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## **Demographic Profile of Knol-Khol Grower in Sub-Tropics of Jammu Region of Jammu and Kashmir**

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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 purposively in Jammu and Samba districts because these two districts were having the maximum area under knol-khol cultivation in Jammu region. A proportionate random sampling procedure, based on the area under knol-khol cultivation in these districts was employed for the selection of villages. The area under knol-khol cultivation in Jammu district and Samba district was 599 ha and 121 ha, respectively. A list of knol-khol growing villages was prepared and 12 villages from Jammu district and 2 villages from Samba district were randomly selected. A list of knol-khol growing farmers with a minimum of 1 kanal (1/20 ha) area under vegetable cultivation was prepared from the selected villages during the year 2020 and 10 farmers from each selected village were randomly selected. The KVK Samba carried out front line demonstrations (FLDs) of the university released G 40 variety of knol-khol. The KVK laid 9 demonstrations on the farmers' fields, each in 2017-18 and 2018-19. In the year 2019-20 KVK Samba again laid the FLDs for 20 farmers. Thus, to study the adoption and adoptability of university released G 40 knol-khol variety, 38 farmers of Samba district were selected as final respondents. Thus, a total sample of 178 (140+ 38) farmers were taken as respondents for the present study. The result showed that majority of the respondents fell under middle age category. Literacy rate of the respondents were quite good. Social participation of the respondents was low. Average operational

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land holding of the respondents was 1.24 ha and that majority of the respondents were fell under small (1-2 ha) and marginal (<1 ha) category of farmers. Cow was possessed by majority of the respondents.

**Keywords:** *Knol-Khol; demonstration; respondents; social participation and literacy rate.*

## 1. INTRODUCTION

In India, the cultivation of knol-khol is popular in Kashmir, West Bengal, Maharashtra, Assam, Uttar Pradesh, Punjab, Odisha and some parts of South India [1]. India is the second largest producer of vegetables in the world (ranks next to China) and accounts for about 15% of the world's production of vegetables. During 2012-13, production level of vegetables was over 162186.6'000 MT with the total area around 9205.2 000 hectares and the productivity of 17.6 MT/ha [2]. Knol-khol is a European vegetable, very popular in Jammu & Kashmir in India. Vegetables are essential in human nutrition because they have some nutrients and other constituents that are lacking in other foods. Since they are high in vitamins and minerals, they are also known as protective foods. The nutritional value of vegetables is determined by a number of factors, genetic as well as environmental factors such as temperature, sun, moisture, and the nutritional condition of the soil in which the vegetable is grown affect it. The nutritional composition is also influenced by cultural traditions, maturity level, post-harvest handling, and storage conditions [3]. Vegetables continue to contribute the most to horticulture crop production (59–61%) over the last five years. Uttar Pradesh has the largest overall vegetable production (283.16 million tonnes), led by West Bengal (276.95 Million Tonnes). Agriculture has long been the backbone of J&K's economy. Despite the fact that agriculture contributes just 19.96% to GSDP, more than 70% of the population relies on agriculture for their livelihood [4]. Potato, Okra, Cauliflower, Tomato, Onion, Radish, Knol-Khol, and other vegetables are cultivated extensively in Jammu and Kashmir. These crops are cultivated in both the Kashmir and Jammu regions of J&K, with the Kashmir region being largely temperate, while the Jammu region has a significant variation in altitude and climatic conditions. Knol-Khol is primarily grown in Jammu and Kashmir, as opposed to other parts of the country, because it is a cool-season crop. This crop is also grown in Jammu's subtropical climate. Knol-Khol is a hardy vegetable originated in cool climates of northern Europe. Its first description was by a European

