B.A. VI SEMESTER

PROJECT REPORT

ON

GLIMPSES OF FLORICULTURE IN KARNATAKA WITH SPECIAL REFERENCE TO ORCHIDS

RANI CHANNAMMA UNIVERSITY BELAGAVI

GEOGRAPHY PRACTICAL EXAM APRIL 2017

FIELD WORK AND PROJECT REPORT

ON

"GLIMPSES OF FLORICULTURE IN KARNATAKA – SPECIAL REFERENCE TO ORCHIDS"

SUBMITTED BY

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CERTIFICATE

This is to certify that Mr. / Miss._____ Seat No. _____of B.A. Sixth semester Rani Parvati Devi College of Arts & Commerce, Belgaum has successfully completed Geography Practical Paper II - Field work and project report, prescribed by Rani Channamma University Belagavi for B.A. sixth semester examination in the Geography Laboratory during the academic year 2016-17. The project work carried out by he/her is satisfactory.

Date: 20.04.2017

_____ _____

Project incharge HOD

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DECLARATION

I declare that the report on ***"Glimpses of Floriculture in Karnataka – special reference to Orchids"*** prepared by me under the guidance and supervision of Dr. Abhay M. Patil, Head of the Department of Geography, R.P. D. College, Belagavi during the course of exercises in **PRACTICAL GEOGRAPHY** prescribed by the Rani Channamma University, Belagavi during the year April 2017 is relevant to the best of my knowledge.

Belagavi _____

20-04-2017 Signature

ACKNOWLEDGEMENT

I express my deep sense of gratitude and indebtedness to my beloved teacher Dr. A.M. Patil, Head of the Department of Geography, RPD College, Belgaum for his incessant encouragement, keen observation, guidance and valuable suggestions in the preparation of this project report and for the field survey. I am also thankful to Dr. M. S. Kurani and Smt. S.I. Kittali for their valuable suggestion towards this project work. I extend my sincere thanks to Dr. (Smt.) S.P. Surebankar, Principal R.P.D. College, Belagavi for her inspiration and encouragement for the completion of this project work.

I extend my sincere gratitude to RPD College Library, which has a good collection of books and its staff whose cooperation helped me a lot in the preparation of this project. I am also grateful to Shri. Pradeep Bhagi the proprietor of Vatika Floritech Khanapur for his valuable information. I extend my sincere thanks to Shri. S. L. Bhangennavar department of Kannada for helping the students during the field visit. I also thank all my friends for their cooperation during the field survey.

Belagavi _____

20-04-2017 Signature

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GLIMPSES OF FLORICULTURE IN KARNATAKA - WITH SPECIAL REFERENCE TO ORCHIDS

I. THE HISTORY OF FLOWERS:

The history of flowers is older than of humans. Flowers are ubiquitous. Virtually, every non-meat food that we eat starts as a flowering plant somewhere. Even the cotton clothes we wear come from flowering plants. Flowers appeared on earth about 130 million years ago, during the Crustacean period. Humans are believed to have existed for a mere two hundred thousand years. Once flowers took firm root about 100 million years ago, they quickly diversified into some 250,000 species. Flowering plants have the botanical name of 'angiosperm.' Angiosperms enclose their seed in fruit, and each fruit contains one or more carpels. Carpels are hollow chambers that protect and nourish the seeds. The oldest fossil of an angiosperm was discovered in China in sediments that date back to 130 million years. It was so primitive that it had not developed the lovely flower that is typical of a flowering plant. It is still considered a flowering plant since it had carpels enclosing seeds that grew into fruits. The first angiosperms are believed to have evolved in areas where there were ecological disturbances like floodplains and volcanic regions. They were slow growing and had short life cycles. Thus, they matured and reproduced and multiplied much faster than trees. As they seeded

quickly, they also evolved faster than other plants that were their competitors. Scientists believe that petals evolved 30 to 40 million years after the first angiosperms evolved. Once this happened, the angiosperms had the distinct advantage over all the other plants, as they attracted the birds and the bees, which, in turn, pollinated them. The world must have started bustling with activity with butterflies and bees and insects swarming everywhere. When this happen some 70 to 100 million years ago, the number of flowering species on Earth exploded. By the time the first flowering plant appeared, plant-eating dinosaurs had been around for a 100 million years. Dinosaurs were eating these and when the dinosaurs became extinct, another group of animals took their place—the mammals, which dispersed the angiosperm fruits, nuts and many vegetables. Now, the flower kingdom and the human race depended on each other.

II. INTRODUCTION

Flowers have always been an integral part of Indian culture. But, floriculture as a business proposition has not received the attention it deserves. This industry is still in a nascent stage and the potential remains untapped. Floriculture is an art, science and business of growing and marketing flowers. As an art, it refers to the cultivation of flowers; as a science it systematically studies botanical aspects of flowers and plants; and as a business it deals with the costs of production and

income from flower production and marketing. The term flowers is used to cover flowers – both fresh and dried – as also ornamental plants and the filling material/foliage used for floral decorations. It can be defined as "a specialized branch of horticulture which deals not only with the cultivation of flowers, foliage, climbers, trees, shrubs, cacti, succulents, etc., but also with their marketing and production of value-added products from them" OR it is defined as "a discipline of horticulture concerned with the cultivation of flowering and ornamental plants for gardens and floristry, comprising the floral industry. It includes bedding plants, flowering plants, foliage plants or house plants, cut greens and cut flowers". It can also be defined as the branch of horticulture that deals with the cultivation of flowering and ornamental plants for sales or for use as raw materials in cosmetic industry. Demands for floricultural products are steadily increasing both in the domestic as well as export markets. The floriculture business is growing in the world at around 6-10 % per annum. In spite of a long tradition of floriculture, India's share in the International market for these flowers is negligible (at present it is < 0.70 %). Recently India has made significant improvement in the production of flowers, particularly cut flowers, which have good potential for export. Floriculture is important from the economic perspective as well. Commercial floriculture has been steadily increasing with increased use of protected cultivation employing greenhouse, shade nets, poly-house etc.

