

Strategic Cropping Plans for Horticultural Crops in the unique Agro-Climatic conditions of the Kashmir valley

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Abstract

The Kashmir Valley presents unique agro-climatic conditions that demand strategic cropping plans for horticultural crops to maximize productivity and resilience. This paper synthesizes existing research and local expertise to propose tailored strategies for optimal crop selection, planting schedules, and management practices. Factors such as altitude, temperature variations, precipitation patterns, soil types, and market demand are considered in designing adaptable cropping plans. Emphasis is placed on diversification, crop rotation, and integrated pest management to enhance sustainability and mitigate risks associated with climate variability. Additionally, the socioeconomic context and the potential for value addition through processing and marketing are explored to foster resilience and prosperity among local farmers. The proposed strategic cropping plans aim to empower farmers with knowledge and tools to navigate the complexities of Kashmir's agro-climate while fostering environmentally sustainable and economically viable horticultural production systems.

Horticulture being one of the vibrant sector of economy in state provides employment opportunities to about half of population. Out of total area of horticulture in state, 90 per cent is in Kashmir valley. Due to continuous increase in production and export, agricultural land is getting diversified into horticultural land. Horticulture directly influences the income, employment and living standard in rural areas of valley. The diverse agro climatic condition of the Kashmir valley offers great potential for growing various varieties of temperate fruits like Apple, Pear, Peach, Plum, Cherry, Walnut and Almond. With the emergence of urbanisation and modernisation change in cropping pattern from traditional to cash rich crops has made horticulture one of the important industry in Kashmir valley.

Keywords: Cropping pattern, Horticulture, Employment, Climate, Area

Introduction

In India Kashmir valley is main horticultural practising region. Kashmir valley is famous for its nutritional products both in India and abroad. The valley offers good scope for cultivation of various horticultural crops. Being on higher altitudes and latitudes, the climatic conditions are conducive for covering a variety of temperate fruits. As a result there is a major change in the concept of horticulture development in the valley. Horticulture contributes around 5000 crore annually in Jammu and Kashmir. Horticulture development is one of thrust area in agriculture, resulting in the generation of higher income and in the improvement of living standards of people. Horticulture is most profitable venture of all farming activities having tremendous potential to push the overall agricultural growth to more than the targeted percentage. Horticulture development has gained commercial tone in the recent years, due to salubrious climatic condition and diverse agro-climatic conditions of Kashmir valley which support the growth of various varieties of horticultural crops. Cultivation of horticulture crops is labour intensive and as such generates huge employment opportunities. Horticulture in recent years has become most important and viable sector of economy which provides food and nutritional security, generates employment and helps in improving economy of state. In Kashmir valley horticulture contributes 7-8 in state GDP and provides employment to about 6 lakh families. Different area and regions have dominance of some specific horticulture crop because of varying topography, soil fertility, soil matter, and different geographical and environment conditions.

Kashmir valley provides 90% of walnut production of country, 77.05% of apple production 7% of saffron. From last few years area and production under horticulture crops has increase manifold and resulted into huge amount of export from the state. Due to increase in demand and consumption of horticultural fruits diversification is taking place towards cash rich crops. The initial land use pattern was mostly field crop cultivation but due to better prospects and wide scope production of cash crops has increased significantly. The growth of horticulture in valley can be attributed to various government initiatives like technological awareness among farmers, introducing improved varieties, technological support, and mechanisation. Among horticultural crops apple occupies predominate position occupies 45 per cent of total area among fruit crops. Horticulture crops are adapted to wide range of climatic conditions and are more remunerative for replacing subsistence farming.

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Study area:

The valley of Kashmir has unique geographical location situated between 33° 20' to 34° 54' N latitude and 73° 55' E and 75° 35' E longitude. The state of J & K is a natural and inevitable destination. The main valley is 100 km wide and 15520.3 km in area. The Himalayas divide the Kashmir valley from Ladakh while the Pir Panjal range which encloses the valley from west and south separates it from the plain of north India the average height is about 1850 m above mean sea level.

Data source and methodology:

The present study is based on secondary source of data. Data has been collected from various published and unpublished sources such as papers, Government Records like Department of Horticulture Kashmir, Digest of Statistics, and also from books, journals, and magazines. The data has been analysed and interpreted through tabulation and simple percentage method. The objective of the study is to analyse district wise cropping pattern of horticultural crops in Kashmir valley, which we help us to understand the horticulture sector and its role in the economy upliftment of the division.

