A Study on the Marketing Perspectives of the Floriculture Industry in Sikkim

A Thesis Submitted

To

Sikkim University

In Partial Fulfilment of the Requirement for the

Degree of Doctor of Philosophy

By

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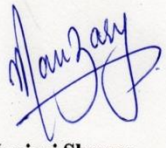
September 2020

Date:

DECLARATION

I, Manjari Sharma, hereby declare that the research work embodied in the Thesis titled "**A Study on the Marketing Perspectives of the Floriculture Industry in Sikkim**" submitted to **Sikkim University** for the award degree of **Doctor of Philosophy**, is my original work. Any content or any part of this thesis has not been submitted to any other institutions or for any other academic purposes.



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CERTIFICATE

This is to certify that the thesis titled **"A Study on the Marketing Perspectives of the Floriculture Industry in Sikkim"** submitted to Sikkim University for partial fulfilment of the degree of Doctor of Philosophy in the Department of Management, embodies the result of bonafide research work carried out by **Miss. Manjari Sharma** under my guidance and supervision. No part of the thesis has been submitted for any other Degree, Diploma, Association and Fellowship.

All the assistance and help received during the course of investigation have been duly acknowledged by her.

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"A Study on the Marketing Perspectives of the Floriculture Industry in Sikkim"

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ACKNOWLEDGEMENT

Creating a literary production is not an individual effort. Instead, it takes collective hard work of many separate people and this is me taking the opportunity to thank all those who have directly or otherwise helped me with the successful completion of my thesis work.

To begin with, I thank the Almighty for his countless blessings. I am thankful to my parents Mrs. Rukmini and Shri Prem Lal Sharma for their abundant support and love. They have been my strength, my backbone throughout my life and I cannot express enough thanks to them.

I am deeply indebted to Dr. Shailendra Kumar, Assistant Professor, Department of Management, Sikkim University, my Guide and Supervisor, for his timely supervision, instructions and guidance for this work. I admire his motivation to keep me in the right track and for his assistance in bringing out this work in the best possible way. I thank him for meticulously going through all the contents and giving timely corrections, even the minute ones, which helped me incredibly to do this research in a proper manner.

I express my sincere gratitude to my Doctoral Research Committee Members, Dr. Krishna Murari, Dr. A Ravi Prakash and Dr. Pradip Kumar Das, Department of Management, Sikkim University for their encouragement and valuable comments which helped me immensely in the course of this research.

I am also thankful to the Chief Librarian and library staff, Sikkim University, for providing me with all types of academic and research support during my work which made me able to do my research systematically and constructively.

I am extremely grateful to the Officials of Horticulture and Cash Crops Development Department, Government of Sikkim, for providing me with research materials needed in the accomplishment of this study. My wholehearted thanks go out to the farmers and suppliers of various parts of Sikkim, for their cooperation and enormously valuable data. Their input is the foundation of this research.

Special thanks to my colleagues, Dr. Nilima Thapa, Ms. Anjana Sharma, Dr. Aaditya Pradhan, Mr. Adarsh Rai, Dr. Geetashree Roy, Mr. Aditya Rai, and all other co-research scholars of the Department of Management, for their help, love, laughter and friendship that we shared.

I also avail this opportunity to express my warm gratitude to my sisters, Ms. Kritika Sharma, Ms. Karishma Sharma, Ms. Nistha Sharma, Ms. Chhunu Pradhan and Ms. Anita Chettri, for their time and effort, for showing me the right way and for always being there for me as friends.

Lastly, immeasurable appreciation and deepest gratitude to Mr. Anil Chettri, for his boundless love, understanding and consistent support at every point of time. His encouragement, patience and affection towards me were things that drove me to overcome the challenges, especially when the tasks seemed insurmountable and strenuous.

- ***Manjari Sharma***

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LIST OF ABBREVIATIONS

Acronyms	Expanded Form
AEZ	Agri Export Zone
AIPH	Association for Horticultural Producers
APEDA	Agricultural and Processed Food Products Export Development Authority
APO	Asian Productivity Organization
BLC	BrassoLaelio Cattleya
BP	Buying Price
CAGR	Compounded Annual Growth Rate
CSS- HMNEH	Centrally Sponsored Schemes – Horticulture Mission for North East and Himalayan States
EC	European Community
FAN	Floriculture Association of Nepal
FAO	Food and Agriculture Organization
GSDP	Gross State Domestic Product
GTA	Gorkha Territorial Administration
HACCP	Hazard Analysis Critical Control Point
HCCDD	Horticulture and Cash Crops Development Department
ICAR	Indian Council of Agricultural Research
IFPH	Integrated Flori Pack House
IIHR	Indian Institute of Horticultural Research
IMARC	International Market Analysis Research and Consulting Group
MIDH	Mission for Integrated Development of Horticulture
MOVCD-NER	Mission Organic Value Chain Development for North Eastern Region
NABARD	National Bank for Agriculture and Rural Development
NAM	National Ayush Mission
NER	North Eastern Region
NGO	Non-Governmental Organization
NHB	National Horticulture Board
PPP	Public Private Partnership

SDF	Sikkim Democratic Front
SGDP	State Gross Domestic Product
SIMFED	Sikkim State Co-operative Supply and Marketing Federation Ltd.
SOM	Sikkim Organic Mission
SP	Selling Price
TAR	TibetanAutonomous Region
UAE	United Arab Emirates
UK	United Kingdom
USA	United States of America
USDA	United States Department of Agriculture
UV	Ultraviolet
WTO	World Trade Organization

CHAPTER 1

INTRODUCTION TO THE FLORICULTURE INDUSTRY

Floriculture is a branch of agriculture which, over the past few decades, has gained great significance when it comes to commercialization and profitability of the stakeholders. This chapter serves the purpose of introducing the floriculture industry, its evolution in the world as well as domestic markets. The chapter also introduces the floriculture sector in the state of Sikkim and its role in the growth and development of the state.

