ANALYSIS OF PRODUCTION AND MARKETING OF TUBEROSE IN NORTH KARNATAKA

USHA C. BENNUR

DEPARTMENT OF AGRICULTURAL EXTENSION EDUCATION
COLLEGE OF AGRICULTURE, DHARWAD
UNIVERSITY OF AGRICULTURAL SCIENCES,
DHARWAD – 580 005

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USHA C. BENNUR

DEPARTMENT OF AGRICULTURAL EXTENSION EDUCATION
COLLEGE OF AGRICULTURE, DHARWAD
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UNIVERSITY OF AGRICULTURAL SCIENCES, DHARWAD

CERTIFICATE

This is to certify that the thesis entitled "ANALYSIS OF PRODUCTION AND MARKETING OF TUBEROSE IN NORTH KARNATAKA" submitted by Miss. USHA C. BENNUR for the degree of MASTER OF SCIENCE (Agriculture) in AGRICULTURAL EXTENSION EDUCATION to the University of Agricultural Sciences, Dharwad is a record of research work done by her during the period of her study in this University under my guidance and supervision and the thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar titles.

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JUNE, 2015

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Chairman: ______________________
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Members: 1. ______________________
(JAYASHREE A. HANDIGOL)

2. ______________________
(VENUGOPAL C. K.)

3. ______________________
(C. MURTHY)

4. ______________________
(S. S. DOLLI)

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DHARWAD
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1. INTRODUCTION

Flowers have always been an integral part of Indian culture and society. With globalization and free market economy, floriculture has attained an industrial status and has gained tremendous momentum in the last few years. It is a viable and profitable alternative for the new generation of farmers. By recognizing its full potential, India has a fair chance of attaining a strong position in the world floriculture platform. India has a long tradition of floriculture. References to flowers and gardens are found in ancient Sanskrit classes like Rigveda (2000-3000 BC), Ramayana (1200-1300 BC), Mahabharata (prior to 4^{th} century BC), Shudraka (100 BC), Ashvagodha (100 AD), Kalidasa (400 AD) and Sarangdhara (1200 AD).

Floriculture is increasingly regarded as a fast emerging and highly competitive industry, with the continuous introduction of new cultivars, new crops and cultural techniques. It is a viable diversification from the traditional field crops due to increased per unit returns with the potential for generating employment and earning valuable foreign exchange.

Globally more than 145 countries are involved in the cultivation of floricultural and ornamental crops and the area under these crops is increasing steadily. In terms of total area and production, Asia-Pacific with an area of 2,44,263 hectares accounts for nearly 60.00 per cent of the total world area which is estimated to be nearly 4,00,000 hectares. The global exports of floriculture stood at US$ 20.6 billion in the year 2013. Developed countries in Europe, America and Asia account for more than 90.00 per cent of the total world floricultural exports. Netherlands continue to dominate world floriculture exports (US$6.27 billion) with its stake at a whopping 51.00 per cent. Germany is the largest importer (US$ 2.231 mn) followed by USA (US $ 1.604 mn), UK (US $1.604 mn) and France (US $1.254 mn).

India is bestowed with several agro-climatic zones conducive for production of sensitive and delicate floriculture products. During the decade after liberalization floriculture industries took giant steps in the export arena. In the EXIM policy, floriculture has been included as one of the thrust area. Indian floriculture industry comprises of flowers such as Rose, Tuberose, Gladiolus, Anthurium, Carnations and

Marigold. Floriculture in India is spread over an area of 255.00 thousand hectares with production of 1754.00 thousand metric tonnes of loose flowers and 543 million cut flowers during 2013-14.

It is commercially cultivated in Tamil Nadu (25.00%) Karnataka (20.00%) and Andhra Pradesh (14.00%) followed by Maharashtra, Punjab, Haryana, West Bengal, Gujarat, Orissa, Jharkhand, Uttar Pradesh and Chhattisgarh.

Floricultural exports from India comprise fresh cut flowers (to Europe, Japan, Australia, Middle East and USA), loose flowers (for expatriate Indians in the Gulf), cut foliage (to Europe), dry flowers (to USA, Europe, Japan, Australia, far East and Russia) and potted plants (limited to very few countries). There are more than 300 export-oriented units in India. The floricultural exports registered a phenomenal growth during the last decade. Floriculture exports which stood at Rs. 63 crore during 1996-97, almost tripled to Rs. 211 crore during 2004-05 and has shown an increased trend to reach Rs. 455.90 crores in 2013-14.

Tuberose (*Polianthes tuberosa* L.), native to Mexico is an ornamental bulbous, an herbaceous perennial plant with florets borne in 15 to 20 pairs to form a terminal spike 70 to 80 cm long, with leaves attached on the lower 15 to 20 cm of the flower stem. The florets are tubular, waxy-white in colour and have distinct fragrance. It is commercially grown for its fragrant cut flowers in India. It is also cultivated for the perfume industry in India and France. Tuberose is grown in many parts of the world, predominantly in the southern hemisphere. It is cultivated on large scale in France, South Africa, North Carolina, USA and in many tropical and sub-tropical areas including India. In India tuberose is grown mainly in the eastern part of the country *i.e.,* West Bengal and also in northern plains and parts of south. The commercial cultivation of tuberose is done mainly in Mysore, Devanahalli taluk (Karnataka), East Godavari, Guntur, Chitoor, Krishna district (Andhra Pradesh), Coimbatore and Madurai (Tamil Nadu), Pune, Thane, Sangli (Maharashtra), Bagnen, Kalaghat, Midnapore, Panskura, Ranaghat, Krishnanagar (West Bengal). At present total area under tuberose cultivation in the country is 7.77 thousand hectares with a production of 40.22 thousand metric tonnes loose flower and 13.90 million cut flowers. (Anonymous, 2014).

In Karnataka tuberose is being grown in an area of 2.0 thousand hectares with a production of 13.11 thousand metric tonnes of loose flowers and 1311 lakh numbers of cut flowers during 2013-14. The crop is being grown in the districts of Haveri (416 hectares), Gadag (65 hectares) and Dharwad (34 hectares). The highest productivity (metric tonnes per hectare) is recorded in Bagalkot (10.95), Gadag (9.85) and Belgaum (9.50) whereas the lowest productivity is noticed in Dharwad (7.35) in 2011-12.

For the promotion of tuberose cultivation, GOI initiated National Horticulture Mission during 2005 to strengthen tuberose cultivation by providing Rs. 35,000 subsidy for big framers and Rs. 23,000 subsidy for small farmers. And it also provides support for drip irrigation and mulching to the extent of 90.00 per cent of the project cost. At present farmers are harvesting 40-50 kg tuberose flowers/gunta as against recommended yield of 80-100 kg/gunta. Even though, a number of recommended production practices are being recommended to maximize benefits, the tuberose growers are not adopting the recommended practices. This may be due to varying personal, socio-economic characteristics, their perceived training needs, availability of resources for production and other problems in adopting recommended production practices.

Therefore, with the broad objective of understanding the level of knowledge and extent of adoption recommended production practices, the present study was conducted in the tuberose growing Belgaum, Haveri and Dharwad districts of Northern Karnataka with the following specific objectives,

1. To enumerate the personal and socio-economic characteristics of tuberose growers
2. To assess the knowledge and adoption of recommended production practices by tuberose growers
3. To enlist the factors motivating cultivation of tuberose
4. To find out the different marketing channels of tuberose, and
5. To identify the constraints in production and marketing of tuberose

Scope of the study

This study is of prime importance, which tries to focus on production and marketing practices followed by tuberose growers. The findings of the study on present situation of knowledge and adoption of tuberose cultivation will help the concerned organization and personnel in strengthening transfer of technology. An understanding about motivating factors in tuberose cultivation and constraints in marketing will help the extension system and government to formulate suitable programmes for promoting tuberose cultivation. Lastly the technological constraints in adoption of recommended technology will help the researchers to refine the package of practices.

Thus, the outcome of the study will be of much use to researchers, development departments and extension workers to design appropriate research and extension programs to meet the needs of tuberose growers and promote tuberose industry.

Limitations of the study

The study was confined to three major tuberose growing districts of Karnataka state due limitations of time and other resources at the disposal of researcher. However, considerable care and thought was exercised in making the study as scientific, systematic and objective as possible.

It is a qualitative study based on personal bias and prejudice of the tuberose growers. Hence, the findings have to be viewed in the specific context of the conditions prevailing in the study area.

2. REVIEW OF LITERATURE

Reviews of existing literature relevant to the study area were limited. Hence, an attempt was made to gather the related literature on horticultural crops growing farmers under the following headings.

2.1 Personal and socio-economic characteristics of flower growers

2.2 Extent of knowledge and adoption of recommended production practices by flower growers

2.3 Factors motivating cultivation of flowers

2.4 Different marketing channels of flowers, and

2.5 Constraints in production and marketing of flowers

2.1 Personal and socio-economic characteristics of flower growers

2.1.1 Age

Smitha (2004) reported that around fifty per cent of Anthurium growers (53.33%) in Coorg district of Karnataka were above 40 years age, followed by 26.66 per cent and 20.00 per cent of the growers in the age group of 31-40 years and 21-30 years of age respectively.

Vinaykumar (2005) in his study in Bengaluru rural and Belgaum district of Karnataka observed that little more than fifty per cent of rose growers (57.50%) were middle aged (31-50 years), followed by 35.50 per cent of old age (above 50 years) but very less per cent farmers (7.50%) belonged to young age (18-30 years) group.

Mannan *et al.* (2007) conducted a study on flower cultivators in Jessore district of Bangladesh. It was found that the less than fifty per cent of farmers (45.54%) belongs to middle age group (36-50 years) followed by 41.58 per cent in young age group (upto 35 years) and only 12.88 per cent were old aged (above 50 years).

Ahmad *et al.* (2008) observed that majority of gladiolus growers (56.70%) were noticed in 31-40 years age, whereas 23.30 per cent were below 30 years and 20.00 per cent each were upto 30 and above 40 years.

Ahmad *et al.* (2010) conducted a study on cut rose growers in Punjab, Pakistan and reported that one-third of farmers (35.00%) were noticed under 30 years age, followed by 30 per cent in 31-40 years age, 20.00 per cent were of 41-50 years and 17.50 per cent were greater than 50 years of age.

Usman and Ashfaq (2013a) in a study on economic analysis of gladiolus producers in Punjab province of Pakistan. They found that majority (72.00%) of the respondents belongs to 21-40 years age, and 24.00 per cent were of 41-60 years, whereas very least per cent of respondents (4.00%) were of more than 61 years age.

Usman and Ashfaq (2013b) in a study on economic analysis of tuberose production in Punjab, noticed that the average age of the farmers was 38 years.

2.1.2 Education

Ramesh Kumar (1989) conducted study on production and investment in Jasmine in Madurai district of Tamil Nadu. He found that 41.25 per cent farmers were educated upto primary school, followed by 35.00 per cent had secondary education, while 6.25 per cent had college education and 17.50 per cent farmers were illiterates.

Neeraja Devi (1990) conducted study on economics of production and marketing of Kakada flowers in Bangalore district of Karnataka. The study revealed that 33.33 per cent of the respondents were illiterates as against 20.00 per cent who can read, whereas 23.33 per cent 13.33 per cent and 8.00 per cent studied upto primary, secondary and college level education respectively.

Guledagudda (1996) conducted a study on production and marketing of Jasmine in Dharwad district of Karnataka. He observed that 26.67 per cent farmers were illiterates, 46.67 per cent had education upto primary school, 15.83 per cent had secondary level education, while only 10.83 per cent had education up to college.

Vinaykumar (2005) in his study on rose cultivators in Bangalore (rural) and Belgaum district indicated that 28.33 per cent of rose growers had education upto high school followed by primary school (22.50%). Very less per cent had pre-university education (13.33%), middle school (11.67%) and graduation (6.67%), whereas 17.50 per cent of rose growers were illiterates.

Ahmad *et al.* (2010) conducted a study on cut rose growers in Punjab, Pakistan and reported that around one-third of rose growers (30.00%) studied upto middle school but left before completing matric (grade 10), followed by 22.50 per cent were of matric completed. Graduation was noticed in 15.00 per cent growers, followed by 27.50 per cent of each of them were graduates and illiterates and only 7.50 per cent were illiterates.

Pawar and Shweta (2011) conducted a study on sustainability of cut flower production in Satara district of Maharashtra. They found that 60.00 per cent of each of the gerbera and carnation growers had education upto primary level, whereas only 40.00 per cent of rose growers had education upto secondary level. Further, 40.00 per cent of each of gerbera and carnation growers completed graduation level and two-third of the rose growers had education upto graduation level.

Nusrat (2012) in a study on profitability of flower production and marketing system in Bangladesh, revealed that 21.87 per cent of the farmers were illiterates, whereas 15.63 per cent had upto primary education, 31.25 per cent had secondary education and 25.00 per cent had higher secondary education, while only 6.25 per cent of the farmers had above higher secondary school education.

Usman and Ashfaq (2013a) observed that 36.00 per cent of the respondents were educated upto matric, followed by primary school (12.00%) and middle school (10.00%). Whereas, 10.00 per cent of the respondents were found to be illiterates, while only 8.00 per cent were educated upto graduation and above in Punjab province of Pakistan.

Usman and Ashfaq (2013b) noticed that the average schooling years of all the tuberose producing farmers were 8 years in Punjab province (Pakistan).

2.1.3 Experience in flower cultivation

Chandregouda (1997) observed that less than fifty per cent of Chrysanthemum growers in eastern dry zone of Karnataka had low farming experience (48.33%), followed by medium (34.67%) and high (17.00%) farming experience, respectively.

Vijayakumar and Narayanagowda (1999) in their study on rose growers in Bangalore district reported that, majority of the rose growers had low level of farming experience (61.00%).

Vinaykumar (2005) observed that majority of rose growers (53.33%) in Bangalore rural and Belgaum district of Karnataka had low farming experience, followed by medium (45.00%) and high (1.67%) farming experience, respectively.

Ahmad *et al.* (2008) conducted a study in Punjab, Pakistan and observed that 16.70 per cent of the growers were involved in the gladiolus production for more than 10 years, whereas 45.00 per cent were growing gladiolus for the last five to ten years, 35.00 per cent of the farmers were found growing gladiolus for last one to five years and very least per cent (3.30%) of farmers were growing gladiolus for less than one year.

Mallikarjun *et al.* (2010) found that more than fifty per cent of respondents (57.86%) had less than three years of experience in organic farming. However, one-fourth of sample farmers (23.57%) had the experience in organic farming for more than six years. Whereas, only 18.57 per cent of the farmers had the experience in organic farming for four to six years.

Birajdar (2012) in a study on management efficiency of cut flower growers of Satara district of Maharashtra, found that 18.00 and 11.66 per cent of the respondents had experiences of 21 to 25 years and 16 to 20 years, respectively and only 3.00 per cent of the respondents had grape farming experiences of less than 10 years.

Usman and Ashfaq (2013a) conducted a study in Punjab province of Pakistan and observed that majority of the gladiolus cultivating farmers (59.00%) were noticed in 1-10 years cultivating gladiolus, followed by 22.00 per cent and 9.00 per cent of farmers had 11-15 years and 16-20 years of farming experience, respectively.

Usman and Ashfaq (2013b) in a study on economic analysis of tuberose producers in Punjab province of Pakistan and reported that, average flower growing experience was about 12 years.

2.1.4 Land holding

Vijaykumar (1997) in his study on rose growers in Bangalore district revealed that 75.00 per cent of the rose growers belonged to small farmers category, followed by medium (23.00%) and big (2.00%) farmers category.

Kumar (1998) in his study on knowledge, adoption and economic performance of banana growers in Bangalore rural district revealed that 46 per cent of banana growers possessed less than 12.63 acres of land, 27 per cent of them possessed from 12.63 to 15.08 acres and 27 per cent possessed more than 15 acres of land.

Smitha (2004) in a study on Anthurium growers of Coorg district in Karnataka observed that 56.66 per cent of the respondents had more than 20 hectares of land, followed by 23.33 and 20.00 per cent respondents had 5-10 hectares and less than 5 hetares of land respectively.

Vinaykumar (2005) in a study on knowledge and adoption of rose growing farmers in Karnataka state revealed that comparatively more number of farmers (41.67%) belonged to semi-medium category, followed by medium (30.00%), small (21.67%) and marginal (6.67%) land holding category.

Mallikarjun *et al.* (2010) in a study in Belgaum district of Karnataka found that majority of the vegetable growers (67.14%) had medium farm size (10.01-25 acre), followed by 24.29 per cent and 8.57 per cent of the vegetable growers had big (> 25 acre) and semi-medium (<5.01-10.00 acre) land holdings respectively.

Ahmad *et al.* (2010) in a study on cut rose production in Pakistan found that 57.50 per cent of the growers were growing rose on less than 1 ha of land, whereas 32.50 per cent were producing roses on 1-2 ha of land followed by only 5.00 each were found to grow on 2-4 ha and greater than 4 ha of land respectively.

Usman and Ashfaq (2013b) reported that average operational land holding of tuberose producers was 10.54 in Punjab province of Pakistan.

2.1.5 Annual Income

Vijaykumar (1997) reported that about half of the growers (51.00%) belonged to medium income category followed by low (47.00%) and high income category (2.00%).

Ravi (2000) conducted a study on knowledge, adoption and participation of farm women in jasmine production in Tumkur district of Karnataka observed that 47.77 per cent of the respondents were from low annual income group, 52.23 per cent of respondents were from high annual income group.

Thiranjan Gowda (2005) conducted study on cultivation and marketing pattern of selected cut flower in Belgaum. He found that 42.18 per cent of respondents belonged to medium income category, whereas 31.25 and 26.56 per cent belonged to low and high income category respectively.

Vinaykumar (2005) reported that about 47.50 per cent rose growers belonged to medium income category, followed by 35.00 per cent and 17.50 per cent belonged to high and low income category respectively.

Mannan *et al.* (2007) observed that majority of flower growers in Jessore district of Bangladesh belonged to low income group (54.46%), followed by medium (32.67%) and high income group (12.87%) respectively.

Nusrat (2012) observed that majority of flower growers in Bangladesh had income from agriculture (55.00%), followed by 23.00 per cent and 22.00 per cent were noticed in business and other professions respectively.

2.1.6 Risk Orientation

Vinaykumar (2005) found that 69.17 per cent of rose growers of Bangalore rural and Belgaum district of Karnataka gad medium level of risk orientation, followed by high (19.17%) and low level of risk orientation (11.67%).

Thiranjan Gowda (2005) conducted study on cultivation and marketing pattern of selected cut flower in Belgaum and noticed that 42.18 per cent of the cut flowers growers had high risk bearing ability whereas 37.50 and 20.31 per cent of them had medium and low level of risk bearing ability respectively.

Mallikarjun *et al.* (2010) observed that 45.00 per cent of organic vegetable farmers showed high risk taking ability whereas 27.86 and 27.14 per cent of farmers had medium and low risk taking ability respectively.

2.1.7 Cosmopoliteness

Chandregouda (1997) in a study on extent of adoption of improved cultivation practices of chrysanthemum reported that two-third of the chrysanthemum growers (60.00%) had medium cosmopoliteness followed by low (23.00%) and high (17.00%) cosmopoliteness category.

Kumar (1998) in a study on adoption and economic performance of banana growers revealed that 43.00 per cent of the banana growers had low cosmopoliteness followed by 31.00 per cent and 26.00 per cent under medium and high category of cosmopoliteness, respectively.

Ravi (2000) analyzed from the study and found that 48.89 per cent of jasmine growers had medium cosmopoliteness, followed by 30.00 per cent had low and 21.11 per cent had high cosmopoliteness.

Mannan *et al.* (2007) conducted a study on present status of flower cultivation in Jessore district of Bangladesh and revealed that 47.53 per cent of respondents were low cosmopolite followed by 45.54 and 6.93 per cent of respondents were noticed in medium and high cosmopoliteness category respectively.

2.1.8 Innovativeness

Kumar (1998) conducted a study on banana growers in Bangalore district of Karnataka state and pointed out that 40.00 per cent of the banana growers had less innovativeness followed by 37.00 per cent medium (37.00%) and high innovativeness (23.00%).

Murali and Jhamtani (2003) conducted a study on entrepreneurial characteristics of floricultural farmers in Coimbatore and Dindigul district of Tamil Nadu state and revealed that majority (61.25%) of the respondents belonged to medium innovativeness category followed by 26.25 and 12.50 per cent farmers belonged to low and high innovativeness category respectively.

Vijay Kumar (2001) conducted study on entrepreneurial behaviour of floriculture farmers in Hyderabad indicated that 47.50 per cent of respondents fell in low category followed by 31.66 per cent in medium category and 20.84 per cent in high category.

Vinaykumar (2005) conducted a study on rose growers in Bangalore rural and Belgaum district of Karnataka state and reported that 61.67 per cent were found in medium innovativeness category, followed by 21.67 per cent and 16.67 per cent were between low and high innovativeness category, respectively.

Thiranjan Gowda (2005) conducted study on cultivation and marketing pattern of selected cut flower in Belgaum. He found that 45.31 per cent of the respondents belonged to high level of innovativeness while, 31.25 and 23.43 per cent of the respondents belonged to medium and low innovativeness categories respectively.

Mallikarjun *et al.* (2010) conducted a study on entrepreneurial characteristics of organic vegetable growers in Belgaum district of Karnataka state revealed that comparatively more number of farmers (53.57%) found in high innovative category, whereas 32.14 per cent belonged to medium innovativeness category and 14.29 per cent were in low innovativeness category.

2.1.9 Economic motivation

Chandregouda (1997) indicated that 49.00 per cent of the chrysanthemum growers had medium economic motivation followed by considerable number of them (38.00%) having high economic motivation. However 13.00 per cent of them had low economic motivation too.

Vinaykumar (2005) reported that 61.67 per cent of rose growers of Bangalore rural and Belgaum district of Karnataka state had medium level of economic motivation followed by high (24.17%) and low (14.17%) economic motivation.

Thiranjan Gowda (2005) conducted study on cultivation and marketing pattern of selected cut flower in Belgaum. He found that 43.75 per cent of the respondents belonged to medium level of economic motivation category whereas 35.93 and 20.31 per cent of the respondents belonged to high and low level of economic motivation respectively.

Mallikarjun *et al.* (2010) reported that, 40.17 per cent of organic vegetable growers of Belgaum district of Karnataka belonged to low level of economic motivation categories, followed by high (36.43%) and medium (22.86%) economic motivation.

2.1.10 Extension Contact

Naik (1994) reported that majority 97.00 per cent of the seed producers had high level of extension contact with extension agencies.

Vijaykumar (1997) indicated that a majority of rose growers (54.00%) had very low extension contact, followed by medium (41.00%) and only 5.00 per cent of the rose growers had high extension contact in Bangalore district of Karnataka.

Vinaykumar (2005) reported that 60.00 per cent of the rose growers in Bangalore rural and Belgaum district of Karnataka belonged to medium extension contact category, while 25.00 per cent and 15.00 per cent growers belonged to low and high extension contact respectively.

2.2 Extent of knowledge and adoption of recommended production practices by flower growers

2.2.1 Extent of knowledge of recommended production practices by flower growers

Vijaykumar (1997) in a study on knowledge and adoption of improved rose cultivation practices in Bangalore revealed that, almost all the rose growers had correct knowledge of variety (100 per cent), time of harvesting (95.00%), spacing between plant to plant (90.00%) and between rows (85.00%). Great majority of rose growers had the knowledge of major diseases attacking the crop (81.00%), number of years of economical yield (76.00%) and major insects (74.00%). While majority of rose growers had the knowledge of yield per acre (68 per cent), control measures for diseases (66.00%) and insects (60.00%). Whereas, only 47 per cent of them were knowing about recommended fertilizers.

Vinaykumar *et al.* (2009) Study was conducted in Bangalore rural district of South Karnataka and Belgaum district of North Karnataka to assess the overall knowledge level of the rose growers about improved cultivation practices. The result indicated that almost equal number of the rose growers had high (43.33%) and medium (42.50%) level of knowledge and (14.17%) of them had low level knowledge.

Kumar (1998) in his study on knowledge level of banana growers in Channapatna and Doddaballapur taluks of Bangalore rural district and improved practices revealed that 45.00 per cent of banana growers had medium overall knowledge level followed by lesser percentage under low (26.00%) and high (29.00%) groups of knowledge level.

Vinaykumar (2005) in a study on knowledge and adoption of rose growers about recommended production practices and reported that almost equal number of rose growers had high (43.33%) and medium (42.50%) level of knowledge, only 14.17 per cent of them had low level of knowledge.

Thiranjan Gowda (2005) in a study on cultivation and marketing pattern of selected cut flower in Belgaum district of Karnataka, found that 40.00 per cent of the respondents had high level of knowledge of recommended cut flower production, followed by 37.50 per cent and 22.50 per cent in medium and low knowledge category.

Singh *et al.* (2010) in a study on adoption of commercial cut flower production technology in Meerut and Ghaziabad of Uttar Pradesh revealed that 31.30 per cent of cut flower cultivators had high knowledge level of cut flower production technology followed by very high knowledge (28.80%) and medium level of knowledge (20.00%). Further, they reported that 80.00 per cent of tuberose cultivators were found to possess medium to high adoption of recommended production technology.

Rajesh Kumar *et al.* (2010) conducted a study on knowledge on improved cultivation practices of rose growers of Rajasmand district in Rajasthan. They found that exactly half of the respondents possessed medium level of knowledge, while 35.84 per cent and 14.16 per cent rose flowers had low and high level of knowledge respectively.

Gawle *et al.* (2012) in their study on adoption pattern of improved marigold production technologies by the farmers in Bilaspur district of Chhattisgarh. The findings of the study revealed that around three-fourth per cent (71.33%) of respondents had medium level knowledge and 63.33 per cent had medium level of adoption of recommended marigold production technology.