Commercial flowers cultivation in India provides an opportunity for rural development owing to its higher returns per unit area and the new employment opportunities. India has a scope to bridge the gap between demand and supply as global demand of floricultural products is growing at a faster rate. India is enriched with diverse agro-climatic conditions such as, fertile land, suitable climate, abundant water supply, low labour cost, availability of skilled manpower, etc. which are quite beneficial for growing a variety of flower plants throughout the year. During the last few years, taking an advantage of the incentives offered by the Government of India, a number of Floriculture units were established in India for producing and exporting flowers to the developed countries. Most of them are located near Mumbai, Pune, Bengaluru, Hyderabad and New Delhi and are getting the technical know-how from Dutch as well as Israeli Consultants. As far as Karnataka's floriculture is concerned, although the state in general apparently enjoys several natural and infrastructural advantages over the other states Karnataka ranks first in the country in the production of traditional and modern flowers as well as in export of cut flowers. The area under flowers – both loose and cut - has increased from about 4 thousand hectares in 1978-79 to 23 thousand hectares in 2006-07, out of this about 200 hectare area is under hi-tech floriculture. During the same period, the production has increased from 21 thousand tons to 1.92 lakh tons valued about Rs.360 crore. In terms of its share in

the country, Karnataka accounted for 27 per cent of the area and 35 per cent of the production during 2003-04. The conducive climate prevailing in the 6 agro-climatic regions spread across 10 Zones in the state is responsible for this impressive growth. The growth of this crop in the state is also highest compared to other food crops as well as horticultural crops. On the export front, its performance is commendable. In 1999-2000, about 58 million stems were exported from the state, fetching Rs.41 crore in foreign exchange which accounted for about 50 per cent of the country's total flower exports and formed about 2 per cent of the total agricultural exports of Karnataka. However, the growth within the state has not been uniform across the districts. Hi-tech floriculture is concentrated in not more than 10 of the present 30 districts in the state, although the cultivation of traditional flowers is fairly well spread across all the districts. The country's first and the only Digital Flower Auction Centre is located in Bengaluru, running by Karnataka Agro Industrial Corporation (KAIC) at Hebbal.

III. IMPORTANCE OF FLORICULTURE IN INDIA:

Besides food and nutritional security, the aesthetic value is also equally important for our daily lively hood as well as for environmental purity. Floriculture is important from the following point of view; Economic point of view, Aesthetic point of view and Social point of view

a. Economic Point of View:

- Floriculture is a fast emerging major venture in the world, especially as a potential money-spinner for many countries in world.
- Many flowers and ornamental plants are being grown for domestic as well as for export market will provide more return/unit area than any other agricultural/horticultural crops. For example in markets such as Delhi and Mumbai and other metros a single spike of gladiolus and gerbera cutflower may sell upto Rs. 3-5 in Kharif and Rs. 5-10/spike in Rabi/Summer.
- Gestation period of flower crop is very less compared to other crops.
- Modern-day floriculture refers to the production of high-value cutflowers such as rose, gladiolus, carnation, mums, orchids, tuberose, anthurium, lilium, gerbera etc,.
- Now days, growing of these cutflower crops, suited for flower arrangements/decorations for bouquets preparation and for floral boskets, have increased substantially and its share of the total trade has also improved.
- The sale of loose flowers of Jasmine, Crossandra, Marigold, China Aster, Chrysanthemums, Berlaria and Gaillardia etc., are a roaring busyness in south India.

- The present trend in floriculture is for making dry flowers, extraction of natural colours and essential oils.
- There is lot of demand for good quality flower seeds and ornamental planting materials. At present the global ornamental crop industry is worth about US$ 70 billion.
- The global consumption of the flowers is about US$ 35 billion. More than three lakhs hectare area is under flower production in different countries of the world.
- Floriculture generates self employment opportunities round the year. The employment opportunities in the field are varied such as.
    i. One can join the floriculture field as farm/estate managers, plantation experts, supervisors and project coordinators and so on.
    ii. Teaching, Research and Extension scientists/ teachers are some other avenues of employment in all SAUs and NARS.
    iii. Marketing of Floriculture products for different ventures is emerging as a potential segment of this field.
    iv. Besides, one can also work as consultant, landscape architect etc with proper training.
    v. One can also work as entrepreneur and offer employment to others.
    vi. In addition to these careers which involve research and actual growing of crops.

vii. Floriculture also provides service career opportunities which include such jobs like floral designers, grounds keepers, landscape designers, architects and horticultural therapists.

viii. Professional qualification combined with an inclination towards gardening and such other activities produces efficient floriculturists and landscaping professionals all over the globe. Presently more than 145 countries are involved in flower production on commercial scale.

b. Aesthetic Point of View:

- Lot of scope for landscaping and is considered as billion dollar earning industry in states which ultimately adds the monitory value of any building/property.
- The wealth of any nation is linked with the health of its people. Unless we can ensure the healthy development of our citizens, especially for the younger generation, by providing them for open breathing places through bio-aesthetic planning like in Chandigarh city and landscape gardening, we cannot expect to build up a healthy society and prosperous nation.
- Horticultural therapy - is the new dimension of horticultural sciences to heal the psychic debility and the science is to use garden, landscape plants, parts of plants, growing activity as tools to work.
- The bio-force of plants offer a permanent solution to the problems of bio force of human thus, bio aesthetic horticulture is emerging as a new

occupational therapeutic tool to restore the lost rhythm and harmony back to human self or inner environment.

- It is being utilized in psychiatric hospitals, general hospitals and physical rehabilitation centers, homes for elderly, prisons and schools. The patients can achieve higher level of personal development and satisfaction.

c. Social Point of View:

- Flowers symbolize the purity, beauty, peace, love, adoration, innocence and passion etc. Hence, many flowers are used to express the most sensitive, delicate and loving feelings eloquently what our words fail to express.
- In our society no social function is complete without the use of flowers, floral ornaments, bouquets or flower arrangements they are invariably used in all social functions. Used in social gatherings, birthday parties, welcoming friends or relatives and honoring dignitaries. The concept of Valentine's Day is fast catching up in India also. The arrival of new born is rejoiced with flowers.
- To an Indian, especially for Hindu's, flowers have a much greater significance in religions offerings. It has estimated that more than 30-40 % of the total flower productions are being consumed in Kolkata city alone used for worshiping purpose.

- Floral garlands, gajras and venis are required in marriage ceremonies for adornment of hairs by women of all ages, especially in the south India.
- In the present modern era sicks are wished for speedy recovery by offering beautiful cutflowers, while the deads are bidden farewell with flowers along with tear of sorrow.
- Flowers are very closely associated with mankind from the dawn of human civilization. There is increasing habit of saying with flowers "Any Indians born with flowers live with flowers and finally dies with flowers".