1.1. Overview

Floriculture has been called the glamour field of agriculture. It is colourful and estimated to be richly profitable. Aptly named as the 'Sunshine Industry of India', it has a lot to offer in terms of self-employment and good remuneration for the small and marginal farmers (Paswan, 2015)[1]. All over the world, the floriculture sector is experiencing a major shift towards more development and investment in it. The cultivation and management of flowers has now become a global trend and an even better option for starting an enterprise. The art and knowledge of growing flowers to perfection is what floriculture stands for. It includes cultivation of flowering and ornamental plants that are for sale or used as raw materials for various sectors like pharmaceuticals, cosmetics and the perfume industry. It has now gained the status of being one of the most productive enterprises for a business to trade in globally.

The word floriculture has its origins in the early 19th century in the Latin word *flos* meaning 'flower' and the English word 'culture'. It is the branch of agriculture that deals with the cultivation and management of flowers and ornamental plants. This

specialized food and ornamental-plant production businesses are grouped together in the section of agriculture that is known as horticulture. Ornamental horticulture, more appropriately, covers the complete industry of flower and ornamental plant production and landscaping.

This industry has turned into a highly specialized one as the growers use manipulative tools and devices to ensure a steady supply of flower and foliage irrespective of the weather and season. Floriculturist do so to minimise the loss to the industry because of the perishable nature of the flowers.

Floriculture has become one of the most highly valued industries across many countries in the world. Globalization has had a vital role to play and its effect on income enhancement, such as, the rise in the per capita consumption of the floricultural products in various regions of the world can also be said to be the primary cause for such a rise in the status of the floriculture industry. Traditional flowers like rose, marigold, tuber rose, jasmine and chrysanthemum still dominate the Indian markets as stated by Choudhary, (2008)[2]. However, there are other varieties of flowers rapidly climbing the stairs to being successfully traded in the global market. Major cut flowers grown in India are rose, orchids, gladiolus, carnation, anthurium and gerbera. India is growing rapidly in this department to meet the demand for flowers in the global scenario.

There is a growing demand in the world market for fresh flowers and associated products. As a result, there is a growth in the prospects of earning for farmers in the floriculture sector as well as in the allied sectors which include packaging, processing, transportation, distribution and marketing sectors. Demand for floriculture produce can be seen in various countries in Western Europe like Germany, France, Netherlands,

Switzerland, the United Kingdom, the United States of America, etc. A few of the world's largest domestic markets in terms of cut flowers include Germany, France, Italy, Netherlands, Spain, Japan, the United Kingdom as well as the United States. In recent times, Russia and the United Arab Emirates have also seen an increase in the demand for flowers (APEDA[1], 2019)[3].

The fact that floriculture plays a vital role in the domestic economy has led many countries to take up measures to grow and sustain the floriculture industry within their borders. India, too, has become an active participant in the floriculture sector on a commercial basis. The importance has slowly shifted from traditional flowers to cut flowers for export purposes.

The products are flowers and ornamental plants, and they are produced in closely controlled condition like greenhouses. Individuals working in the floriculture industry are called floriculturists, horticulturists or agriculturists, but are more commonly known as florists or flower and plant producers. Floriculture deals with cultivation, marketing and arranging of flowers and foliage plants. Flowers and ornamental plants have gained an important position in present day society. There has always been an occasion where man has utilized flowers to express his sentiments, such as weddings, funerals, birthdays, pujas, social functions, etc. Flowers were only grown outdoors in the past which meant that their quality and quantity was completely determined by various factors like seasons, climatic conditions, rains, etc. But with the expansion and growth

[1] APEDA: The Agricultural and Processed Food Products Export Development Authority was established by the Government of India under the Agricultural and Processed Food Products Export Development Authority Act passed by the Parliament in December, 1985.

of cities, civilization and social activities, the floriculture industry developed to meet with the increasing demands for flowers and ornamental plants.

Opening up to the world market in the WTO[2] regime paved the way for the free movement of floricultural products worldwide. This, along with globalization and its effect on income generation have all contributed to the increase in per capita consumption of flowers in most countries. Noticeable feature of global floriculture is the development and expansion of floriculture in non-traditional areas. The flower industry comprises cultivation of and trade in cut flowers, cut foliage, potted plants and bedding plants. Roses, carnations, lilies and chrysanthemums are the main representatives of the cut flower industry. The share of cut flowers and potted plants in the global trade of ornamental plant products is almost 80%. The per year growth during the late 2000s was an appropriate rate of 6 to 9% (Sheela, 2008)[4].

The importance of commercial floriculture from an aesthetic, environmental and economic point of view hasn't been properly understood in India and remains more or less neglected. Floriculture and gardening are being neglected by the administrators and gets the least priority in any process of planning or allotment of funds. However, in the past few decades, commercial trade of flowers has attained importance and made considerable progress.

Though many people are nostalgic about floriculture, there are others who brush away the idea as a luxury or even wastage of money. But the significance and the importance of floriculture cannot be brushed off so easily or ignored altogether. Flowers symbolize

[2] WTO: World Trade Organization is an international organization which concerns itself with the rules and regulation of international trade between nations. It was established in the year 1995 and has 164-member states.

purity, beauty, peace, love and passion. The potential of floriculture as an industry has not been exploited properly. Compared to any other branch of agriculture, the income per unit area from floriculture is much higher. It is hence said to be an intensive type of agriculture.

In recent times, India has made great progress in industry and agriculture. As a consequence, there are now more affluent people who can afford to buy flowers and floricultural products. This has also enlarged the markets for cosmetics, a wide variety of which use floricultural produce or by-products such as perfumes and aromatics as their ingredients. Some of the essential oils from such flowers as jasmine, rose and tuberose used in the manufacture of these cosmetics are priced as high as Rs. 8000 to Rs. 12000 per kg. Currently the manufacturers get their supply mainly from Bulgaria and France.

Similarly, the business of nursery plants should be encouraged and organized on sound business lines so as to earn for the country a good amount of foreign exchange through the sale of plants and seeds. One vital step in this direction will be to set up an organization for certifying the seeds and standardizing the nursery stocks. At present there is no such organization and the customers are cheated with substandard products. Moreover, our growers lack the scientific knowledge about growing flowers. The consequence of this is that our yields are much lower compared to other countries.

1.2. Background

Sikkim is one of the most biodiversity rich states of our country. It is the second smallest state in India having an area of around 7096 sq. km and is often termed as the “Paradise of Naturalists”.

