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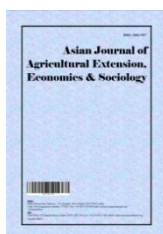
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## **Constraints Faced by Almond Growers in Adoption of Recommended Package of Practices in Pampore Area of Kashmir Valley**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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### **ABSTRACT**

The present study was conducted in the Pampore block of the Kashmir valley. The area is specifically known for production of world's most precious spice viz. Saffron. Owing to its Karewa lands, the area is known to produce top quality almonds both bitter and sweet ones. The study was undertaken in this area to get the first-hand information regarding the production technology adopted by the almond growers of the different villages falling in Pampore area in order to enable the policy makers to develop strategies for the transfer for technology wherever there exists any such scope for the same. The study was carried out in five randomly selected villages of Horticulture block Pampore of district Pulwama of J&K (UT). A sample of 120 almond growers was taken for collecting the primary data with the help of a well-structured interview schedule. The study reveals that majority of the respondents were literate with middle age (16-30 years) having family size of 6-10 members, possessing a land holding of above 2 hectares. Majority of the respondents were dependent on agriculture for their livelihood with farming experience of 16-30 years, annual income upto Rs 2 lakhs, medium sources of information and scientific orientation and majority of the respondents had medium extension contacts. Majority of the respondents (46.67 percent) had medium level adoption regarding the recommended package of practices.

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**Keywords:** Constraints; almond growers; adoption of recommended package of practices.

## 1. INTRODUCTION

Almonds (*Prunus amygdalus* L.) are native to Mediterranean region and considered as one of the oldest tree nuts in the world, it is closely related to peach and have probably evolved from the same ancestral species in South-Central Asia. From there it spread along the shores of the Mediterranean in Northern Africa and Southern Europe by Egyptians, Greeks and Romans. It was brought to California in the 17<sup>th</sup> century by Spanish where the industry progressed and production increased several folds due to cultivation of superior varieties accompanied by prudent scientific production and protection technologies making California, the world leader in almond production. In India, it was first introduced to Kashmir during 16<sup>th</sup> century by Persian settlers but in spite of its great potential in the region, the crop could not be developed on commercial scale as that of apple. Almond (*Prunus amygdalus* L.) belongs to family Rosaceae, a drupe, consisting of an outer hull and a hard shell with the seed, which is not a true nut. There are two main types of almonds. One variety (*Prunus amygdalus* var. *dulcis*) produces sweet almonds, which are edible, and may be eaten raw or roasted or pressed for the almond oil [1]. The other variety (*Prunus amygdalus* var. *amara*) produces bitter almonds, which are used for almond oil.

The world almond production for the year 2017 stands at 2,239 thousand metric tonnes, with United States being the leading producer. In the United States, the production amounted to approximately 10 lakh tonnes with area 4 lakh hectares, in that marketing year followed by Spain 2.5 lakh tonnes having area under almond 6.3 lakh hectares and Iran having production of 1.1 lakh tonnes and area 50 thousand hectares approximately [2].

The India's almond production for the year 2016-17 stands at 7.94 thousand metric tonnes. Out of this, 7 thousand metric tonnes are being produced alone in Kashmir valley, which accounts for 88 per cent of the total almond production in India and rest 0.94 metric tonnes are being produced in Himachal Pradesh, accounting for 11 per cent of the total almond production in India [3-5]. In Jammu and Kashmir, almond is cultivated over an area of 5.11 thousand hectares with production of 7 thousand metric tonnes. However, the world average

production of a professionally maintained almond tree is 23-30 kg/tree which are higher than the almond production in Jammu and Kashmir [6]. Pulwama is the leading producer of almonds and is having maximum area 4,688 hectares under almond in the state of Jammu and Kashmir with a production of 4,180 metric tonnes followed by Budgam having area under almond 1,467 hectares and production 1,486 metric tonnes. In Baramulla area under almond is 258 hectares and production is 553 metric tonnes. In district Pulwama block Pampore has the maximum area under almond 1,435 hectares with production 574 metric tonnes. The area and production of Himachal Pradesh for the year 2017 stands at 6.58 thousand hectares and 7 thousand metric tonnes, respectively [7].

## 2. MATERIALS AND METHODS

### 2.1 Locale of Study

Kashmir valley consists of 12 districts and the present study was conducted in Pampore block of Pulwama district in Jammu and Kashmir which was selected purposively on the basis of having maximum area (4,668 hacters) under almond.

### 2.2 Agro-climatic Conditions

District Pulwama lies Mid to High altitude Temperate Agro Climatic Zone. Pulwama is located at 33° 54'N latitude, 70° 53'E longitude and 5273meter altitude with average annual rainfall of 658mm. Majority of the area has clay soils and very limited area has sandy loam soils. Net sown area is 32.381 thousand hectares with net irrigated area 21.319 thousand hectares, gross irrigated area is 38.858 thousand hectares, rainfed area 20.453 thousand hectares with a cropping intensity of 176 per cent.

### 2.3 Cropping Pattern of District

Besides, Pampore being known for the world's famous cash crop i.e. saffron, the Cropping pattern of this karewa land is dominated by horticulture as it is economically preferable especially apple and almond fruit Crops.

### 2.4 Selection of Horticulture Block

In district Pulwama, almond is cultivated in 5 blocks and block Pampore has been purposively selected having maximum area under almond.

**Table 1. Selection of Horticulture block**

<b>Name of block</b>	<b>Area (hectares)</b>	<b>Production (tonnes)</b>
Pulwama	344	310
Tral	229	206
Pampore	1486	1338
Rajpora	18	16
Kakapora	317	386

[Source: Chief Horticulture Office, Pulwama 2018]

## 2.5 Selection of Villages

Block Pampore comprises 23 villages. Out of 23 villages, almond is being cultivated only in 19 villages. Among 19 villages only 5 villages namely 1. Chandharoo 2. Maij 3. Dusoo 4. Konibal 5. Ludhoo got selected randomly.

