r	5		2		50	
Turme	10	470	61	9540	676	9303.2
ric	8	470	0	8540	0/6	0
Naga	43		10			1797.6
king	5	1760		6000	1372	1/9/.0
chilly	5		00			1

C . 1' .	10	200	25	2500	205	2388.7
Garlic	0	200	0	2500	295	5

Sources: Nagaland statistical handbook

From Table 03 it is observed that the average productivity of cardamon is 0.43 M.T per hectare in 2010-11 which increased by 0.56 M.T per hectare in 2018-19. The growth rate of production is found 0.5 per cent and growth rate of area expansion is 0.56 per cent of that period.

It is observed that the average productivity of black pepper is 0.9 M.T per hectare in 2010-11 which increases to 0.23 M.T per hectare in 2018-19. The growth rate of production is found 0.5 per cent and growth rate of area expansion is -0.40 per cent of that period.

It is observed that the average productivity of turmeric is 4.35 M.T per hectare in 2010-11 which increases to 13.76 M.T per hectare in 2018-19. The growth rate of production is found 18.79 per cent and growth rate of area expansion is 5.26 per cent of that period.

The average productivity of Naga king chilli is 4.04 M.T per hectare in 2010-11 which decreases to 1.31 M.T per hectare in 2018-19. The growth rate of production is found 0.02 per cent and growth of areas expansion is 2.15 per cent.

The average productivity of garlic is 2 M.T per hectare in 2010-11 which increases to 8.09 M.T per hectare in 2018-19. The growth rate of production is found 10.94 per cent and growth of areas expansion is 1.95 per cent.

Therefore, from the above explanation the production growth of cardamon in Nagaland was 0.5 percent with area 0.56 per cent in which the growth rate in Dimapur was nil but in Kohima it was 0.11 per cent with area 0.04 per cent.

The production growth rate of black pepper in Nagaland was 0.5 per cent with area -0.40 per cent in which the growth rate in Dimapur was -0.40 per cent with area -0.62 per cent and in Kohima it was 0.5 per cent with area -0.50 per cent.

The production growth rate of turmeric in Nagaland was 18.79 per cent with area 5.26 per cent in which the growth rate in Dimapur was 101.22 per cent with area 41 per cent and in Kohima it was 3.5 per cent with area 0.25 percent.

The production growth rate of Naga King Chilli in Nagaland was 0.02 per cent with area 2.15 per cent in which the growth rate in Dimapur was -0.75 per cent with area -0.62 and in Kohima it was 0.30 per cent with area 6.4 per cent.

The production growth rate of Garlic in Nagaland was 10.94 per cent with area 1.95 per cent in which the growth rate in Dimapur was 6.50 per cent with area 0.70 per cent and in Kohima it was 17.05 per cent with area 2.9 per cent.

Table 04: Land use statistics for cultivation in Nagaland (Area in Hectare)

Classification of area	2010-11	2013-14	2018-19
Land utilization	1625004	1651530	1653110
Forest	862930	862930	862930
Non- available for cultivation	89470	95358	112109
Other uncultivated land excluding fallow land	155439	163167	134919

Fallow land	155126	149607	159558
Net area sown	362231	380468	383594
Total cropped area	452471	499311	528994
Area sown more than once	96190	118843	145400

Sources: Nagaland statistical handbook

From the above table 4 the growth rate of land utilization was 0.02 per cent. The average growth rate for non-available for cultivation land was 0.25 percent. The uncultivated land excluding fallow land was estimated by negative growth rate as -0.13. The fallow land growth rate was estimated as 0.02 per cent. The net area sown was estimated at 0.05 per cent. The total cropped area growth rate was estimated at 0.17 per cent. The area sown more than once growth rate was estimated to be 0.51 percent.

With the increasing population even the utilization of land had been increasing to feed the growing population. The forest area had always been measured as 862930 hectares. The utilization of land had increased by 28106 from 2010-11 to 2018-19. The area sown more than once had also increased by 49210 hectares. The Net area sown had been recorded at 383594 hectares in 2018-19 comparing to 2010-11 at 362231 and the total cropped area was recorded at 528994 in 2018-19 against 452471 in 2010-11.

From table 03 it is observed that the total area under spices cultivation in 2010-11 was 3458 hectare and 0.764 per cent of total crop area which increases to 6652 hectares in 2018-19 with crop area 1.257 per cent shows the gradual increase the importance of spices cultivation in the state.

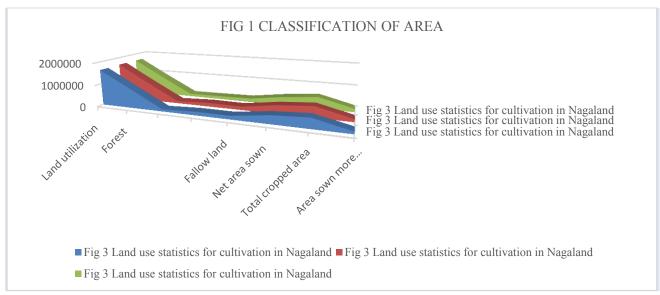


Fig 0: Line diagram to categorize the land classification

Importance of spices cultivation in the state

Spices have a several properties ranging from antioxidant, anti-inflammatory, anti-bacterial and anti-viral. Thus, spices are used in food, medicine, and cosmetic products.