Sikkim is situated in an ecological hotspot in the lower Himalayas, one of only three among the Ecoregions of India. The forested region of the state exhibits a diverse range of flora and fauna. Due to the altitudinal geography of the state, it is one of the few regions to exhibit wide variety of plants, flowers, tropical species and such a huge diversity within such a small area. Nearly 81% of Sikkim comes under the administration of the forest department.

Bananas, figs, orchids, sal trees, laurel and bamboo flourish in the Himalayan subtropical forests in the temperate elevations above the 1500 meters (4900 ft), in the lower altitudes of Sikkim. Alpine type vegetation is typically found between altitudes of 3500 to 5500 (11500 to 16000 ft). Species of pine, firs, rhododendrons, junipers are found in the lower elevation in the Eastern Himalayan alpine scrub and meadows. It is also home to wide variety of rhododendrons and wildflowers. Over the past couple of years' great emphasis has been applied to floriculture in the state. It has had a great impact in the lives of the local farmers and it can now be said that it is one of the most recent additions to the commercial sector of the agriculture industry. Today the state has gained international recognition in the field of floriculture. Widely heralded as a botanists' paradise, this tiny state is one of the 18 biodiversity hotspots in the world (Avasthe, Pradhan, & Bhutia, 2014)[5]. With variations in the agro-ecological situation, which ranges from hot, humid subtropical climate in the foothills to cold, dry, alpine climate in the higher altitudes, the region exhibits ample scope for the development of floriculture.

1.3. Floriculture- The Global Scenario

Global floriculture exports stand at Euro 5.1 billion which is expected to touch Euro 9.0 billion by 2025 (Singh H. P., 2010)[6]. The study also suggests that the global export

increased over tenfold from 4.5 billion to 5.1 billion during 1975 to 2005. Thus, floriculture provides ample opportunity both for the domestic market and export. However, in order to be competitive and to harness the potential, there is a need for effective institutional support.

A study by P R Newswire, (2018)[7], indicates that the global floriculture market revenue is likely to reach a compounded annual growth rate of 5.0 per cent over the next 10 years. Germany is the leading country for importing cut-flowers. The Netherlands has dominated the world floriculture export trade; Netherlands accounted for an estimated market share of 64% of world cut flower exports in 1995, followed by Colombia (14%) and Israel (4.2%). The developing countries' share in the world cut flower trade in 1995 was estimated at 28.4%. India's share in the global cut flower trade in 1995 was a mere 0.3%, almost negligible as compared to the rest.

The Netherlands alone accounts for nearly half of this trade. Asian countries are venturing into the lucrative business of international floriculture trade and claiming their stake. Thailand, Malaysia, China, Singapore and India are the leading countries in terms of Asian contribution. While their present share in the international front has not been significant, their potential to grow and hold a solid place in the global market cannot be argued with.

Historically, the Netherlands, Italy, Germany and Japan had strong traditions for growing and consumption of flowers. The concept of commercial floriculture was perpetuated across the world from these regions. Now production centres are developing in Latin America, Africa and also in Asia to meet the demand of consuming countries and also to expand the domestic market resulting in improved economic conditions. These countries provide high quality floricultural products with low cost

price which is finding a favourable place in markets of Western Europe, America and Japan. Emergence of new production centres has made floriculture more competitive and this in turn is benefitting the ultimate consumers. In international terms, the consumption of cut flowers is concentrated in three regions namely, Western Europe, North America and Japan. The highest growth is expected in Japan and the USA. The consumption is rising not only in Japan but also in other Asian countries with rise in expendable income and a flower minded culture. Table 1.1 shows the top ten cut flowers that are traded globally:

Table 1.1: Top Ten Cut Flowers in the World Market

No.	***Top Ten Cut Flowers***
1	Rose
2	Carnation
3	Chrysanthemum
4	Gerbera
5	Gladiolus
6	Gypsophila
7	Liastris
8	Nerine
9	Orchids
10	Archilea

Source: APEDA, (2019)[8]

Floriculture could be considered as the most colourful sector of horticulture, which includes flowers, foliage, potted plants, ornamentals and greens. With urbanization and an increase in disposable income level, the demand for floriculture products has

increased significantly. As a result, there has been an increasing demand for cut flowers like rose, gladiolus, carnation, orchid, gerbera, lilium, etc. There is an equally strong demand for the traditional flowers like jasmine, marigold, chrysanthemum, tuberose etc. This has led to the transformation of the floriculture sector from household activity to a commercial venture. The total world area under floriculture is 6,20,000 hectares among which Asia-Pacific occupies 4,53,000 ha (nearly 73 per cent of total). India occupies 51% area under floriculture in Asia – Pacific region (AIPH and Union Fleurs, 2018)[9]. The world floriculture market is growing significantly at the rate of 10-15% per annum, estimated to be worth over $17 billion (Floriculture Today, 2018)[10]. In this, fresh cut flowers and foliage contribute 49.1% (US$ 83.1 billion) and live plants, bulbs and cuttings contribute up to 50.9% (US$ 8.60 billion). More than 90% of the global trade in floriculture is accounted for by the developed countries in Europe, America and Asia. Netherlands continues to dominate the world floriculture industry, accounting for 60% (US$ 4.73 billion) of world floriculture exports in 2013 (UN Comtrade, 2018)[11]. Countries that are major exporters of floricultural products are Netherlands, Germany, Italy, Belgium, Denmark, USA. Major importing countries in floriculture are Germany, France, Netherlands, USA, United Kingdom, Italy, Belgium, Switzerland, Austria and Japan. The scope for floriculture in developing countries is anticipated to flourish as a mainstream occupation, majorly dominated by small and medium sized enterprises. Moreover, low cost maintenance including low labour costs in developing countries is also a critical factor contributing to the growth of the floriculture industry.

The member countries of Asian Productivity Organization (APO)[3] are increasingly making efforts to cater to the domestic and overseas markets on critical issues relating to perishability, seasonality, market volatility and quality sensitivity remains.

The World Bank report titled "From Competition at Home to Competing Abroad – A Case Study of India's Horticulture" highlights the fragmented cold chain in the country as one of the major factors contributing to high marketing costs and high wastages (Swain, 2010)[12].