2.2.2 Extent of adoption of recommended production practices by flower growers

Adapur *et al.* (1993) in a study on adoption of recommended practices of chrysanthemum cultivation in Dharwad district of Karnataka revealed that majority of the respondents adopted the practices like row to row spacing (60.00%), basal dose application of fertiliser (73.33%), top dressing (61.67%) and time of planting (95.00%).

Chandregouda (1997) found that 41 per cent of the farmers had medium adoption level, 33 per cent had low and the remaining 26 per cent had high overall adoption levels of recommended cultivation practices of chrysanthemum.

Vijaykumar (1997) found that almost all the rose growers had adopted the practices like time of harvesting (100.00 %) and varieties (93.00 %). Great majority of the rose growers adopted the practices such as use of weedicides (81.00%) and spacing between rows (72.00%). While majority of rose growers had adopted practices like number of prunings (64.00 %), plant protection measures for insects (57.50 %), diseases (47.50%), spacing between plants (47.00%) and recommended level of fertilizer application (32.50%).

Ravi (2000) through his study reported that 43.30 per cent of jasmine growers belonged to medium adoption level category followed by high (35.55%) adoption and low adoption (21.12%) categories.

Vinaykumar (2005) in a study on knowledge and adoption of rose growers about recommended production practices and reported that almost half of the rose growers

(49.17%) had high adoption level of recommended practices. Whereas 34.17 and 16.67 per cent of rose growers had medium and high adoption level respectively.

Kumar *et al.* (2009) had undertaken a study on adoption of improved cultivation practices by rose growers in Karnataka reported that 49.17 per cent of the respondents had high adoption level of recommended practices followed by 34.17 per cent had medium adoption level and only 16.67 per cent of them had low adoption level category.

Sivashankar and Shashidhar (2011) in his study on adoption behaviour of Jasmine cultivator in Bellary district of Karnataka reported that 43.00 per cent of the respondents had medium adoption level while 34.00 per cent and 23.00 per cent had low and high adoption level respectively.

Chendake and Chauhan (2013) conducted a study on sustainable vegetable flower cultivation practices in Sabarkantha and reported that majority (83.00%) of respondents had high adoption level whereas only 17.00 per cent had low adoption level of gerbera recommended cultivation practices.

2.3 Factors motivating cultivation of flowers

Thakur (2000) in a study on motivational factors influencing acquisition of farm technology by farmers revealed that interest in removing deficient knowledge of technology, conducting suitable farming consistent with farm conditions, appropriate use of existence resources and upholding changeable farming system were the motivational factors expressed by 86.66, 74.16 and 65 per cent respectively.

Patel and Patel (2000) conducted a study on inspiration sources for introducing drip irrigation system and stated that the dealers/agents of drip irrigation system were indicated as a source for inspiration by majority of the drip owners. The progressive farmers who had already adopted drip irrigation system stood second as a source of inspiration. Few of the drip owners expressed that they were inspired by Department of Agriculture, which gave the subsidy for the drip irrigation system.

Shashidhara (2003) in his study on drip irrigation farmers of Bijapur district in Karnataka revealed that all the drip irrigation adopters were influenced to adopt drip irrigation due to influencing factors like saving water (100.00%), better utilization of nutrients (79.00%), save in labours (75.00%), easy application of fertilizers (68.00%), to avail subsidy provision (54.00%), to reduce weed growth (33.00%) and to avoid land leveling (8.00%).

Thiranjan Gowda (2005) conducted study on cultivation and marketing pattern of selected cut flowers in Belgaum district of Karnataka. The study revealed that cent per cent of the respondents expressed profitability as the major motivational factor followed by good demand in market (60.00%) and availability of good infrastructural facilities (47.50%). While 27.50 per cent expressed promotion of Belgaum as an Agri Export zone, had motivated them to take up gerbera cultivation.

Birajdar (2012) reported that a high majority of cut flower growers (92.00%) had taken up the activity due to their self-interest followed by assured market for the produce (80.00%), lucrativeness of the enterprise (35.33%), safe financial background (20.67%), role of government subsidies (18.00%), employment opportunities (8.00%) and influence of friends/relatives (6.67%) were the other factors to influence practicing protected cut flower production.

2.4 Different marketing channels of flowers

2.4.1 Marketing channels preferred by the flower growers

Patil (1985) in a study on production and marketing of Chrysanthemum in Dharwad district of Karnataka noticed that producers were found to market their flowers to commission agent cum wholesaler then retailer who sold intern to consumers.

Guledagudda (1996) conducted a study on production and marketing of Jasmine in Dharwad district of Karnataka. He reported that growers were found to market flowers through Channel-I (Producer- Village traders- Consumers) and Channel-II (Producer- Commission agents cum wholesalers- Retailers- Consumers).

Barawakar (1998) studied marketing of cut flower in Mumbai market. He observed that gerbera flower growers found to market through channel-1 (Producer-Retailer) followed by channel-2 (Producer- Wholesaler- Retailer- Consumer). Whereas rose, gladiolus and aster however were marketed through channel 1, 2 and 3 (Producer-Hundekari-Wholesaler-Retailer-Consumers)

Manzoor *et al.* (2001) pointed out the channel of Producer-Auctioneers cum commission agents-Retailers-consumers and the produce was also marketed from producers to consumers in Pakistan flower market.

Bhanumathy and Sitadevi (2003) carried out a study on economic analysis of Jasmine in Chidambaram taluk of Cuddalore district of Tamil Nadu. It was noticed that Producer- Commission agent cum wholesaler- Retailer- Consumer was the main marketing channel among the Jasmine growers.

Tale *et al.* (2003) in a study on economics of flower marketing in Nagpur district of Maharashtra reported that Producer- Commission agent- Retailer- Consumer was the only marketing channel through which more than 90.00 per cent turnover was handled.

Tariq *et al.* (2007) in a study on scenario of gladiolus production in Punjab, Pakistan pointed out that the flowers were marketed from growers to consumer, retailers, middlemen and to traders and from traders the flowers were sent to wholesaler.

Nusrat (2010) noticed that of flowers in Bangladesh marketed through Channel-I (Farmers- Wholesaler cum retailer- Retailers- Users), Channel-II (Farmers- BRAC Office-Wholesaler cum retailer- Retailers- Users) and Channel-III (Farmers- BRAC Office-Wholesaler cum retailer-Users)

Bhosale *et al.* (2011) observed that gerbera cutflower in Pune district of Maharashtra was marketed through Channel-1 (Producer- Wholesaler- Florist- Consumer) and Channel-2 (Producer- Florist- Consumer).

Karuppusamy *et al.* (2012) reported that Jasmine in Tamil Nadu was marketed through Channel-I (Producer- Commission agent- Retailer- Consumer), Channel-II (Producer-Commission agent- Wholesaler- Retailer- Consumer), Channel-III (Producer- Retailer-Consumer), Channel-IV (Producer- Commission agent- Processor), Channel-V (Producer-Retailer- Consumer) and Channel-VI (Producer- Exporter- Retailer- Consumer).

Anil Kumar *et al.* (2013) reported that the 90.00 per cent of marigold cultivators in Uttar Pradesh have sold marigold flower through channel-II (Producer- Retailer- Consumer) and only 10.00 per cent sold through channel-I (Producer- Consumer).

Sudhagar (2013) in a study on production and marketing of cut flowers reported that 78,000 of flowers were marketed through channel-I and 1, 60,000 flowers were handled through channel-II in Hosur taluk of Tamil Nadu.

2.4.2 Reasons for preferring different marketing channel

Karuppusamy *et al.* (2012) noticed that jasmine growers in Tamil Nadu preferred channel II and III in sale of jasmine because major portion of the jasmine was marketed through these channels and the channel VI was preferred because of the benefits of exports.

2.4.3 Sources of different marketing information

Thiranjan Gowda (2005) in a study on cultivation and marketing of cut flowers in Belgaum district reported that 75.00 per cent of the respondents were getting market information from commission agents, while 47.50 per cent and 27.50 per cent contacted co-farmers and retail outlets respectively.

Nusrat (2012) found that most of the farmers received their market information from market visit and personal interview and fellow farmers in marketing of flowers in Bangladesh.

Birajdar (2012) reported that 62.50 per cent of the respondents were getting market information from commission agents while 27.50 per cent and 75.00 per cent contacted co-farmers and co-operative societies, respectively in Satara and Pune district of Maharashtra.

2.4.4 Post-harvest management practices followed by flower growers

Thiranjan Gowda (2005) in a study on cultivation and marketing of cut flowers in Belgaum district noticed that cent per cent of the carnation and gerbera growers were following grading of flowers and were using cardboard boxes for packing.

Birajdar (2012) conducted study on management efficiency of cut flower growers in Satara and Pune districts of Maharashtra and pointed that cent per cent of the cut flower growers were following grading of flowers and were using cardboard boxes for packing the flowers

2.5 Constraints in production and marketing of tuberose

Ramesh Kumar (1989) in his study on Jasmine growers in Madurai district of Tamil Nadu remarked that all the farmers faced the pest and disease problems (100.00%). Non-availability of truck/carts (12.50%), bad connecting roads (5.00%), high hire charges (26.25%) and low frequency of buses (15.00%) were noticed to be marketing problems.

Ramesh (1997) conducted a study on production and marketing of crossandra flowers in Chitradurga district of Karnataka. He found that all the farmers expressed production problems of pest and diseases problem (100.00%), followed by lack of technical knowhow (90.00%) and non-availability of labour (96.66%). The problem of commission charges was expressed by all the farmers (100.00%), followed by transport facilities (13.33%) and unfair trading practices (80.00%).

Raut and Rasane (2000) reported the major constraints of lack of labours for grading and packing (30.00%), high transport cost (30.00%) followed by absence of open auction method of sale, low price and high commission in the market as the other constraints by rose cultivator in Nasik district of Maharashtra.

Manzoor *et al.* (2001) reported that ignorance of government for not developing policy implication, non-existence of export facilities and increase in cost of production as the major constraints in cultivation of flowers in Pakistan.

Smitha (2004) reported the problem in production and marketing of Anthurium in Coorg district of Karnataka. He found that high cost of planting materials (46.66%), huge investment requirement in flower production (40.00%), pest and diseases attack on crops (33.33%) and low light intensity during winter (16.66%) as the production constraints, whereas, like absence of organized market for anthurium (40.00%) and transportation problem (33.33%) were the problems expressed in marketing of Anthurium.

Raina *et al.* (2011) noticed the lack of proper marketing channel and lack of price policy as a major problem among cut flower growers in Jammu And Kashmir State.

Haque *et al.* (2012) pointed the problem of lack of technical knowledge, followed by non-availability of HYV seedlings and lack of transportation facilities in the second and third rank respectively.

Nusrat (2012) studied the different constraints involved in production and marketing of flowers in Bangladesh. The study revealed the economic problems like high price of mother stock (63.00%), costly fertilisers and insecticide (78.00%) and the technical problems like lack of scientific knowledge and training (87.00%), incidence of pest and disease (72.00%). While in marketing inadequate transportation (84.00%), low market price (78.00%) and lack of market information (75.00%) were the major problems expressed by flower cultivators.

Sanjit Kumar (2012) observed that flower producers in Medinipur district of West Bengal were facing the problems of scarcity of planting material, timely replacement, problem of transportation, adequate and timely credit facilities.

Sudhagar (2013) in a study on production and marketing of cut flowers in Hosur taluk of Tamil Nadu reported the production problems like irregular supply of electricity (100.00%) followed by huge investment requirement (91.66%), non-availability of quality planting material (86.66%), scarcity of labour (75.00%), poor harvest during rainy season (63.03%) and pest and disease attacks (53.33%). In case of marketing problems seasonal demand (96.36%), absence of organized retail markets (85.45%) were the highly expressed problems followed by price fluctuations (54.54%) and lack of adequate cold storage facilities (74.00%).

Nirmal Kumar (2013) reported that lack of cold storage facilities, lack of sufficient government subsidy for flower cultivation, absence of training center, lack of well-developed marketing system were the major constraints in Nadia district of West Bengal.

Usman and Ashfaq (2013b) revealed the problems of high fertilizer cost, shortage of water, fluctuation in daily prices, no proper flower market and no training institutes among tuberose growers in Pakistan.

Islam and Rashadur (2013) noticed the problems like weak research activities, unorganized market, lack of post-harvest management and air condition vehicles and limited government initiatives by flower growers in Jessore.

3. METHODOLOGY

The research study was conducted during the year 2014-15 in Haveri, Belgaum, and Dharwad districts of Karnataka. The general description of the research methods and procedures employed in the study are outlined under the following major headings.

3.1 Research design

3.2 Locale of the study

3.3 Brief description of the study area

3.4 Selection of villages

3.5 Selection of respondents

3.6 Selection of variables for the study

3.7 Operationalization and measurement of variables

3.8 Constraints faced by tuberose growers in adoption of improved cultivation practices

3.9 Marketing channels preferred by the tuberose growers

3.10 Motivational factors for tuberose cultivation

3.11 Procedures followed in data collection

3.12 Statistical methods used to analyse the data

3.1 Research design

In the present investigation, *Ex-post-facto* research design was used. This design was considered as appropriate because the phenomenon had already occurred. *Ex-post-facto* research is the most systematic empirical enquiry in which the researcher does not have control over independent variables as their manifestation has already occurred or as they are inherent and cannot be manipulated. Thus, inferences about relation among variables could be made without direct intervention from concomitant variation of independent and dependent variables (Kerlinger, 1973).

3.2 Locale of the study

The study was conducted in the purposively selected Haveri, Belgaum and Dharwad districts of Northern Karnataka on the basis of largest cultivated area under tuberose.

Among ten taluks of Belgaum district Chikkodi taluk tops in tuberose cultivable area (32 ha) followed by Khanapur (6 ha) (Appendix IV). Among the five taluks of Dharwad district, Dharwad taluk has more cultivable area under tuberose (28 ha) followed by Kalghatagi (11 ha) taluk (Appendix V). Similarly, among the seven taluks of Haveri district, Ranebennur taluk had the maximum tuberose area (365 ha) followed by Haveri (20 ha) (Appendix VI). Hence, Chikkodi taluk in Belgaum district, Dharwad taluk from Dharwad district and Ranebennur taluk in Haveri district were purposively selected for the study.

3.3 Brief description of the study area

Belgaum district situated in the Northwestern part of the Karnataka represents agro-climatic zone 8 and 9. The district is bordered by Maharashtra state in the North, Bagalkot district in the East, Dharwad and Uttar Kannada districts in the South, Goa and Maharashtra state in the west. The area of the district is 13,415 km^2 which has been divided into ten talukas. As per 2011 census the population of the district is 4,214,505 with an average literacy rate of 78 per cent of which 54 per cent are male and 46 per cent are female literates.

The total geographical area of the district is 4, 27,329 ha of which 3, 62,855 ha is the net sown area. The major commercial crops grown are maize, rice, wheat, sugarcane, tobacco and cotton. The district is ideally suited for cultivation of horticulture crops like mango, banana, grapes, sapota and guava (10.20 thousand hectares) and vegetables like onion, green chilli, potato, tomato and khol crops (26.22 thousand hectares). The major flower crops such as gerbera, rose, carnation, chrysanthemum and tuberose are being grown in an area of 960 ha with a production of 8673 m.tons. Among the flowers, tuberose is being cultivated in an area of 44 ha with production of 422 m.tons (Appendix III).

Dharwad district situated in northern transitional zone (zone-3) of Karnataka is basically malnad area and consists of five taluks. This is surrounded by Belgaum in north, Haveri in south, Gadag on east and Uttara Kannada on west. As per 2011 census, the total population of the district was 1,349,563 with literacy rate of 71.87 per cent of which 86.37 per cent are male and 73.46 per cent are female literates.

The total geographical area of the district is 1, 11,788 ha of which 74,838 ha is the net sown area. The major commercial crops grown in the district are cotton, chilly, sugarcane, groundnut, jowar and wheat. It is having suitable climatic condition to grow horticulture crops like mango, sapota, guava and banana (7.4 thousand hectares) and vegetables like onion, potato, tomato and brinjal (29.20 thousand hectares). The flowers like marigold, jasmine, rose, chrysanthemum, tuberose and crossandra are being grown in an area of 246 ha with a production of 629 m.tons. Among flower crops, tuberose is grown in area of 34 ha with a production of 250 m.tons (Appendix III).

Haveri district is situated in northern transitional zone (zone-8). It is bounded by Dharwad and Gadag in the north, Davanagere and Shimoga in the south, Uttara Kannada in the west and Bellary in the east. The total geographical area is 4,85,156 ha. of which 4,27,955 ha is under cultivation. The total population of the area is 14,39,116 with an average literacy rate of 70.00 per cent, of which 84.00 per cent are male and 70.46 per cent are female literates.

The important crops grown in the district are jowar, tomato, cotton, maize, chilly, sunflower, groundnut, wheat, safflower, paddy, green gram and sugarcane. The district has suitable climate condition to grow horticulture crops like mango, sapota, banana (6163 thousand hectares), vegetables like chilli, okra, brinjal (8824 thousand hectares). Flowers like jasmine, chrysanthemum and tuberose are being grown in area of 543 ha with a production of 851 m.tons. Among flower crops, tuberose is grown in area of 416 ha with a production of 3728 m.tons (Appendix III).

3.4 Selection of villages

Considering the highest area under tuberose cultivation, the list of villages in Dharwad, Chikkodi and Ranebennur taluks was prepared in consultation with the extension officers of Horticulture Department. From each taluka, four villages were selected (Table 1).

Plate 1: View of tuberose field

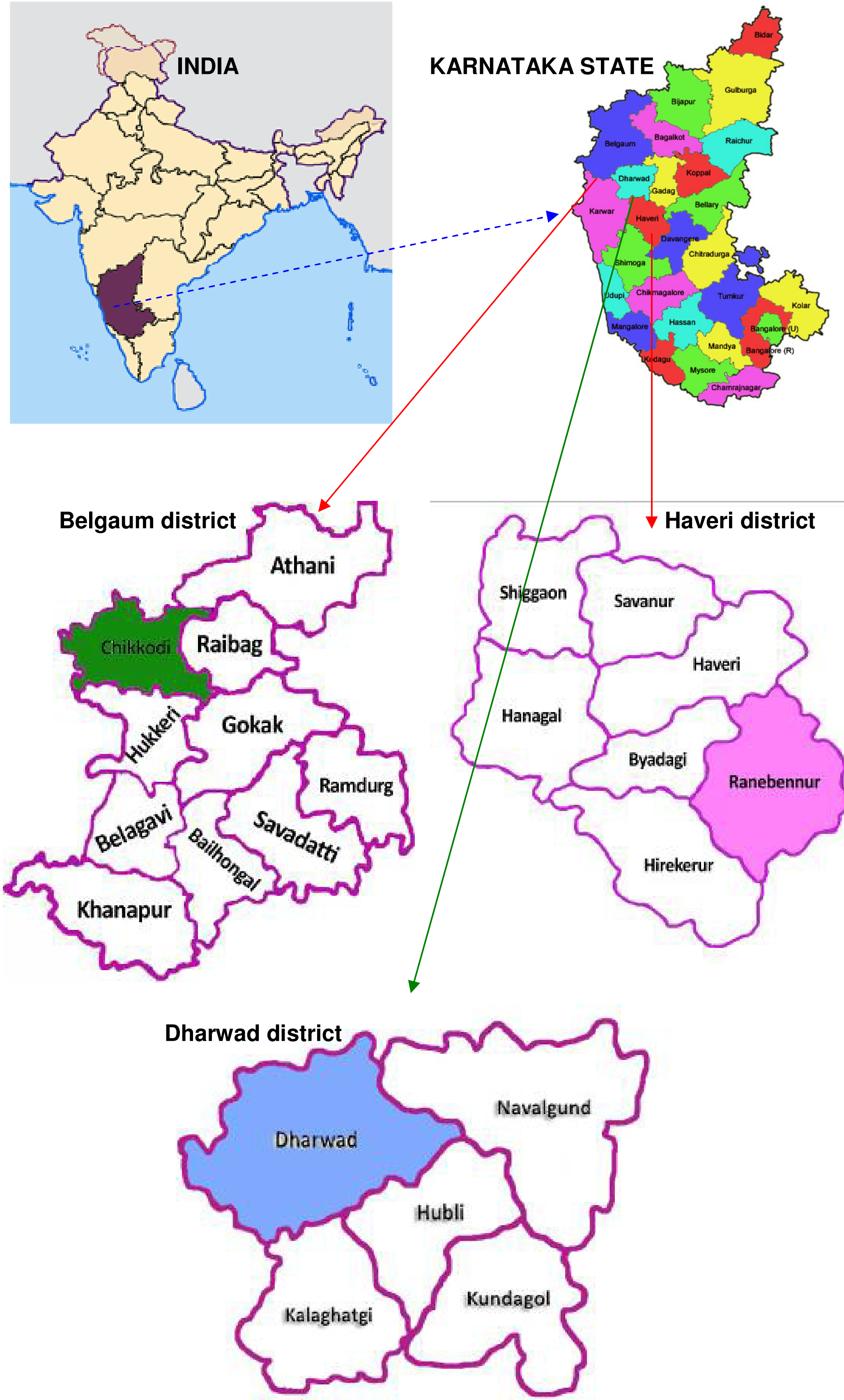


Fig. 1: Map showing the study area

Table 1: List of villages selected for the study

District	Name of the taluka	Name of the selected villages	Number of respondents selected
1. Dharwad	Dharwad	Kanakur	10
		Chandanamatti	10
		Hebballi	10
		Talwai	10
2. Belgaum	Chikkodi	Nagaral	10
		Examba	10
		Hadnal	10
		Donewadi	10
3. Haveri	Ranebennur	Menasinhal	10
		Timmenahalli	10
		Kuppelur	10
		Tumminakatti	10
		Total	120

3.5 Selection of respondents

The list of tuberose growers in the selected villages was prepared in consultation with officers of state Department of Horticulture and people involved in production and marketing of tuberose flower. Based on random sampling, 10 tuberose growers were selected from each of selected village to constitute a sample of 120 for the study (Table 1).

3.6 Selection of variables for the study

3.6.1 Dependent variables

In the light of objectives set for the study the dependent variables considered were;

1. Knowledge level of recommended cultivation practices of tuberose flower, and
2. Adoption of recommended cultivation practices of tuberose flower

3.6.2 Independent variables

Based on the review of literature and discussion with the scientists of UAS, Dharwad and extension functionaries of Department of Horticulture, the following independent variables were selected for the study.

1. Age
2. Education
3. Experience in tuberose cultivation
4. Land holding
5. Annual income
6. Risk orientation
7. Cosmopoliteness
8. Innovativeness
9. Economic motivation
10. Extension contact

3.7 Operationalization and measurement of variables

3.7.1 Dependent variables

3.7.1.1 Knowledge level

It is operationally defined as the degree to which the factual information possessed by the tuberose grower regarding recommended production practices.

A 'teacher made test' was developed to measure the knowledge level. A total of 18 practices were framed covering different cultivation aspects *viz*., selection of varieties (1), bed preparation (2), selection of planting material (1), fertilizer application (2), irrigation system (1), pest and disease management (7), harvesting of flowers (4). A score of 1 was assigned for correct answer and 0 for the incorrect answer. The total knowledge score for individual respondent was calculated by summing up the number of items correctly answered. As a result, the maximum score that one could get was 18 and the minimum was zero. After computing knowledge scores, the respondents were grouped in to low, medium and high categories based on the mean and standard deviation as shown below.

Knowledge category	Score
Low	< (Mean-0.425 SD)
Medium	(Mean-0.425 SD to Mean + 0.425 SD)
High	> (Mean + 0.425 SD)

3.7.1.2 Adoption of recommended cultivation practices of tuberose production

Adoption was operationally defined as the extent to which the improved production practices in the tuberose cultivation were practiced on a continuous basis.

After discussing with scientists of University of Agricultural Sciences, Dharwad and extension officers of department of horticulture and reviewing relevant literature, 16 practices were identified in the areas of selection of varieties (1), bed preparation (2), selection of planting material (1), irrigation system (1), fertilizer management (2), pest and disease management (5) and harvesting of flowers (4). A score of two was assigned for complete adoption of individual practice. Considering the extent of adoption, scores were assigned for full, partial and non-adoption of the recommended practices.

Thus the maximum score that an individual respondent could obtain was 32 and minimum was zero. Depending upon the total score obtained by each of the respondent, the respondents were grouped into three categories taking mean and standard deviation as a measure of check.

Adopters' Category	Score
Low	< (Mean – 0.425 SD)
Medium	(Mean-0.425 SD to Mean + 0.425 SD)
High	> (Mean + 0.425 SD)

3.7.2 Independent variables

The method followed for the measurement of quantification of each independent variable is given below.

3.7.2.1 Age

It refers to the chronological age of the respondents in completed years at the time of investigation. The procedure followed by Hinge (2009) was used to categorize the respondents.

Category	Age
Young	18-30 years
Middle	31-50 years
Old	Above 50 years

3.7.2.2 Education

Education was operationalized as the extent of formal education undergone by the respondents. The respondents were grouped into different levels of education based on the frequency and percentage. The procedure followed by Shashidhara (2003) was adopted for computation.

Category	Scores
Illiterate	0
Primary school (1^{st}-4^{th})	1
Middle school (5^{th}-7^{th})	2

High school (8^{th}-10^{th})	3
PUC	4
Graduate	5

3.7.2.3 Experience in tuberose cultivation

Experience in tuberose cultivation refers to numbers of years a farmer has been cultivating tuberose. Later, the number of years of experience in tuberose cultivation in completed years of the respondents was categorized in to low, medium and high experienced groups by taking mean and standard deviation.