IV. SIGNIFICANCE OF THE STUDY

The study based on field survey of a representative sample of the existing high-tech floriculture enterprises across Khanapur Taluka of Belgaum district. The study is intended to provide a database on the costs, returns, profitability and export prospects as well as problems of high-tech floriculture in Karnataka, which could be of great use for professionals, academicians, policy makers and stakeholders including financial institutions.

V. SCOPE OF THE STUDY:

Floriculture in India comprises both traditional and modern flower crops. Most traditional flowers are grown in open fields while modern flowers are grown

under protected conditions. The traditional flowers grown in the open include chrysanthemum, jasmine, crossandra, rose, tuberose, aster, marigold, champaka, etc. A large number of small and marginal farmers as well as small traders (forming the unorganized sector) are eking out a living in the sector compared to hi-tech floriculture. The traditional flowers are grown in all districts of the state. The traditional floriculture is still predominant in the state in terms of area and production. However, there are a few exceptions to this general practice in Karnataka. For instance, roses (as cut flowers) are also grown by small and marginal farmers under open conditions, while traditional flowers like chrysanthemum are grown by large growers under poly-house conditions. The chief flowers grown under greenhouse conditions are rose, gerbera, carnation, bird of paradise and anthurium. The present study is to focus on the hi-tech floriculture in Karnataka with special reference to Khanapur taluka of Belgaum District.

VI. METHODOLOGY :

The study was based on both the primary and secondary data. Secondary data has been collected from published sources and primary data has been collected from the field survey made by the students. The secondary data relating to area, production and other information has been collected from the published sources.

STUDY AREA (for collection of primary data):

Because of the favourable climate and easier access to the market the cut-flower cultivation in Karnataka is concentrated in the districts of Bangalore (both urban and rural), Belgaum, and Kodagu. Hence, only Belgaum district was selected for this study. The agro-climatic feature of this district is presented below. Belgaum district: Belgaum district is located in the interior of the Deccan Peninsula and lies between North Latitude 15° 23′ and 16° 58′ and East Longitude 74° 05′ and 75° 28′. Climate wise the district is divided into three zones viz. Hilly zone, North transition zone, North dry zone. The average annual rainfall distribution is 808 mm. The temperature ranges from 19.50 C to 35.70 C. There are three main types of soils namely black, red sandy and sandy loam. The soils are slightly acidic and are good in organic matter. The main food crops are jowar, paddy, bajra, maize, wheat and other cereals. Among the commercial crops tobacco, cotton, sugarcane are more popular. Major fruit crops grown are grape, mango, sapota, guava, papaya and pomegranate.

VII. COLLECTION OF DATA:

The primary data required for the study were collected by the survey method from the sample flower grower by the personal interview method using a pre-tested structured schedule. In order to get better co-operation and reliable data from the

respondents, the purpose of the study was clearly explained to the respondents prior to the interview. The schedule used for interview was structured in such a way as to obtain information on inputs used, cost of inputs, production materials, creation of the structure for the greenhouse. The information regarding orchids was also gathered from the respondents.

Sampling: A list of village growing flowers in Belgaum district was obtained from the Department of Horticulture, Government of Karnataka. Keeping in view commercial production of cut flowers under greenhouse condition and the financial as well as time constraints of the students, Khanapur taluka of Belgaum district was selected for the study of Orchids.

VIII. PEEP INTO HISTORY OF FLORICULTURE IN KARNATAKA

Karnataka is well known for floriculture right from the 18th century onwards. During Hyder Ali and Tippu Sultan periods and also during the regime of Mysore kings, floriculture received great impetus and the colonial government also evinced lot of interest in this sector. The Lalbagh and Cubbon Parks established in Bangalore and the Brindavan Gardens established in Mysore in the early 20th century are testimony to these efforts. The flower shows are organized by the Mysore Horticultural Society, Bangalore twice a year at the historic Lalbagh Glass House. Farmers in the state were also started growing various traditional flowers

due to the positive encouragement by different rulers. These flowers are being grown either for domestic consumption or for trade in the domestic markets within their vicinity. The roads and railways have been used to transport these flowers. The farmers in the state have been growing traditional flowers such as rose, chrysanthemum, tuberose, aster, jasmine, crossandra, marigold, champaka, gladiolus, and bird of paradise in the open fields. Some of these flowers are also being cultivated as cut-flowers in recent years. Rose, carnations, gerbera, and anthurium were grown under protective covers and these have gained momentum in the last 10 years. Recently, new crops like lilies, calla lily, iris, limonium, alstroemeria gypsophila, liatris, lisianthus and freesia have also emerged as potential cut-flowers in the state. Modern cut-flowers are relatively better in quality, have longer vase life and always fetch high unit price in the market. All these new trends have turned floricultural activity as an important agri-business activity in the state.

IX. FLORICULTURE DEVELOPMENT IN KARNATAKA

a. Area and production of flowers

There has been a steady increase in the area under commercial flowers in Karnataka (Table 1 and 2). The area has increased from 12,000 hectares in 1990-91 to 21,000 hectares in 2004-05 with a compound growth rate of 3.72 percent per

annum. However, the area had come down to 18,000 hectares in 2002-03 from 21,000 hectares in the year 2001-02 due to drought. The production of commercial flowers increased from mere 61,000 tons to 151,000 tons during the same period with a compound growth rate of 6.59 per cent per annum. Thus, although the growth in the area under flower crops has increased at a slow pace, flower production has gone up at a fairly brisk pace. Today, Karnataka is a major floricultural product growing states in the country with 21,801 hectares and a production of 124,440 tonnes of lose flowers accounting for 24.48 per cent of the country's total area and 23.44 per cent of the production in 1999-2000. If we examine the trends over a period of time, we find rapid increase in both area and production. The area under traditional floriculture increased from 0.05 lakh hectares in triennium ending 1982-83 to 0.22 lakh hectares in triennium ending 1999-2000 with an increase of 0.17 lakh hectares or by 340 per cent. The production has increased from 0.30 lakh tones in triennium ending in 1978-79 to 1.51 lakh tones in triennium ending 1999-2000 with an increase of 1.02 lakh tones or by 240 per cent. This increase is 100 per cent high compared to the area expansion during this period. Similar increase is found in all districts of the state, which falls under different agro-climatic regions. However, the central zone comprising of Bangalore, Kolar, Chitradurga, and Tumkur accounted for major increase.