Results and Discussion

Cropping pattern is defined as the proportion of area under different crops at a point of time. It indicates the time and arrangement of crops in a particular land area. Cropping pattern indicates the decision making ability of farmer which witnesses response to the change in physical and socio- economic factors over space and time. Cropping pattern is a dynamic concept as it changes with time and space. Cropping pattern of area is determined by rainfall, temperature, soil climate and technology. Successful cropping pattern implies the most efficient use of arable land. No cropping pattern can be good for all the times to come because it is determined by the interaction of physical and socio-economic factors over a period of time. The Kashmir valley has a high degree of variation in its cropping pattern due to mountainous and undulating terrain with micro level variations in temperature, precipitation and soil. Kashmir valley is mostly growing horticulture crops due to favourable climatic condition and physiography. The main horticulture crops are Apple, Pear, Plum, Peach, Cherry, Walnuts and Almond. Both area and production of horticulture crops is increasing in all the district of valley. Apple is major fruit and is more concentrated in the districts of Kashmir region with 48% of area among horticulture crops and Baramulla stands front runner in both area and production. Significant changes area witnessed in the nature and changes of cropping pattern and shift has been observed particularly in the horticulture sector.

In recent years, the Kashmir Valley has witnessed shifts in climate patterns, including changes in temperature, rainfall distribution, and the incidence of extreme weather events, posing new challenges for agricultural productivity and resilience. Against this backdrop, there is a growing imperative to develop strategic cropping plans that optimize the use of available resources, mitigate risks associated with climate variability, and enhance the sustainability of horticultural production systems.

The overall horticultural cropping pattern of Kashmir valley for the year 2018-19 is given in below mention table:

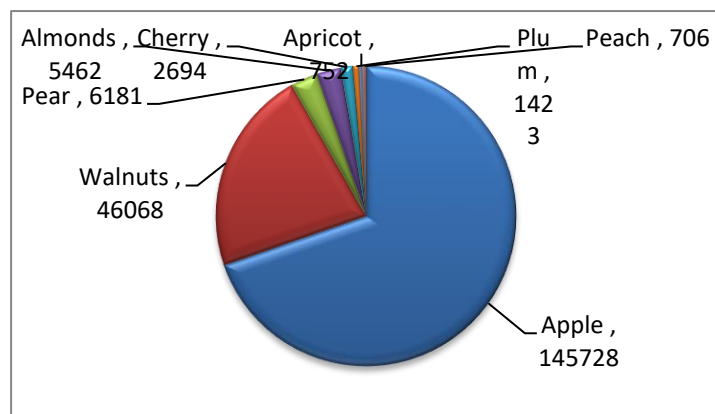
Table No. 1, Percentage of area under different Horticultural Crops in 2018-2019

Crops	Apple	Walnuts	Pear	Almonds	Cherry	Plum	Apricot	Peach
Area	145728	46068	6181	5462	2694	1423	752	706
%	69.72	22.04	2.95	2.61	1.28	0.68	0.35	0.33

Source: *Horticulture Department of Kashmir*

Almost all district of valley are involved in cultivation of horticulture crops. Most land available for horticulture fruit is in Baramulla, Kupwara, Shopian, Anantnag, Kulgam and Pulwama.

From the above table it is clear that apple occupies the highest area among horticultural crops in Kashmir valley with 69.72% of area, because of favourable climatic and topography. Apple is grown in almost all districts of valley and involves major percentage of people. Walnuts are second important in area with 22.04% followed by pear 2.95%, almonds 2.61% and cherry with 1.28% of area. These five crops make 99% of horticulture area and the rest of 1 per cent is under plum 0.68%, apricot 0.35% and peach 0.33%.



There is wide variation in district wise cropping pattern among horticulture crops. Few districts are leading in area under different horticulture crops like Baramulla, Kupwara and Anantnag while some area lagging behind e.g. Bandipora, Srinagar etc. in order to clearly understand the district wise variation in area under different horticultural crops we have briefly discussed the district wise horticultural cropping pattern below; Table showing cropping pattern of horticulture for the 2018-19 is briefly discussed:

Table No. 2, District wise Cropping Pattern of Kashmir Valley (2018-19)

	Apple	Walnut	Pear	Peach	Plum	Cherry	Almond	Apricot	Other fresh + dry
Srinagar	1674	164	287	77	139	333	323	35	89
Ganderbal	7111	5267	385	190	232	1055	5	86	284
Budgam	13777	3123	1636	0	535	8	1258	23	131
Baramulla	25231	3139	660	56	51	212	258	121	185
Bandipora.	4969	589	114	23	15	71	2	19	16
Kupwara	19281	8800	478	41	46	113	13	58	25
Anantnag	18336	12169	552	116	113	117	12	171	142
Kulgam	18106	4026	590	111	105	114	19	87	4
Shopian	21669	3276	396	25	36	608	13	44	164
Pulwama	15574	5515	1083	67	151	63	3559	108	27