Category	Scores
Low	< (Mean-0.425 SD)
Medium	(Mean-0.425 to Mean + 0.425 SD)
High	> (Mean + 0.425 SD)

3.7.2.4 Land holding

It refers to the number of acres of land possessed by the farmer. The criteria prescribed by the Karnataka Land Reforms Act 38 to 1966 (Part-B) 99 and 195-96 under sections 2 (a) 32 was used where in one acre of irrigated or garden land is equated to 2.5 acres of dry land was used for calculating the total land holding of the producers. The respondents were then grouped as below.

Farmers categories	Landholding (ha)
Marginal	<1 ha
Small	2.00 ha
Medium	2.00 to 4ha
Big	>4ha

3.7.2.5 Annual income

It was operationalized as the total income earned by the respondents from both agricultural and allied enterprises in a year. Later, respondents were grouped into four categories as per norms suggested by Ministry of Rural Development, Government of India and followed by Deepak (2003).

Sl.No.	Categories	Income Rs. /annum
1	Low income group	Up to Rs. 17,000/-
2	Semi-Medium income group	Rs. 17,001 - Rs. 34,000.
3	Medium income group	Rs. 34,001- Rs. 51,000
4	High income group	Above Rs. 51,000

Further, frequencies and percentage were used to present the data.

3.7.2.6 Risk orientation

It refers to the degree to which a farmer is oriented towards risk and uncertainty and has courage to face the problems in farming. In the present study risk orientation of respondents was measured with the help of a scale developed by Supe (1969). The scale contained six statements of which two statements were negatively keyed. A weightage of ‘2’ for the ‘yes’ response and ‘1’ for ‘No’ response in case of positive statements and 1 and 2 in case of negative statements respectively was assigned. Thus, the possible score range from 6 to 12. Using mean and standard deviation as measure of check, the respondents were classified into low, medium and high groups.

Category	Scores
Low	< (Mean-0.425 SD)
Medium	(Mean-0.425 to Mean + 0.425 SD)
High	> (Mean + 0.425 SD)

3.7.2.7 Cosmopoliteness

Cosmopoliteness is the degree to which an individual is oriented outside to one's immediate social system. This variable was measured using the procedure followed by Hinge (2009). Two dimensions of the variable were considered in this case are

1. The frequency of visit to the nearest town

2. The purpose of visit to the town

The items and scoring pattern followed in quantifying the frequency of visit were as follows:

Item	Score
Two or more times in a week	5
Once in a week	4
Twice a month	3
Once a month	2
Never	1

The items and scoring pattern to quantify the purpose of visit were

Item	Score
Agriculture	3
Personal	2
Entertainment	1

The cumulative maximum score obtained was 10 and minimum was 0. Depending upon total score obtained by each of the respondent, they were grouped into three categories, *viz.*, 'low', 'medium' and 'high' based on mean and standard deviation as a measure of check.

Category	Scores
Low	< (Mean-0.425 SD)
Medium	(Mean-0.425 to Mean + 0.425 SD)
High	> (Mean + 0.425 SD)

3.7.2.8 Innovativeness

It was operationalized as the degree to which a tuberose grower showed interest and desire to change in tuberose production practices and introduce such changes as and when it suits him in terms of income generation.

Self-rating innovative proneness scale developed by Moulik (1965) was used to measure the level of innovative proneness of the respondents. Scale consisted of three sets of statements. Each set consisted of three sub statements with respective scores of 3, 2 and 1 indicating level of proneness of the respondents to adopt innovations in tuberose flower production. Respondents were requested to choose one that most accurately or least accurately portrayed himself/herself from a group of three sub-statements describing a particular personality characteristic.

Scoring was done by summing up the ratios of the weight of 'strongly agree'. The scores ranged from 16-24. Using mean and standard deviation as measure of check the respondents were classified into low, medium and high groups.

Category	Scores
Low	< (Mean-0.425 SD)
Medium	(Mean-0.425 to Mean + 0.425 SD)
High	> (Mean + 0.425 SD)

3.7.2.9 Economic motivation

It refers to the values or attitude for which the respondents attached greater importance to profit maximization. This was quantified by using the scale developed by Supe (1969). The scale consists of six statements, of which five statements were positive and one was negative. The responses were recorded on five point continuum ranging from strongly agree, agree, undecided, disagree and strongly disagree with scores of 5, 4, 3, 2 and 1 for positive statements and 1, 2, 3, 4 and 5 for negative statements respectively.

Maximum and minimum scores obtainable by the individual on the scale were 30 and 6 respectively. Based on the scores obtained, farmers were grouped into three categories by using mean and standard deviation as measure of check.

Category	Score
Low	< (Mean-0.425 SD)
Medium	(Mean-0.425 to Mean + 0.425 SD)
High	> (Mean + 0.425 SD)

3.7.2.10 Extension contact

Extension contact refers to the frequency of contact of the individuals with extension personnel to get information about agriculture crops. The frequency of contact of a respondent with extension agency during the previous year was taken into consideration. The variable was quantified by using the procedure followed by Deepak (2003). The frequency of contact of each extension worker by the respondents was calculated. The extent of extension contact were rated on three point continuum *viz.*, regularly, occasionally and never with the weightage of 3, 2 and 1 respectively. The score of individual respondents was the summation of scores of all the extension personnel contacted by the respondents. The data obtained was analysed by using frequency and percentage. Later, using mean and standard deviation as measure of check the respondents were classified into low, medium and high groups.

Category	Score
Low	< (Mean-0.425 SD)
Medium	(Mean-0.425 to Mean + 0.425 SD)
High	> (Mean + 0.425 SD)

3.8 Constraints faced by tuberose growers in adoption of improved cultivation practices

To know the problems faced by the respondents in adoption of recommended production technology, the respondents were asked to indicate the problems under the detailed items and thus responses were recorded. Later, the obtained responses were enlisted and expressed in terms of frequency and percentage.

3.9 Marketing channels preferred by the tuberose growers

The marketing channels preferred by the respondents was studied by asking them to indicate the nature of marketing which included where, when, to whom and through which channel, they sell tuberose flowers. Responses obtained from the farmers were expressed in frequencies and percentages.

3.10 Motivational factors for tuberose cultivation

Motivational factors of the respondents were identified by asking respondents to indicate the factors which have motivated them to take up tuberose cultivation. The responses were computed using frequencies and percentages.

3.11 Procedures followed in data collection

3.11.1 Pre-testing of interview schedule

Keeping in view the objectives and variables under study, a structured interview schedule was prepared by reviewing the previous research studies, consulting and discussing with the experts and professional workers in the field of horticulture and specialists in agricultural extension. The questionnaire was pre-tested in a non-sample area. The finalized interview schedule was prepared after inserting necessary modifications, additions and deletions based on pre-tested results. The final format of the interview schedule was used for collecting responses from each respondent in an informal atmosphere by personal interview method.

3.12 Statistical methods used to analyse the data

The data collected from the respondents was scored, tabulated and analyzed by using suitable statistical tools such as frequency, percentage, mean, standard deviation. Finally the appropriate inferences were drawn at each level of interventions to arrive the final results.

4. RESULTS

The results are presented under the following headings in accordance with the objectives of the study.

4.1 Personal and socio-economic characteristics of tuberose growers

4.2 Knowledge and adoption of recommended production practices by tuberose growers

4.3 Factors motivating cultivation of tuberose

4.4 Different marketing channels followed by tuberose growers

4.5 Constraints in production and marketing of tuberose

4.1 Personal and socio-economic characteristics of tuberose growers

The results pertaining to personal and socio economic characteristics of tuberose growers have been depicted in Table 1 and Fig.2.

4.1.1 Age

It is observed that moderately high per cent of tuberose growers (55.00%) were middle aged followed by old aged farmers (36.67%) whereas only 8.33 per cent were noticed in young age group.

4.1.2 Education

In the distribution of education level around one- third of tuberose growers (37.50%) studied up to primary school followed by middle school (15.83%) and high school education (13.33%). Pre-university and graduation was noticed with 10.00 per cent and 1.67 per cent of the respondents respectively. But 21.67 per cent of the respondents were noticed to be illiterates.

4.1.3 Experience in tuberose cultivation

The results revealed that 45.83 per cent of the respondents had 3-4 years of experience in tuberose cultivation, followed by 1-2 years of experience with 30.00 per cent respondents. Whereas 24.17 per cent of respondents noticed in 5-6 years of experience.

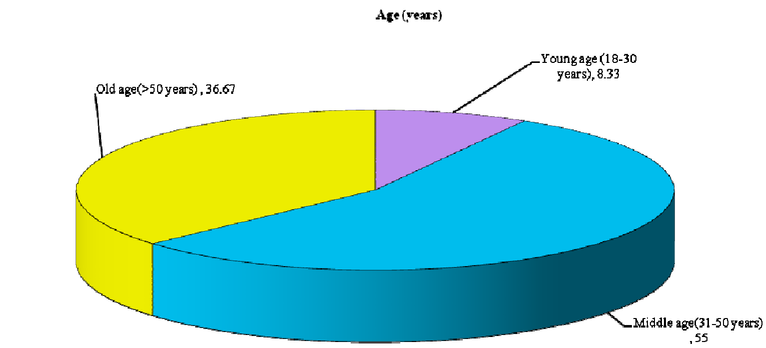
Table 2: Distribution of respondents based on their personal and socio economic characteristics

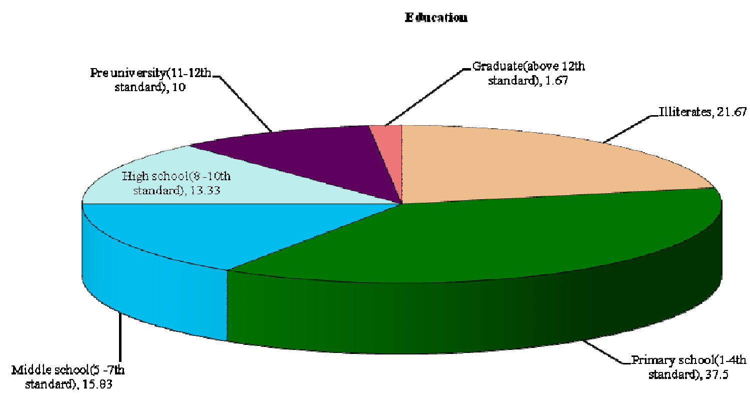
(n =120)

Sl. No.	Characteristics	Frequency	Percentage
1.	**Age**		
	Young age (18-30 years)	10	8.33
	Middle age(31-50 years)	66	55.00
	Old age(>50 years)	44	36.67
	Mean(45.33)		
	SD(11.31)		
2.	**Education**		
	Illiterates	26	21.67
	Primary school(1-4th standard)	45	37.50
	Middle school(5 -7th standard)	19	15.83
	High school(8 -10th standard)	16	13.33
	Pre university(11-12th standard)	12	10.00
	Graduate(above 12th standard)	02	1.67
3.	**Experience in tuberose cultivation**		
	1-2 years	36	30.00
	3-4 years	55	45.83
	5-6 years	29	24.17
	Mean(3.70)		
	SD(1.90)		
4.	**Land holding**		
	Marginal (< 1 ha)	17	14.17
	Small (1- 2 ha)	56	46.67
	Medium (2-4 ha)	42	35.00
	Large (>4 ha)	5	4.17
	Mean(1.80)		
	SD(1.29)		
5.	**Annual income**		
	Low income group(Up to Rs.17,000)	23	19.16
	Semi-medium income group (Rs. 17,001 - Rs. 34,000)	45	37.50
	Medium income group(Rs. 34,001 - Rs. 51,000)	32	26.67
	High income group (Above Rs.51,000)	20	16.67
	Mean (71,586.33)		
	SD (13,639.08)		

Contd…..

Sl. No.	Characteristics	Frequency	Percentage
6.	**Risk orientation**		
	Low(<9.98) Medium(9.51-10.19) High (>10.19) Mean(10.44) SD(1.07)	45 56 19	37.50 46.67 15.83
7.	**Cosmopoliteness**		
	Low (<6.85) Medium (6.85-8.01) High (>8.01) Mean(7.83) SD(1.36)	38 52 30	31.67 43.33 25.00
8.	**Innovativeness**		
	Low (<18.94) Medium (18.94 -21.07) High (>21.07) Mean(20.01) SD(2.50)	31 56 33	25.83 46.67 27.50
9.	**Economic motivation**		
	Low (<21.07) Medium (21.07 -23.62) High (>23.62) Mean(22.35) SD(2.99)	40 48 32	33.33 40.00 26.67





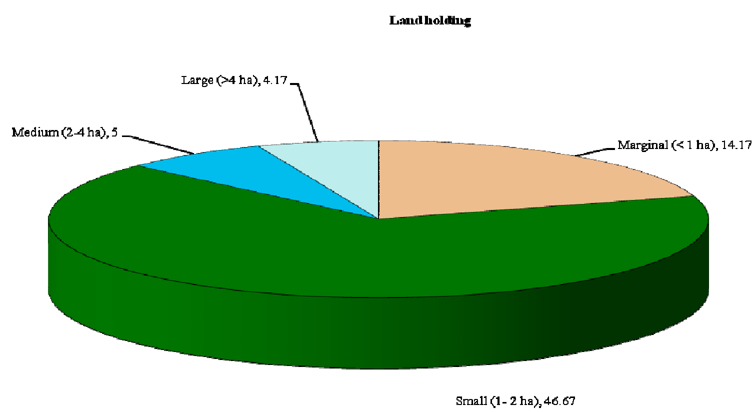
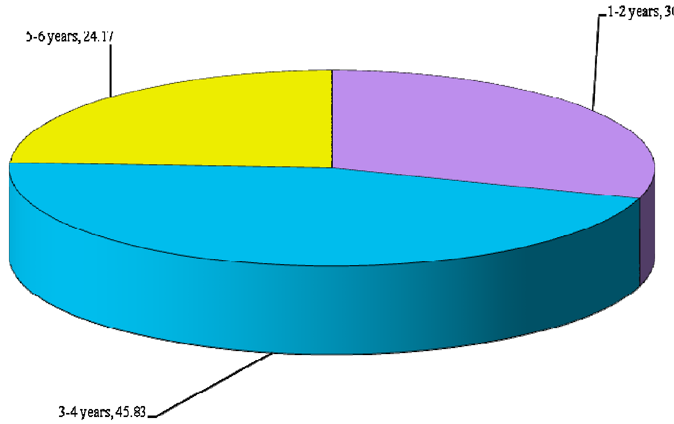
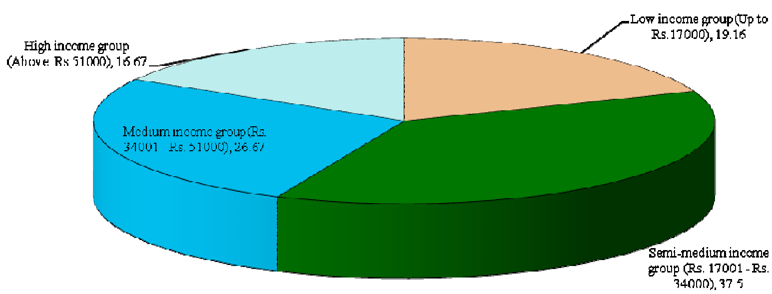


Fig. 2: Distribution of respondents based on their personal and socio

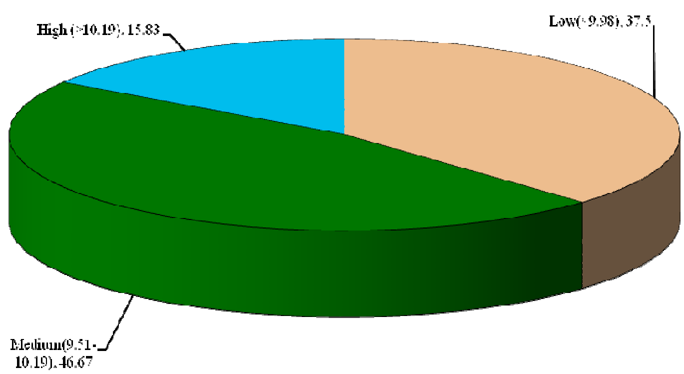
Experience in tuberose cultivation



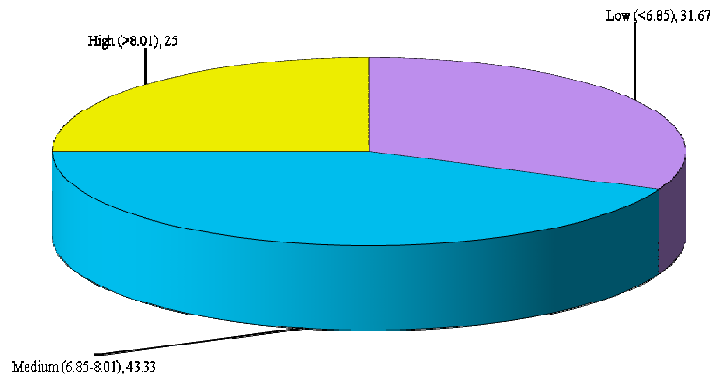
Annual income



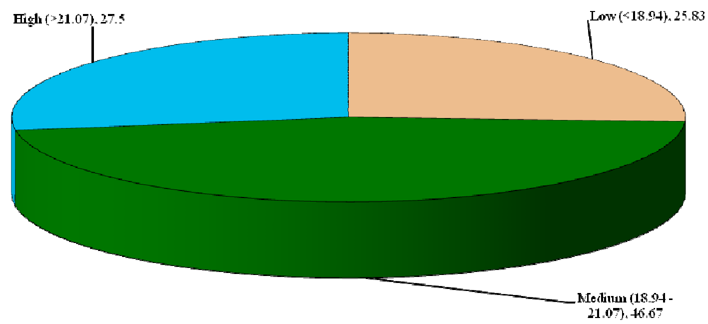
Risk orientation



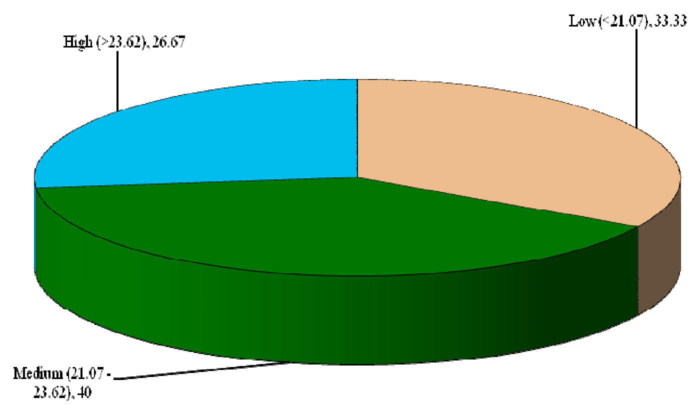
Cosmopoliteness



Innovativeness



Economic motivation



4.1.4 Land holding

The data shows that nearly fifty per cent of respondents (46.67%) had small size of land holdings and around one-third (35.00%) had medium size land holdings. The marginal land holding was noticed with 14.17 per cent of farmers. However 4.17 per cent farmers had large land holdings.

4.1.5 Annual income

It could be observed that comparatively more number (37.50%) of respondents belonged to semi-medium income group (Rs. 17,001-Rs. 34,000/annum) whereas 26.67 and 19.16 per cent of the respondents were observed in medium (Rs. 34,001-Rs. 51,000/annum) and low (up to Rs. 17,000/annum) income group respectively. While 16.67 per cent of the respondents belonged to high (Above Rs. 51,000/annum) income group.

4.1.6 Risk orientation

Around fifty per cent (46.67%) of growers possessed medium risk orientation, followed by low risk orientation (37.50%). Whereas, high risk orientation was noticed with 15.83 per cent farmers.

4.1.7 Cosmopoliteness

It could be seen from the Table 1 that medium level of cosmopoliteness was noticed with 43.33 per cent of the respondents followed by low level of cosmopoliteness (31.67%). While, one-fourth of the respondents (25.00%) belonged to high level of cosmopoliteness.

4.1.8 Innovativeness

The results in Table 1 revealed that around fifty per cent tuberose growers (46.67%) belonged to medium level of innovativeness, whereas high level of innovativeness and low level of innovativeness was noticed with one fourth per cent of respondents (27.50% and 25.83%) respectively.

4.1.9 Economic motivation

The distribution of respondents in economic motivation (Table 1) highlight that 40.00 per cent growers belonged to medium economic motivation category followed by low level of economic motivation with 33.33 per cent farmers. Whereas one-fourth growers (26.67%) possessed high economic motivation.

4.1.10 Extension contact

The data in Table 2 revealed that one-fourth of farmers (25.00%) regularly contacted Senior Assistant Director of Horticulture followed by regular contact of Assistant Agricultural Officers (15.00%) and Horticulture Assistants (14.17%). Whereas, majority had never contacted Assistant Horticultural Officers (70.83%) and Deputy Director of Horticulture (70.00%). However, more number of farmers (40.83%) found to contact Horticultural Assistants occasionally.

The distribution of growers in the overall extension contact as shown in Table 3 and Fig.3 highlight that 48.33 per cent were noticed in medium category of extension contact followed by low (41.67%) and high (10.00%) extension contact.

4.2 Knowledge and adoption of recommended production practices by tuberose growers

The details of individual recommended production practices and extent of knowledge among the sample farmers (Table 4 and Fig.4) has been presented under following headings.

4.2.1 Selection of varieties

The knowledge of recommended varieties *viz.,* Prajwal, Rajath Rekha, Shringar, Mexican Single and Arka Nirantar was observed with majority (85.00%) of growers.

Table 3: Extension contact of the tuberose growers

(n=120)

Sl. No.	Extension worker	Frequency of contact					
		Regularly		Occasionally		Never	
		F	%	F	%	F	%
1	Horticultural Assistants	17	14.17	49	40.83	54	45.00
2	Assistant Horticultural Officers	5	4.17	30	25.00	85	70.83
3	Assistant Director of Horticulture	8	6.67	57	47.50	55	45.83
4	Senior Assistant Director of Horticulture	30	25.00	49	40.83	41	34.17
5	Deputy Director of Horticulture	12	10.00	24	20.00	84	70.00
6	Assistant Agricultural Officers/ Agricultural officers	18	15.00	47	39.17	55	45.83
7	SMS of KVK	4	3.33	30	25.00	86	71.67

Table 4: Distribution of tuberose growers according to their extension contact

(n=120)

Sl. No.	Category	Frequency	Percentage
1	Low (<11.19)	50	41.67
2	Medium (11.19-12.90)	58	48.33
3	High (>12.90)	12	10.00
	Mean	12.05	
	SD	2.01	

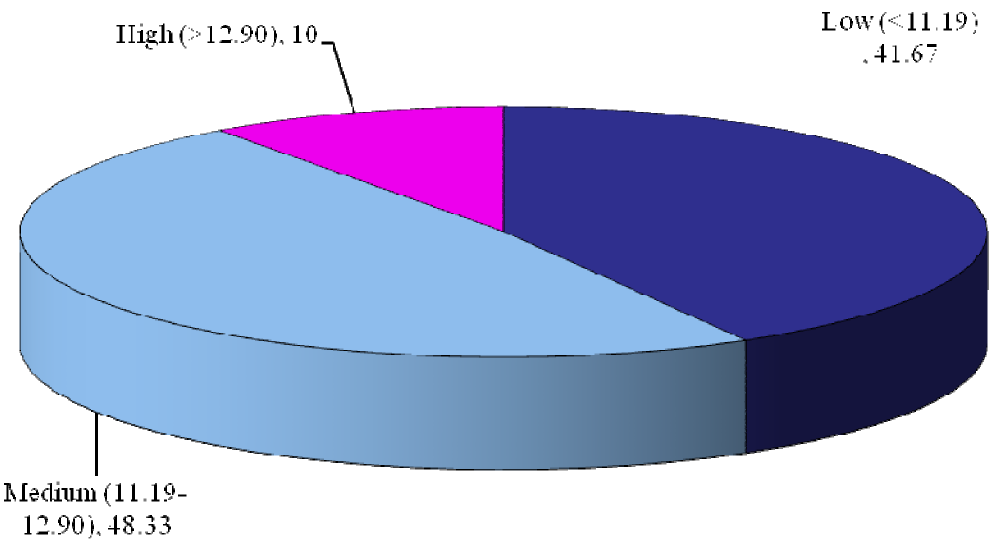


Fig. 3: Distribution of tuberose growers according to their extension

Table 5: Distribution of respondents based on knowledge level of individual recommended cultivation practices of tuberose

(n=120)

Sl. No.	Recommended practices	No.	Per cent
1.	Varieties (Prajwal, Rajath Rekha, Shringar, Mexican Single and Arka Nirantar)	102	85.00
2.	Suitable soil(Loam, sandy loam)	120	100.00
3.	Spacing		
	a. Inter row (30cm)	96	80.00
	b. Intra row(30cm)	82	68.33
4.	Planting material		
	a. Size of the bulb(2-3cm)	103	85.83
	b. Weight of the bulb(30gm)	95	79.16
5.	Fertiser management		
	a) FYM(300 Kg/gunta)	108	90.00
	b) Chemical fertilizers		
	i) Basal: (N:P:K ; 0.5:0.5:0.5 kg/gunta)	56	46.67
	ii) Top dressing : 0.5 kg N/gunta(6 weeks after planting)	58	48.33
6.	Irrigation system Drip irrigation	102	85.00
7.	Control of pests	120	100.00
	a) Name of the pests : (Thrips and Aphids)	72	60.00
	b) Recommended chemical : Thrips : Monocrotophos 36 SL, Oximedeton methyl 25 EC ; Dimethoate 30 EC; Aphids : Dimethoate , Imidacloprid c) Concentration : 1 ml/ ltr. water; 1 ml/ ltr. water; 1.7 ml/ ltr. water ; 1.5 ml/ ltr. water; 1.5 ml/ ltr. water	70	58.33
8.	Control of diseases	120	100.00
	a) Name of the diseases : (Stem rot disease, Leaf blight, Root knot)	70	58.33
	b) Recommended chemical : Stem rot disease: Carbondazim, Leaf blight: Carbondazim, Root knot : Neem cake or Carbonfuron 3g c) Concentration: 1 gm/ltr. water; 1 gm/ltr. water; 6 kg/gunta or 0.2 kg/gunta;	46	38.33
9.	Harvesting of flowers		
	a. Time of harvesting (morning/evening)	120	100.00
	b. Ideal stage of harvesting (partially opened bud stage and completely opened bud stage)	120	100.00
	c. Method of harvesting (Handpicking)	120	100.00
10.	Yield (80-100 kg flowers/gunta)	97	80.83

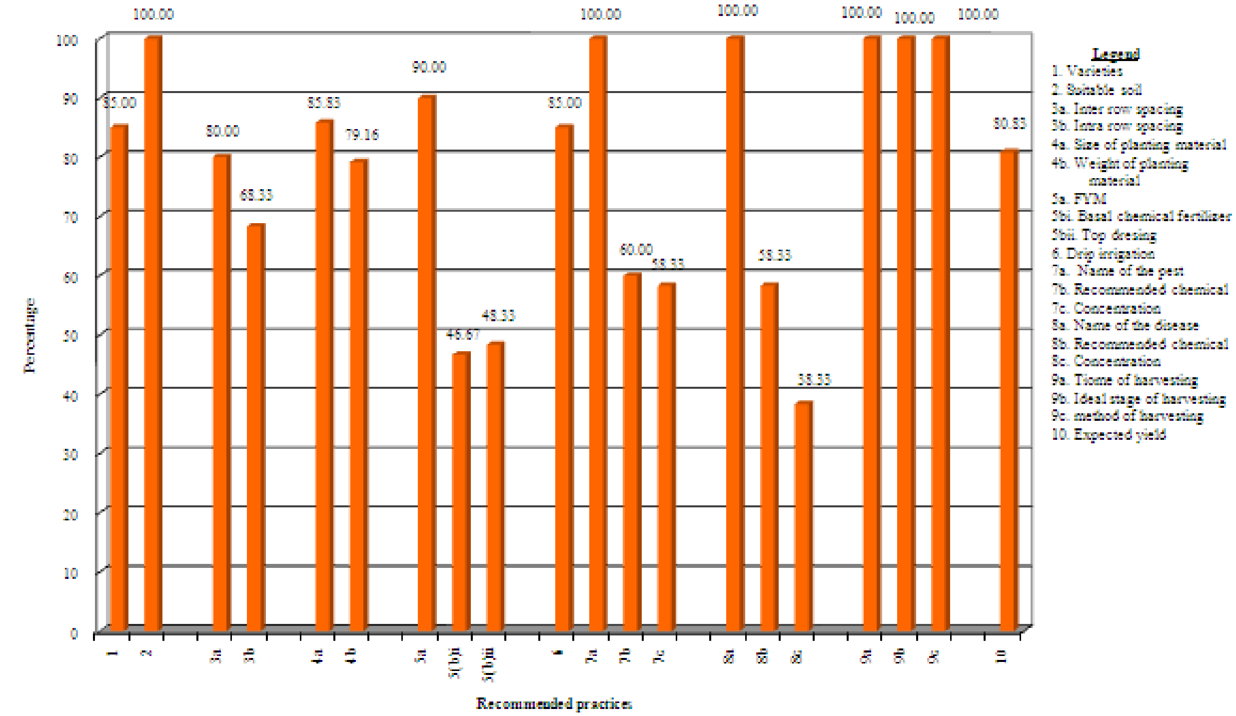


Fig. 4: Distribution of respondents based on knowledge level of individual recommended cultivation practices of tuberose

4.2.2 Bed preparation

The knowledge of recommended suitable soil was noticed with all the growers. The recommended inter row and intra row spacing was noticed with 80.00 per cent and 68.33 per cent of farmers respectively.