Table 1: Trends in Area and Production of Commercial Flowers

1990-91 to 2004-05

Sl. No.	Year	Area ('000' he)	Prod. ('000' tons)	Sl. No.	Year	Area ('000' he)	Prod. ('000' tons)
1	1990-91	12	61	9	1998-99	21	128
2	1991-92	13	73	10	1999-00	21	132
3	1992-93	14	81	11	2000-01	21	157
4	1993-94	15	86	12	2001-02	21	157
5	1994-95	17	102	13	2002-03	18	147
6	1995-96	19	108	14	2003-04	21	151
7	1996-97	21	116	15	2004-05	21	151
8	1997-98	19	97		CGR	3.72	6.59

Source: National Horticulture Board, Bangalore

Table 2: District-wise Annual Compound Rates of Area and Production of Floriculture (Between 1980-81 and 1999-2000)

Districts	Area	Prod.	Districts	Area	Prod.
Belgaum	9.53	9.79	Chitradurga	5.18	6.69
Bellary	4.48	5.60	Tumkur	3.37	5.55
Bidar	19.55	19.48	**Central Region**	7.10	9.04
Bijapur	10.37	11.54	Mandya	14.44	16.41
Dharwar	12.55	9.77	Mysore	9.00	8.41
Gulbarga	9.05	5.68	Hassan	9.30	7.47
Raichur	10.99	9.25	**Southern Region**	10.26	10.61
Northern Dry Region	9.82	10.00	U Kannada	7.28	4.25
Bangalore Urban	14.82	20.69	D.Kannada	7.81	8.17
Bangalore Rural	11.83	16.33	Chikkamagalur	7.03	0.47
Bangalore	11.36	13.96	Kodagu	12.33	5.46
Kolar	4.99	5.31	Shimoga	7.71	6.40
			Hills and Coastal Region	8.43	4.95

Table 3: Percentage Shares of Different Commercial Flowers 2006-07.

Sl. No.	Flower	Percentage to total area	Percentage to total Production	Percentage to total Value of Production
1	Aster	6.59	7.69	4.21
2	Crossandra	9.10	5.11	6.10
3	Marigold	24.19	28.99	11.66
4	Jasmine	19.19	14.71	25.42
5	Chrysanthemum	17.28	28.56	23.39
6	Tuberose: Single	4.13	4.74	5.07
7	Tuberose: Double	0.65	0.14	0.22
8	Gladiolus	0.92	0.25	0.91
9	Rose	7.75	2.28	5.56
10	Bird of Paradise	0.20	0.03	0.01
11	Salldago / Golden Rod	0.10	0.03	0.07
12	Calla Lilly	0.02	0.01	0.67
13	Orchids	0.02	0.01	0.67
14	Carnation	0.74	0.04	0.79
15	Anthurium	0.16	0.05	1.38
16	Gerbera	0.30	0.04	0.17
17	Statice: Free flowering variety	0.29	0.05	0.01
18	Statice: Seasonal variety	0.21	0.02	0.01
19	Other Flower Crops	8.18	7.26	14.36
Total - Commercial Flower Crops		100	100	100

Source: Government of Karnataka, Dept. of Horticulture, Bangalore

b. Crop-wise area and production of commercial flowers

The latest data (Table 4 and 5) shows that the total area under commercial flowers in 2006-07 was 23,017 hectares with a production of 1,91,940 tons. The area under flowers was dominated by Marigold with almost a quarter of the total area under flowers (24.19%), followed by Jasmine (19.19%) and chrysanthemum (17.28%).

Most of the small farmers grow these traditional flowers under open conditions. Production of marigold was the highest (44397 tons) in the year 2004-05 followed by chrysanthemum (41843 tons) and Jasmine (27586 tons). From the point of view of the value of flowers produced, jasmine accounted for the highest proportion of the total value of flowers, 25.42 percent, followed closely by Chrysanthemum, with 23.39 percent among cut flowers, rose occupies the first position in the area (1815 hectares) followed by Carnation (173 hectares), gerbera (71 hectares), bird of paradise(47 Hectares) and Anthurium (37 hectares). Production of rose stood at 4510 tons in the year 2006-07, while that of anthodium, carnation and gerbera was 97, 73 and 71 tons respectively.

c. New Flower Auction Centres in Karnataka

To tap the potential in the floriculture sector, the Union Government has sanctioned six flower auction centres to the State under the Rashtriya Krishi Vikas Yojana (RKVY). The centres would come up at Sirsi in Uttara Kannada; Madikeri in Kodagu; Chikkanayakanahalli in Tumkur; apart from Udupi, Belgaum and Bagalkot. These districts are known for large areas under floriculture, and several people in the floriculture business have set up hi-tech units. Flower growers lacked awareness about market conditions because of poor linkages in the distribution chain and had poor access to cold storage facilities, leading to seasonal

gluts and price variation. The auction centres provided all facilities, including storage. There is considerable scope for tapping the Rs. 600-crore domestic market in the floriculture sector. At present, only 2.5 per cent of the flower sales were in the organised retail sector.

Table 4: Crop-Wise Area, Production and Value of Commercial Flowers 2006-07

Sl. No.	Flower	Area in Hectares	Production Tons	Value of production
1	Aster	1542	15203	1498
2	Crossandra	2131	10112	2174
3	Marigold	5664	57329	4151
4	Jasmine	4493	29090	9052
5	Chrysanthemum	4046	56474	8329
6a	Tuberose: Single	966	9382	180
6b	Tuberose: Double	152	272	78
7	Gladiolus	216	498	323
8	Rose	1815	4510	1980
9	Bird of Paradise	47	61	3
10	Salldago / Golden Rod	24	62	26
11	Calla Lilly	5	16	240
12	Orchids	0.2	0.2	1
13	Carnation	173	73	283
14	Anthurium	37	97	492
15	Gerbera	71	71	62
16a	Statice: Free flower flowering Variety	67	94	3
16b	Statice : Seasonal variety	50	39	1
17	Other Flower Crops	1916	14349	5113
Total - Commercial Flower Crops		23,017	1,91,940	35,953

Table 5: Percentage Shares of Different Commercial Flowers in the Total Floriculture Area, Production and Value in Karnataka 2006-07.