Botanist in 1554. It was cultivated in North Europe in the 15th century and in Italy, Spain and Germany in the 16th century. It is said to have been first grown in Ireland in 1734 and in England in 1837. It was introduced into the USA in the 18th century. It is not grown on a large scale anywhere in the world. It is mainly grown in Mediterranean region, West Europe, North America, the Near East, Japan and India. In India, it is a popular crop in Kashmir Valley and is also cultivated in selected pockets of West Bengal, Uttar Pradesh, Himachal Pradesh and Madhya Pradesh. It is a European vegetable that is very common in the Indian state of Jammu and Kashmir. Knol-Khol varieties produce an average yield of 200q/ha [5]. The recommended varieties of Knol-Khol in Jammu region are SJKK-01 (G40), purple vienna, king of market, white Vienna. The area under Knol-Khol form 599 ha in Jammu district to 69 ha in Reasi district with a total area of 1672 ha for Jammu division in 2018-19, whereas production varies from 10401 tonnes for Jammu division to 200 tonnes for Kishtwar district with an overall production of 35036 tonnes. The productivity of Knol-Khol ranges from 2.85 to 29.39 tonnes per hectare. The common Knol-Khol varieties grown in Jammu are king of market, purple vienna and White Vienna. The G 40 variety is recently introduced and released by SKUAST- Jammu in 2013 and its demonstration are being laid by different KVK's of SKUAST- Jammu. Considering the facts and views highlighted above, the present study entitles "**Demographic profile of Knol-Khol grower in sub- tropics of Jammu region of Jammu and Kashmir**" was conducted in Jammu region.

## 2. METHODOLOGY

The present study was conducted purposively in Jammu and Samba districts because these two districts were having the maximum area under knol-khol cultivation in Jammu region. A proportionate random sampling procedure, based on the area under knol-khol cultivation in these districts was employed for the selection of villages. The area under knol- khol cultivation in Jammu district and Samba district was 599 ha and 121 ha, respectively. A list of knol-khol

growing villages was prepared and 12 villages from Jammu district and 2 villages from Samba district were randomly selected. A list of knol-khol growing farmers with a minimum of 1 kanal (1/20 ha) area under vegetable cultivation was prepared from the selected villages during the year 2020 and 10 farmers from each selected village were randomly selected, The KVK Samba carried out front line demonstrations (FLDs) of the university released G 40 variety of knol-khol. The KVK laid 9 demonstrations on the farmers' fields, each in 2017-18 and 2018-19. In the year 2019-20 KVK Samba again laid the FLDs for 20 farmers. 38 farmers of G 40 knol-khol variety grower of Samba district were also selected as final respondents. Thus, a total sample of 178 (140+ 38) farmers were taken as respondents for the present study. Among 178 respondents, 1 of the respondent who was given G 40 seed by KVK Samba could not so the seed.

### 3. RESULTS AND DISCUSSION

#### 3.1 Descriptive Statistics Regarding Socio-Economic Status of the Respondents

##### 3.1.1 Age

The responses on age were collected in chronological years and results presented in Table 1 showed that mean age of the respondents was 46 ( $\pm 14.08$ ) years. It further reveals that 19 per cent of the respondents fall under young category (up to 30 years), 64 per cent of the respondents fall under middle category (up to 60 years) and only 17 per cent were in the age group of above 60 years. The reason for majority of respondents falling in the middle age category might be that the middle-aged farmers having moderate farming experience have more work efficiency than the younger and middle age groups. These findings are in line with the study of Iqbal et al., [6].

##### 3.1.2 Education

The results presented in Table 1 indicate that 16 per cent of the total respondents were illiterate and that the majority i.e. 84 per cent respondents were literate, though having different levels of education viz. 1 per cent of the respondents had below primary level education, 9 per cent had primary level education, 13 per cent had middle level education, 32 per cent of the respondents had matriculation level of education, 16 per cent of the respondents had 10+2 level of education

and 13 per cent had graduation or above level of education. The reason for majority of the respondents being literate might be because of the fact that majority of the respondents belonged to age category of 31-60 years and that such an age group can somewhat be related to modern generation, where formal education is given a prime importance. These findings are in consonance with the DES (2015-2016) according to which the literacy rate of district Jammu is more than 50 per cent.

##### 3.1.3 Telephone connectivity

With regard to telephone connectivity, 78 per cent of the respondents had source of telephone connectivity while 22 per cent of the respondents had no source of telephone connectivity. Further it reveals that only 51 per cent of the respondents had smart phone. It could be attributed to fact that the easiness in getting a mobile connection and its handiness apart from mobility is a major factors that respondent preferred to own a mobile phone rather than land line telephone connection.

##### 3.1.4 Family type

With regard to family type of the respondents 70 per cent of the respondents had the Joint family and 30 per cent had Nuclear family. This might well be because the survey was mainly concentrated in rural areas where people prefer to have joint families. Similar results were obtained by Memon et al., [7].

##### 3.1.5 Family size

With regard to the family size of the respondents, the average family size of the respondents was 4.74 ( $\pm 1.28$ ) members. With respect to categorization of the family size done by using Singh cube root method, 12 per cent of the respondents were under the family size of less than 3 members (Small), 79 per cent of the respondents were under the family size of 4-6 members (Medium) and 9 per cent were under the family size of more than 6 members (Large).