4.2.3 Selection of planting material

The knowledge of recommended size and weight of bulb was noticed with majority of growers (85.83% and 79.16% respectively).

4.2.4 Fertilizer management

Application of FYM was known to majority (90.00%) farmers. But the knowledge of basal application (46.67%) and top dressing of chemical fertilizers (48.33%) was noticed with less than fifty per cent of farmers.

4.2.5 Irrigation system

The recommended method of drip irrigation system was known to majority of the respondents (85.00%).

4.2.6 Pest and disease management

All the tuberose growers possessed the knowledge of important pests. Whereas the knowledge of recommended pesticide for controlling pests (thrips and aphids) was noticed with 60.00 per cent farmers. Similarly, the recommended concentration was also known to less than sixty per cent of farmers (58.33%).

The knowledge of major diseases affecting crop was with all the farmers. But the knowledge of recommended chemical was noticed with 58.33 per cent of farmers and the recommended concentration was noticed with 38.33 per cent of farmers.

4.2.7 Harvesting of flowers

The ideal time, stage and method of harvesting was known to all the tuberose growers. And the knowledge of expected yield was noticed with 80.83 per cent growers.

4.2.8 Distribution of respondents based on the overall knowledge level of the recommended cultivation practices of tuberose

A persual of data in Table 5 and Fig.5 indicates the distribution of farmers on the basis of overall knowledge in tuberose cultivation. It was observed that comparatively more number of farmers had medium level of knowledge (39.13%), followed by low (30.83%) and high (30.00%) knowledge category.

4.2 Adoption of recommended cultivation practices in tuberose

4.2.1 Adoption of individual cultivation practices of tuberose

The results presented in Table 6 and Fig.6 depict the adoption of individual recommended practices by tuberose growers.

4.2.2.1 Selection of varieties

Majority of growers (87.50%) adopted recommended varieties [Prajwal (65.83%), Rajath Rekha (9.17%), Shringar (12.50%)]. Whereas 12.50 per cent farmers were found to adopted other than recommended variety (Konkan local variety).

4.2.2.2 Bed preparation

All the farmers planted in the recommended soil only. It was observed that recommended spacing was adopted by 55.00 per cent of farmers, but the practice of keeping other than recommended spacing viz., 30×20 cm and 20×10 cm was also noticed in the study area.

4.2.2.3 Selection of planting material

Recommended size of the bulb was adopted by all the growers, whereas recommended weight of bulb was followed by only 30.83 per cent farmers. But the practice of using 20 gm and 10 gm weight bulb was also observed with 39.17 and 30.00 per cent farmers respectively.

Table 6: Distribution of respondents based on the overall knowledge level of the recommended cultivation practices of tuberose

(n=120)

Sl. No.	Category	Frequency	Per cent
1	Low (<11.82)	37	30.83
2	Medium (11.82-12.91)	47	39.17
3	High (>12.91)	36	30.00
	Mean	12.37	
	SD	1.28	

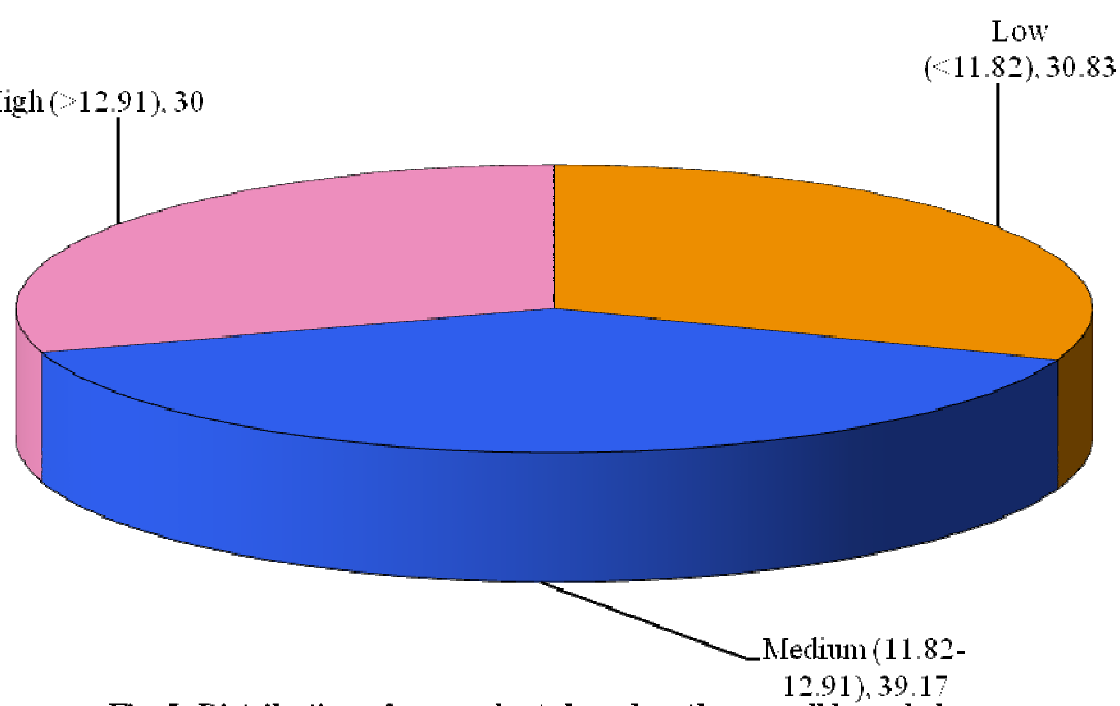


Fig. 5: Distribution of respondents based on the overall knowledge

Table 7: Distribution of respondents based on adoption of individual cultivation practices of tuberose

(n=120)

Sl. No.	Details of Practices	No. of farmers adopted	Level of adoption		
			Fully adopted	Partially adopted	Not adopted
		No. (%)	No. (%)	No. (%)	No. (%)
1.	Varieties a) Recommended: i) Prajwal ii) Rajath rekha iii) Shringar b) Others: i) Konkan (local variety)	79 (65.83) 11 (9.17) 15 (12.50) 15 (12.50)	105 (87.50)	00 (0.00)	15 (12.50)
2.	Suitable soil (Loam and Sandy loam)	120 (100.00)	120 (100.00)	00 (0.00)	00 (0.00)
3.	Spacing followed a) (Recommended : 30×30 cm) b) Others : i)30×20 cm ii) 20×10cm	66 (55.00) 34 (28.33) 20 (16.67)	66 (55.00)	54 (45.00)	00 (0.00)
4.	Planting material i. Size of the bulb (2-3cm)	120 (100.00)	120 (100.00)	00 (0.00)	00 (0.00)
	ii. Weight of the bulb a) (Recommended : 30gm) b) Others: i) 20 gm ii) 10 gm	37 (30.83) 47 (39.17) 36 (30.00)	37 (30.83)	83 (69.17)	00 (00.00)

Contd….

Sl. No.	Details of Practices	No. of farmers adopted	Level of adoption		
			Fully adopted	Partially adopted	Not adopted
		No. (%)	No. (%)	No. (%)	No. (%)
5.	Fertliser management i. FYM applied a) (Recommended : 300 Kg/gunta)	71 (59.17)	71 (59.17)	49 (40.83)	00 (0.00)
	b) Others : i) 200-300 Kg/gunta	49 (40.83)			
	ii. Chemical fertilizers i) Basal : a. Recommended : (N:P:K ; 0.5:0.5:0.5 kg/gunta)	46 (38.33)	46 (38.33)	74 (61.67)	00 (0.00)
	b. Others : (N:P:K ; 1:1:1 kg/gunta)	74 (61.67)			
	ii. Top dressing: a. Recommended : 0.5 Kg N/gunta (6 weeks after planting)	32 (26.67)	32 (26.67)	88 (73.33)	00 (0.00)
	b. Others : 1-2 Kg N/gunta (6 weeks after planting)	88 (73.33)			
6.	Irrigation system a) Recommended: Drip irrigation	25 (20.83)	25 (20.83)	00 (0.00)	95 (79.17)
	b) Others : Furrow irrigation	95 (79.17)	00 (0.00)	00 (0.00)	00 (0.00)
7.	Control of pests (Thrips and Aphids) a) Recommended chemical used: Thrips: Monocrotophos 36 SL; Oximedeton methyl 25 EC; Dimethoate 30 EC ; Aphids: Dimethoate Imidacloprid	44 (36.67)	44 (36.67)	76 (63.33)	00 (0.00)
	b) Other than recommended chemical : Monocrotophos 36 SL; Carbondizim; Dimethoate; Carbofuron	76 (63.33)			

Contd….

Sl. No.	Details of Practices	No. of farmers adopted	Level of adoption		
			Fully adopted	Partially adopted	Not adopted
		No. (%)	No. (%)	No. (%)	No. (%)
	a) Recommended concentration: 1 ml/ ltr. water; 1 ml/ ltr. water ; 1.7 ml/ ltr. water; 1.5 ml/ ltr. water; 1.5 ml/ ltr. water	28 (23.33)	28 (23.33)	92 (76.67)	00 (0.00)
	b) Other than recommended concentration : 2-3 ml/ltr. water; 1-2 ml / ltr. water ; 2-3 ml/ ltr. water; 2-2.5 ml/ ltr. Water	92 (76.67)			
8.	Control of diseases (Stem rot, leaf blight, Root knot)				
	I. Chemical :				
	a) Recommended chemical used: stem rot: Carbondizim; leaf blight : Carbondizim; root knot: Neem cake or Carbofuron 3g.	35 (29.17)	35 (29.17)	85 (70.83)	00 (0.00)
	b) Other than recommended chemical: Monocrotophos; Carbofuron; Carbondizim	85 (70.83)			
	II. Concentration:				
	a) Recommended concentration: 1g/ ltr. water; 1gm/ ltr. water; 6 kg/gunta or 0.2 kg/gunta.	14 (11.67)	14 (11.67)	106 (88.33)	00 (0.00)
	b) Other than recommended concentration: 2-3 gm/ltr.; 1-2 gm/ltr.; 3-5 kg/gunta or 0.5-0.75 kg/gunta	106 (88.33)			
9.	Harvesting of flowers				
	i. Time of harvesting (morning/evening)	120 (100.00)	120 (100.00)	00 (0.00)	00 (0.00)
	ii. Ideal stage of harvesting (partially opened bud stage and completely opened bud stage)	120 (100.00)	120 (100.00)	00 (0.00)	00 (0.00)
	iii. Method of harvesting (Handpicking)	120 (100.00)	120 (100.00)	00 (0.00)	00 (0.00)
10.	Yields/gunta/year				
	i) Recommended yield: 80-100 Kg/gunta	38 (31.67)	38 (31.67)	82 (68.33)	00 (0.00)
	ii) Others:				
	a) 51-70 Kg	45 (37.50)			
	b) 30-50 Kg	37 (30.83)			

(Figures in parenthesis indicate Percentage)

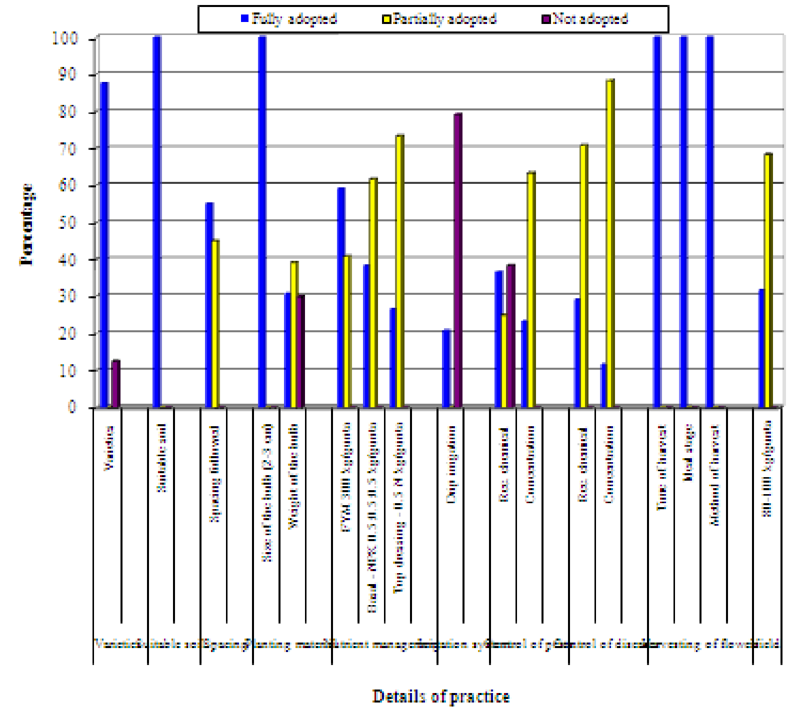


Fig. 6: Distribution of respondents based on adoption of individual recommended cultivation practices of tuberose

4.2.2.4 Fertilizer management

Around sixty per cent of farmers (59.17%) adopted recommended FYM (300 kg/gunta). Whereas, recommended basal application of chemical fertilizer was observed with 38.33 per cent farmers. Similarly recommended method of top dressing was noticed with only 26.67 per cent growers.

4.2.2.5 Irrigation system

Drip irrigation was adopted by only 20.83 per cent farmers and rest of farmers (79.17%) found to practice furrow irrigation.

4.2.2.6 Pest and disease management

The recommended method of controlling pests was noticed with 36.67 per cent farmers. But the recommended concentration was noticed with only 23.33 per cent farmers.

The recommended method of controlling diseases was observed with 29.17 per cent farmers. Whereas, recommended concentration was found to adopted by very less per cent farmers (11.67%).

4.2.2.7 Harvesting of flowers

All the farmers were found to harvest flowers at the ideal time and stage of flowers following recommended method of hand picking.

The yield obtained by farmers shows that 31.67 per cent of the farmers were getting recommended yield (80-100 kg/gunta) whereas only 37.50 per cent of farmers were getting 51-70 kg/gunta. The less yield level of 30-50 kg was also found to harvested by 30.83 per cent farmers.

4.2.2.8 Distribution of respondents based in the overall adoption of the recommended cultivation practices of tuberose

The data presented in Table 7 and Fig.7 indicated that comparatively more number (44.17%) of farmers belonged to low adoption category, followed by medium adopters (35.00%). However high adoption was observed with 20.83 per cent farmers.

Table 8: Distribution of respondents based on the overall adoption level of the recommended cultivation practices of tuberose

(n=120)

Sl. No.	Category	No.	Per cent
1	Low (<22.52)	53	44.17
2	Medium (22.52-24.49)	42	35.00
3	High (>24.49)	25	20.83
	Mean	23.51	
	SD	2.32	

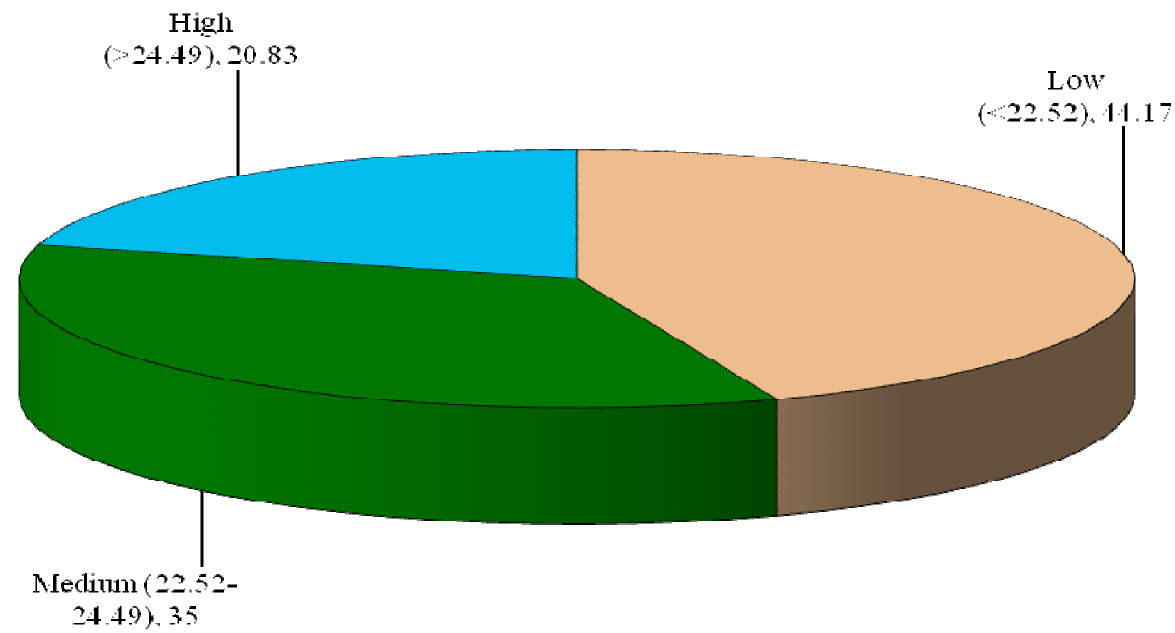


Fig. 7: Distribution of respondents based on the overall adoption level of the

4.3 Factors motivating cultivation of tuberose

The factors motivating farmers to grow tuberose are being discussed under the categorization of production related, marketing related and supporting ones (Table 8).

Among the production related factors all the farmers expressed the suitable soil as the major motivating factor for cultivating tuberose followed by availability of water (64.17%). The easy maintenance of crop (50.83%), low cost of cultivation as compared to other flowers (40.00%), easy availability of seed material (35.00%), and favourable climatic condition (31.67) were the other moderately expressed motivating factors. While only 23.33 per cent of the respondents expressed that technological support motivated them to take up tuberose cultivation.

In marketing of flower more number of farmers (48.33%) expressed the profitability of crop as the motivating factor, followed by nearness of the market (47.50%). The factor of seasonal demand of flowers (38.33%), was the other factor motivated farmers to grow tuberose.

The supporting factors like influence of friends and relatives (82.50%) had greatly influenced. Availability of subsidy (41.67%), loan facility (25.00%) and infrastructural support from horticulture office (15.83%) were the other factors encouraged farmers to grow tuberose.

4.4 Different marketing channels followed by tuberose growers

It is evident from the results shown in Table 9 that more number of farmers (43.33%) marketed flowers through channel-2 *i.e.*, Producer-Commission agents-Retailers-Consumers, less than one-third of farmers preferred channel-0 (25.00%) *i.e.*, Producer-Consumer and channel-1 (27.50%) *i.e.*, Producer-Retailer-Consumer. While 29.17 per cent of the respondents marketed through channel-3 *i.e.*, Producer-Pre-harvest contractors-wholesaler-Retailer- Consumers.

Table 9: Motivating factors of tuberose growers

(n=120)

Sl. No.	Factors	Frequency	Percentage	Rank
1.	Production related factors			
	a) Suitable soil	120	100.00	I
	b) Availability of water	77	64.17	II
	c) Easy maintenance of crop	61	50.83	III
	d) Low cost of cultivation as compared to other flowers	48	40.00	IV
	e) Easy availability of seed material	42	35.00	V
	f) Favorable climatic conditions	38	31.67	VI
	g) Technological support	28	23.33	VII
2.	Marketing related factors			
	a) Profitable crop	58	48.33	I
	b) Nearness of the market	57	47.50	II
	c) Seasonal demand	46	38.33	III
3.	Other supporting factors			
	a) Influence of friends and relatives	99	82.50	I
	b) Availability of subsidy	50	41.67	II
	c) Loan facility	30	25.00	III
	d) Infrastructural support from horticulture office	19	15.83	IV

(Multiple responses obtained)

Table 10: Marketing channels followed by the tuberose growers

(n=120)

Sl. No.	Items	Frequency	Percentage
1.	Channel- 0(Producer- consumer)	30	25.00
2.	Channel- 1(Producer- Retailer- Consumer)	33	27.50
3.	Channel- 2 (Producer- Commission agents- Retailers- Consumer)	52	43.33
4.	Channel -3 (Producer- Pre-harvest contractor- Wholesaler-Retailer-Consumer)	35	29.17

(Multiple responses obtained)

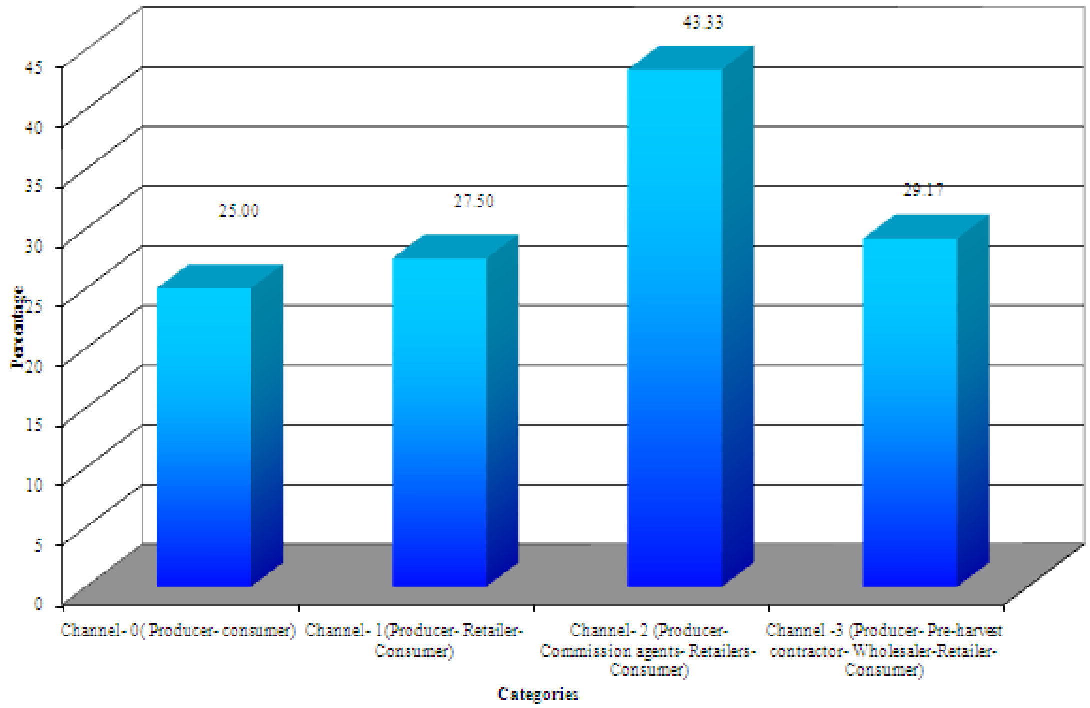


Fig. 8: Marketing channels followed by the tuberose growers

4.4.1 Reasons for preferring different marketing channels

The reasons for preferring different marketing channels are shown in Table 10. It is noticed that channel-2 was preferred by more number of farmers because of benefits like getting more number of buyers through commission agents (92.30%) and buying of other necessary materials (75.00%). Channel-3 was the next preferred because of the reason of price fluctuation (100.00%), getting good price (100.00%) and possibility of getting advance money (100.00%). Further, the channel-1 was preferred because of reason of buying other necessary materials (60.60%), insufficient time to go to market (51.52%) and to get good price (45.45%). Whereas, channel-0 i.e., Producer-Consumer was the lastly preferred one because of getting good price (100.00%), no trust in middlemen (96.67%) and helps to buy other necessary materials (73.33%).