Spice in food

Spices enhance the natural flavour of foods. They were vital in ancient times, and we can't imagine life without them now. They are available in a variety of flavours and aromas. They're basically food enhancers that offer foods a distinct flavour and aroma. To make tea, some spices are boiled in sugar. Curry is the most well-known food made from a variety of spices with seasoning dairy and poultry products. Ginger, turmeric, fennel, cumin, fenugreek, coriander, and nutmeg are among the curry's main ingredients. It adds flavour to meats, seafood, vegetables, and soups [10].

Spice in medicine

The medical significance of all spices is unknown. Nevertheless, we know for a fact that spices can be used to treat a variety of illnesses, including cancer, fever, malaria, stomach upset, nausea, and many others. For example, nutmeg is used to treat nausea and digestive problems. Spices have long been recognised for their medicinal properties in dental and skin care. When it comes to ancient medicine, herbs have long been used to treat a variety of illnesses before the advent of modern medicine. Spices like oregano, for example, help in the battle against insulin resistance. Turmeric and clove will also help to reduce blood sugar levels [11].

Spice in industry

Spices may also be used as natural preservatives in food. Cinnamon is a natural preservative that can quickly substitute synthetic preservatives that are harmful to human health. They've been used to flavour drugs in the pharmaceutical

industry. Clove is a method for producing Clove oil, which is very useful in the pharmaceutical industry. Saffron, one of the world's most common spices, adds to the point that spices were as important in ancient times as crude oil is nowadays [12].

Problem

As we know from many sources that Spices are an important cash crops and it has many beneficial in our daily life. Knowing the importance of spices the state is unable to increase better production and quality. From the primary production there is a problem of cultivation with not proper improved seeds and to use of modern techniques. When we look at the farmers most of them has no proper education but just the knowledge of traditional cropping pattern that continues. The State Government had failed to invest more and thought of export perspectives for adding income to one's state economy.

Findings

Some of the findings are as mentioned.

- Nagaland had a very good climatic condition to produce a diversified crops mainly spices like cardamon, black pepper, turmeric, garlic, and Naga King chilli.
- Among the major spices grown in Dimapur district the production of turmeric had a very good increase in production of 4555 M.T between 2010-2018. Followed by garlic 130 M.T in between 2010-2018.
- Likewise in Kohima district cardamon and Naga king chilli had a very good production. The production of cardamon had increased by 70 M. T in between 2010 to 2013 and Naga king chilli to 513 M. T in between 2010 to 2013.
- 4. The production growth of cardamon in Nagaland was 0.5 percent with area 0.56 per cent in which the growth rate in Dimapur was nil but in Kohima it was 0.11 per cent with area 0.04 per cent.
- 5. The production growth rate of black pepper in Nagaland was 0.5 per cent with area -0.40 per cent in which the growth rate in Dimapur was -0.40 per cent with area -0.62 per cent and in Kohima it was 0.5 per cent with area -0.50 per cent.
- 6. The production growth rate of turmeric in Nagaland was 18.79 per cent with area 5.26 per cent in which the growth rate in Dimapur was 101.22 per cent with area 41 per cent and in Kohima it was 3.5 ppr cent with area 0.25 percent.
- 7. The production growth rate of Naga King Chilli in Nagaland was 0.02 per cent with area 2.15 per cent in which the growth rate in Dimapur was -0.75 per cent with area -0.62 and in Kohima it was 0.30 per cent with area 6.4 per cent.
- 8. The production growth rate of Garlic in Nagaland was 10.94 per cent with area 1.95 per cent in which the growth rate in Dimapur was 6.50 per cent with area 0.70 per cent and in Kohima it was 17.05 per cent with area 2.9 per cent.

- 9. The growth rate of land utilization was 0.02 per cent. The average growth rate for non-available for cultivation land was 0.25 percent. The uncultivated land excluding fallow land was estimated by negative growth rate as -0.13. The fallow land growth rate was estimated as 0.02 per cent.
- 10. The Net area sown had also increased by 21363 hectares in between 2010 to 2018. The net area sown growth rate was estimated at 0.05 per cent. The total cropped area growth rate was estimated at 0.17 per cent. The area sown more than once growth rate was estimated to be 0.51 percent.
- 11. The total area under spices cultivation in 2010-11 was 3458 hectare and 0.764 per cent of total crop area which increases to 6652 hectares in 2018-19 with crop area 1.257 per cent shows the gradual increase the importance of spices cultivation in the state.

Suggestion

- The farmers cultivating spices should give proper assist so that they could reach the maximum yield. The proper knowledge on utilization number of fertilizers and pesticides should be given and allow them to enhance modern technologies.
- The availability of credit and storage facilities are also the major constraints therefore financial institutions should timely revitalize the existing credit facilities so that the farmers get timely credit for undertaking the improved cultivation process.
- 3. There should be an extensive educational programmed organized from the side of the State Government to educate the farmers in essential areas of cultivation, preservation, and marketing. Therefore, this can be remedied if the Government Organization takes up to investigate this matter for better production.
- 4. The infrastructure facilities like road, transportation is still lacking behind so the State Government should investigate this matter seriously. As the Government initiative is the very foremost thing for any kind of development.

Conclusion

Spices are one of the precious gifts of nature. Spices are thus generally high valued labour intensive and resource intensive products production, and productivity of such spices can also generate employment opportunities and thus helps to earn their livelihood. Most of the spices are marketed in dried form. The spices are usually used for flavoring and seasoning, and medicinal purposes. The Government must show some initiative towards the spice farmers to work on a positive manner and their efficiency and efforts in production and allow to export to include income in state's economy. The farmers should be properly guided and informed about the market knowledge and most importantly the importance of spices to export. It is time that we bring out some significant strategies in spices marketing with innovative and creative approaches to bring fruits of labour to the State and farmers.

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