

## Performance of horticultural crops in Arunachal Pradesh with special reference to West Kameng District

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### ABSTRACT

The Arunachal Pradesh region is one of the richest reservoirs of genetic variability and diversity of different crops *i.e.* various kinds of fruits, different vegetables, spices, ornamental plants and also medicinal and aromatic plants. The diversity for horticultural crops of this region has mainly been managed by local farmers, often women. Considerable diversity exists among the regional horticultural species including variation in plant type, morphological and physiological characteristics, reactions to diseases and pests, adaptability and distribution. Apart from the nutritional value, many regional horticultural crops are used for medicinal purposes and income generating source in the rural areas. The Arunachal Pradesh of States constitutes the District of West Kameng, Tawang, East siang, East Kameng, Papum Pare, Lower Subansiri, Kurang Kumey, Upper Subansari, West siang, East siang, Upper siang, Dibang valley, Lower Dibang valley, Lohit, Anjaw, Changlang and Tirap. The raining season in this region generally commences from March and lasts till the end of September. Diverse agro-climate condition, fertile soils and abundance of rainfall offer immense scope for development in the horticulture sector. This paper is a humble effort at bringing fort the states of production of the horticultural crops of the Arunachal Pradesh, particularly West Kameng. The exportable surplus and its potentialities is also discus as well as the potential for the National/ International markets is also found out along with the problems of support for export promotion, transport facility etc.

### KEYWORDS

Horticulture, Vegetables, Fruits, Arunachal Pradesh, Aromatic Plants, Constraints, Prospects, Strategies

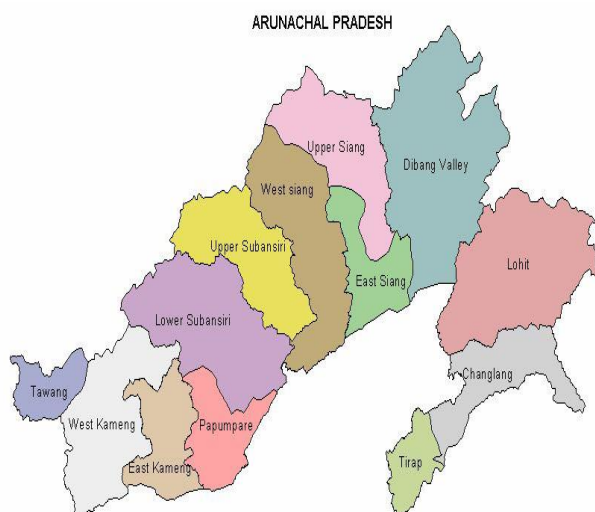
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Arunachal Pradesh has tremendous potential for development of fruits and vegetable crops, spices, plantation crops, flowers and medicinal and Aromatic Plants. Arunachal Pradesh, also called "the land of rising sun", or orchid state of India, down-lit of mountain, lies in northeast India. The state is the largest of the North-Eastern states, spread over an area of 83,743 km<sup>2</sup> (32,333 sq mi). The state shares an international border, 160 km (99 mi) long with Bhutan in the west while a 1,030 km (640 mi) long border separates the state

from China in the North. A 440 km (270 mi) long border exists between Arunachal Pradesh and Burma in the east. It borders the states of Assam in the south and Nagaland in the east and southeast. Arunachal Pradesh falls in the outer Himalayas and Patkoi Ranges. It is endowed with wide topographical variations, vegetation and wild life. The state is vivisected by rivers and streams, which originate in higher Himalayas and Arakan Ranges and flow down to form the tributaries of Brahmaputra.

Arunachal Pradesh is primarily a hilly tract nestled in the foothills of Himalayas. Previously, Arunachal Pradesh had been a part of the North Eastern Frontier Agency. Today, Arunachal Pradesh is a state of the Indian Union. Due to the topographical diversity, the climate in Arunachal Pradesh ranges from sub-tropical to temperate depending upon the altitude. The regions in the lower belts of the state experience hot and humid climates, with a maximum temperature in the foothills reaching up to 40 °C (during the summer). The average temperature in this region in winter ranges from 15° to 21 °C while that during the monsoon season remains between 22° and 30 °C. The areas around the middle belt of Arunachal Pradesh are relatively cooler.