1.4. Indian Scenario

Commercially, floriculture can open up great opportunities for the poor Indian farmers. Owing to the diverse climatic conditions in India, there is scope for growing variety of commercial flowers. This can be seen in the data provided by APEDA (2019)[13]; which states that India has exported 19726.57 million tons of floriculture products to the world for a total worth of Rs. 571 crores (US$ 81.94 millions) in 2018-19. The Indian floriculture industry has been shifting from traditional flowers to cut flowers for export purposes. Once the liberalization policies were set up, it acted as an incentive to the Indian entrepreneurs to establish climate-controlled export-oriented floriculture units. In India, Maharashtra, Karnataka, West Bengal and Haryana have emerged as major floriculture centres in recent times.

[3] APO (Asian Productivity Organization): An intergovernmental organization committed to improving productivity in the Asia-Pacific region. It was established in the year 1961 and contributes to the sustainable socio-economic development of the region through policy advisory services and institutional capacity building efforts.

In recent times, India has made a radical progress in industry and agriculture. As a consequence, there are now more affluent people who can afford to buy flowers and floricultural products.

One of the significant developments is that horticulture has moved from rural confines to commercial production and this changing scenario has encouraged private sector investment in production system management. Horticulture, which includes fruits, vegetables, spices, flowers and medicinal and aromatic plants has proved beyond doubt its potential for gainful diversification.

In India, the area under cultivation of flower crops in 2012-13 was 2,33,000 ha with a production of 76,732 lakh of cut flowers and 1.72 million tonnes of loose flowers. The country exported 27,121 MT of floriculture products to the world worth Rs. 423.44 crore during the year 2012-13. Major export destinations (2012-13) were United States, Germany, United Kingdom, Netherland, and United Arab Emirates.
In India, Maharashtra, Karnataka, Andhra Pradesh, Haryana, Tamil Nadu, Rajasthan, West Bengal have emerged as major floriculture centres. West Bengal (33.1%), Karnataka (12.3%) and Maharashtra (10.3%) are the leading cut flower production states, while Tamil Nadu (18 %), Andhra Pradesh (12.98%) and Karnataka (12%) are major loose flower production states (National Horticulture Board, 2013)[14]**.** The following table shows the major export destinations in the year 2018-19 from India:

Table 1.2: Major Export Destination

Sl. No.	Countries
1	United States of America
2	Netherlands
3	United Kingdom
4	Germany
5	United Arab Emirates

Source: APEDA, (2019)[15]

Jammu and Kashmir could play a vital role in this field. Floricultural exports from India comprises fresh cut flowers to Europe, Japan, Australia, Middle East and USA, loose flowers to the Gulf, cut foliage to Europe, dry flowers to USA, Europe, Russia, Australia, Japan and Far East and potted plants limited to few countries.

Dry flowers and ornamentals have great export potential as nearly 70 per cent of total export of floricultural commodities from India consists of dried products. The floriculture exports from India dropped marginally in value terms, due to local consumption of flowers growing at a phenomenal speed, high import tariff, low availability of dedicated perishable carriers, high freight rates. The industry also faces several challenges at the production level mostly related to availability of basic inputs including seeds and planting materials, quality irrigation and skilled manpower, ageing plantations, etc. At the marketing stage, major challenges faced by the Indian flower exporters are related to low levels of product diversification and differentiation, lack of integration and innovation, low quality flowers and challenges associated with quality and environmental issues. Inadequate cold chain management is not only affecting the

future floriculture trade in the country, but also has a negative impact on the present produce and its marketability.

Many export-oriented units have been approved in the sector. However, most of them operate at less than 50% of their capacity. With proper redressal of the problem, the floriculture industry may turn to be a viable enterprise for earning foreign exchange.
In a study conducted by Prasad & Kapoor, (2008)[16], the new potential areas which can be further explored within the domestic territory and developed further for the floriculture industry are in the North Eastern Region of India, namely, Sikkim and Arunachal Pradesh and North Uttaranchal.

In spite of an abundant and varied production base, India's export of floricultural products is not encouraging but is slowly catching up. The low performance is attributed to many constraints like non-availability of air space in major airlines since most of the airlines prefer heavy consignments, growers and exporters face infrastructural problems like inadequate cold storages and refrigerated transport, bad interior roads, absence of backup of delivery and supporting companies resulting in high cost of technology for Indian entrepreneurs. In order to overcome these problems, attention must be focused on various schemes that help in the exporting of the flowers. Post liberalization, floriculture has been identified as a sunrise industry and conferred it 100 % export-oriented status by the Government of India. The increasing consumption of cut flowers makes it the most widely traded floriculture product, cutting into the share of other floriculture products.

Indian commercial floriculture industry has the possibility of budding into the leading flower industry of floriculture worldwide. The need for diversification to the horticulture sector was acknowledged by the Government of India in the mid-eighties

by focusing its attention on investment in this sector. Presently horticulture has established its credibility in improving income through increased productivity, generating employment and in augmenting exports. This has helped the horticulture sector to move from rural confines to commercial ventures.

In India, floriculture is not getting the priority it deserves, though it has a great role to play. It is an intensive type of agriculture and the income per acre is much higher than any other agricultural product if it is done in a scientific manner.

Floriculture has finally begun to form an important section of commercial agriculture and with the amassed awareness of its potential, many people have become associated with this industry. Floriculture today has a much wider scope than just contributing to the local cash crop industry; it has also begun to form a vital part of the economy in terms of the revenues it generates. Great potential exists for cultivation of flowering plants. An increasing trend in area and production of flowers has been observed since 2003-04. Table 1.3 shows the crop wise area and production of horticultural crops for the years 2014-2017.