4.4.2 Sources of market information

The data shown in Table 11 indicated that comparatively more number of farmers highlighted that commission agents is a good source of getting market information (58.33%), followed by relatives, neighbours and friends (45.83%), and retailers (35.83%) as the source of market information. Input dealers were indicated as source of information by 30.00 per cent farmers. While extension personnel of department of horticulture as the source of market information was revealed by 15.83 per cent farmers.

4.4.3 Post-harvest management practices followed by tuberose growers

The data depicted in Table 12 revealed that majority of tuberose growers (89.17%) were following grading of flowers. Regarding method of packing more number of farmers (76.67%) were found to pack flowers in gunny bags, followed by packing in bamboo basket (55.83%). While practice of wrapping in cloth was observed with 25.00 per cent farmers. Whereas the practice of packing in plastic covers which was the non-recommended method of packing flowers was noticed with 31.67 per cent farmers.

Table 11: Reasons for preferring different marketing channels

(n=120)

Sl. No.	Reasons	Channel 0 (n_1=30)	Channel 1 (n_2=33)	Channel 2 (n_3=52)	Channel 3 (n_4=35)
1.	No trust in middlemen	29 (96.67)	0.00	0.00	0.00
2.	Helps to purchase other necessary materials	22 (73.33)	20 (60.60)	39 (75.00)	0.00
3.	Benefit of getting more number of buyers through commission agents	0.00	0.00	48 (92.30)	0.00
4.	To get good price	30 (100.00)	15 (45.45)	15 (28.84)	35 (100.00)
5.	Possibility of getting advance money	0.00	0.00	0.00	35 (100.00)
6.	Lack of transport facilities	0.00	0.00	0.00	22 (62.85)
7.	Non- availability of labour for harvest	0.00	0.00	0.00	27 (77.14)
8.	Lack of time to go to market	0.00	17 (51.52)	0.00	28 (80.00)
9.	Risk of price fluctuation	0.00	0.00	0.00	35 (100.00)

(Multiple responses obtained)

Table 12: Sources of market information

(n=120)

Sl. No.	Sources of getting market information	No.	Percentage
1.	Commission agents	70	58.33
2.	Relatives, neighbors and friends	55	45.83
3.	Retailers	43	35.83
4.	Input dealers	36	30.00
5.	Extension personnel of dept. of horticulture	19	15.83

(Multiple responses obtained)

Table 13: Post-harvest management practices followed by tuberose growers

(n=120)

Sl. No.	Practices	No.	Percentage
1.	Grading of flowers	107	89.16
2.	Method of packing		
	a) Recommended		
	i) Gunny bags	92	76.67
	i) Bamboo basket	67	55.83
	ii) Wrapping in cloth	30	25.00
	b) Other than recommended		
	i) Plastic covers	38	31.67

(Multiple responses obtained)

4.5 Constraints in production and marketing of tuberose

The constraints as expressed by respondents in production and marketing of tuberose have been depicted in Table 13 and 14.

4.5.1 Constraints in production of tuberose

It is observed that among the technical problems 53.33 per cent of tuberose growers highlighted the constraint of high incidence of pest (thrips) and disease (stem rot). Lack of technical guidance and non-availability of quality planting material were the other technical problems observed with 40.00 per cent and 35.00 per cent growers respectively.

Regarding the non-technical problems majority (70.00%) expressed the problem of high cost of plant protection chemicals, high cost of fertilizer and limited/irregularity of power supply were noticed with 42.50 per cent and 32.50 per cent of farmers respectively. Not abundant availability and costly planting material were highlighted by 20.83 per cent and 16.67 per cent farmers respectively. Whereas the constraint of non-availability of labours was highlighted by only 14.17 per cent of respondents.

4.5.2 Constraints in marketing of tuberose

Around fifty per cent of farmers highlighted the constraints of exploitation by middlemen (56.67%), followed by lack of market information (52.50%) and price fluctuation (48.33%). The problem of poor transport facilities was expressed by 41.67 per cent farmers whereas non-availability of exclusive market for marketing of tuberose and lack of knowledge in grading was pointed out by 16.67 and 10.83 per cent of farmers respectively.

Table 14: Constraints in production of tuberose

(n=120)

Sl. No.	Statements	Frequency	Percentage
	a) Technical problems		
1.	High incidence of pest (Thrips) and disease (stem rot)	64	53.33
2.	Lack of technical guidance	48	40.00
3.	Non-availability of quality planting material	42	35.00
	b) Non-technical problems		
1.	High cost of plant protection chemicals	84	70.00
2.	High cost of fertilizer	51	42.50
3.	Limited and irregularity in power supply	39	32.50
4.	Availability of seed material		
	a) Not abundant	25	20.83
	b) Costly planting material	20	16.67
5.	Non- availability of labours	17	14.17

(Multiple responses obtained)

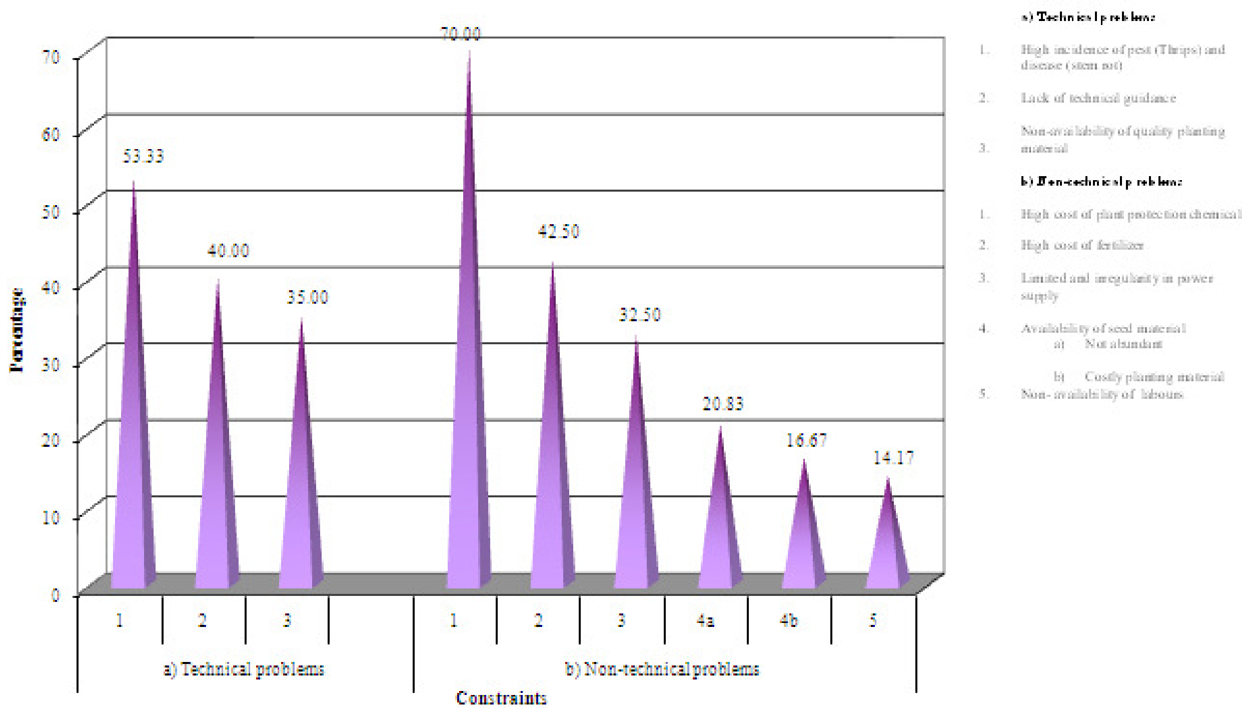


Fig. 9: Constraints in production of tuberose

Table 15: Constraints in marketing of tuberose

(n=120)

Sl. No.	Statements	Frequency	Percentage
1.	Exploitation by middlemen	68	56.67
2.	Lack of market information	63	52.50
3.	Price fluctuation	58	48.33
4.	Poor transport facilities	50	41.67
5.	Non- availability of exclusive market for tuberose	20	16.67
6.	Lack of knowledge in grading	13	10.83

(Multiple responses obtained)

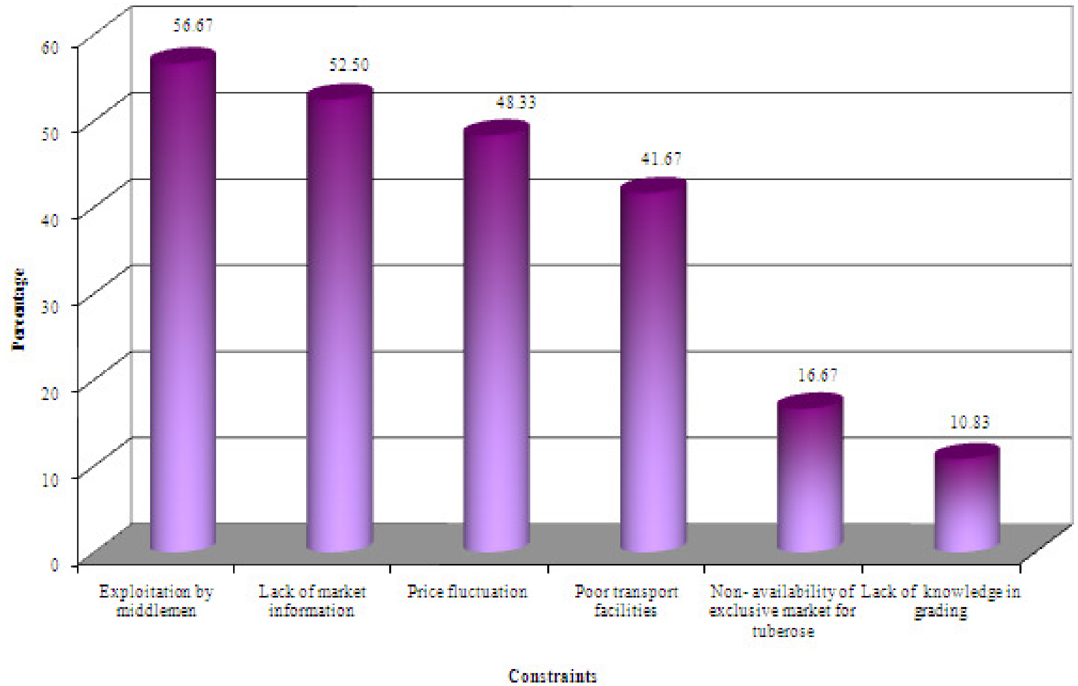


Fig. 10: Constraints in marketing of tuberose

5. DISCUSSION

The results of the study are discussed in this chapter under the following headings.

5.1 Personal and socio-economic characteristics of tuberose growers

5.2 Knowledge and adoption of recommended production practices by tuberose growers

5.3 Factors motivating cultivation of tuberose

5.4 Different marketing channels followed by tuberose growers

5.5 Constraints faced in production and marketing of tuberose

5.1 Personal and socio-economic characteristics of tuberose growers

5.1.1 Age

The results presented in the Table 1 indicated that little more than fifty per cent of the respondents (55.00%) were in middle aged while, 36.67 per cent were old and 8.33 per cent were young age group with a mean age distribution of 45 years. It is evident that middle aged farmers are more interested in flower cultivation. Usually, farmers of young to middle aged are enthusiastic having more responsibility and are more efficient than older ones which motivated them to grow tuberose than routine crops.

The results were in line with the research findings reported by Vinaykumar (2005), Mannan *et al.* (2007) and Ahmad *et al.* (2008).

5.1.2 Education

The data in the Table 1 revealed that majority of the farmers were educated upto pre-university whereas graduation was noticed with very less per cent farmers (1.67%). This shows that majority of farmers who are involved in flower cultivation were more or less educated.

Non-realization of the influence of higher education in one's life, increased importance of literacy and facilities available were the reasons for favour of average education, whereas costly higher education prevented the parents from providing higher education to their children.

The above findings got support from the studies conducted by Ramesh Kumar (1989), Guledagudda (1996), Vinaykumar (2005), Nusrat (2012) and Usman and Ashfaq (2013).

5.1.3 Experience in tuberose cultivation

It is noticed that around fifty per cent of farmers (45.83%) had experience of growing tuberose for the past 3-4 years. This shows that the cultivation of tuberose was recently introduced in the study area. Similar situation was reported in the studies of Mallikarjun *et al.* (2012), whereas research studies reported by Ahmad *et al.* (2008), Birajdar (2012) and Usman and Ashfaq (2013) found to revealed more than 10 years of experience in cultivation.

5.1.4 Land holding

It is clear from Table 1 that around fifty per cent (46.67%) of the respondents had small holdings followed by medium size holdings (35.00%). Whereas only 4.17 per cent of the respondents were big farmers. The fragmentation of ancestral land from generation to generation has led to smaller size of land holding.

The similar distribution of small holdings was also noticed in the findings of Vijaykumar (1997) and Ahmad *et al.* (2010).

5.1.5 Annual income

The distribution of farmers in annual income shows that little more than one-third of farmers (37.50%) belonged to semi-medium level of annual income (Rs. 17,001-Rs. 34,000) whereas 26.67 per cent belonged to medium income group (Rs. 34,001-Rs. 51,000) while only 16.67 per cent had high level income (Rs. > 51,000). The average annual income was around Rs. 70,000.

The assured regular income, through increased demand for flowers was the reason for the higher income levels. The findings are line with the findings of Vinaykumar (2005) and Mannan *et al.* (2007).

5.1.6 Risk orientation

Majority of the farmers (69.50%) were noticed in medium to high risk orientation and around one-third of the farmers (37.50%) found to exhibit low and high (15.83%) risk orientation.

The low cosmopoliteness and average level of contact with extension personnel have resulted for the situation.

Similar distribution of risk orientation was also reported in the research studies of Vinaykumar (2005), whereas high risk orientation was reported by Thiranjan Gowda (2005) and Mallikarjun *et al.* (2010).

5.1.7 Cosmopoliteness

Results of the Table 1 revealed that around seventy per cent (68.33%) farmers were noticed in medium to high cosmopoliteness.

The constant guidance by the extension personnel of horticulture department was the reason for medium level of cosmopoliteness.

The incidence of medium cosmopoliteness was also highlighted in the studies of Chandregowda (1997) and Ravi (2000).

5.1.8 Innovativeness

The medium level of innovativeness was noticed with more number (46.67%) of the farmers followed by an almost equal per cent of one fourth farmers in high (27.50%) and low (25.83%) innovativeness. The average education level and medium level of risk orientation and cosmopoliteness were the reasons for the situation.

The studies conducted by Murali and Jhamtani (2003) and Vinaykumar (2005) reported that majority of farmers possessed high and medium innovativeness, whereas the findings reported by Mallikarjun *et al.* (2010) found to contradict the present findings.

5.1.9 Economic motivation

Majority of famers (74.17%) were noticed in medium to high level of innovativeness. Commercial value of crop and regular employment man days have resulted for the situation.

Similar findings were noticed in the studies of Chandregouda (1997), Vinaykumar (2005) and Thiranjan Gowda (2005).

5.1.10 Extension contact

It could be observed that a high per cent of farmers (90.00%) were noticed in low to medium level of extension contact, while 10.00 per cent farmers exhibited high extension contact.

The spread of technologies by farmers of high extension contact category, medium level of cosmopoliteness and innovativeness have favoured the situation. The results are in conformity with the findings of Vijay kumar (1997) and Vinaykumar (2005).

5.2 Knowledge and adoption of recommended production practices by tuberose growers

5.2.1 Knowledge of individual recommended production practices

The results on extent of knowledge about individual production practices as depicted in Table 4 are discussed under the following headings.

5.2.1.1 Selection of varieties

Majority of farmers (85.00%) were knowing the recommended varieties *viz.*, Prajwal, Rajath Rekha, Shringar, Mexican single and Arka Nirantar. The recent introduction of crop and availability of recommended varieties were the reasons for incidence of high knowledge with majority of farmers. Similarly knowledge of recommended varieties with all the farmers was also reported by Vijaykumar (1997).

5.2.1.2 Bed preparation

It is evident from the results (Table 4) that all the farmers were knowing suitable soil for the crop. Similarly, majority of farmers found to possessed recommended inter row spacing (80.00%) and intra row spacing (68.33%).

Interest of the farmers coupled with recent introduction of crop, farmers might have encouraged to know the recommendation. The incidence of high knowledge about recommended spacing was also reported by Vijaykumar (1997).

5.2.1.3 Selection of planting material

The knowledge of recommended size and weight of bulb was noticed with majority of growers (85.83% and 79.16% respectively). Costly planting material and also the seasonality of the flower compelled the farmers to know the recommended size and weight of the bulb.

5.2.1.4 Fertilizer application

Majority of the farmers (90.00%) were knowing FYM application, whereas knowledge of chemical fertilizer application was noticed with less than fifty per cent farmers.

The fear of harmful effect of chemical fertilizer and perceived benefits of FYM were the reasons for existence of the situation.

5.2.1.5 Irrigation system

The recommended method of irrigation was known to majority of the respondents (85.00%).

The encouragement by the horticulture department to promote drip irrigation and the shortage of water availability compelled the majority of farmers to know the recommended irrigation system.

5.2.1.6 Pest and disease management

All the tuberose growers possessed the knowledge of important pests and diseases affecting the tuberose crop. Whereas, the knowledge of recommended chemical to control pest (60.00%) and disease (58.33%) was known to two-third of farmers, similarly the knowledge of recommended concentration in controlling pest was known to more number of farmers (58.33%) than disease control (38.33%).

The existence of medium level of risk orientation, innovativeness and extension contact besides less belief in the efficacy of chemical have compelled the situation. Similar findings were also reported by Thiranjan Gowda (2005).

5.2.1.7 Harvesting of flowers

The ideal time, stage and method of harvesting was known to all the tuberose growers, similarly knowledge of recommended yield was noticed with a high per cent of farmers (80.83%).

Seasonality of crop, profitability and easy procedure of harvesting were the reasons for the situation.

The similar situation of knowledge of ideal harvesting practices was noticed in the research study of Vijaykumar (1997).

5.2.1.8 Overall knowledge level of farmers about recommended cultivation practices of tuberose flower

It was observed that (Table 5) more than two-third of farmers (69.96%) were noticed in low to medium level of knowledge, while one-third of farmers (30.00%) possessed high knowledge. This shows that farmers had overall average knowledge of recommended tuberose cultivation.

The distribution of farmers in the low risk orientation, innovativeness, economic motivation favoured the situation. The findings were in conformity with the Kumar (1998) in banana crop, Thiranjan Gowda (2005) and Singh *et al.* (2010) in cut flower production.

5.2.2 Adoption of recommended cultivation practices of tuberose flower

Adoption of individual cultivation practices of tuberose flower by farmers

The results on extent of adoption of individual production practices as depicted in Table 7 are discussed under the following headings.

5.2.2.1 Selection of varieties

It was observed that majority of the farmers (87.50%) adopted recommended varieties, whereas local variety was also preferred by 12.50 per cent.

The availability of recommended varieties and knowledge of recommended varieties were the reasons for the situation. The studies of Vijaykumar (1997) confirmed that majority of rose growers adopted recommended varieties.

5.2.2.2 Bed preparation

All the farmers planted in the recommended soil. But the recommended spacing was adopted by less than sixty per cent of farmers (55.00%). The perceived idea of better utilization of land and the rationale of getting more yield with less spacing were the reasons for not adopting recommended spacing. Similar incidence of adoption of recommended spacing in chrysanthemum cultivation was reported in study of Adapur *et al.* (1993).

5.2.2.3 Selection of planting material

Majority of farmers adopted recommended size of bulb as compared to recommended weight of bulb (30.83%).

The importance given to size of planting material rather than weight of planting material and rationale of getting same productivity were the reasons for the situation.

5.2.2.4 Fertiliser management

Majority of farmers (59.17%) adopted recommended FYM. Whereas, less number of farmers adopted recommended basal application of chemical fertilizer (38.33%) and top dressing (26.67%).

Non-availability and costly FYM, costly chemical fertilizer and also belief of adverse effect of chemical fertilizer were the reason for less adoption. The results are in accordance with the study conducted by Vijaykumar (1997).

5.2.2.5 Irrigation system

The recommended method of drip irrigation was adopted by only one fifth of farmers (20.83%).

High capital requirement and also non-availability of subsidy were the reasons for the existing situation.

5.2.2.6 Pest and disease management

The data presented in the Table 7 shows that around one-third of farmers (36.67%) were found to use recommended chemical to control pests. Whereas recommended concentration was noticed with less than one-fourth of farmers (63.33%). Similarly, use of recommended chemical to control disease was noticed among 29.17 per cent farmers and recommended concentration was noticed with very least per cent (11.67%) farmers. Lack of knowledge, less belief in the efficacy of the chemical and not convinced of the recommendation were the reasons for less adoption of recommended plant protection measures.

5.2.2.7 Harvesting of flowers

All the farmers were found to harvest flowers at the ideal time and stage of flowers with recommended method of harvesting.

Knowledge about recommended harvesting practices, seasonality of the produce, easy to harvest and also to avail better market price favoured the adoption of recommended harvesting practices.

5.2.2.8 Overall adoption level of farmers about recommended cultivation practices of tuberose flower

More number of farmers (44.17%) were noticed in low adoption, while only one-fifth of farmers (20.83%) found in high adopters category.

Lack of recommended knowledge, low level of economic motivation coupled with low risk orientation and innovativeness were the factors favoured the existing situation. These results are in conformity with the studies conducted by Chandregouda (1997) and Sivashankar and Shashidhar (2011).

5.3 Factors motivating tuberose cultivation

The results on factors motivating farmers to grow tuberose is depicted in Table 9, brings to light that, all the farmers were motivated due to the possession of suitable soil, followed by availability of water (64.17%) and easy maintenance of crop (50.83%). Less cost of cultivation (40.00%), easy availability of seed material (35.00%) and technological support (23.33%) were the other production related factors which motivated farmers to grow tuberose.

In marketing of flowers around fifty per cent of farmers narrated profitability of crop (48.33%) and nearness of market (47.50%). Whereas, around one-third of farmers highlighted seasonal demand (38.33%) as the motivating factors for growing tuberose.

In case of other factors majority farmers reported influence from friends and relatives (82.50%) and availability of subsidy (41.67%) whereas, one-fourth of farmers (25.00%) highlighted availability of loan, followed by infrastructural support (15.83%) as the motivating factors.

The availability of resources, financial and technical support from the department more profitability of the crop and easy marketing of flowers were the reasons for expression of these motivating factors. This shows that more influence of production related factors rather, marketing and other factors were the determining factors in expressing willingness of farmers to take up tuberose cultivation.

The findings are in accordance with the studies of Thiranjan Gowda (2005) and Birajdar (2012).

5.4 Different marketing channels followed by tuberose growers

More number of farmers (43.33%) marketed the flowers through channel-2 (Producer-Commission agents-Retailers-Consumers) followed by one-third marketed through channel-3 (Producer-Pre-harvest contractors-wholesaler-Retailer-Consumers)s and channel-1 (Producer-Retailer-Consumer). Whereas channel-0 (Producer-Consumer) was preferred by less than one-third of growers (29.17%).

Perishability of produce, non-guarantee of regular consumers to sell directly, non-availability of time and lack of transport facilities were the reasons for preferring different marketing channels. Similarly varied preference of marketing channels was also reported by Patil (1985), Guledagudda (1996), Barawakar (1998), Nusrat (2010) and Karuppusamy *et al.* (2012).

5.4.1 Reasons for preferring different marketing channels

Channel-2 was highest preferred because majority farmers perceived the benefits of getting more number of buyers through commission agents followed by buying other necessary materials. Channel-3 was next preferred because all the farmers expressed the benefits of getting advance money and to get good price and risk of price fluctuation followed by insufficient time to sit in market place (80.00%), and non-availability of labour for harvest (77.14%). Marketing channel-1 was preferred because of benefit of buying other necessary material (60.60%) and lack of time to sit in the market for selling (51.52%).

Channel-0 was lastly preferred marketing channel wherein all the farmers expressed the benefit of getting good price followed by no trust in middlemen (96.67%) and feasibility of purchasing other necessary materials (73.33%).

Low level of risk orientation, cosmopoliteness, innovativeness and less economic motivation were the factors to exhibit the varied reasons in choosing different marketing channels.

5.4.2 Sources of market information

The data on sources of getting market information (Table 12) revealed that commission agents were rated as main source (58.33%) followed by relatives and friends (45.83%). Around thirty per cent highlighted retailers (35.83%) and input dealers (30.00%) as the source of market information. Whereas, extension personnel was less preferred source of information (15.83%).

Not influenced by the extension workers, influence of commission agents, less cosmopoliteness and medium risk orientation were the reasons for preferring varied sources of market information. The similar situation of preferring commission agent for getting market information was also noticed in the findings of Thiranjan Gowda (2005) and Birajdar (2012).

5.4.3 Post-harvest management practices followed by tuberose growers

The data shown in Table 13 highlight the post-harvest management practices followed by tuberose growers.