## 2.6 Selection of Almond Growers

The study was carried in selected 5 villages in block Pampore of Pulwama district. A comprehensive list of farmers engaged in almond cultivation from each village was framed in consultation with the office of Horticulture Development Officer of the concerned Horticulture Block. Respondents were selected using proportionate sampling technique (taking area as auxiliary information) and ultimate unit of sampling (farmer) were selected randomly taking the total sample size of 120 respondents.

## 2.7 Formula for Proportionate allocation Method

$$n_1 = N_1/N \times n$$

$n_1$  = Total sample from the village

$n$  = Sample size (120)

$N_1$  = Total number of respondents from the concerned village.

$N$  = Total number of respondents from the 5 villages.

## 2.8 Data Collection

The researcher personally collected the data by interviewing the respondents using well-structured interview schedule. The questions were simple and brief, asked in local language i.e. Kashmiri. All the selected respondents were personally interviewed by the researcher and the data was recorded directly on the schedule, which enabled the author to get first-hand information and gave an opportunity to observe their reactions. The respondents were at ease and expressed their opinion freely, fairly and

frankly as friendly atmosphere was maintained during the interview.

## 2.9 Compilation of Data and Working Out of Scores

Scores were given to responses collected from respondents and then accordingly tabulated. Suitable statistical tools were used and findings emerged out of the data analysis were interpreted based on the study objectives and accordingly discussed and necessary inferences, conclusions were drawn.

## 3. RESULTS AND DISCUSSION

### 3.1 Constraints Faced by Almond Growers

In this part an attempt was made to measure intensity of constraints encountered by almond growers in adoption of SKUAST-K recommended package of practices by almond growers. The constraints expressed by the respondents were tabulated and then awarded with necessary scores like frequency, percentage and then ranks were given to the constraints in descending order. The findings regarding these constraints are presented in Table 3.

In order of priority, the data from Table 3 revealed that "Frost injury" was the main constraint as faced by (100 percent) of the respondents. (92.50 per cent) indicated "High cost of fertilizer/pesticide, (83.33 percent) of the respondents indicated "Lack of planting material, (75.00 percent) of the respondents indicated the constraints of having Old aged and less productive trees, ( 68.33 percent) of the respondents indicated Lack of awareness camps (56.66 percent) indicated Frequent fluctuation in prices (44.16 percent) indicated Lack of extension services (20.83 percent) of the respondents indicated that people are preferring to apple cultivation rather than almond (9.16 percent) Indicated porcupine damage

**Table 2. Selection of Almond orchardists from selected villages**

District	Block	Villages		No. of orchardists	Orchardists to be selected
Pulwama	Pampore	1	Dusoo	168	27
		2	Chandhara	231	37
		3	Maij	98	15
		4	Konibal	133	21
		5	Ludhoo	129	20
Total		05		759	120

[Source: Horticulture Development Office, Pampore Pulwama]

**Table 3. Constraints faced by almond growers**

S. No	Constraints	Frequency	Percentage	Ranking
1.	Frost injury	120	100	I
2.	High cost of fertilizer/pesticide	111	92.50	II
3.	Lack of planting material	100	83.33	III
4.	Old aged and less productive trees	90	75.00	IV
5.	Lack of awareness camps	82	68.33	V
6.	Frequent fluctuation in prices	68	56.66	VI
7.	Shifting of almond orchards into apple orchards	25	20.83	VIII
8.	Lack of extension services	53	44.16	VII
9.	Porcupine damage	11	9.16	IX

**Table 4. Suggestion given by almond growers**

S. No	Suggestions	Frequency	Percentage	Ranking
1.	Incentives to be provided to farmers	112	93.33	I
2.	High quality inputs and planting material	103	85.83	II
3.	Improved varieties	92	76.67	III
4.	Training programmes	65	54.17	IV
5.	More awareness regarding package of practices	42	35.00	V
6.	Low cost inputs	33	27.50	VI
7.	Technical guidance	15	12.50	VII

### 3.2 Suggestions Given By Almond Growers

The data presented in the table 4 revealed that majority of the respondents 93.33 per cent suggested that farmers should be provided incentives, 85.83 per cent suggested high quality inputs and planting material, 76.67 per cent suggested introduction of improved varieties especially late flowering varieties, 54.17 per cent of the respondents suggested that training programmes should be organised related to production technology of almond.

35.00 per cent suggested that farmers should be given more awareness regarding package of practices of almond cultivation, 27.50 per cent suggested that farmers should get inputs to be required in almond cultivation at low costs and 12.50 per cent of the respondents suggested technical guidance.

### 4. CONCLUSION

Almond being one of the important fruit crop of Jammu and Kashmir, which has been cultivating in wide area by farmers in the selected survey area. The current study brought out certain important findings which have got direct bearing on those involved in technology transfer and policy making. They are detailed below.

- Major constraints faced by almond growers were damage to blossom due to early spring frosts (Frost injury), high cost of fertilizer/pesticide, old aged and less productive trees.
- All inputs should be made available to farmers instead of a few inputs. Pure quality of rootstock, fertilizers and pesticides at low cost may be provided to the farmers. The credit facility should be

made available to the farmers at low rate of interest and easy way so that they can easily use the new technologies in their almond orchards.

- Government forecasting agencies should provide information about the “Natural calamities” in time so that the farmers can take preventive measures in advance.
- Main emphasis should be given on development of improved varieties of almond like late flowering varieties to avoid the major constraint like damage to blossom due early spring frosts, old aged and less productive trees.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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