Table 1.3: Crop Wise Area and Production of Horticulture Crops for Three Years

Area in '000 Ha
Production in '000 MT

Crops Flowers	**2014-15**		**2015-16**		**2016-17 (Provisional)**	
	Area	**Production**	**Area**	**Production**	**Area**	**Production**
Aromatic	659	1000	634	1022	634	1031
Flowers Cut	-	484	-	528	-	593
Flowers Loose	249	1659	278	1656	309	1653
Total Flowers	**249**	**2143**	**278**	**2184**	**309**	**2246**

Source: Government of India, Ministry of Statistics and Programme Implementation, 2017[17]

Floriculture adds to the local scenic beauty of the area that it is grown in, but in addition to that, great scope exists for exports of flowers. Floriculture is important for the beekeeping industry which also provides an alternate source of income to Indian farmers. The highest production of flowers was recorded in Tamil Nadu (416.63 million tonnes) followed by Karnataka (280.92 million tonnes) as shown in Table 1.4. The graphical representation with regard to leading flowers producing states in 2016-17 is also shown in the *Figure 1.1.*

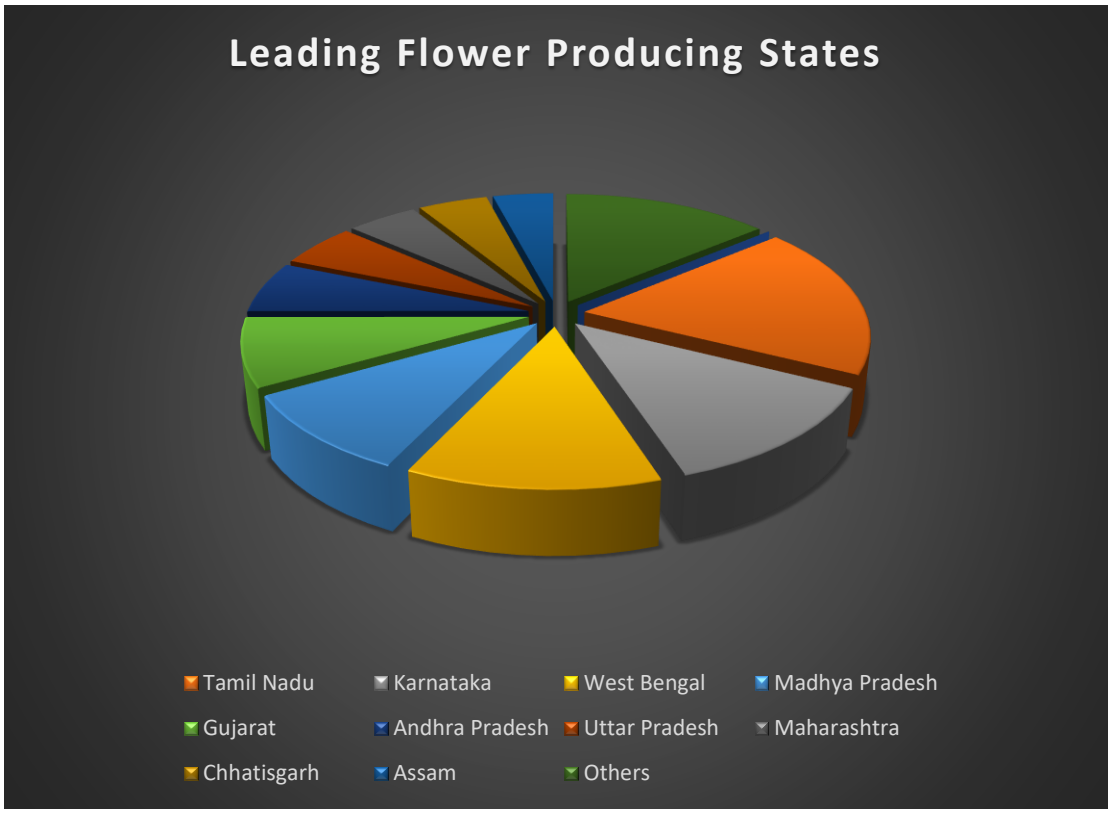
Table 1.4: Production Share of Leading Flower Producing States 2016-17 (Provisional)

Sl. No.	**State**	**Production (in '000 MT)**	**% Share**
1	Tamil Nadu	416.63	18.55
2	Karnataka	280.92	12.51
3	West Bengal	272.76	12.14
4	Madhya Pradesh	216.00	9.62
5	Gujarat	186.00	8.28
6	Andhra Pradesh	140.34	6.25
7	Uttar Pradesh	118.29	5.27
8	Maharashtra	106.77	4.75
9	Chhattisgarh	105.11	4.68
10	Assam	91.47	4.07
	Others	312.11	13.89
All India Total		**2246.40**	**100.00**

Source: Ministry of Agriculture & Farmers Welfare (2017)[18]

Figure 1.1: Production Share of Leading Flower Producing States 2016-17

(Provisional)



Source: Ministry of Agriculture & Farmers Welfare (2017)[19]

With changing lifestyles and enhanced urban affluence, floriculture in India has gained a definite commercial status in recent times especially in the past three decades.

The potential of the commercial floriculture has led it to blossom into a viable agri-business option. The abundance and availability of natural resources like favourable climatic conditions allows production of wide range of temperate and tropical flowers, almost all year round in many parts of the country. Developed 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 basis of gainful and quality employment to thousands of people in India.

Flowers have also been a source of aesthetic pleasure to humans. It could be argued that flowers were among the first luxuries that humans indulged in. Gardening in one's own backyard is known to have been prevalent in the Indian subcontinent even in the medieval times; this we surmise from the fact that kings and emperors of the era were great lovers of gardens. Examples include the emperors of the Lodhi dynasty of the Delhi Sultanate and the Mughals in later years. We can safely surmise that flowers were cultivated even before these times. Flowers and ornamental products are produced commercially and their markets exist throughout the country in which flowers and other products are sold. Floriculture has by far, a greater annual growth potential of 25 to 30 per cent which is 25 - 30 times more than that of cereals or any other agricultural produce. In fact, India can meet the international demand of cut flowers which peaks during winter months.

Being a tropical moderate country, India is a treasure house of ornamental plants which in itself is a special niche in the market. The Government of India approves projects in this sector which mostly involves either technical collaboration or financial collaboration with well- established foreign companies.

1.5. Commercial Floriculture

Commercial floriculture is only a decade old although traditionally it has been prevalent for a long time now. The sector has a fast pace of growth. Intensive floriculture has provided ample opportunity for employment and is expected to grow substantially.

Commercial floriculture uses its products in ornamentation and also other industries like perfumery and more. Commercial floriculture is the art and knowledge of growing flowers to perfection. It has become a remunerative enterprise all over the world. It

needs intensive care and is suitable for small and marginal farmers especially around the cities. There is great potential for export and distant markets. The floriculture industry promotes activities such as tissue culture, grading and packing units, cold storage etc., which has led it to gain the status as a profitable agri-business option in the world over the recent decades, particularly in the developing nations.