**Fig 1. Map of Arunachal Pradesh, India**

The middle belt in Arunachal Pradesh experiences micro thermal climate. Moreover, Arunachal Pradesh possesses an alpine climate in the higher altitudes of the state. The higher regions of Arunachal Pradesh witness snowfall during winter. The snowfall draws large number of tourists to the state from all across the world. Arunachal Pradesh experiences heavy rainfall during May to September. The average rainfall recorded in Arunachal Pradesh is 300 centimeters, varying between 80 centimeters and 450 centimeters. Arunachal Pradesh is geographically divided into six natural regions. The Western parts of Kameng and Tirap district form the first two regions of the topography of Arunachal Pradesh. The other three distinct topographical regions consist of the upper, middle and the lower belts of the state as well as the foothills.

The topography of Arunachal Pradesh is characterized by mountainous ranges and sub-mountainous terrains along the northern parts. Abrasion by the rivers that flow through the mountains has created a broad valley, which is a major feature of the geography of the state. Arunachal Pradesh is said to possess the largest area among the states in the North Eastern part of India and ranks 15th nationally. Arunachal Pradesh, which is also known as the 'Land of Dawn-Lit Mountainous', is encompassed by the Shivalik ranges. From the snow-capped mountains of the eastern Himalayas to sparsely populated mountainous areas in the extreme north-eastern part of the state, these lofty slopes form an indelible part of the area in Arunachal Pradesh.

The state of Arunachal Pradesh is blessed with a rich biodiversity owing to the huge expanse of green cover. The state's forests are known for housing over 5000 species of plants, 500 different birds, 85 terrestrial mammals and a wide number of insects, butterflies and reptiles. Apart from them, the forests of Arunachal are also home to a large number of people belonging to the different tribes. These tribal people, aloof from urbanization, dwell in these forests where the various forest-based products form a part of their livelihood. Climatically, the forests can be categorized as Tropical and Sub-tropical forests, Temperate forest, Pine forests and Subalpine forest. Owing to its location amid the foothills of the Himalayas, Arunachal Pradesh is one of the richest states in the region in terms of biodiversity. The state's climatic conditions facilitate the growth of a vast variety of plants and trees in the territory, thereby providing a rich store of fauna to the region. Orchids, fern, bamboo, cane, rhododendrons, oak, hedychiums, and various medicinal plants form a diverse range of the state's green cover.

The total area of fruits during 2013-2014 has been estimated as 89081 hectare with a total production of 3,22,157 MT, vegetable estimated 1400 hectare with total production 35000 MT and 21387 hectare under spices with 16814 MT production. However the productivity status of various crops is still low as compared to all India level. There are no regulated markets and the trade moves around the private traders who procure the produces at local markets in the village areas.

**Table 1. Area, Production different Horticulture crop in Arunachal Pradesh for the Year 2013-14**

S. N.	Name of Crops	Area (in ha.)	Production (in MT)	Productivity (MT/ha)
<b>A. Fruits</b>				
1	Citrus( Orange)	39876.00	182100.00	4.57
2	Pineapple	12780.00	69607.00	5.45
3	Apple	14276.00	31873.00	2.23
4	Banana	6232.00	19095.00	3.06
5	Kiwi	4052.00	4956.00	1.22
6	Walnut	4925.00	591.00	0.12
7	Others	6940.00	13935.00	2.01
Total (A)		<b>89081.00</b>	<b>322157.00</b>	
<b>B. Vegetables</b>				
1	Cabbage	400.00	11000.00	27.50
2	Cauliflower	250.00	5750.00	23.00
3	Tomato	500.00	13500.00	27.00
	Others	250.00	4750.00	19.00
Total (B)		<b>1400.00</b>	<b>35000.00</b>	
<b>C. Spices</b>				
	Large Cardamom	16770.00	3101.00	0.18
	Black Pepper	1167.00	1096.00	0.94
	Ginger	3450.00	12617.00	3.66
Total (C)		21387.00	16814.00	