Majority of the farmers found to practice grading (89.16%) followed by using gunny bags for packing the produce (76.67%). Packing the flowers in bamboo baskets (50.83%) and wrapping in cloth (25.00%) were the other recommended management practices followed by tuberose growers. Whereas, one-third of farmers (31.67%) were practicing packing the flowers in plastic covers which was non-recommended practice.

The profitability of crop, perishability of flowers and convinced of recommendations were found to favour the situation. The findings reported by Thiranjan Gowda (2005) and Birajdar (2012) observed that all the respondents followed the practice of grading.

5.5 Constraints faced in production and marketing of tuberose

5.5.1 Constraints in production of tuberose

A perusal of data in Table 14 revealed that more than fifty per cent tuberose growers (53.33%) expressed the constraint of high incidence of pest and thrips. Whereas, lack of technical guidance (40.00%) and non-availability of quality planting material (35.00%) were the other technical problems expressed in cultivation of tuberose.

In case of non-technical problems comparatively more number of farmers expressed high cost of plant protection chemicals (70.00%) followed by high cost of fertilizer (42.50%) and irregular power supply (32.50%). Less than one-fifth of farmers highlighted non abundance (20.83%) and costly planting material (16.67%). The results are in agreement with the findings of Ramesh Kumar (1989), Ramesh (1997), Raut and Rasane (2000), Smitha (2004) and Nusrat (2012).

5.5.2 Constraints in marketing of tuberose

A perusal of data (Table 15) revealed that substantial percentage of farmers expressed the constraints of exploitation by middlemen (56.67%) and lack of market information (52.50%). Less than fifty per cent farmers highlighted price fluctuation and poor transport facilities (41.67%). Whereas, problems of non-availability of exclusive market for tuberose and lack of knowledge in grading were highlighted by only 16.67 per cent and 10.83 per cent of farmers respectively.

Similar constraints in marketing of flowers was also reported by Haque *et al.* (2012), Nirmal Kumar (2013) and Islam and Rashadur (2013).

6. SUMMARY AND POLICY IMPLICATIONS

Tuberose (*Polianthes tuberosa L.*), native to Mexico is an ornamental bulbous, and herbaceous perennial plant. It is commercially grown for its fragrant cut flowers in India. India produces 40.22 thousand metric tonnes of loose and 13.90 million numbers of cut flowers from an area of 7.77 thousand hactares. In Karnataka tuberose is being grown in an area of 2.0 thousand hectares with a production of 13.11 thousand metric tonnes of loose flowers and 1311 lakh numbers of cut flowers. Haveri, Belgaum and Dharwad are the largest tuberose growing districts in Northern Karnataka produces 3728, 422 and 250 tonnes tuberose flowers grown in the area of 416, 44 and 34 ha, respectively.

Floriculture is one such commercial field, which yields more income to the farmers. The area is increasing every year in view of high profit, good market and favourable agro climatic condition congenial for the crop.

With the support from National Horticulture Mission, lot of importance has been given for the promotion of floriculture in India. Inspite of this cultivation is not upto the expectation and also has not spread to all parts of Karnataka. This may due to varying personal and situational factors and lack of knowledge regarding the recommended cultivation practices and other constraints faced by the farmers. Keeping this in view, the present study was designed with the following specific objectives.

- To enumerate the personal and socio-economic characteristics of tuberose growers
- To assess the knowledge and adoption of recommended production practices by tuberose growers
- To enlist the factors motivating cultivation of tuberose
- To find out the different marketing channels of tuberose, and
- To identify the constraints in production and marketing of tuberose

The study was conducted in Haveri, Belgaum and Dharwad districts of Karnataka during the year 2013-14. These two districts were selected purposively, as these districts have largest area under tuberose cultivation. Further, Ranebennur taluk from Haveri district, Chikkodi taluk from Belgaum and Dharwad taluk from Dharwad district were selected due to the highest area under tuberose cultivation. Thereafter, four villages were selected from each taluk based on highest area under tuberose cultivation and also having maximum number of tuberose growers. And from each selected village ten farmers were randomly selected to constitute 120 sample for the study.

In the light of the objectives set for the study, knowledge and adoption of tuberose growers about recommended cultivation practices were the two dependent variables. The variables age, education, experience in tuberose cultivation, land holding, annual income, risk orientation, cosmopoliteness, innovativeness, economic motivation and extension contact were the independent variables selected for the study. For determining the knowledge level of recommended cultivation practices, the 'teacher made knowledge test' was developed.

The pre-tested interview schedule was used to collect the data from the tuberose growers by personal interview method. The data collected were scored, tabulated and analysed by using frequency, percentage, mean, standard deviation and correlation.

The salient findings of the present study area;

6.1 Personal and socio-economic characteristics of tuberose growers

1. A high per cent of the growers (55.00%) belonged to middle aged group, while only 8.33 per cent were noticed in young age group.
2. One-third of the growers (37.50%) were educated upto primary school (1-4th), while 21.67 per cent respondents were noticed to be illiterates.
3. Nearly fifty per cent (46.67%) of growers had small size of land holdings and around one-third (35.00%) had medium size of land holdings.
4. Less than fifty per cent (45.83%) of the growers had 3-4 years of farming experience in tuberose cultivation, while one-fourth farmers possessed 5-6 years of experience.

5. Comparatively more number (37.50%) of growers belonged to semi-medium income group (Rs. 17,000-Rs. 34,000).

6. Around fifty per cent (46.67%) of growers possessed medium risk orientation.

7. Medium level of cosmopoliteness was noticed with 43.33 per cent of the farmers followed by low level of cosmopoliteness (31.67%).

8. Around fifty per cent tuberose growers (46.67%) belonged to medium level of innovativeness.

9. Forty per cent of the growers belonged to medium economic motivation category.

10. Nearly fifty per cent (48.33%) of respondents were noticed in medium category of extension contact.

6.2.1 Knowledge of recommended production practices by tuberose growers

1. Majority of farmers (85.00%) possessed the knowledge of recommended varieties.

2. The knowledge of recommended soil was noticed with all the growers.

3. The knowledge of recommended size and weight of bulb was noticed with majority of growers (85.83% and 79.16% respectively).

4. A high per cent of the growers had knowledge of application of FYM (90.00%), less than fifty per cent of farmers possessed knowledge of basal application (46.67%) and top dressing of chemical fertilsers (48.33%).

5. The recommended method of drip irrigation was known to majority of the respondents (85.00%).

6. All the tuberose growers possessed the knowledge of important pests. Whereas, the knowledge of recommended pesticide for controlling thrips and aphids was noticed with 60.00 per cent farmers. Similarly, the recommended concentration was also known to around sixty per cent of farmers (58.33%).

7. The knowledge of major diseases affecting crop was known to all the farmers. But, the knowledge of recommended chemical was noticed with 58.33 per cent of farmers. Knowledge of recommended concentration was noticed with 38.33 per cent of farmers.

8. The ideal time, stage and method of harvesting was known to all the tuberose growers.

9. The knowledge of recommended yield was noticed with a high per cent of farmers (80.83%).

10. Comparatively more number of farmers (39.13%) had medium level of overall knowledge.

6.2.2 Adoption of recommended production practices by tuberose growers

1. Majority of growers (87.50%) adopted recommended varieties.

2. All the farmers planted in the recommended soil only.

3. Majority of farmers adopted recommended intra row spacing (91.67%) followed by inter row spacing (55.00%).

4. Recommended size of the bulb was adopted by all growers, whereas recommended weight of bulb was followed by only 30.83 per cent farmers.

5. Around sixty per cent of farmers (59.17%) adopted recommended FYM. Whereas, recommended basal application of chemical fertilizer was observed with 38.33 per cent farmers and top dressing by 26.67 per cent growers.

6. Drip irrigation was adopted by only 20.83 per cent farmers.

7. The recommended method of controlling pests was noticed with 36.67 per cent farmers but, recommended concentration was practiced by 23.33 per cent farmers.

8. The recommended method of controlling diseases was observed with 29.17 per cent farmers but recommended concentration of chemical was adopted by 11.67 per cent farmers.

9. All the farmers were found to harvest flowers at the ideal time and stage of flowers following the recommended method of harvesting.

10. Around one-third of the growers (31.67%) were getting recommended yield of 80-100 kg/gunta.

11. One-fifth of farmers (20.83%) were noticed in high adoption category.

6.3 Factors motivating cultivation of tuberose

1. Among the production related factors all the farmers expressed the suitable soil as the major motivating factor, followed by availability of water (64.17%).

2. Profitability of the crop was expressed by high per cent of farmers (48.33%).

3. Availability of subsidy as a supporting factor was expressed by 41.67 per cent farmers.

6.4 Marketing channels of tuberose

1. Around forty per cent of farmers (43.33%) marketed flowers through channel-2 (Producer-Commission agents-Retailers-Consumers).

2. Benefit of getting more number of buyers through commission agents was major reason amongst channel-2 preferred farmers.

3. Nearly two-third of the farmers (58.33%) were getting market information from commission agents.

4. Around ninety per cent of the respondents (89.17%) were following grading of flowers.

5. A high per cent of the respondents (76.67%) were using gunny bags for packing of flowers.

6.5 Constraints in production and marketing of tuberose

1. A high per cent of respondents highlighted the constraint of non-suitability of recommendations (87.50%), followed by high incidence of pest (thrips) and disease (stem rot) among 53.33 per cent farmers.

2. Among the non-technical problems 70.00 per cent of respondents expressed the problem of high cost of plant protection chemicals, followed by high cost of fertilizer (42.50%).

3. In marketing of tuberose more than half per cent of respondents (56.67%) expressed the constraint of exploitation by middlemen, followed by lack of market information (52.50%).

Implications of the findings of the study for field extension work

1. The existence of knowledge and adoption gap calls for strengthening the technology transfer by the concerned agencies.

2. Lack of required entrepreneurial qualities enunciates the need for effective training of farmers.

3. Very less per cent of farmers in high extension contact necessitates the need for establishing a strong network among tuberose growers, scientists, extension workers, marketing agencies and other stake holders.

4. The demand for good planting material is on the increase. Hence, the production of quality planting material and supply at a reasonable price assumes greater importance.

5. The absence of organized market emerged as the most important bottleneck in tuberose flower production. Establishment of an exclusive flower market with required infrastructure to handle the exchange of tuberose flowers is thus essential. State Government should provide the necessary support in this direction.

6. The absence of refrigerated infrastructure for transportation and sale of flowers affected the quality of flowers resulting in realizing lower returns by the producers. The provision of cold chain facilities thus assumes great importance. The needed infrastructure for these purposes could be established by forming a viable growers association which in turn could mobilize the needed resources from national Horticulture Board and state Government.

7. Promotion of scientific grading, packing and storage by developing the adequate infrastructural facilities is essential for a sustained growth of the tuberose flower industry.

Suggestions for the future research

The present study was confined to only three districts of Karnataka due to limitation of time and cost of researcher. Hence, findings of this study could not be generalized to other regions. Therefore, a comprehensive research study covering major tuberose growing districts of the state need to be carried in order to draw a comprehensive generalization and to make concrete recommendations for planners and policy makers in achieving increased area, production and better marketing of tuberose.

The other areas of research on tuberose that could be taken up are,

- Documentation of successful case studies of tuberose growers
- A comparative study of exporting and non-exporting tuberose flower growers
- Studies on market intelligence of tuberose flower growers

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Appendix I: State-wise Area and Production of Tuberose in India (2013-2014)

States/Uts	Area (‘000 hectare)	Production (Loose) (‘000 MT)	Production (Cut) (Lakh number)
Andaman and Nicobar Islands	-	-	-
Andhra Pradesh	2.31	13.88	-
Bihar	0.11	0.54	-
Chhattisgarh	1.41	5.54	-
Goa	0.00	0.00	-
Haryana	0.10	-	0.77
Himachal Pradesh	-	-	-
Jammu and Kashmir	-	-	0.02
Karnataka	2.00	13.11	1311
Madhya Pradesh	0.26	1.00	-
Maharashtra	1.00	6.10	-
Odisha	0.51	12.82	-
Puducherry	0.01	0.00	-
Telangana	0.03	0.02	-
Uttarakhand	0.03	0.32	-
West Bengal	-	-	-
India	**7.77**	**40.22**	**13.90**

Source : Anonymous (2014), Ministry of Agriculture, Govt. of India.

Appendix II: Area and Production of Flowers in India from 1993-1994 to 2011-2012 and 2013-2014

Year	Area (In ' 000)	Production	
		Loose (In '000 MT)	Cut (In Million No.)
1993-1994	53	233	555
1994-1995	60	261	519
1995-1996	82	334	537
1996-1997	71	366	615
1997-1998	74	366	622
1998-1999	74	419	643
1999-2000	89	509	681
2000-2001	98	556	804
2001-2002	106	535	2565
2002-2003	70	735	2060
2003-2004	101	580	1793
2004-2005	118	659	2071
2005-2006	126	694	2762
2006-2007	144	880	3718
2007-2008	166	868	4365
2008-2009	167	987	4794
2009-2010	183	1021	66671
2010-2011	191	1031	69027
2011-2012	254	1652	75066
2013-2014	255	1754	543

Source : Anonymous (2014), Ministry of Agriculture, Govt. of India.

Appendix III: District-wise area, production and yield of tuberose in Karnataka during 2011-12

District	Single			Double		
	Area (ha)	Production (M. tons.)	Yield (M.Tons/ ha)	Area (ha)	Production (M. tons.)	Yield (M.Tons/ ha)
Bangalore Urban	50	611	12.22	24	288	12.00
Bangalore Rural	50	106	2.13	2	1	0.50
Chikkaballapura	92	920	10.00	-	-	-
Chitradurga	381	3537	9.28	-	-	-
Davanagere	41	182	4.40	2	2	1.00
Kolar	22	224	10.18	45	43	0.95
Shimoga	-	-	-	68	68	1.00
Tumkur	30	300	10.00	-	-	-
Bagalkot	25	275	10.95	6	44	7.26
Belgaum	44	422	9.50	-	-	-
Bijapur	47	470	10.00	34	34	1.00
Dharwad	34	250	7.35	-	-	-
Gadag	65	638	9.85	4	40	10.00
Haveri	416	3728	8.96	-	-	-
Bellary	60	339	5.65	-	-	-
Bidar	10	80	8.00	-	-	-
Gulbarga	127	1231	9.69	38	436	11.47
Koppal	10	80	8.00	-	-	-
Raichur	90	810	9.00	30	180	6.00
Yadgiri	-	-	-	-	-	-
Chamarajnagar	21	189	9.00	-	-	-
Hassan	6	60	10.00	-	-	-
Mandya	5	40	8.00	-	-	-
Mysore	196	1568	8.00	-	-	-
Total	**1789**	**15811**	**8.84**	**287**	**1385**	**4.82**

Source : Anonymous (2014), Ministry of Agriculture, Govt. of India.

Appendix IV: Taluka-wise area and production of tuberose in Belgaum district during 2012-13

Sl. No.	Name of the tauka	Tuberose			
		Area (ha)	Production (t)	Yield (t/ha)	Value (In Rs. lakh)
1.	Athani	-	-	-	-
2.	Bailhongal	-	-	-	-
3.	Belagavi	-	-	-	-
4.	Chikkodi	32.00	320.00	10.00	20.00
5.	Gokak	3.80	38.00	10.00	9.13
6.	Hukkeri	-	-	-	-
7.	Khanapur	6.00	46.00	7.67	9.34
8.	Raibhag	-	-	-	-
9.	Ramdurg	2.40	22.80	9.50	6.61
10.	Savadatti	2.00	20.00	10.00	16.00
	Total	**46.20**	**446.80**	**9.67**	**61.08**

Source: Anonymous, 2014, Annual Report, 2014, Dept. of Horticulture, Belgaum

Appendix V: Taluka-wise area and production of tuberose in Dharwad district during 2012-13

Sl. No.	Name of the tauka	Tuberose			
		Area(ha)	Production (t)	Yield (t/ha)	Value (In Rs. lakh)
1.	Dharwad	29.12	34.94	1.20	104.83
2.	Hubli	-	-	-	-
3.	Kalghatagi	11.44	13.73	1.20	41.18
4.	Kundgol	-	-	-	-
5.	Navalgund	-	-	-	-
	Total	**40.56**	**48.67**	**2.40**	**146.02**

Source: Anonymous, 2014, Annual Report, 2014, Dept. of Horticulture, Dharwad

Appendix VI: Taluka-wise area and production of tuberose in Haveri district during 2012-13

Sl. No.	Name of the tauka	Tuberose			
		Area(ha)	Production (t)	Yield (t/ha)	Value (In Rs. lakh)
1.	Haveri	15.00	142.50	9.50	28.50
2.	Hanagal	4.00	11.00	8.50	18.70
3.	Byadagi	-	-	-	-
4.	Hirekerur	20.00	120.42	4.00	96.60
5.	Ranebennur	365.00	2125.00	9.00	135.00
6.	Shiggaon	-	-	-	-
7.	Savanur	-	-	-	-
	Total	**404.00**	**2398.92**	**31.00**	**278.80**

Anonymous, 2014, Annual Report, 2014, Dept. of Horticulture, Haveri

Appendix VII: Interview schedule

Analysis of production and marketing of tuberose in North Karnataka

PART - I

I. General Information

1. Name of the farmer

a. village:

b. Taluk:

c. District:

2. Age (in completed years):

3. Education: a.Illiterate b. Primary school c. Middle school d. High School

e. PUC f. Graduate g. Post graduate

4. Experience in tuberose cultivation:_______________years

5. Area under tuberose cultivation:______________gunta

i) Have you grown tuberose during the last years, yes/No?

If yes, area spread over the years

Years	Area(gunta)
2014	
2013	
2012	
2011	

6. Land holding (acres)

i. Irrigated :_________ ii. Rain fed :_________

iii. Size of polyhouse (sq.m.) :_________ iv. Waste land :_________

v. Total :_________

7. Annual income

Sl. No.	Sources of income	Income per year(Rs.)
1.	Agriculture	
2.	Agro-based subsidiary enterprises (like poultry, dairy, goat/sheep rearing etc.)	
3.	Floriculture	
4.	Business	
5.	Others (specify)	

8. Risk orientation

Please indicate whether you agree or disagree with the following statements by putting (√) mark in the columns agree or disagree for the statement

Sl. No.	Statements	Response	
		Agree	Disagree
1.	A grower should rather take more of a chance in making a big profit than to be content with a smaller but less risky profits		
2.	A grower who is willing to take greater risk than the average grower, usually have better financial condition		
3.	It is good for a farmer to take risk when he knows his chance of success is fairly high		
4.	It is better for a flower grower not to try new farming practices unless most other growers have used these with success		
5.	Trying an entirely a new method involves risks but it is worthy		
6.	A farmer should grow large number of crops to avoid greater risk involved in growing one or two crops		

9. Cosmo politeness

Please indicate frequency of visit, and purpose of visit to the nearest town.

Sl. No.	Statements	Response
1.	How many times do you visit the nearest town?	Two or more times in a week/Once a week /Twice a month/ Once a month/ Never
2.	What is the purpose of your visit?	Agricultural/Personal/Entertainment/Others (specify)
3.	Are you a member in any organization outside the village?	Yes/No If yes mention the status :

10. Innovativeness
You are requested to indicate your agreement as Strongly Agree (SA), Agree (A), Disagree (DA), to the following statements

Sl. No.	Statements	SA	A	DA
1.	I try to keep myself up to date with information on latest cultivation practices, but that doesn't mean that I try out all the new methods on my land			
2.	I feel restless till I try out a new cultivation practice I have heard of			
3.	They talk of new cultivation practices these days, but who knows if they are better than old ones			
4.	If government would help me to establish a 20 acre farm elsewhere, I'll move out of my village			
5.	From time to time I have heard of cultivation practices and I have tried out most of them in last few years			
6.	I usually want to see what results my neighbors obtained before I tryout the new cultivation practices			
7.	Somehow I feel the traditional ways of cultivation are the best			
8.	I am cautious about trying a new practice			
9.	After all our forefathers were wise in their cultivation practices and I do not see any reason for changing those old methods			
10.	Often new practices are not successful however, if they are promising I would surely like to adopt them			

11. Economic motivation

You are requested to indicate your agreement as Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (DA), and Strongly Disagree (SDA) to the following statements

Sl. No.	Statements	SA	A	UD	DA	SDA
1.	A tuberose flower grower should work towards higher yield and economic profit					
2.	The most successful tuberose growers will make more profit					
3.	A grower should try any new ideal technology that may earn him more money					
4.	A grower should grow cash crops to increase monetary profits instead of field crops for home consumption					
5.	It is difficult for the growers children to make a good stand unless he provides them with economic assistance					
6.	A grower must earn for his living but most important thing in life is the one in which it cannot be defined in economic terms					

12. Extension contact

Sl. No.	Extension Workers	Frequency of contact		
		Regularly	Occasionally	Never
1.	Horticultural Assistants			
2.	Assistant Horticultural Officers			
3.	Assistant Director of Horticulture			
4.	Senior Assistant Director of Horticulture			
5.	Deputy Director of Horticulture			
6.	Assistant Agricultural Officers/Agricultural officers			
7.	Specialists of UAS			
8.	Agricultural Field Officers of Banks			
9.	Any others (specify)			

PART-II

a) Knowledge level of improved cultivation practices of tuberose growers

Please indicate your response to the following items

Sl. No.	Items/practices	Details of practices known	Remarks K-Known NK-Not Known
1.	Tuberose varieties (single) recommended for commercial cultivation [a. Mexican single b. Shringar c. RajathRekha d. Prajwal e. Arka Nirantar]		
2.	Suitable soil for cultivation [Loam and sandy loam]		
3.	Spacing recommended for cultivation is [a. Row to row(30 cm) b. Plant to plant(30 cm)]		
4.	Ideal size of planting material is [a. Desired size of the bulb (2-3 cm)] [b. Desired weight of the bulb(30 gm)]		
5.	Recommended quantity of FYM/gunta (350 kg/gunta)		
6.	Recommended quantity of fertilizer to be applied (kg/gunta) [N: 2.5 kg/gunta (a. Basal: 1.25 kg b. top dressing: 1.25 kg) P: 0.5 kg/gunta K: 0.5 kg/gunta]		
7.	Irrigation system a. Desirable method of irrigation system (Drip irrigation) b. Others		
8.	a. Major diseases noticed in tuberose [i) Stem rot ii) Botrytis Spot and Blight iii) Alternative leaf spot iv) Others (specify)]		

	b. Recommended measures for controlling diseases				
	Diseases	Name of the chemical	Concentration and interval of sprays		
	i)stem rot	Carbondizim	1 gm. @ 50%/1 ltr. water (@ 10 Days Interval)		
	ii)Botrytis Spot and Blight	Carbondizim	1 gm. @ 50%/1 ltr. water (@ 15 days Interval)		
	iii)Alternative leaf spot	Mancozeb	1 gm.@ 0.2%/ 1 ltr. water (@ 10 Days Interval)		
	Others (specify)				
9.	a. Major pests observed in tuberose i) Thrips ii) Aphids iii) Weevils iv) Others (specify)				
	b. Recommended measures for controlling pests				
	pest	Name of the chemical	Concentration and interval of sprays		
	i)Thrips	i)Dimethoate	1.75 ml/ltr. water @ 0.2% (@ 10 Days Interval)		
	ii)Aphids	ii)Rogor	2 ml/ltr. @ 0.2% (@ 15 days Interval)		
	iii)Weevils	iii)Thiodon	2 mg/ltr. (@ 10 Days Interval)		
	Others (specify)				

10.	Harvesting of flowers a. Recommended time of harvest (morning/evening) b. What is the ideal stage of harvesting (Bud stage or completely opened bud stage) c. Method of harvesting (Handpicking)		
11.	Yield of tuberose as per recommended cultivation (Qty/gunta/year)		

b) Adoption of recommended practices of tuberose by the farmers

Sl. No.	Items/practices	Details of practices adopted	Level of adoption		
			Fully adopte d	Partially adopted	Not adopte d
1.	Tuberose varieties used/planted.				
2.	Type of soil in which grown or planted				
3.	Spacing followed				
	a.Row to row b. Plant to plant				
4.	Selection of planting material a. Size of the bulbs used b. weight of the bulb preferred				
5.	Quantity of FYM applied				
6.	Quantity of fertilizer applied(kg/gunta) [As Basal:____As top dress:___] N: P: K:				
7.	Irrigation method followed				
8.	a. Major diseases observed i) ii) iii)				

	b. Measures followed to control diseases						
	Name of the disease	Name of the chemical	Concentration and interval of sprays				
	i) ii) iii)						
9.	a. Major pests observed in tuberose i) ii) iii)						
	Control measures followed						
	Name of the Disease	Name of the chemical	Concentration and interval of sprays				
	i) ii) iii)						
10.	Harvesting of flowers a. Time of harvesting(morning/evening) b. Stage of harvesting c. Method of harvesting d. Any practices followed to treat the harvested flowers?						
11.	What is the yield/gunta/year you are harvesting						

PART-III

i) Marketing channels in marketing of tuberose

Sl. No.	Items/practices	Response Yes/No	Rate obtained(Rs./Kg)
1.	Marketing channels preferred i. Sold to local retailers ii. Commission agents iii. Sold to pre-harvest contractors iv. Others (specify)		
i.	Reasons for preferring local retailers 1. To realize higher profit 2. Unforeseen risks 3. Helps to buy other necessary materials 4.Problem of marketing 5. Shortage of manpower/ family members Others (specify)		
ii.	Reasons for selling through commission agents 1. Farmers get advance for cultivating and to meet other urgent needs 2. Availability of storage facilities 3. To get good price 4. Others (specify)		
iii.	Reasons for selling to pre-harvest contractors 1. Need for advance money 2. Lack of transport facilities 3. Lack of labour for harvest 4. Lack of time to go to market 5. Risk of price fluctuations 6. Others (specify)		