Commercial flower forcing is an important segment of the floriculture industry. It is a production or manufacturing business. Commercially, floriculture can open up great opportunities for the poor farmers in India. Our country has diverse climatic conditions which offers the scope for growing several kinds of commercial flowers. The cultivators can deploy a part of their land for growing commercial and common flowers which do not require much care and generally earn more profit than many other crops. The government can organize the flower growers into societies and offer them help in selling their produce through a network of retail stores in the big cities, hotels and markets, thus eliminating the menace of middlemen.

In India, floriculture still hasn't gotten the priority that it deserves. If practiced using scientific methods, this intensive type of agriculture has the potential to earn higher income per acre than any other agricultural products.

1.6. Floriculture in Sikkim

Sikkim has been crowned as one of the biodiversity rich states of our country. It is the second smallest state of India having an area of around 7096 sq. km and is often termed as the paradise of naturalists. Over the past couple of years great emphasis has been applied to floriculture in the state. It has had a great impact in the lives of the local farmers and it can now be said that it is one of the most recent additions to the

commercial sector of the agriculture industry. Today the state has gained international recognition in the field of floriculture. Widely held as a botanists' paradise, this tiny state is one of the 18 biodiversity hotspots in the world (Avasthe, Pradhan, & Bhutia, 2014)[20]. With variations in the agro-ecological situation, which ranges from hot, humid subtropical climate in the foothills to cold, dry, alpine climate in the higher altitudes, the region has ample scope for the development of floriculture.

1.6.1. Topography

Sikkim is a mountainous State, with rough dimensions of about 65 kms width and 110 length located in the Eastern Himalayas between 27° to 28° North latitude and 88° to 89° East longitudes. The State occupies a strategic position sharing three international borders; Nepal in the west, Bhutan and Chumbi Valley of TAR (Tibetan Autonomous Region) in the east and China comprising TAR in the north and north-east. The State is bounded by GTA Region (Gorkha Territorial Administration) of West Bengal in the South. Formidable physical features surround the State with the Tibetan Plateau towering over in the North with the Chola and the Pangolin range in the East and the Singalela range in the West. The total geographical area of Sikkim is 7096 sq. kms (7,09,600 Ha).

The topography of Sikkim is quite varied and provides a great variety of habitats, which support and sustains rich flora and fauna. Most parts of the State are rugged and mountainous with altitudes varying between 300 meters above msl to 8595 meters peaking at Mount Khangchendzonga, the third highest mountain peak in the world. The rugged and hilly terrain is capped by the Himalayan Range in the North and the East, with gradual decline in altitude towards South and West and again rising gently culminating in the Singalela range in the west. A lower ridge peaking at Tendong and

Mainam in South separates the valleys of the Teesta and the Rangit rivers somewhere in the centre of the State. The Teesta and the Rangit are the two main rivers which are fed by numerous streams and rivulets which present gushing torrents during the monsoon season.

1.6.2. Soil Type

The soils of Sikkim are generally acidic. The entire state primarily consists of gneissose and half-schistose rocks. They are typically coarse, often with higher ferric concentrations, neutral to acidic with poor organic/mineral nutrients. Notwithstanding extensive soil erosion and heavy loss of nutrients through leaching due to high intensity rainfall, the soils support both evergreen and deciduous forests to such an extent that the forest cover, increasing every year is a marvel for many green-hungry visitors.

1.6.3. Climate

Sikkim experiences different climatic conditions with summer in the foothills and chilly winter on the mountains. The climate of the State has been divided roughly into three distinct categories – tropical, temperate and alpine. Temperature varies with altitude and slope. For most of the period in a year, the climate is cold and humid as rainfall occurs each month, except the winters which sometimes experience prolonged dry spells. Thus, the State experiences highly diverse climatic conditions. It is predominantly wet and mist almost throughout the year with average annual rainfall of 2000 mm to 5000 mm mostly concentrated during the monsoons.

1.6.4. Economic Profile

The economy of Sikkim is agrarian by tradition. Agriculture and animal husbandry form the backbone of the economy. Around 65% of the people live in villages. Farm activities like land tilling, sowing/plantation and harvesting of different kinds of crops are the primary activities in villages. The off-farm activities include weaving of bamboo mats and baskets. However, with the start of development, opportunities have sprung up in other tertiary sectors like tourism and service sectors. It is estimated that less than 11 % of the total geographical area is under agriculture. The contribution of the agriculture sector to the total GSDP at present is estimated at 15% but this contribution is diminishing year by year due to diversion into tertiary sectors.

1.6.5. Sikkim Floriculture

One of the three Ecoregions of India, Sikkim, is located at the ecological hotspot of the lower Himalayas. The forested region of the state exhibits a diverse range of flora and fauna. Nearly 81% of Sikkim comes under the administration of the forest department. Alpine type vegetation is typically found between altitudes of 3500 to 5500 (11500 to 16000 ft).

Most of the Sikkim orchids are beautiful but short lived. But there are species like Cymbidium eburneum, C. hookerianum and C. irridioides which were under exploitation since time immemorial and have been the mother plants of the modern Cymbidium hybrids. We are well aware that the orchids of Sikkim, even though they look insignificant, are still being smuggled out of Sikkim indiscriminately under the very nose of strict vigilance. It means that somewhere else in the world (technically advanced countries), these insignificant orchids are being used to produce beautiful

orchid hybrids. It is high time that one should realize the importance of our rich orchid diversity and act sensibly, giving due thought to increasing the technology knowhow by sending promising individuals to foreign countries to excel in the art of hybridization. On the other hand, there is also a dire need to improvise our strategies to stop the precious orchid species from being smuggled out of the state.