**Table 2. Area and Production of Major horticulture crops in West Kameng 2013-14**

S. N.	Name of Crop	Area under Cultivation (in ha)	Production (MT)
<b>A. Fruits</b>			
1.	Apple	3430	6172.40
2.	Kiwi	1170	3861.00
3.	Walnut	260	364.00
4.	Peach	20	54.60
5.	Plum	20	54.70
6.	Pear	40.5	108.54
7.	Orange	128	831.79
8.	Banana	10	244.65
Total (A)		5078.5	11691.28
<b>B. Vegetables</b>			
1.	Cabbage	20	66.00
2.	Chillies	10	32.00
3.	Tomato	30	546.00
Total (B)		60.00	644.00
<b>C. Flowers</b>			
1.	Cut flowers	0.75	0.20
Total (C)		0.75	0.20
<b>D. Spices</b>			
1.	Ginger	07	23.49
2.	Cardamom	-	-
Total (D)		07	23.49

Some traders from Assam have been procuring mandarin orange and exporting to Bangladesh. During the last season approximately 1200 MT of orange has been exported through this channel. It was also reported that good quantities of Ginger is also being sold outside the State however no organized market information system is in place to assess the quantity and price of such transactions

taking place. There is only one processing unit in the state in Bagra (West Siang an individual entrepreneur. The unit is extracting fruit juice and pulp. The unit is also reportedly having problems in production due to lack of technical support which has been leased out to the state also has the potential of taking up commercial floriculture also, however there is a lot of work needed before planning to

export orchids cut flowers in a big way. The production of potato and tomato has also increased over the years and has the potential of growing much more if proper processing and marketing infrastructure is provided.

### Objectives of the Studies

- To find out the status of production of horticulture in the Arunachal Pradesh states.
- To identify various potential national markets for exporting these products.
- To calculate horticulture production in District.

### West Kameng District

It is estimated that approximately 4700 sq. km. is alpine while approximately 33,500 sq. km. is in temperate zone in North East covering areas of Tawang, Sela Pass, Dirang, Bomdila, in West Kameng district of Arunachal Pradesh. The average annual rainfall 143.3 mm, maximum temperature in summer 16.87° C, minimum temperature in winter - 0.5° C and highest peak in the district is Kangte with an altitude of 7090 meters above mean sea level, where exotic fruits disporas has added new dimensions in scientific horticulture production in apple and kiwi which has started from tiny Tainzing Gaon, Tibetan settlement of West Kameng district in Arunachal Pradesh. These temperate and sub-temperate fruits and others horticulture crops like spices and medicinal plants and sub-alpine nut crops like Hazelnut, Chestnut, Pasta, Walnut and dry fruits hold a high promise for commercialization and horticulture revolution in the North East Region. The horticultural crops are this region give below:

**Major Agricultural Products:** Paddy, Maize, Millet, Cauliflower, Potato, Tomato, Beans, Carrots, Green Vegetables

**Major Horticulture Products:** Apples, Oranges, Pomegranates, Pine Apples, Walnuts, Kiwis, Plums, Pears

**Floriculture:** Begonia, Dahlia, Roses, Gladiolus, Orchids, Marigold

**Major Mineral Resources:** Coal, Copper Ore, Glass Sand, Marble, Dolomite

**Flora:** Hallock, Hingori, Amari, Dhuna, Gomari, Bonsum, Walnut, Pines, Jutuli

**Fauna:** Leopard Cat, Elephant, Barking Deer, Wild Boar, Musk Deer, Monkey, Red Panda, Warblers, Babblers, Black Necked Crane, Jungle Fowl, Hornbill, Imperial Pigeon

The total area of fruits during 2013-2014 has been estimated as 5078.5 hectare with a total production of 11,691.28 MT, Vegetable estimated 60 hectare with total production 644 MT and 07 hectare under spices with 23.49 MT production and cut flowers estimated 0.75 ha with total production 0.20 MT. However the productivity status of various crops is still low as compared to others state of India level.

### Future Prospects

The future prospects of apple, kiwi, walnut, orange and persimmon and spices large cardamom, ginger cultivation in favorable agro ecological Zones of India are bright Promising in the light of introduction of advance technologies, export potential of fruit and Agriculture policies of the government of India. India is presently facing challenges in terms of falling productivity, weather vagaries, advent of new diseases and insect pests besides the global competition, the future of fruit industry depends upon the promote through which conversions of weakness into its strengths, harnessing of agro climatic niches to optimum level development of in built sustainability in apple, kiwi systems, and management and marketing efforts to meet challenges of international trade in an effective manner are achieved.

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