2.	Sources of getting market information		
3.	Are you following grading of flowers? Yes/no -If yes how many grades are made for marketing tuberose?		
4.	Packing of flowers Method of packing followed i) Bamboo basket ii) Gunny bags iii) open cloths iv) Others (specify)		

ii) Constraints/ Problems faced by tuberose growers

1.	**a) Production related problems** 1.Non-availability of seed material i) Not abundant ii) Not genuine iii) Costly iv) Others (specify) 2. High cost of fertilizers 3. High incidence of Pest and diseases 4. High cost of plant protection chemicals 5. Limited and irregularity in power supply 6. Non-availability of technology/lack of technical guidance 7. Labour problems 8. Others (specify) **b) Marketing related problems** 1. Lack of market information 2. Poor transportation facilities 3. Price fluctuation in the market 4. Exploitation by middlemen 5. Lack of exclusive market for tuberose 6. Storage problems 7. Others (specify)		

PART-IV

Which of the following factors motivated you to take up tuberose cultivation? (Rank them)

Sl. No.	Factors	Ranking of factors
1.	Profitable crop	
2.	Export potential	
3.	Easy maintenance of crop	
4.	Not risky	
5.	Scope/convenient to market locally	
6.	Easy availability of seed material	
7.	Favorable climatic conditions to grow	
8.	Low cost of cultivation as compared to other flowers	
9.	Others (specify)	

ಉತ್ತರ ಕರ್ನಾಟಕದಲ್ಲಿ ಸುಗಂಧರಾಜ ಹೂವು ಸಾಗುವಳಿದಾರರಲ್ಲಿ ಅಳವಡಿಕೆಯಲ್ಲಿರುವ ಉತ್ಪಾದನಾ ತಾಂತ್ರಿಕತೆ ಮತ್ತು ಮಾರುಕಟ್ಟೆ : ಒಂದು ಅಧ್ಯಯನ

ಸಂದರ್ಶನಾ ಪ್ರಶ್ನಾವಳಿ

ಭಾಗ – 1

ಪ್ರತಿವಾದಿ ಸಂ: ದೂರವಾಣಿ ಸಂಖ್ಯೆ:

ರೈತನ ವೈಯಕ್ತಿಕ, ಸಾಮಾಜಿಕ ಮತ್ತು ಆರ್ಥಿಕ ಗುಣಲಕ್ಷಣಗಳು

ರೈತನ ಹೆಸರು :

ಗ್ರಾಮ :

ತಾಲೂಕು :

ಜಿಲ್ಲೆ :

1. **ವಯಸ್ಸು: ________ ವರ್ಷಗಳು**
2. **ಶಿಕ್ಷಣ: ಅನಕ್ಷರಸ್ಥ/ಪ್ರಾಥಮಿಕ/ಮಾಧ್ಯಮಿಕ/ಪ್ರೌಡಶಾಲಾ/ಪದವಿ ಪೂರ್ವ/ಪದವಿ/ ಸ್ನಾತಕೋತ್ತರ**
3. **ಭೂಮಿ ಹಿಡುವಳಿ (ಎಕರೆ):**

   ಅ) ನೀರಾವರಿ: ____________ ಆ) ಮಳೆಯಾಶ್ರಿತ: ____________

   ಇ) ಹೊದಿಕೆ ಮನೆಯ ವಿಸ್ತೀರ್ಣ: ____________ ಈ) ಬರಡು ಭೂಮಿ: ____________

   ಉ) ಒಟ್ಟು ____________
4. **ತಾವು ಸುಗಂಧರಾಜ ಬೆಳೆಯನ್ನು ಎಷ್ಟು ವರ್ಷಗಳಿಂದ ಸಾಗುವಳಿ ಮಾಡುತ್ತಿದ್ದೀರಿ? ________ ವರ್ಷಗಳು**
5. **ಸುಗಂಧರಾಜ ಹೂವಿನ ಒಟ್ಟು ಸಾಗುವಳಿ ಕ್ಷೇತ್ರ ____________ (ಗುಂಟಾ ಅಥವಾ ಎಕರೆ)**

   ತಾವು ಎಷ್ಟು ವರ್ಷಗಳಿಂದಾ ಸುಗಂಧರಾಜವನ್ನು ಬೆಳೆದಿದ್ದೀರಾ?________ ವರ್ಷ

   ಹಾಗಾದರೆ ಕಳೆದ ವರ್ಷಗಳಲ್ಲಿ ಸಾಗುವಳಿ ಮಾಡಿದ ಕ್ಷೇತ್ರ

ಸಾಗುವಳಿ ಕ್ಷೇತ್ರ **(ಗುಂಟಾ ಅಥವಾ ಎಕರೆ)**	ಪಡೆದ ಇಳುವರಿ ಕಿ.ಗ್ರಾ/ಪ್ರ ಗು/ಎ	ಅನಿಸಿಕೆ

6. **ಕುಟುಂಬದ ವಾರ್ಷಿಕ ಆದಾಯ:**

ಕ್ರ.ಸಂ.	ಆದಾಯದ ಮೂಲಗಳು	ವಾರ್ಷಿಕ ಆದಾಯ (ರೂ.)
1	ಕೃಷಿಯಿಂದ	
2	ಕೃಷಿ ಸಂಭಂದಿತ ಚಟುವಟಿಕೆಗಳಿಂದ (ಕೋಳಿ ಸಾಕಾಣಿಕೆ / ಕುರಿ / ಆಡು ಸಾಕಾಣಿಕೆ ಮುಂತಾದವುಗಳು)	
3	ಹೂ ಕೃಷಿ	
4	ವ್ಯಾಪಾರ	
5	ಇತರೇ	

7. ಕಷ್ಟ ಪುನರ್ಮನ ದೃಷ್ಟಿಕೋನ

ಈ ಕೆಳಗಿನ ಹೇಳಿಕೆಗಳಿಗೆ ತಮ್ಮ ಸಮ್ಮತಿ ಅಥವಾ ಅಸಮ್ಮತಿ ಪ್ರತಿ ಹೇಳಿಕೆಗಳಿಗೆ ಈ ☑ ಗುರುತಿನಿಂದ ಸೂಚಿಸಿರಿ.

ಕ್ರ.ಸಂ.	ಹೇಳಿಕೆಗಳು	ಪ್ರತಿಕ್ರಿಯೆ	
		ಒಪ್ಪುತ್ತೇನೆ	ಒಪ್ಪುವುದಿಲ್ಲ
1	ರೈತನು ಕಡಿಮೆ ಅಥವಾ ಅತೀ ಕಡಿಮೆ ಕಷ್ಟದ ಲಾಭಕ್ಕಿಂತ ಅತೀ ಹೆಚ್ಚು ಲಾಭ ಮಾಡಲು ಹೆಚ್ಚಿನ ಅವಕಾಶ ಕೈಗೆತ್ತಿಕೊಳ್ಳಬೇಕು.		
2	ಯಾವ ರೈತನು ಹೆಚ್ಚಿನ ಕಷ್ಟ ಎದುರಿಸಲು ಇಚ್ಛೆ ಹೊಂದಿರುತ್ತಾನೋ ಅವನು ಸಾಮಾನ್ಯ ರೈತನಿಗಿಂತ ಸಬಲನಾಗಿರುತ್ತಾನೆ.		
3	ಯಶಸ್ಸಿನ ಅವಕಾಶಗಳು ಹೆಚ್ಚಿಗೆ ಎಂದು ತಿಳಿದಾಗ ರೈತರು ಕಷ್ಟ ತೆಗೆದುಕೊಳ್ಳುವುದು ಒಳ್ಳೆಯದು.		
4	ಬಹುತೇಕ ರೈತರು ಯಶಸ್ವಿಯಾಗದ ಹೊರತು ಯಾವುದೇ ಹೊಸ ಕೃಷಿ ವಿಧಾನಗಳನ್ನು ಅಳವಡಿಸುವುದು ಸೂಕ್ತವಲ್ಲ.		
5	ಹೊಸ ಕೃಷಿ ವಿಧಾನಗಳನ್ನು ಅಳವಡಿಸುವಾಗ ರೈತರು ಕಷ್ಟ ಎದುರಿಸಬೇಕಾಗುತ್ತದೆ. ಆದರೂ ಇದು ಸೂಕ್ತವಾಗಿದೆ.		
6	ರೈತರು ವಿವಿಧ ಬೆಳೆ ಬೆಳೆಯುವುದರಿಂದ ಕಷ್ಟ ತಪ್ಪಿಸಬಹುದು.		

8. ಹೊರಗಿನ ಜಗತ್ತಿನೊಡನೆ ಸಂಪರ್ಕ : ಈ ಕೆಳಗಿನ ಹೇಳಿಕೆಗಳ ಕುರಿತಂತೆ ನಿಮ್ಮ ಪ್ರತಿಕ್ರಿಯೆಯನ್ನು ತಿಳಿಸಿ

ಕ್ರ.ಸಂ.	ಹೇಳಿಕೆಗಳು	ಪ್ರತಿಕ್ರಿಯೆ
1	ನೀವು ಎಷ್ಟು ಬಾರಿ ನಿಮ್ಮ ಸಮೀಪದ ಪಟ್ಟಣಕ್ಕೆ ಹೋಗುತ್ತೀರಿ?	ವಾರದಲ್ಲಿ 2 ಅಥವಾ 3 ಬಾರಿ/ ವಾರದಲ್ಲಿ ಒಂದು ಬಾರಿ / ತಿಂಗಳಲ್ಲಿ 2 ಬಾರಿ/ ತಿಂಗಳಿಗೊಮ್ಮೆ/ ಯಾವತ್ತು ಹೋಗುವುದಿಲ್ಲ
2	ನೀವು ಪಟ್ಟಣಕ್ಕೆ ಯಾವ ಉದ್ದೇಶಕ್ಕಾಗಿ ಭೇಟಿ ಕೊಡುತ್ತೀರಿ?	ಕೃಷಿ ಸಂಭಂದಿತ ಕೆಲಸಕ್ಕಾಗಿ/ ವೈಯಕ್ತಿಕ ಕೆಲಸಕ್ಕಾಗಿ/ ಮೋಜಿಗಾಗಿ / ಇತರೆ
3	ನೀವು ನಿಮ್ಮ ಊರಿನ ಹೊರಗಡೆ ಯಾವುದಾದರೂ ಸಂಘದಲ್ಲಿ ಸದಸ್ಯರಾಗಿದ್ದೀರಾ? ಹಾಗಾದರೆ ಆ ಸಂಘದ ಸ್ಥಿತಿಗತಿ ಏನು?	ಹೌದು / ಇಲ್ಲ

9. ಆವಿಷ್ಕಾರಗಳ ಅಳವಡಿಕೆ

ಈ ಕೆಳಗೆ ಸೂಚಿಸಲಾದ ವಿವಿಧ ಹೇಳಿಕೆಗಳಿಗೆ ಸಂಭಂದಿಸಿದಂತೆ ತಮ್ಮ ವಿವಿಧ ರೀತಿಯ ಒಪ್ಪಿಗೆಯನ್ನು ಈ ☑ ಚಿಹ್ನೆಯಿಂದ ಸೂಚಿಸಿರಿ.

ಕ್ರ.ಸಂ.	ಹೇಳಿಕೆಗಳು	ಬಲವಾಗಿ ಒಪ್ಪುತ್ತೇನೆ	ಒಪ್ಪುತ್ತೇನೆ	ಅಸಮ್ಮತ
1	ಇಲ್ಲಿಯವರೆಗೆ ನಾನು ಹೊಸ ಕೃಷಿ ಪದ್ಧತಿಗಳ ಮಾಹಿತಿ ಪಡೆಯಲು ಯತ್ನಿಸಿದ್ದೇನೆ. ಅಂದರೆ ನನ್ನ ಜಮೀನಿನಲ್ಲಿ ಈ ಎಲ್ಲಾ ಹೊಸ ವಿಧಾನಗಳನ್ನು ಪ್ರಯತ್ನಿಸಿದ್ದೇನೆ ಎಂದು ಅರ್ಥವಲ್ಲ.			
2	ನಾನು ಕೇಳಿದ ಹೊಸ ಕೃಷಿ ಪದ್ಧತಿಗಳನ್ನು ಅಳವಡಿಸಿಕೊಳ್ಳುವ ತನಕ ನನಗೆ ಸಮಾಧಾನವಿಲ್ಲ			
3	ಇತ್ತೀಚಿನ ದಿನಗಳಲ್ಲಿ ಹಲವಾರು ಹೊಸ ಕೃಷಿ ಪದ್ಧತಿಗಳ ಬಗ್ಗೆ ಮಾತನಾಡುತ್ತಾರೆ. ಆದರೆ ಈ ಹೊಸ ಕೃಷಿ ಪದ್ಧತಿಗಳು ಹಳೆಯದಕ್ಕಿಂತ ಉತ್ತಮವಾಗಿವೆಯೋ ಇಲ್ಲವೋ ಎಂದು ಯಾರಿಗೆ ಗೊತ್ತು.			

ಕ್ರ.ಸಂ.	ಹೇಳಿಕೆಗಳು	ಬಲವಾಗಿ ಒಪ್ಪುತ್ತೇನೆ	ಒಪ್ಪುತ್ತೇನೆ	ಅಸಮ್ಮತ
4	ಸಮಯಕ್ಕೆ ತಕ್ಕಂತೆ ನಾನು ಹಲವಾರು ಹೊಸ ಕೃಷಿ ಪದ್ಧತಿಗಳ ಬಗ್ಗೆ ಕೇಳಿದ್ದೇನೆ ಮತ್ತು ಅವುಗಳಲ್ಲಿನ ಬಹುತೇಕ ಕೃಷಿ ಪದ್ಧತಿಗಳನ್ನು ಕಳೆದ ಹಲವು ವರ್ಷಗಳಿಂದ ಪ್ರಯತ್ನಿಸಿದ್ದೇನೆ.			
5	ನಾನು ಯಾವಾಗಲೂ ಹೊಸ ಕೃಷಿ ಪದ್ಧತಿಗಳನ್ನು ಪ್ರಯತ್ನಿಸುವುದು ನೆರೆಹೊರೆಯವರು ಹೊಸ ಪದ್ಧತಿಗಳಿಂದ ಯಾವ ಫಲಿತಾಂಶ ಪಡೆಯುತ್ತಾರೊ ಎನ್ನುವ ಆಧಾರದ ಮೇಲೆ ಅವಲಂಬಿಸಿರುತ್ತೇನೆ.			
6	ಏನೆಂದರೂ ಸಾಂಪ್ರದಾಯಿಕ ಕೃಷಿ ಪದ್ಧತಿಗಳು ಉತ್ತಮವೆಂದು ನಾನು ನಂಬಿದ್ದೇನೆ.			
7	ಹೊಸ ಕೃಷಿ ಪದ್ಧತಿಗಳನ್ನು ಪ್ರಯತ್ನಿಸುವಾಗ ಎಚ್ಚರಿಕೆಯಿಂದಿರುವೆನು.			
8	ಏನೆಂದರೂ ನಮ್ಮ ಹಿರಿಯರು ಕೃಷಿ ಪದ್ಧತಿಗಳ ಅಳವಡಿಕೆಯಲ್ಲಿ ವಿವೇಚನವುಳ್ಳವರಾಗಿರುವರು ಕಾರಣ ನಾನು ಈ ಹಳೆಯ ಕೃಷಿ ಪದ್ಧತಿಗಳನ್ನು ಬದಲಾಯಿಸಲು ಯಾವುದೇ ಕಾರಣ ದೊರೆಯುತ್ತಿಲ್ಲ.			
9	ಕೆಲವೊಮ್ಮೆ ಹೊಸ ಕೃಷಿ ಪದ್ಧತಿಗಳು ಪರಿಣಾಮಕಾರಿಯಾಗಿರುವುದಿಲ್ಲ ಆದರೂ ಅವುಗಳು ಭರವಸೆಯಾಗಿದ್ದಲ್ಲಿ ನಾನು ಖಂಡಿತವಾಗಿ ಅವುಗಳನ್ನು ಅಳವಡಿಸಿಕೊಳ್ಳಲು ಬಯಸುತ್ತೇನೆ.			

10. ಆರ್ಥಿಕ ಪ್ರೇರಣೆ

ಈ ಕೆಳಗಿನ ಹೇಳಿಕೆಗಳ ಕುರಿತಂತೆ ನಿಮ್ಮ ಒಪ್ಪಿಗೆಯನ್ನು ಈ ☑ ಚಿಹ್ನೆಯಿಂದ ಸೂಚಿಸಿರಿ.

ಕ್ರ.ಸಂ.	ಹೇಳಿಕೆಗಳು	ಬಲವಾಗಿ ಒಪ್ಪುತ್ತೇನೆ	ಒಪ್ಪುತ್ತೇನೆ	ನಿರ್ಧಾರಕ್ಕೆ ಬಂದಿಲ್ಲ	ಅಸಮ್ಮತ	ಬಲವಾಗಿ ಅಸಮ್ಮತ
1	ಸುಗಂಧರಾಜ ಹೂವು ಬೆಳೆಯುವ ರೈತರು ಹೆಚ್ಚಿನ ಇಳುವರಿ ಮತ್ತು ಆರ್ಥಿಕ ಲಾಭ ಪಡೆಯುವುದಕ್ಕೆ ಕೆಲಸ ಮಾಡಬೇಕು					
2	ಅತೀ ಹೆಚ್ಚು ಲಾಭ ಪಡೆಯುವವನೇ ಯಶಸ್ವಿ ಸುಗಂಧರಾಜ ಬೆಳೆಯುವ ರೈತ ಎನ್ನುವರು.					
3	ರೈತರು ಹೆಚ್ಚು ಹಣ ಗಳಿಸಲು ಯಾವುದೇ ಹೊಸ ತಾಂತ್ರಿಕ ವಿಷಯವನ್ನು ಪ್ರಯತ್ನಿಸಬೇಕು.					
4	ರೈತನು ತನ್ನ ಮನೆ ಬಳಕೆಗಾಗಿ ಹೊಲದ ಬೆಳೆಗಳನ್ನು ಬೆಳೆಯುವುದಕ್ಕಿಂತ ವಾಣಿಜ್ಯ ಬೆಳೆಗಳನ್ನು ಬೆಳೆದು ಹೆಚ್ಚಿನ ಲಾಭಾಂಶ ನಿರೀಕ್ಷಿಸಬೇಕು.					
5	ರೈತನು ತನ್ನ ಮಕ್ಕಳಿಗೆ ಆರ್ಥಿಕ ಸಹಾಯವನ್ನು ಒದಗಿಸದ ಹೊರತು ಅವರ ಮಕ್ಕಳು ಸಮಾಜದಲ್ಲಿ ಮುಂದೆ ಬರಲು ಸಾಧ್ಯವಿಲ್ಲ.					
6	ರೈತನು ತಾನು ಜೀವಿಸುವುದಕ್ಕೆ ಗಳಿಸಬೇಕು. ಆದರೆ ಜೀವನದಲ್ಲಿ ಅತೀ ಮುಖ್ಯವಾದ ಅಂಶವೆಂದರೆ ಈ ಜೀವನವನ್ನು ಆರ್ಥಿಕ ದೃಷ್ಟಿಯಿಂದ ನೋಡಬಾರದು.					

11. ವಿಸ್ತರಣಾ ಸಿಬ್ಬಂದಿಯೊಂದಿಗಿನ ಸಂಪರ್ಕ:

ಕ್ರ.ಸಂ.	ವಿಸ್ತರಣಾ ಸಿಬ್ಬಂದಿಗಳು	ಭೇಟಿಯ ಪುನರಾವರ್ತನೆ			ಉದ್ದೇಶ
		ನಿಯಮಿತವಾಗಿ	ಆಗಾಗ್ಗೆ	ಇಲ್ಲವೇ ಇಲ್ಲ	
1	ತೋಟಗಾರಿಕಾ ಸಹಾಯಕರು				
2	ಸಹಾಯಕ ತೋಟಗಾರಿಗಾ ಅಧಿಕಾರಿಗಳು				
3	ಸಹಾಯಕ ತೋಟಗಾರಿಕಾ ನಿರ್ದೇಶಕರು				
4	ಹಿರಿಯ ತೋಟಗಾರಿಕಾ ನಿರ್ದೇಶಕರು				
5	ತೋಟಗಾರಿಕಾ ನಿರ್ದೇಶಕರು				
6	ಸಹಾಯಕ ಕೃಷಿ ಅಧಿಕಾರಿಗಳು/ ಕೃಷಿ ಅಧಿಕಾರಿಗಳು				
7	ಕೃಷಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವಿಷಯ ತಜ್ಞರು				
8	ಇತರೇ (ಹೆಸರಿಸಿ)				

ಭಾಗ – 2

ಅ) ಸುಗಂಧರಾಜ ಸಾಗುವಳಿಯಲ್ಲಿ ಶಿಫಾರಿತ ಬೇಸಾಯ ಕ್ರಮಗಳ ಜ್ಞಾನ ಸಂಪಾದನೆ / ಜ್ಞಾನದ ಮಟ್ಟ

ಕ್ರ.ಸಂ.	ಸಾಗುವಳಿ ಕ್ರಮಗಳು	ಬೇಸಾಯ ಕ್ರಮಗಳ ಜ್ಞಾನ	ಶರಾ (ಗೊತ್ತಿದೆ/ ಗೊತ್ತಿಲ್ಲ)
1	ವ್ಯಾಪಾರ ದೃಷ್ಟಿಯಿಂದ ಶಿಫಾರಿತ ತಳಿಗಳು [ಅ) ಪ್ರಜ್ವಲ್ ಆ) ರಜತ್ ರೇಖಾ ಇ) ಶ್ರಿಂಗಾರ್ ಈ) ಮೆಕ್ಸಿಕನ್ ಸಿಂಗಲ್ ಉ) ಅರ್ಕಾ ನಿರಂತರ್]		
2	ಸುಗಂಧರಾಜ ಸಾಗುವಳಿಗೆ ಸೂಕ್ತವಾದ ಮಣ್ಣು ಗೋಡುಮಣ್ಣು/ ಮರಳು ಮಿಶ್ರಿತ ಗೋಡುಮಣ್ಣು/ಮಸಾರಿ/ಕೆಂಪು ಮಣ್ಣು		
3	ಬಿತ್ತನೆ ಅಂತರ ಅ) ಸಾಲಿನಿಂದ ಸಾಲಿಗೆ (1 ಅಡಿ) ಆ) ಗಿಡದಿಂದ ಗಿಡಕ್ಕೆ (1 ಅಡಿ)		
4	ಬಿತ್ತನೆಗೆ ಸೂಕ್ತವಾದ ಗಡ್ಡೆಯ ವ್ಯಾಸ ಮತ್ತು ತೂಕ ಅ) ಗಡ್ಡೆಯ ವ್ಯಾಸ (2–3 ಸೆಂ.ಮೀ) ಆ) ಗಡ್ಡೆಯ ತೂಕ (30 ಗ್ರಾಂ)		
5	ಶಿಫಾರಿತ ಕೊಟ್ಟಿಗೆ ಗೊಬ್ಬರದ ಪ್ರಮಾಣ 750 ಕೆಜಿ/ ಗುಂಟಾ		
6	ಶಿಫಾರಿತ ರಾಸಾಯನಿಕ ಗೊಬ್ಬರದ ಪ್ರಮಾಣ ಸಾರಜನಕ: 2.5 ಕೆಜಿ/ಗುಂಟಾ ಅ. ನಾಟಿ ಸಮಯದಲ್ಲಿ: (1.25 ಕೆ.ಜಿ) ಆ. ನಾಡಿ ಮಾಡಿದ 6 ವಾರಗಳ ನಂತರ: (1.25 ಕೆಜಿ) ರಂಜಕ: 1.25 ಕೆಜಿ/ಗುಂಟಾ ಪೊಟ್ಯಾಷ್: 1.25 ಕೆಜಿ/ಗುಂಟಾ		
7	ನೀರಾವರಿ ಪದ್ಧತಿ ಅ) ಸೂಕ್ತವಾದ ನೀರಾವರಿ ಪದ್ಧತಿ? [ಹನಿ ನೀರಾವರಿ ಪದ್ಧತಿ/ಕಾಲುವೆ ನೀರಾವರಿ ಇತರೆ]		