Sikkim has over 525 species of orchids, as well as numerous endemics. These species make up around 12% of the total flowering plants found in the State. Other dominant families of the flowering plants are Asteraceae (293 species), Poaceae (291 species), Fabaceae (221 species), Cyperceae (143 species), Rosaceae (138 species), Primula (58 species) and Rhododendron (36 species). Endemism of flowering plants is also very high in Sikkim. A total of 25 species and one genus (Brachycaulos) are endemic to the state. Some of the notable endemic plants are *Coelogyne treutleri, Juncus sikkimensis, Mahonia sikkimensis, Podophyllum sikkimensis, Ranunculus sikkimensis, Anaphalis cavei, Berberis sikkimensis,* etc., (Archarya & Sharma, 2013)[21]. To top it all, 23 eastern Himalayan endemics are also represented in the State of which nine species belong to the genus *Rhododendron* and three species to genus *Meconopsis*.

1.7. Protected Cultivation

Protected cultivation is defined as a technique where the climate surrounding the plant is controlled either partially or fully as per the prerequisites of the crop cultivated during its period of growth. In short, it is the modification of the natural environment to achieve optimum plant growth. Looking into the increasing population, climate change, decreasing land holdings, increasing pressure on natural resources i.e., land and water and high demand of quality, horticultural fresh produce is what led to a shift towards modern technologies of crop production like protected cultivation. The concept of

protected cultivation was initiated in Sikkim in the beginning of 2001-02. Since then, the state of Sikkim has been able to make rapid strides with consistent support over the years through the implementation of CSS- Horticulture Mission for North East and Himalayan States (HMNEH)[4]. Large scale construction of polygreen houses of bamboo and tubular structure green houses in clusters for cultivation of both seasonal and off-season vegetables and flowers have been taken up.

The yield under poly-house cultivation can be achieved to the level of 5-8 times as compared to the open crop cultivation (Kalmegh & Singh, 2016)[22]. Increase in the importance of protected cultivation and green house technology, with various initiatives given by the government to the entrepreneurs, has led to many ventures coming up in this sector. It also helps that there are many liberalized policies that have been solely developed for businesses set up for this purpose. Protected cultivation has been one of the most effective interventions to improve productivity and quality besides supporting consistent production.

Noteworthy progress has been made in the field of vegetable cultivation and floriculture through different kinds of poly green houses. Infrastructure development to support production, post-harvest and marketing are being given importance by the Government.

Greenhouses were introduced in India during the sixties as research facilities for some public and private sector organizations. Research efforts at several centres brought out

[4] CSS-HMNEH: Centrally Sponsored Schemes- Horticulture Mission for North East and Himalayan States, is a part of Mission for Integrated Development of Horticulture (MIDH) scheme, which is being implemented for an overall development of Horticulture in the North Eastern States as well as the other Himalayan States. The mission focuses on the entire structure of horticulture from production to consumption through backward and forward linkages.

different location-specific designs of small and standalone greenhouse structures that were used to grow seedlings, vegetables, flowers and medicinal plants.

Greenhouse crop production represents the most intensive of agricultural production systems and under certain conditions, greenhouse cultivation may be equal to highly developed industrial manufacturing operations (Sirohi, 2010)[23].

India has a wide range of diverse agro-climatic conditions but cultivation practices of crops in India have been generally restricted to regional and seasonal needs. Although the area under cultivation as well as the actual produce has seen a significant growth, the technology used and practices followed are predominantly traditional, resulting in low productivity and poor quality of horticultural produce supplies to various markets in the country.

While India is moving steadily to expand the area under protected cultivation, the pace of progress could be increased several folds if the Government of India continues to support protected cultivation efforts strongly in the country. Presently the leading states in protected horticulture are Maharashtra (mainly growing flowers and capsicum) and Karnataka (largely cut flowers), but now there is good progress in other states in protected horticulture viz., Himachal Pradesh, Punjab, Gujarat, Uttarakhand, North Eastern States (Mizoram, Sikkim), Uttar Pradesh, Jammu and Kashmir, Haryana, Jharkhand, etc (Singh & Hasan, 2010)[24].

1.8. Role of floriculture in Sikkim

Thorough research and study on ornamental and cut flowers is imperative to support and solve the issues faced by growers. The cooperation between private and public institutions needs to be strengthened and developed.

The cut flower industry in Sikkim is a relatively recent development compared to other agricultural enterprises. In fact, it has shown such tremendous growth in the last decade that production has increased in response to local and foreign demands. The trend is expected to continue in the future with the growing affluence of the local population and that of the developing countries as well as improved market opportunities.

1.8.1. Medicinal Flowers

The old age practice followed around the world of using plants and flowers to cure certain ailments and diseases is still prevalent today. From times immemorial, the practice of using herbal medicine has been gradually nurtured and brought up to its present position with continuous additions. The practice of treatment using parts of medicinal flowers in a traditional way has always been a part of the ethnic communities of Sikkim. Around 460 species of plants of therapeutic value occur in the state of Sikkim. Only local communities used and collected medicinal plants and flowers decades ago but with a better understanding of their advantages and their therapeutic uses and recent commercialization, their demands and exploitations have amplified manifolds.

Floriculture has gained the status as an emerging career option in this modern era. The right knowledge and the requisite skills in this field, can lead to a person making a successful career as a farm manager, entrepreneur and plantation supervisor. Floriculture is a wide field and career opportunities are many and varied. Prasad, Singh, & Kumar (2012)[25]**,** further state in their book 'Commercial Floriculture' that in general, they are classified as opportunities in the following fields:

- The production of floricultural crops,

- The buying and selling of floricultural products and supplies essential for the production of floricultural products,
- Processing of floricultural products
- The landscaping of public and private properties, and
- The research, teaching and extension phases of floriculture.

1.8.2. Career opportunities

Floriculture has proved to be a good start to earn huge income by growing it commercially. Many young budding entrepreneurs have taken up commercial practice and have been successful in making a market for themselves. The floriculture industry thus provides an opportunity for many to be employed and earn profits. The by-products such as wine making, perfume industry, organic soap making and candles have also gone up in terms of production and have helped shape the career of many entrepreneurs and start-ups.

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CHAPTER 2

REVIEW OF LITERATURE

This chapter focuses on many literary and scholarly works by various authors and experts which forms a fundamental part of the entire research. It helps to widen the perspective and knowledge of the researcher and add dimension to her work.

In this chapter, there are reviews of certain research articles garnered from books and reputed journals on floriculture in India and across the globe which have an impact on the practices of marketing policies of the floriculture industry in Sikkim.