##### 3.1.6 Type of house

The result presented in Table 1 showed that 92 per cent of the respondents had pucca type of house, 6 per cent of the respondents had semi kutch type of house and only 2 per cent of the respondents had kutch type of house. Majority of the houses in the study area were found pucca type.

## 3.2 Social Participation

With regard to social participation, the results presented in Table 1 showed that only 1.7 per cent of the respondents had social participation as member of a farmer club.

### 3.2.1 Operational land holding

With regard to operational land holding, the result showed that the average operational land holding of the respondents was 1.24 ha and that majority of the respondents were small (1-2 ha) and marginal (<1 ha) farmers viz. 48 per cent and 38 per cent respectively and 14 per cent of the respondents were semi- medium farmers (2-4 ha). These results are similar to the latest census reports of the country and the UT of Jammu and Kashmir and are also supported by the findings of Iqbal et al.,[8]. Table 2.

### 3.2.2 Categorization of farm size

With regard to categorization of farm size the results presented in Table 2 showed that 38 per cent of the respondents fall under marginal category having less than 1 ha of land, 48 per cent of the respondents fall under small category having 1-2 ha of land and 14 per cent of the respondents fall under semi- medium category having 2-4 ha of land and none of the respondents fall under medium and large category having 4-10 and more than 10 ha of land.

### 3.2.3 Experience

The results also depict that the average farming experience of the respondents was 27.63 years and average experience of the respondents in Knol-Khol cultivation was 23.64 years. The reason might be that majority of the respondents belonged to the middle age group of 31-60 years and are engaged in Knol-Khol cultivation since the time they are doing agriculture.

### 3.2.4 Source of Irrigation and area covered under irrigation (in ha)

With regard to Source of Irrigation and area covered under irrigation, the results presented in Table 2 showed that 58 per cent of the respondents had Canal water as a source of irrigation, 73 per cent of the respondents had Pump/ motor pump and only 3 per cent of the

respondents had bore well as a source of irrigation. Further, it reveals that 82.2 ha of land irrigated by Canal, 111.2 ha of land irrigated by Pump/ motor pump and only 3.7 ha of land irrigated by Bore well.

### 3.2.5 Distribution of respondents on the basis of their occupation

The results presented in Table 3 shows distribution of respondent on the basis of their occupation. 62 per cent of respondents has agriculture source of income while 6 per cent of respondents have agriculture and Govt. Service as their occupation. The 12 per cent of respondents have agriculture plus private job as their source of income and 8 per cent of respondents do business along with agriculture to earn money. Only 2 per cent of respondents are retired from Govt. service and they depend on Govt. pension and agriculture for earnings. The 9 per cent of the respondents do labour work along with agriculture to earn. As majority of the respondents had agriculture as only source of income. This may be attributed to the fact that the surveyed respondents were farmers and belonged to rural areas. These findings are supported by the results of Bhanotra et al., [9].

### 3.2.6 Status of livestock possession and allied agricultural enterprise of respondent

The data presented in Table 4 showed that Cow and buffalo was possessed by 82 per cent and 17 per cent of the respondents, respectively and only 1 per cent of the respondents possessed Goat. It further reveals that average milk yield per day from cow was 8.16 ( $\pm 2.97$ ) litres and average milk yield per day from Buffalo was 7.51 ( $\pm 1.67$ ) litres. In case of quantity of milk sold per day, the result showed that average cow milk sold by the respondents was 5.50 ( $\pm 2.52$ ) litres and the average selling price per litres milk of cow was Rs 37.59 ( $\pm 4.72$ ) and average buffalo milk sold by the respondents was 4.93 ( $\pm 1.55$ ) litres and the average selling price per litre milk of buffalo was Rs 45.68( $\pm 5.13$ ). Further the result revealed that 2 per cent of the respondents had Mushroom unit and annual average income from mushroom unit was Rs 25000, 3 per cent of the respondents were grower flowers and average annual income from floriculture was Rs 23000. Similar results were also found by Iqbal et al., [10].