Sl. No.	Flower	Percentage to total Area	Percentage to total Production	Percentage to total Value of production
1	Aster	6.59	7.69	4.21
2	Crossandra	9.10	5.11	6.10
3	Marigold	24.19	28.99	11.66
4	Jasmine	19.19	14.71	25.42
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6a	Tuberose: Single	4.13	4.74	5.07
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8	Rose	7.74	2.27	5.56
9	Bird of Paradise	0.20	0.03	0.01
10	Salldago / Golden Rod	0.10	0.03	0.07
11	Calla Lilly	0.02	0.01	0.66
12	Orchids	0.01	0.01	0.01
13	Carnation	0.74	0.04	0.79
14	Anthurium	0.16	0.05	1.38
15	Gerbera	0.30	0.04	0.17
16a	Statice: Free flower flowering Variety	0.29	0.05	0.01
16b	Statice : Seasonal variety	0.21	0.02	0.01
17	Other Flower Crops	8.18	7.26	14.36
Total Commercial Flower Crops		100	100	100

d. Trends in Hi-tech Floriculture Karnataka is a pioneer state in India in the cultivation of commercial flowers. Although the commercial flowers occupy hardly 1.5% of the total area under horticulture crops in the State, they generate an annual revenue of over 300 crore. This speaks of the high remunerative nature of

the commercial flower crops. The average size of holding of the traditional flower crops is hardly half an acre. As many as 50,000 farm families are totally depending on flower cultivation in the State, and more than 2 lakh people are indirectly involved in the flower trade (Thippaiah, 2005). Hi-tech flower cultivation in India first started in Karnataka. During 1960s itself, M/s. Indo American Hybrid Seeds, Bangalore, started producing flowers in the green house. Perhaps, this is the beginning of hi-tech floriculture in India. This success story paved way for large scale hi-tech flower production during the 1990s. Even now, Karnataka is the leading hi-tech flower producer in the country, with a share of over 40% of the total production. The first flower to be brought under protected cultivation was rose which, even today, is the leading cut flower produced in the State. The other cut flowers such as gerbera, carnation, green house chrysanthemum, anthurium and orchids are also under hi-tech cultivation. There are at present over 100 hi-tech units in Karnataka (Table 6) with a total value of cut flowers of over Rs.70 crore per annum. Some cut flowers are grown under open conditions also, the most important among them being: rose, gladiolus, bird of paradise, statice, golden rod, gypsophyla, limonium, double tuberose, etc. The estimate is that more than 200 small farmers are involved in the production of cut flowers under open conditions. In the wake of liberalization and globalization, thrust was given to hi-tech floriculture. About 170 hi-tech floriculture units were established in the country. In

Karnataka, 35 units accounting for about 21 per cent of the country's total, covering an area of 150 hectares with an investment of Rs.500 crore were started by private entrepreneurs and corporate houses (GOK, 2000). Most of these units were concentrated particularly around Bangalore and Kolar. Out of the 35 units that came up in Karnataka, 14 were located in one taluka, i.e., Doddaballapur taluka of Bangalore rural district. These 14 units purchased altogether about 250 hectares at the cost of about Rs. 45,000 per hectare in the mid-nineties. But the actual average flower cultivated area is 3.21 hectares investing about Rs. 3 crore per hectare (Thippaiah, 2005). Thus, there is considerable underutilization of capacity especially among the first generation units. Besides these, another 50 cost-effective green houses (protective shade net) came up in the regions around Bangalore (Roses), Belgaum (Carnation, Gerbera), Kodagu (Anthurium), Chikkamagalur (Anthurium) Dakshina Kannada and Uttar Kannada (Orchids) districts for cultivating modern flowers. Most of the hi-tech floriculture units in Karnataka are owned and organized as private limited companies ostensibly to take advantage of the industrial benefits and subsidies provided by the central government on the one hand, and the liberal land ceiling policy of Karnataka Government introduced in the early nineties according to which non-agricultural private/public limited companies are permitted to acquire large acreages of agricultural lands for hi-tech floriculture purpose. An interesting feature of the hi-

tech floriculture units that have come up in and around Bangalore district is that a large majority of these are owned and organized by entrepreneurs from Andhra Pradesh, who, in the local horticulture industry parlance, the 'expatriate entrepreneurs' in hi-tech floriculture in Karnataka. Of course a few of them have established similar units in the Hyderabad region as well. One major Bangalore based firm, Karuturi Floritech Limited, has even gone global, acquiring major chunk of equity in floricultural companies in Kenya and Ethiopia. It is major hi-tech producer and exporter of cut flowers in Karnataka. Bangalore based Karuturi Networks of the Karuturi Group, is reported to be the world's largest rose-producer, with offices in Bangalore, Dubai, Amsterdam, Nairobi and Addis Ababa. Worldwide, though, cut-roses from countries such as Ethiopia and Kenya, form the largest global suppliers. In 2007, the company acquired the 188-hectare, Kenyabased Dutch rose farm, Sher Agencies, for US$73 million and says it has capacity to produce 1 million stems daily by March 2008.

Table No. 6 : Disrict-Wise Distribution of Hi-Tech Floriculture Units

2005-06

Sl.No.	District	Number of Floriculture Units	Flowers grown
1	Bangalore (Urban)	20	Rose, Anthurium, Carnation, Gerbera, Chrysanthemum
2	Bangalore (Rural)	25	Rose, Carnation, Anthurium,Gerbera, Chrysanthemum
3	Kolar	02	Rose
4	Shimoga	05	Anthurium
5	Dakshina Kannada	05	Orchids
6	Kodagu	10	Anthurium
7	Udupi	05	Orchids
8	Dharwad	05	Anthurium, Gerbera
9	Mysore	05	Anthurium, Gerbera
10	Mandya	01	Carnation, Gerbera
11	Belgaum	20	Carnation, Rose, Anthurium, Gerbera
Total		103	

Source: Government of Karnataka, Dept.of Horticulture, Bangalore

X. ORCHID CULTIVATION FOR FLORICULTURE IN BELGAUM DISTRICT

a. Introduction :

Currently, floriculture is recognised as a lucrative profession. The demand for flowers in the world market is growing around 15 per cent each year. The floriculture industry in India comprises the florist trade, nursery plants, potted plants (including house plants), bulb and seed production, micro propagation (tissue culture raised plant) material and extraction of essential oils from flowers. Modern cut flowers like rose, gladiolus, chrysanthemum, carnation, gerbera, anthurium, tuberose and orchids are basically used in floral arrangements. With changing life styles and increased urban affluences, floriculture has assumed a definite commercial status in recent times during the past 2-3 decades particularly. Appreciation of potential of commercial floriculture has resulted in the blossoming of this field into a viable agri-business option. Availability of natural resources like diverse agro- climatic conditions helped in production of wide a range of temperate and tropical flowers, almost all through the year in one part of the country or other. Improved communication facilities have increased their availability in every part of the country. The commercial activity of production and marketing of floriculture products is also a source of gainful employment to crores of people.