ಕ್ರ.ಸಂ.	**ಸಾಗುವಳಿ ಕ್ರಮಗಳು**	**ಬೇಸಾಯ ಕ್ರಮಗಳ ಜ್ಞಾನ**	**ಶರಾ (ಗೊತ್ತಿದೆ/ ಗೊತ್ತಿಲ್ಲ)**
8	ಅ) ಸುಗಂಧರಾಜ ಹೂವಿನ ಸಾಗುವಳಿಯಲ್ಲಿ ಕಂಡು ಬರುವ ಮುಖ್ಯವಾದ ರೋಗಗಳು ▪ ಬುಡ ಕೊಳೆಯುವ ರೋಗ ▪ ಸಿಡಿ ರೋಗ ▪ ಬೇರು ಗಂಟು ಜಂತು ರೋಗ ▪ ಇತರೆ		
	ಆ) ಶಿಫಾರಿತ ರೋಗ ನಿರ್ವಹಣಾ ಕ್ರಮಗಳು		
	ರೋಗಗಳು		
	ಬುಡ ಕೊಳೆಯುವ ರೋಗ **ಅ. ಸಿಂಪಡಣಾ ದ್ರಾವಣದ ಹೆಸರು** ಕಾರ್ಬನ್‌ಡೈಜಿಮ್ **ಆ. ಪ್ರಮಾಣ/ ಎಷ್ಟು ದಿನಗಳಿಗೊಮ್ಮೆ** ಪ್ರತಿ ಲೀಟರ್ ನೀರಿಗೆ ಶೇ. 50 ಬೆರೆಸಿ ಭೂಮಿಗೆ ಹಾಕಬೇಕು		
	ಸಿಡಿ ರೋಗ **ಅ. ಸಿಂಪಡಣಾ ದ್ರಾವಣದ ಹೆಸರು** ಕಾರ್ಬನ್‌ಡೈಜಿಮ್ **ಆ. ಪ್ರಮಾಣ/ ಎಷ್ಟು ದಿನಗಳಿಗೊಮ್ಮೆ** ಪ್ರತಿ ಲೀಟರ್ ನೀರಿಗೆ ಶೇ. 50 ಬೆರೆಸಿ ಭೂಮಿತ ಹಾಕಬೇಕು		
	ಬೇರು ಗಂಟು ಜಂತು ರೋಗ **ಅ. ಸಿಂಪಡಣಾ ದ್ರಾವಣದ ಹೆಸರು** ಬೇವಿನ ಹಿಂಡಿ/ ಕಾರ್ಬೊಫ್ಯುರಾನ್ 3ಜಿ **ಆ. ಪ್ರಮಾಣ/ ಎಷ್ಟು ದಿನಗಳಿಗೊಮ್ಮೆ** ಬೇವಿನ ಹಿಂಡಿ 12.5 ಕೆಜಿ ಅಥವಾ ಕಾರ್ಬೊಫೂರಾನ್ 3ಜಿ ಯನ್ನು 0.5 ಕೆಜಿ/ಗುಂಟೆ ಬಿತ್ತನೆ ಮೊದಲು ಮಣ್ಣಿನಲ್ಲಿ ಬೆರೆಸಬೇಕು		
	ಇತರೆ		
9	ಅ) ಸುಗಂಧರಾಜ ಹೂವಿನ ಮುಖ್ಯವಾದ ಕೀಟಗಳು ▪ ಥ್ರಿಪ್ಸ್ ▪ ಹೇನು ▪ ಇತರೆ		
	ಆ) ಶಿಫಾರಿತ ಕೀಟ ನಿರ್ವಹಣಾ ಕ್ರಮಗಳು		
	ಥ್ರಿಪ್ಸ್ **ಅ. ದ್ರಾವಣದ ಹೆಸರು** ಡೈಮಿಥೊಯೆಟ್ 30 ಇಸಿ **ಆ. ಪ್ರಮಾಣ/ ಎಷ್ಟು ದಿನಗಳಿಗೊಮ್ಮೆ** 1.7 ಮಿ.ಲೀ ನ್ನು ಪ್ರತಿ ಲೀಟರ್ ನೀರಿನಲ್ಲಿ ಬೆರೆಸಿ ಸಿಂಪಡಣೆ ಮಾಡಬೇಕು		
	ಹೇನು **ಅ. ದ್ರಾವಣದ ಹೆಸರು** ಡೈಮಿಥೊಯೊಟ್ **ಆ. ಪ್ರಮಾಣ/ ಎಷ್ಟು ದಿನಗಳಿಗೊಮ್ಮೆ** 2 ಮಿ.ಲೀ. ನ್ನು ಪ್ರತಿ ಲೀಟರ್ ನೀರಿನಲ್ಲಿ ಬೆರೆಸಿ ಸಿಂಪಡಣೆ ಮಾಡಬೇಕು		
	ಇತರೆ		
10	ಹೂವುಗಳ ಕಟಾವು		
	ಅ) ಶಿಫಾರಿತ ಕಟಾವಿನ ಸಮಯ (ಮುಂಜಾನೆ/ ಸಂಜೆ)		
	ಆ) ಕಟಾವಿಗೆ ಸೂಕ್ತವಾದ ಹೂವಿನ ಹಂತ (ಮೊಗ್ಗಿನಾವಸ್ಥೆಯಲ್ಲಿ ಅಥವಾ ಪೂರ್ತಿಯಾಗಿ ಅರಳಿದಾಗ)		
	ಇ) ಹೂವು ಕಟಾವು ಮಾಡುವ ಪದ್ಧತಿ (ಕೈಯಿಂದ ಆರಿಸುವುದು)		
11	ಶಿಫಾರಿತ ಪದ್ಧತಿಯಿಂದ ನಿರೀಕ್ಷಿತ ಇಳುವರಿ (ಪ್ರತಿ ಗುಂಟೆ ಪ್ರದೇಶದಿಂದ ಪ್ರತಿ ವರ್ಷಕ್ಕೆ ಬರುವ ಇಳುವರಿ)		

ಆ) ಸುಗಂಧರಾಜ ಸಾಗುವಳಿಯಲ್ಲಿ ಶಿಫಾರಿತ ಬೇಸಾಯದ ಕ್ರಮಗಳ ಅಳವಡಿಕೆ.

ಕ್ರ.ಸಂ.	ಸಾಗುವಳಿ ಕ್ರಮಗಳು	ಅಳವಡಿಕೆ ಮಾಡಿದ ಬೇಸಾಯ ಕ್ರಮಗಳ ವಿವರ	ಅಳವಡಿಕೆ		
			ಸಂಪೂರ್ಣ ವಾಗಿ	ಅಪೂರ್ಣ ವಾಗಿ	ಅಳವಡಿಸಿಲ್ಲ
1	ನಾಟಿಮಾಡಿದ ಸುಗಂಧರಾಜ ಹೂವಿನ ತಳಿಗಳು	[ಅ) ಪ್ರಜ್ವಲ್ ಆ) ರಜತ್ ರೇಖಾ ಇ) ಶ್ರಿಂಗಾರ್ ಈ) ಮೆಕ್ಸಿಕನ್ ಸಿಂಗಲ್ ಉ) ಅರ್ಕಾ ನಿರಂತರ್]			
2	ಯಾವ ತರಹದ ಮಣ್ಣಿನಲ್ಲಿ ಹೂವನ್ನು ಬೆಳೆಯುತ್ತೀರಿ?	ಗೋಡುಮಣ್ಣು/ ಮರಳು ಮಿಶ್ರಿತ ಗೋಡುಮಣ್ಣು/ಮಸಾರಿ/ಕೆಂಪು ಮಣ್ಣು			
3	ನಾಟಿ ಮಾಡುವಾಗ ಅನುಸರಿಸಿದ ಅಂತರ? ಅ) ಸಾಲಿಂದ ಸಾಲಿಗೆ ಆ) ಗಿಡದಿಂದ ಗಿಡಕ್ಕೆ	ಅ) ಸಾಲಿನಿಂದ ಸಾಲಿಗೆ (1 ಅಡಿ) ____ಇತರೆ ಆ) ಗಿಡದಿಂದ ಗಿಡಕ್ಕೆ (1 ಅಡಿ) ____ಇತರೆ			
4	ನಾಟಿಗೆ ಬಳಸುವ ಗಡ್ಡೆಯ ವ್ಯಾಸ ಮತ್ತು ತೂಕ ಅ) ನಾಟಿಗೆ ಬಳಸುವ ಗಡ್ಡೆಯ ವ್ಯಾಸ ಆ) ನಾಟಿಗೆ ಬಳಸುವ ಗಡ್ಡೆಯ ತೂಕ	ಅ) ಗಡ್ಡೆಯ ವ್ಯಾಸ (2–3 ಸೆಂ.ಮೀ) ಆ) ಗಡ್ಡೆಯ ತೂಕ (30 ಗ್ರಾಂ)/ ____ಇತರೆ			
5	ಭೂಮಿಗೆ ಬಳಸುವ ಕೊಟ್ಟಿಗೆ ಗೊಬ್ಬರದ ಪ್ರಮಾಣ	750 ಕೆಜಿ/ ಗುಂಟಾ/ ____ಇತರೆ			
6	ಉಪಯೋಗಿಸಿದ ರಾಸಾಯನಿಕ ಗೊಬ್ಬರದ ಪ್ರಮಾಣ? ಸಾರಜನಕ ಅ) ನಾಟಿ ಸಮಯದಲ್ಲಿ ಆ) ಮೇಲು ಗೊಬ್ಬರವಾಗಿ ರಂಜಕ ಪೊಟ್ಯಾಶ್	ಸಾರಜನಕ: 2.5 ಕೆಜಿ/ಗುಂಟಾ ಅ. ನಾಟಿ ಸಮಯದಲ್ಲಿ: (1.25 ಕೆ.ಜಿ) ____ಇತರೆ ಆ. ನಾಡಿ ಮಾಡಿದ 6 ವಾರಗಳ ನಂತರ: (1.25 ಕೆಜಿ) ರಂಜಕ: 1.25 ಕೆಜಿ/ಗುಂಟಾ ____ಇತರೆ ಪೊಟ್ಯಾಷ್: 1.25 ಕೆಜಿ/ಗುಂಟಾ ____ಇತರೆ			
7	ಅಳವಡಿಸಿದ ನೀರಾವರಿ ಪದ್ಧತಿ	[ಹನಿ ನೀರಾವರಿ ಪದ್ಧತಿ/ಕಾಲುವೆ ನೀರಾವರಿ ಇತರೆ]			
8	ಅ) ನಿಮ್ಮಲ್ಲಿ ಕಾಣಬಂದ ಮುಖ್ಯವಾದ ರೋಗಗಳು	▪ ಬುಡ ಕೊಳೆಯುವ ರೋಗ ▪ ಸಿಡಿ ರೋಗ ▪ ಬೇರು ಗಂಟು ಜಂತು ರೋಗ ▪ ಇತರೆ			

ಕ್ರ.ಸಂ.	ಸಾಗುವಳಿ ಕ್ರಮಗಳು	ಅಳವಡಿಕೆ ಮಾಡಿದ ಬೇಸಾಯ ಕ್ರಮಗಳ ವಿವರ	ಅಳವಡಿಕೆ		
			ಸಂಪೂರ್ಣವಾಗಿ	ಅಪೂರ್ಣವಾಗಿ	ಅಳವಡಿಸಿಲ್ಲ
	ಆ) ನೀವು ಅನುಸರಿಸಿದ ರೋಗ ಹತೋಟಿ ಕ್ರಮಗಳು				
	ರೋಗಗಳು				
	ಬುಡ ಕೊಳೆಯುವ ರೋಗ **ಅ. ಸಿಂಪಡಣಾ ದ್ರಾವಣದ ಹೆಸರು** ಕಾರ್ಬನ್‌ಡೈಜಿಮ್ **ಆ. ಪ್ರಮಾಣ/ ಎಷ್ಟು ದಿನಗಳಿಗೊಮ್ಮೆ** ಪ್ರತಿ ಲೀಟರ್ ನೀರಿಗೆ ಶೇ. 50 ಬೆರೆಸಿ ಭೂಮಿಗೆ ಹಾಕಬೇಕು				
	ಸಿಡಿ ರೋಗ **ಅ. ಸಿಂಪಡಣಾ ದ್ರಾವಣದ ಹೆಸರು** ಕಾರ್ಬನ್‌ಡೈಜಿಮ್ **ಆ. ಪ್ರಮಾಣ/ ಎಷ್ಟು ದಿನಗಳಿಗೊಮ್ಮೆ** ಪ್ರತಿ ಲೀಟರ್ ನೀರಿಗೆ ಶೇ. 50 ಬೆರೆಸಿ ಭೂಮಿತ ಹಾಕಬೇಕು				
	ಬೇರು ಗಂಟು ಜಂತು ರೋಗ **ಅ. ಸಿಂಪಡಣಾ ದ್ರಾವಣದ ಹೆಸರು** ಬೇವಿನ ಹಿಂಡಿ/ ಕಾರ್ಬೊಫ್ಯುರಾನ್ 3ಜಿ **ಆ. ಪ್ರಮಾಣ/ ಎಷ್ಟು ದಿನಗಳಿಗೊಮ್ಮೆ** ಬೇವಿನ ಹಿಂಡಿ 12.5 ಕೆಜಿ ಅಥವಾ ಕಾರ್ಬೊಫೂರಾನ್ 3ಜಿ ಯನ್ನು 0.5 ಕೆಜಿ/ಗುಂಟೆ ಬಿತ್ತನೆ ಮೊದಲು ಮಣ್ಣಿನಲ್ಲಿ ಬೆರೆಸಬೇಕು				
	ಇತರೆ				
9	ಅ) ಬೆಳೆಯಲ್ಲಿ ಕಂಡುಬಂದ ಮುಖ್ಯವಾದ ಕೀಟಗಳು ▪ ಥ್ರಿಪ್ಸ್ ▪ ಹೇನು ▪ ಇತರೆ				
	ಆ) ಅನುಸರಿಸುವ ಕೀಟ ಹತೋಟಿ ಕ್ರಮಗಳು				
	ಥ್ರಿಪ್ಸ್ **ಅ. ದ್ರಾವಣದ ಹೆಸರು** ಡೈಮಿಥೊಯೆಟ್ 30 ಇಸಿ **ಆ. ಪ್ರಮಾಣ/ ಎಷ್ಟು ದಿನಗಳಿಗೊಮ್ಮೆ** 1.7 ಮಿ.ಲೀ ನ್ನು ಪ್ರತಿ ಲೀಟರ್ ನೀರಿನಲ್ಲಿ ಬೆರೆಸಿ ಸಿಂಪಡಣೆ ಮಾಡಬೇಕು				
	ಹೇನು **ಅ. ದ್ರಾವಣದ ಹೆಸರು** ಡೈಮಿಥೊಯೊಟ್ **ಆ. ಪ್ರಮಾಣ/ ಎಷ್ಟು ದಿನಗಳಿಗೊಮ್ಮೆ** 2 ಮಿ.ಲೀ. ನ್ನು ಪ್ರತಿ ಲೀಟರ್ ನೀರಿನಲ್ಲಿ ಬೆರೆಸಿ ಸಿಂಪಡಣೆ ಮಾಡಬೇಕು				
	ಇತರೆ				
10	ಹೂಗಳ ಕಟಾವು ಅ) ಕಟಾವಿನ ಸಮಯ ಆ) ಯಾವ ಹೂವಿನಾ–ವಸ್ಥೆಯಲ್ಲಿ ಕಟಾವು ಇ) ಹೂ ಕಟಾವು ವಿಧಾನ	 : ಮುಂಜಾನೆ/ ಸಂಜೆ : ಮೊಗ್ಗಿನಾವಸ್ಥೆಯಲ್ಲಿ ಅಥವಾ ಪೂರ್ತಿಯಾಗಿ ಅರಳಿದಾಗ : ಕೈಯಿಂದ ಆರಿಸುವುದು			
11	ನೀವು ಪಡೆದ ಇಳುವರಿ? (ಪ್ರತಿ ಗುಂಟೆಗೆ ಪ್ರತಿ ವರ್ಷಕ್ಕೆ)				

ಭಾಗ – 3

ಅ) ಸುಗಂಧರಾಜ ಹೂವಿನ ಮಾರಾಟ ಪದ್ಧತಿಗಳು ಮತ್ತು ಕಾರಣಗಳು

ಕ್ರ.ಸಂ.	ಮಾರಾಟದ ಕ್ರಮಗಳು	ಸೂಚಿಸಿದ ಸಲಹೆಗಳು
1	ಮಾರಾಟ ಮಾಡುವ ರೀತಿ 1) ಸ್ಥಳೀಯ ಚಿಲ್ಲರೆ ವ್ಯಾಪಾರಿಗೆ 2) ಕಮೀಷನ್ ಏಜೆಂಟರಿಗೆ 3) ಕಟಾವು ಮುಂಚೆಯೇ ಗುತ್ತಿಗೇದಾರರಿಗೆ 4) ಇತರೆ	
2	ಸ್ಥಳೀಯ ಚಿಲ್ಲರೆ ವ್ಯಾಪಾರಿಗೆ ಮಾರಲು ಕಾರಣವೇನು? 1) ಹೆಚ್ಚು ಲಾಭ ನಿರೀಕ್ಷಿಸುವುದರಿಂದ 2) ಗೊತ್ತಿರದ/ಮುಂದೆ ನೋಡದ ನಷ್ಟವಾಗುವುದೆಂದು 3) ತುರ್ತು ಸಮಯದಲ್ಲಿ ಮನೆಯ ಖರ್ಚಿಗಾಗಿ ಹಣದ ಅತಿ ಅವಶ್ಯಕತೆ ಇರುವುದರಿಂದ 4) ಇತರೆ	
3	ಕಮೀಷನ್ ಏಜೆಂಟರಿಗೆ ಮಾರಲು ಕಾರಣ? 1) ಮುಂಗಡವಾಗಿ ಹಣ ಪಡೆದು ಆ ಹಣವನ್ನು ತುರ್ತು ಅಗತ್ಯಗಳನ್ನು ಪೂರೈಸಲು ಮತ್ತು ಬೇಸಾಯ ಮಾಡಲು ಉಪಯೋಗಿಸಿಕೊಳ್ಳಬಹುದು. 2) ಹೂ ಶೇಖರಣಾ ವ್ಯವಸ್ಥೆ ಒದಗಿಸುವುದರಿಂದ 3) ಉತ್ತಮ ಬೆಲೆ ಪಡೆಯುವುದರಿಂದ 4) ಇತರೆ	
4	ಕಟಾವು ಮುಂಚೆಯ ಗುತ್ತಿಗೆದಾರರಿಗೆ ಮಾರಲು ಕಾರಣ? 1) ಮುಂಗಡವಾಗಿ ಹಣ ಪಡೆಯಲು 2) ಸಾಗಾಣಿಕೆಯ ಕೊರತೆ 3) ಕಟಾವು ಮಾಡಲು ಕೂಲಿಕಾರರ ಕೊರತೆ 4) ಮಾರುಕಟ್ಟೆಗೆ ಹೋಗಿ ಮಾರಾಟಮಾಡಲು ಸಮಯದ ಕೊರತೆ ಇರುವುದರಿಂದ 5) ಬೆಲೆಯ ಅಸ್ಥಿರತೆಯ ಭಯ 6) ಇತರೆ	
5	ತಾವು ಮಾರುಕಟ್ಟೆ ಮಾಹಿತಿಯನ್ನು ಯಾವ ಮೂಲಗಳಿಂದ ಪಡೆದುಕೊಳ್ಳುವಿರಿ?	
6	ನೀವು ಹೂಗಳ ವರ್ಗೀಕರಣ ಮಾಡುತ್ತೀರಾ? (ಹೌದು/ಇಲ್ಲ) ಹೌದಾದರೆ ಎಷ್ಟು ತರಹದ ವರ್ಗೀಕರಣ ಮಾಡುತ್ತೀರಿ?	
7	ಹೂ ತುಂಬಿಡುವ ಪದ್ಧತಿ ಅ) ಬಿದಿರಿನ ಬುಟ್ಟಿಯಲ್ಲಿ ಆ) ಗೋಣಿ ಚೀಲಗಳಲ್ಲಿ ಇ) ಬಟ್ಟೆಯಲ್ಲಿ ಈ) ಪ್ಲಾಸ್ಟಿಕ್ ಚೀಲ ಉ) ಇತರೆ	

ಆ) ಸಾಗುವಳಿ ಮತ್ತು ಮಾರಾಟದಲ್ಲಿ ಎದುರಿಸುತ್ತಿರುವ ಸಮಸ್ಯೆಗಳು

ಕ್ರ.ಸಂ.	ಸಮಸ್ಯೆಗಳು	ಸೂಚಿಸಿದ ಸಲಹೆಗಳು
1	ಅ) ಸಾಗುವಳಿ ಕುರಿತಾದ ಸಮಸ್ಯೆಗಳು 1) ಬೀಜದ ಅಲಭ್ಯತೆ ಕುರಿತು ಅ) ಹೇರಳವಾಗಿ ಸಿಗುವುದಿಲ್ಲ ಆ) ಗುಣಮಟ್ಟದ್ದಾಗಿರುವುದಿಲ್ಲ ಇ) ದುಬಾರಿ ಈ) ಇತರೆ 2) ದುಬಾರಿಯಾದ ರಸ ಗೊಬ್ಬರಗಳು 3) ಅತಿಯಾದ ಕೀಟಗಳು/ರೋಗಗಳ ಸಮಸ್ಯೆ 4) ದುಬಾರಿ ಕೀಟ/ರೋಗ ನಾಶಕಗಳು 5) ಮಿತವಾದ ಹಾಗೂ ಅವ್ಯವಸ್ಥಿತ ವಿದ್ಯುತ್ ಪೂರೈಕೆ 6) ತಂತ್ರಜ್ಞಾನದ ಅಲಭ್ಯತೆ/ ತಂತ್ರಜ್ಞಾನ ಮಾರ್ಗದರ್ಶನವಿಲ್ಲದ್ದರಿಂದ 7) ಕೂಲಿಯಾಳುಗಳ ಕೊರತೆ 8) ಇತರೆ	
	ಆ) ಮಾರಾಟ ಸಂಭಂದಿತ ಸಮಸ್ಯೆಗಳು 1) ಮಾರುಕಟ್ಟೆಯ ಮಾಹಿತಿಯ ಕೊರತೆ 2) ಸಾಗಾಣಿಕಾ ಸೌಲಭ್ಯದ ಸಮಸ್ಯೆ 3) ಬೆಲೆಯ ಅಸ್ಥಿರತೆ 4) ಮಧ್ಯವರ್ತಿಯಿಂದ ವಂಚನೆ 5) ಸುಗಂಧರಾಜ ಹೂ ಮಾರಾಟಕ್ಕಾಗಿ ಪ್ರತ್ಯೇಕ ಮಾರುಕಟ್ಟೆ ಇಲ್ಲದಿರುವುದು 6) ಹೂ ಶೇಖರಣಾ ಸೌಲಭ್ಯ ಇಲ್ಲದಿರುವುದು 7) ಇತರೆ	

ಭಾಗ – 4

ಈ ಕೆಳಗಿನ ಯಾವ ಕಾರಣಗಳಿಂದ ನೀವು ಸುಗಂಧರಾಜ ಸಾಗುವಳಿ ಮಾಡಲು ಪ್ರೇರಿತರಾಗಿದ್ದೀರಿ.

1) ಬೆಳೆ ಸಂಬಂಧಿತ ಕಾರಣಗಳು

ಅ) ಬೀಜಗಳು ಸುಲಭವಾಗಿ ದೊರೆಯುತ್ತವೆ.

ಆ) ಇತರೇ ಹೂಗಳಿಗೆ ಹೋಲಿಸಿದರೆ ಕಡಿಮೆ ಖರ್ಚು

ಇ) ಸುಲಭವಾದ ಬೆಳೆ ಸಾಗುವಳಿ

2) ವಾತಾವರಣ ಸಂಬಂಧಿತ ಕಾರಣಗಳು

ಅ) ಅನುಕೂಲಕರ ವಾತಾವರಣ

3) ಮಾರಾಟ ಸಂಭಂದಿತ ಕಾರಣಗಳು

ಅ) ಲಾಭದಾಯಕ ಬೆಳೆ

ಆ) ಸ್ಥಳೀಯ ಮಾರುಕಟ್ಟೆಗೆ ಮಾರಲು ಹೆಚ್ಚಿನ ಅವಕಾಶ

ಇ) ಮಾರುಕಟ್ಟೆಯಲ್ಲಿ ಒಳ್ಳೆಯ ಬೇಡಿಕೆ

ಈ) ಮಾರುಕಟ್ಟೆ ಸಮೀಪವಿರುವುದರಿಂದ

4) ಸಂಸ್ಥೆಗಳಿಗೆ ಸಂಭಂದಿತ ಕಾರಣಗಳ

ಅ) ತಂತ್ರಜ್ಞಾನದ ಸಹಾಯ

ಆ) ಕೃಷಿ ಮಹಾವಿದ್ಯಾಲಯದಿಂದ ಸಹಾಯ

ಇ) ತೋಟಗಾರಿಕಾ ಇಲಾಖೆಯಿಂದ ಸಹಾಯ

5) ಸರಕಾರದಿಂದ ಸಹಾಯ ಧನ

6) ಗೆಳೆಯರಿಂದ / ಕುಟುಂಬದವರಿಂದ ಪ್ರೇರಣೆ.

ANALYSIS OF PRODUCTION AND MARKETING OF TUBEROSE IN NORTH KARNATAKA

USHA C. BENNUR **2015** **Dr. A. BHEEMAPPA**
Major advisor

ABSTRACT

The present study on analysis of production and marketing of tuberose in Belgaum, Haveri and Dharwad districts was conducted during 2014-15. Based on simple random sampling the selected 120 tuberose growers were interviewed using structured interview schedule.

The results showed that nearly fifty percent of tuberose growers (46.67%) had small land holding and 3-4 years of experience in tuberose cultivation (45.83%). More number of farmers were middle aged (55.00%), educated (79.33%) and observed in medium level of risk orientation and innovativeness (46.67%), followed by cosmopoliteness (43.33%) and economic motivation (40.00%).

The overall knowledge about recommended cultivation practices of tuberose revealed that comparatively more number of farmers had medium level of knowledge (39.17%). Further detailed analysis of knowledge about individual cultivation practices indicated that all the farmers had knowledge of suitable soil, pest and diseases and harvesting of flowers. Similarly, majority (85.00%) of growers had knowledge of recommended varieties (85.00%), inter row and intra row spacing (80.00% and 68.33% respectively) and expected yield (80.83%).

The analysis of overall adoption of recommended cultivation practices of tuberose showed that more number of farmers (44.17%) were noticed in low adoption category. Further, adoption of individual practices revealed that all the farmers grown tuberose in recommended soil and planted recommended size of bulb and harvesting practices.

Availability of suitable soil (100.00%), water (64.17%) and easy maintenance (50.83%) were the major motivating factors for growing tuberose. In marketing of flowers comparatively more number of farmers preferred to market flowers through Channel-2 (Producer-Commission agents-Retailers-Consumers) due to the advantage of getting more number of buyers (92.30%). Majority of tuberose growers followed recommended method of grading flowers (89.17%) and packing of flowers (76.67%). Incidence of pest and disease (53.33%) and exploitation by middlemen (56.67%) were the major constraints in production and marketing of tuberose.