**Table 1. Descriptive statistics regarding socio-economic status of the respondents**

Parameters	Total (n=178)
Mean age (years) $\pm$ S.D.	46 $\pm$ 14.08
Young (20 to 30)	35 (19)
Middle (31 to 60)	112 (64)
Old age (61 to 75)	31 (17)
Mean education (% farmers) $\pm$ S.D.	9.00 $\pm$ 3.36
Illiterate	28 (16)
Below Primary	2 (1)
Primary	17 (9)
Middle	23 (13)
Matriculate	58 (32)
12 <sup>th</sup>	29 (16)
Graduation and above	21 (13)
Phone connection (% farmers)	140 (78)
Smart Phone	72 (51)
Family Type (% farmers)	
Joint	125 (70)
Nuclear	53 (30)
Average Family size (% farmers) $\pm$ S.D.	4.74 $\pm$ 1.28
Small>3	21 (12)
Medium 4-6	140 (79)
Large<6	17 (9)
Type of house (% farmers)	
Kutcha	4 (2)
Semi kutcha	10 (6)
Pucca	164 (92)
Social participation(% farmers)	
Farmer club	3(1.7)

**Table 2. Land holding status and farm size of the respondents**

Parameters	Area in ha	Total (n=178)
Average operational land holding (ha) $\pm$ S.D.		1.24 $\pm$ 0.65
Owned (ha) $\pm$ S.D.		1.21 $\pm$ 0.66
Leased in (ha) $\pm$ S.D.		0.01 $\pm$ 0.15
Leased out (ha) $\pm$ S.D.		0.02 $\pm$ 0.17
Categorization of farm size (% farmers)		
Marginal (<1 ha)		67 (38)
Small (1-2 ha)		85 (48)
Semi- medium (2-4 ha)		26(14)
Medium (4-10 ha)		0
Large (>10 ha)		0
Average Irrigated area (ha) $\pm$ S.D.		1.07 $\pm$ 0.63
Average Unirrigated area (ha) $\pm$ S.D.		0.17 $\pm$ 0.35
Average experience in farming (year) $\pm$ S.D.		27.63 $\pm$ 13.27
Average experience in Knol-Khol cultivation (years) $\pm$ S.D.		23.64 $\pm$ 10.48
<b>Source of Irrigation</b>	<b>(in ha)</b>	<b>(% farmers)</b>
Canal	82.2	104 (58)
Pump/motor pump	111.2	130 (73)
Bore well	3.7	6 (3)

\* Multiple responses

**Table 3. Distribution of respondents on the basis of their Occupation**

Occupation (% farmers)	N 178
Agriculture only	110(62)
Agriculture + Govt. Service	11(6)
Agriculture + Pvt. Service	22(12)
Agriculture + Business	14(8)
Agriculture + Retired from govt. Service	4(2)
Agriculture + Labour	15(9)
Agriculture + Other	2(1)

**Table 4. Status of livestock possession and allied agricultural enterprise of respondent**

Animals	Possession	Milk Yield/day Litre $\pm$ S. D	Qty sold /day Litre $\pm$ S. D	Selling price/litre Rs $\pm$ S. D
Cow	146 (82)	8.16 $\pm$ 2.97	5.50 $\pm$ 2.52	37.59 $\pm$ 4.7
Buffalo	31 (17)	7.51 $\pm$ 1.67	4.93 $\pm$ 1.55	45.68 $\pm$ 5.13
Goat	2 (1)			
Agricultural enterprise	Possession	Average income per year (₹)		
Mushroom	3 (2)	25000		
Floriculture	5 (3)	23000		

#### 4. CONCLUSION

It is concluded on the basis of findings that majority of the respondents fell under middle age category. Literacy rate of the respondents were quite good because modern generation gives prime importance to education. Telephone connectivity was adopted by majority of the respondents, as it is very important tool of communication in today's era. Joint family trends were dominant in the study. The average family size of the respondents was 4.74 ( $\pm$  1.28) members. Majority i.e. 79 per cent of the respondents were under the family size of 4-6 members (Medium) category. Social participation of the respondents were low, there is need to aware the farming community to participate in different social organization because social participation helps to develop their leadership skill and farmers can be benefited with different governmental schemes by participation in different social organization. Average operational land holding of the respondents was 1.24 ha and that majority of the respondents were fell under small (1-2 ha) and marginal (<1 ha) category of farmers. Average experience in Knol-Khol cultivation of the respondent farmers was 23.64( $\pm$ 10.48) years. Majority of the respondent farmers 73% had pump/motor pump as source of irrigation. Agriculture was the only occupation of majority of the respondents. Cow was possessed by majority of the respondents. Annual average income from mushroom unit was Rs 25000 and

average annual income from floriculture was Rs 23000.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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