The evolution of orchid culture from hobbyist to commercial grower is very slow as most of the orchids collected from different regions do not adapt to local conditions, hence died. The methods of propagation are not known and most of the orchids which flower under utmost care are found to be self sterile. Further, it is difficult to germinate the seeds, which lacks any functional endosperm. The seeds sown in the nursery beds require long period of germination and any disturbance to the soil or physical environment destroyed the whole population.

Orchids belong to the family Orchidaceae. The family Orchidaceae contains the largest number of species than any other family of flowering plants, with possibly as many as 25,000 species. Orchids have been occupying a pride place in horticulture and floriculture not only for their aesthetic value but also for their therapeutic value right from the Vedic Age. The major developments in cultivation of orchids in the world have been due to modern scientific technology which has been suitably used in case of orchid seed germination and meristem culture. Today orchids are grown on assembly line method in extensive glasshouses with controlled environment and the sale of orchid flowers runs in millions of dollars. The modern methods of propagation have brought orchid cultivation on par with other commercial crop.

b. Scenario of orchids in India and Karnataka

India has a great potential of becoming a major exporter of orchids at global level. Its main strength lies in its rich genetic resources, varied climatic zones, availability of trained manpower in the field of floriculture, lesser cost of production in comparison with the other major orchid growing countries. However, till date, India has failed to make any impact in this sector. Orchid trade is still in infancy due to the lack of knowledge on the varieties suitable for commercial production and export. Moreover, research work on the evaluation of commercial hybrids and varieties for suitability to our condition is very limited in our country.

In India the area under commercial cultivation of orchid's particularly tropical orchids like Dendrobium etc. is limited to the Southern states and Maharashtra, whereas temperate orchids like Cymbidium are grown in North-Eastern states. Most of the produce is sold internally with meagre export.

Karnataka is the leader in floriculture, accounting for 75% of India's total flower production. The state has the highest area under modern cut flowers, and 40 flower growing and exporting units.

Karnataka is into floriculture for over 300 years. The Tigala community near Devanahalli, Chickaballapur and VSL Agro Tech are extremely good at growing

flowers.The area under orchids (Dendrobium) in Karnataka is 3000 square meters with the production potential of 2.6 lakh spikes per annum.

Orchids are most fascinating and beautiful of all flowers. They exhibit a wide range of diversity in form, size, colour and texture of flowers beyond the imagination of human mind. This manifold and perplexing range of floral structures arouse our highest admiration. Orchids constitute an order of royalty in the world of ornamental plants and they are of immense horticulture importance and play a very useful role to balance the forest ecosystem.

Orchids have emerged as an important constituent in the global cut flower trade. Cymbidium, Dendrobiums, Phaphilopedilums, Phalaenopsis, Vandas, Cattleyas, and Orchidiums are the types especially used for cut flower production. Over all, orchids have gained immense popularity in both domestic and international market as they possess long vase life and have inherent therapeutic value. India accounts for nearly 7 per cent of world's genetic diversity contributing 1300 species of orchids. The distribution pattern of orchids in India shows that they are mostly inhabitated in Western Ghats and Andaman and Nicobar group of Islands.

They are most pampered of the plants occupy top position among all the flowering plants valued for cut flower production and potted plants. They are known for their long lasting and bewitchingly beautiful flowers which fetch a very high price in the international market.

Cultivation of orchids has become a very profitable occupation as it is one of the most important ornamental plants. Development of new hybrids and commercial production of cut flowers in orchids has expanded tremendously. Presently, orchids are grown as subsidiary crop in major producing areas. So there is vast market potential in the domestic and export market which is yet to be tapped. There is tremendous scope for orchid improvement and development of industry based on these wonderful plants. Belgaum district is purposively selected for the study as it is one of the major orchid growing regions as well as it is the native place of the students.

c. Profile Of A Successful Hi-Tech Floriculture Firm

(Sample survey done by students)

Questionnaire Part A indicates the general information of orchid grower in the study area. It could be observed from the sample survey done by the students that, Vatika Floritech Nursery is the second largest orchid growing farm in Karnataka next to Bangalore, this farm is located near Khanapur town in Belgaum District, was established in 1998 and registered in 1999. Shri. Pradeep Bhagi the chief of this firm has set up this polyhouse. Shri. Bhagi the proprietary (respondent) of this Vatika firm is 60 year old and with regard to his educational status; the respondent orchid farmers was literates (100%) i.e. Diploma Engineer from Kolhapur. The size

of land holding of farmers was 5 acres. Only 10 guntas is under orchid cultivation. On an average, 5000 plants were found in 10 gunta of land under cultivation and had around 30 years of experience in orchid cultivation.

d. Documentation of different varieties of orchids produced

An effort was made to document the different varieties of orchids grown in Belgaum district during the field study and are presented in Table 7. It was seen from the Table 7 that Five different varieties of orchids, viz, Dendrobium Phalaenopsis, Mokara, Cattleya, Aranda were grown in the study area. Among these varieties, Dendrobium has high market demand and shelf life is up to 14-21 days, Phalaenopsis has shelf life up to 25 – 30 days, Mokara having shelf life of 14-30 days, Cattleya has 10-20 days, where as Singapore white and Singapore red having shelf life of 10-15 days and Aranda has 18 -28 days.

Table No. 7: Stage of Harvest, Spike Length and No. of Flowers of some Commercial Orchids

Orchid hybrid	Commercial stage of Harvest	Spike length (cm)	No of Flowers
Aranda	50% bloom	45 - 60cm	8-10
Cattleya	2-4 days before bud open	25-40 cm	1 or more
Dendrobium	All flowers except top bud	40-60cm	8-12
Phalaenopsis	Fully open flowers	40-60 cm	8-10
Mokara	Fully open flowers	50-75 cm	8-15

e. Investment pattern and maintenance cost in orchid production

Investment in orchid cultivation mainly consists of the costs incurred in establishing the green house for orchids. The costs incurred in the green house up to bearing stage which takes one year, formed the establishment cost of the green house for orchid cultivation. The establishment costs in orchid cultivation were classified into material costs and maintenance cost. The material costs were the costs incurred during the first year and they included the green house construction, costs on well, pump set, pump house, sprayer, plant material and planting *etc.*. The maintenance costs were the costs incurred in maintenance of the orchid house till the time of bearing, that is up to one year after planting and they included expenditure on labour, fertilizers, manures, plant protection chemicals and irrigation *etc.* The results related to cost of establishment of green house for orchid cultivation on per gunta is presented in Table 8. The total cost of establishment per gunta was 2, 32,920. The investment cost constituted the major share (94.67%) of the total establishment cost. Out of the total per gunta investment cost, the establishment cost was 2, 20,500 and maintenance cost was 12,420 (5.33%).