Source: Horticulture department of Kashmir

Looking at the table the district wise analysis shows that out of total area under apple 17.31% is in Baramulla district followed by Shopian 14.86%, Kupwara 13.23%, Anantnag 12.58%, and Kulgam 12.42%. Favourable climatic conditions and traditional expertise is the main reason of having such large area under apple crop. The lowest area under apple is in Srinagar 1.14% followed by Bandipora 3.40% and Ganderbal 4.87%. Land use pattern of Srinagar, Bandipora and Ganderbal largely influences the area under apple crop in above districts. Walnut is second important fruit with 22.04% of total area among horticultural crops, walnut is included in dry fruit category and occupies first place in said category. In walnuts with 26.41% of area Anantnag is at first place followed by Kupwara 19.10%, Pulwama 11.97%, Ganderbal 11.43% and Kulgam 8.73%. The lowest area of walnut is in Srinagar of 0.35% followed by Bandipora 1.27%. Pear is third important fruit and has total area of 2.95% out of total area in horticulture in Kashmir valley. Out of total area under pear fruits Budgam has highest area of 26.46% followed by Pulwama 17.52%, Baramulla 10.67%, Kulgam 9.54% and Anantnag 8.93%. The lowest area under pear is in Bandipora 1.84% followed by Srinagar 4.64%. Almond is another important fruit and is second important in dry fruit category with 2.61% of area among horticulture and out of total area Pulwama has highest area of 65.15% under almonds followed by Budgam 23.03%, Srinagar 5.91% and Baramulla 4.72%. The lowest area of almond is in district Bandipora 0.03%, Ganderbal 0.09% and Anantnag 0.21%. Cherry with 1.28% of total horticultural area is at fifth position. Out of total area, with 39.16% Ganderbal is leading in area under cherry fruit followed by Shopian 22.56%, Srinagar 12.36% and Baramulla 7.86%.

The lowest area of cherry is in Budgam 0.29% followed by Pulwama 2.33% and Bandipora 2.63%. Plum is one of the lowest cultivated crop of Kashmir valley among horticulture crops with the total area of 0.68% out of total area covered by horticultural crops. Budgam is leading in area under plum fruit with 37.59% followed by Ganderbal 16.30%, Pulwama 10.61%, Srinagar 9.76% and Anantnag 7.94%. The lowest area is in Bandipora 1.05% followed by Shopian 2.52%, Kupwara 3.23% and Baramulla 3.58%. Another important horticulture crop is apricot and the area of apricot is also below 1 per cent among horticultural crops in valley. Out of total area in apricot highest is in Anantnag 22.73% followed by Baramulla 16.09%, Pulwama 14.36%, Kulgam 11.56% and Ganderbal 11.43%. The lowest area is in Bandipora 2.52% followed by Budgam 3.05% and Srinagar 4.65%. Another important temperate horticulture crop of Kashmir valley is Peach occupies 0.33% of total area in horticulture and in peach out of total area, Ganderbal has highest area of 26.91% followed by Anantnag 16.43%, Kulgam 15.72%, Srinagar 10.90% and Pulwama 9.49%. The lowest area is in Bandipora 3.25% followed by Shopian 3.54%. In Budgam zero per cent area was under peach in 2018-19.

From above analysis it is clear that each district has certain advantage in specific fruits and in each district some crops area grown at large scale while others and grown at minimum level. Favourable conditions for horticulture encompass a harmonious blend of climatic suitability, soil fertility, water availability, and market accessibility. A conducive climate, characterized by optimal temperatures, sunlight, and rainfall, lays the foundation for robust plant growth, while nutrient-rich, well-drained soil provides essential support. Reliable water sources ensure consistent irrigation, vital for crop hydration and health. Varied topography offers diverse microclimates suitable for a range of crops, while accessible markets, supported by adequate infrastructure, facilitate efficient selling of produce. Government policies, subsidies, and extension services bolster horticultural endeavours, fostering growth and innovation. Research institutions and technologies contribute to enhanced productivity, while a skilled labour force and effective pest and disease management ensure the sustainability and success of horticultural ventures.

Apple is mostly grown in Baramulla, Shopian, Kupwara and Anantnag due to availability of suitable soil and climatic conditions. In the same way walnuts cultivation is most in Anantnag. In Almond and pear cultivation Pulwama and Budgam are main districts and about 90% of almond area is occupied by these two districts. Ganderbal is one of the lowest horticulture producing district but in cherry highest area is enjoyed by Ganderbal and in pear Ganderbal is at second place. In Srinagar, Bandipora and Ganderbal horticulture is not taken serious due to limited availability of soil for cultivation of horticultural crops and also area surrounding these districts is mostly occupied by lakes like Manasbal Lake, Anchar Lake and Dal Lake. Urban expansion in Srinagar is cause of low area under horticulture. The main districts which are famous for horticulture are Baramulla and Shopian for apple fruit, Anantnag for walnuts, Pulwama for almonds. Almost in all district horticulture crops area grown and 90% of horticulture area of state is in Kashmir valley. The economy of the valley is totally depend on horticulture were about 60% of population is involved in this industry. Through various government efforts and policies day by day there is increase in both area and production of horticultural crops in valley. Diversification towards horticulture cultivation is taking place from agriculture due to high return from horticultural crops which directly influences the income, employment, and living standard in the rural areas of the valley.

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