Table No. 8 :Investment Pattern in Orchid Cultivation

(Per gunta)

Sl. No.	Particulars	Value Rs.	%
A.	**Investment costs**		
1	Green house (including shade net, uv sheet, fabrication ,labour cost for construction, bed preparation, pots and planting)	1,10,000	47.22
2	Land preparation	2000	0.86
3	Open well	18,000	7.73
4	Pipe line	2000	0.86
5	Pump set	8000	3.43
6	Pump house	5000	2.15
7	Sprayers	2000	0.86
8	Plant material	60,000	25.76
9	Sprinklers	7000	3.01
10	Foggers	3500	1.50
11	Baskets and trolley	1000	0.43
12	Potting media	2000	0.86
Total		2,20,500	94.67
B.	**Maintenance cost (up to one year)** **I Year**	**12,420**	**5.33**
	Total 12,420	12,420	5.33
Total establishment cost (A+B)		2,32,920	100

Source: International Journal of Biological Sciences (IJBS)

Table No. 9: Maintenance Cost of Orchid Garden during Gestation Period - Up to one year (Per gunta)

Sl. No	Particulars	Value(Rs.)	Per cent
A.	**Labour cost**		
1.	Pots preparation	1000	8.05
2.	Weeding	720	5.80
3.	Application of manures and fertilizers	2200	17.71
4.	Spraying of P.P. chemicals	1400	11.27
5.	Irrigation	1800	14.49
6.	Miscellaneous	300	2.42
	Total labour cost (A)	7420	59.74
B.	**Material cost :**		
1.	Manures	300	2.42
2.	Fertilizers : N-P-K	2000	16.10
3.	Plant protection chemicals	2500	20.13
4.	Micronutrient	200	1.61
	Total material cost(B)	5000	40.26
Grand Total (A+B)		12420	100

Source: International Journal of Biological Sciences (IJBS)

d. Questionnaire

(PART - A)

General Information

1. Name of nursery : Vatika Nursery

2. Name of proprietor : Shir. Pradeep Bhagi

a.Taluka : Khanapur b. District : Belagavi

c. Location : Rural (√) or Urban ( ) or Semi Urban ( )

3. Name of the place : Prabhunagar

4. Status of the ownership : Proprietary (√) Partnership ( )

Public Ltd. ( ) Private Ltd. ( )

5. Respondent's role : Owner (√) Head ( ) Farmer ( )

6. Age : 60

7. Sex : Male (√) Female ( )

9. Marital Status : Bachelor ( ) Married (√)

10. Education :School level ( ) Graduate ( )

Professional (√) Other ( )

11. Year of Establishment : 1998

12. Year of Registration : 1999

13. What were the reasons for starting Green house unit/floriculture trade?

Sl. No.	Statement of reasons	Yes	No
a.	Floriculture market will be so attractive due to import substitution		√
b.	Floriculture market will have high growth in the near future		√
c.	Floriculture is high profit yielding business	√	
d.	Floriculture has high export prospect		√
e.	Buyers or potential customers have encouraged for Floriculture business	√	
f.	Easy availability of Floriculture technology		√
g.	Government subsidy schemes to take up the project/business		√
h.	Tax exemption or low tax rates for the Floriculture project		√
i.	Availability of land and other factors at subsidized rate		√
j.	Government policy and procedures related to Floriculture business		√
k.	Prior market contacts or previous experience in the Floriculture business		√
l.	Advise and support of Floriculture development officials or bankers		√
m.	Contacts of Floriculture business people		√
n.	Desire for self employment and personal interest in Floriculture	√	
o.	Had knowledge or experience in Floriculture production or trade		√
p.	Family background favoured getting into this Floriculture business	√	

PART - B

(Please answer these questions as truthfully as possible because it is for the student research work which will be helpful to other researchers for reference.)

QUESTIONS

1. Total variety of flowers in the nursery : 47

2. Which major flowers do you grow? (Preferential order)

   a. Dendrobium b. Phalaenopsis

   c. Mokara d. Others

3. Which major flowers do you sell? (Preferential order)

   a. Dendrobium b. Phalaenopsis.

4. What is the average sale per day? Approximately Rs. Not available

5. Who are the major consumers? a. Florists b. Local flower sellers

6. How much land does your nursery occupy? Approximately 0.4 Acre

7. Do you import the flowers and other floriculture products? (From which place)

   Thailand breed flowers

8. Do you import nursery products from? (Preferential order)

   Fertiliser from Thailand

9. Do you export flowers, too? If YES, in which countries do you export?

   No

10. Where do supply the flowers (within the state) ?

a. Belgaum city b. Hubli c. Dharwad

11. Where do supply the flowers (outside the state) ?

Goa

12. Which is your favourite flower ?

Dendrobium

13. Number of Employees :

a. Permanent Staff - 2 b. Casual Labour - 4

14. Number of Women Employes :

a. Permanent Staff - 1 b. Casual Labour : Nil

15. Please assign employees to a particular job category (numbers):

a. Managers	:	Men	(1)	Women	( )
b. Supervisors	:	Men	( )	Women	( )
c. Skilled Permanent Labourers	:	Men	(1)	Women	( )
d. Unskilled Permanent Labourers	:	Men	(1)	Women	( )
e. Unskilled Casual Labourers	:	Men	(2)	Women	(2)

16. What is the average daily / monthly salary (as appropriate)

a. Skilled Permanent Labourers : Rs. 400/ day

b. Unskilled Permanent Labourers : Rs. 225/day

c. Unskilled Casual Labourers : Rs. 150/day

17. Chemical Fertiliser/pesticides used, if any

Fertilisers used: Nitrogen, Phosphorus and Potassium, along with trace elements such as Iron. Potassium is mainly responsible for the control of flowers

Persticides used: Pyrethrum, an ingredient in many commercial insect spray, is a natural insecticide derived from plant sources that attacks insects' nervous systems.

18. If yes, any health issues (side effects of fertilisers/ pesticides)

Till now there are no health issues found

19. If no, what type of manure used?

NA

20. Irrigation facilities : Available

Bore well irrigation, and fertilized water is supplied to the orchids through sprinklers.

21. Scarcity of water, if yes How do you manage ? Yes

Every day it requires 12000 liters of water, during summer water is supplied through tankers.

22. Average temperature required :

22 to 32 degree celcius

23. How do you manage during heavy rainy season?

Heavy rainy does not cause any problems to the poly-house

24. Do you have your own vehicle to transport the flowers ? Yes ( ) No (√)

25. If yes, which one _____

26. If No, how do you manage ? - No

Hired vehicles

27. Does the farm employ university graduates? - No

If yes, how many and in what positions?

28. Are there minimum education or technical training requirements for any positions? -

Yes, Technical training is required

29. Share your experiences of having failed at any venture and how you over came from it.

30. Obstacles faced at the time of setting up of the nursery ?

a. Loan problem from the nationalised banks

b. water problem

31. What is a weakness you have that you really want to improve upon?

No answer

32. How has the floriculture market been performing since 2000

a. Declined ( )

b. Stagnant ( )

c. Grow at reasonably at good rate ( )

d. Grow rapidly than out expectation (√)

33. What are the major problems in this business ?

a. Availability of cheap and skilled labours

b. Electricity problems

34. What is the total investment required to start this business?

Rs. 26 Lac

35. What is the biggest regret you have from your professional work life?

No Answer

36. Do you enjoy this profession? Level of satisfaction

a. Very satisfied (√) b. Satisfied ( )

c. Need to work more ( ) d. Not satisfied ( )

37. Suggestion for younger generation to take-up this task.

Younger generation should take lead to develop such flori business, it has a wide market both at national and international level. It requires lots of devotion and dedication. You should personally work on the field to get better returns.

XI. SUMMARY

Flowers have captured a remarkable place in modern culture. So there is a latent demand for flowers especially with regards to orchids as they keep very well and a plethora of choices in flower form and colour. The growers with their experience in running successful enterprises both in agro sector and other Industrial activity and with able technical assistance from experienced growers can certainly run the project to successful fruition in a short gestation period. Floricultural crops are highly labour intensive and have the capacity to generate substantial direct and indirect employment in rural areas as well as in urban areas. Estimates across different states in India indicate that the employment generation of flower crops cultivation was higher than other horticulture crops, food crops and commercial crops. According to estimates, the employment generation of floricultural crops cultivation was 913 man-days per hectare in Crossandra and 1,210 man-days in Jasmine (Rao, 1997). A Study by UAS Bangalore, in Chitradurga district showed that the employment generation of one hectare of Crossandra was 1,461 man-days per year. Of this, the female workforce accounted for 65 percent. The high-tech floriculture employs more labour. However, the cost of generating a human labour day is Rs. 1886 in high-tech floriculture compared to Rs.87 in conventional floriculture and Rs.217 in commercial floriculture (Chengappa and Reddy 2000 and Prakash 2000).

Orchids have emerged as an important constituent in the global cut flower trade. Cymbidium, Dendrobiums, Phaphilopedilums, Phalaenopsis, Vandas, Cattleyas, and Orchidiums are the types especially used for cut flower production. Over all, orchids have gained immense popularity in both domestic and international market as they possess long vase life and have inherent therapeutic value. India accounts for nearly 7 per cent of world's genetic diversity contributing 1300 species of orchids. The distribution pattern of orchids in India shows that they are mostly inhabitated in Western Ghats and Andaman and Nicobar group of Islands.

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TYPES OF ORCHIDS OBSERVED

CYMBIDIUM

CYMBIDIUM (WHITE)

DENDROBIUM

DENDROBIUM (WHITE)

PHALAENOPSIS

CYMBIDIUM

MILTONIA

EPIDENDRUM

VANDA

PHALAENOPSIS (WHITE)

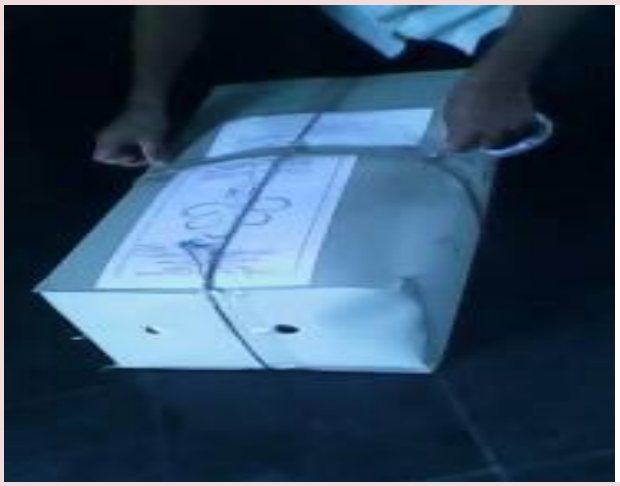
HARVESTING OF ORCHIDS

INITIAL PACKING

SORTING

LEBELIMG AND PACKING

PLACING GRADED AND LEBELED INITIAL PACKING SPIKES IN THE BOX



FINAL PACKING FOR TRANSPORTATION

B.A. VI SEMESTER STUDENTS – 2017 BATCH
DURING FIELD VISIT

POLYHOUSE AT
PRABHUNAGAR, NEAR KHANAPUR

STUDENTS AND STAFF WITH FARM OWNER
SHRI. PRADEEP BHAGI
NEAR POLYHOUSE

STUDENT INTERACTION WITH
MR. PRADEEP BHAGI

STUDENT INTERACTION WITH MR. PRADEEP BHAGI

STUDENT INTERACTION WITH MR. PRADEEP BHAGI

INTERNAL VIEW OF POLYHOUSE

INTERNAL VIEW OF POLYHOUSE

FOG AND MIST GENERATOR
FOGGER/MISTER

FOG AND MIST GENERATED

SPRINKELERS TO SUPPLY
FERTILESED WATER TO ORCHIDS

ORCHIDS
GROWN IN COCONUT SHELLS

VIEW OF ORCHIDS AT POLYHOUSE















STUDENTS ENJOYING THE VIEW OF ORCHIDS AT POLYHOUSE