2.1. Global Floriculture Market

Increasing number of exports of floriculture products, ever changing lifestyles and swift modernization of people are a few factors that are expected to boost the global floriculture market. According to a study conducted by Pachpande, (2012)[1], the most important trade channel for imported flowers, in the global arena, are auctions. However, the recent years has seen a rapid rise in trade of floriculture products through wholesale and direct sale channel.

Another study by MarketResearch.biz, (2018)[2] states that the global floriculture market can be segmented on the basis of type, end-use and region. The types segment is inclusive of bedding plants, potted plants and cut flowers. The end use segment includes conference and activities, gifts and personal use. The regions covered in the analysis are Asia Pacific, North America, Europe, Middle East and Africa.

The report further states that the cut flower segment accounts for the highest revenue share contribution and is further expected to register a compounded annual growth rate of over 5 % between the years 2017 to 2026. Cut flowers are the easiest to harvest and handle.

The report also offers a general view of the global floriculture market. The segmentation of the market covers every aspect of the target market. The cumulative revenue of the first half of the above mentioned decade (2017- 2021) is projected to be USD 370.4 billion and this is further expected to increase over the latter part of the decade. The report further states that the floriculture market is projected to reach a value of USD 103.9 billion in 2026 at a CAGR of 5 % over the forecasted period.

According to Alagiri (2008)[3]**,** in the global scenario, the area under cultivation had an estimated growth of about 375,000 hectares and the value of trade crossed USD 100 billion by the end of 2006 in floral products. He further states that the world market for cut flowers and potted plants grew at a rate of 6-9% per year over the last decades; and that in 2006 the consumption of flowers was concentrated in three regions, Western Europe, North America and Japan.

In a study done by Wijnands (2008)[4] he states that the USA is the largest flower market and Japan follows suit. In the US, before 1994, the domestic production exceeded the imports. Colombia, Ecuador and the Netherlands have a market share of over 80% of the entire world market and is said to have been few of the major exporters of the USA.

The study further states that the market value of cut flowers in Japan, although second to the USA is larger than Germany, the UK and Italy. Japan ranks fourth in production value after China, India, and the Netherlands.

According to Abrol and Baweja (2019)[5], the total area and production value under bulbous crops is maximum in the Netherlands with an area of 20577 ha and 570 million euro respectively. Europe shares about 77% of the global market and is considered the trade centre of world floriculture.

In a study by Manzoor, Shahid, & Baluch (2001)[6], the average net income of producers of floriculture business in Lahore, Pakistan, ranged from Rs. 49,971 to Rs. 221, 975 per hectare per year for different types of flowers. The average net income of retailers was estimated to be about Rs. 12,546 per month per shop. The study further suggested that an extensive programme be periodically organized to bridge the gap between research and field applications.

India's nearest neighbour, Nepal is still in the nascent stages of having a successful floriculture business. Floriculture in Nepal started in 1998 when Floriculture Association of Nepal (FAN) started growing Gladiolus commercially and marketing it as a cut flower (Pun, 2012)[7].

A study of the floriculture sector in Ethiopia states that the industry is suffering from insufficient infrastructure system which are necessary for the development of a growing nation like Ethiopia. The government has initiated awareness trainings on health and safety issues and roles regarding environmental protection (Tizazu & Workie, 2018)[8].

Hence, it can be seen that the role of the government is substantial in bringing about a drastic change in the floriculture sector and turning it into a commercial venture.

2.2. Importance and Development of Floriculture Industry

Floriculture is the art and business of growing ornamental plants and marketing flowers commercially. In his book titled 'The Principles of Floriculture', White (1915)[9], talks about the importance and need for the development of the flower industry. In the same book, he goes on to state the two cultures used by flower growers to cultivate their products – under glass and in the open.

According to the study, the flower growers fall into various categories: the amateur floriculture, conservatory plant culture and commercial flower growing. The greater numbers of farmers belong to the category of amateur floriculturist. The conservatory is often designed for showcasing the gorgeous blooms and attracting the flower lovers. Commercial floriculture deals with the cultivation and marketing of flowers for financial remuneration. The demand for flowers by public is increasing day by day and even the number of individuals entering into the business has radically increased in the past few decades.

Arora (2009)[10], in his book *Advances in Horticulture Science Research*, shared an overview of the past few decades of development in the floriculture industry in the global scenario. The consumption pattern of cut flowers is on an upward curve and grew at an annual average rate of 6 – 9 per cent per year. In 1985, the total consumption was USD 12.5 billion worldwide which eventually rose to USD 25 billion at the end of 1990. In 1995, the total world market was about USD 31 billion. Asia also has few major production centres viz, Japan, Israel, India, Southeast Asian countries such as Thailand, Malaysia etc.

In the current and future commercial flower markets, production opportunities exist if high quality product can be reliably produced in consistent quantities. And to do so, it requires optimum production management. A major role for attaining this production opportunity is education of the stakeholders. Institutes and organizations should be able to enable broadcasting of information on management of cut flower operations and facilitate training of technical personnel involved in such operations.

The total value of exports of floricultural material by India in the export market was Rs. 24.28 lakhs in 1976-77, Rs. 75.50 lakhs in 1977-78, Rs. 80-85 lakhs in 1978-79 and Rs. 56.22 lakhs in 1979-80. These exports included about 38% cut flowers, 37% foliage plants, 11% flowering plants and 14% others (Swarup, 2009)[11]. These figures themselves show the potential for growth of the flower industry in the market.

In a study by Londhe (2008)[12], he discussed the strengths of floriculture development in India. The varied agro climatic condition in the country and cheaper costs help to deliver quality products at internationally competitive prices. The availability of skilled manpower and their ability to absorb technology and implement the same at a relatively low cost further adds to the development of this sector in India.

Even in a large state such as Gujarat, 2/3rd of the exporters of agro-sector belong to the small and medium enterprise and the export intensity of Gujarat's agricultural sector is a significant 12 % of its gross domestic product (Dholakia, 2003)[13] .

2.3. Indian Floriculture Scenario

The Indian Floriculture market was worth about Rs. 157 billion in 2018. It is also projected to grow at a Compounded Annual Growth Rate (CAGR) of 20.1% for the next five years according to a study of the Indian floriculture market by (IMARC, 2019)[14] .

Flower exports have recorded a robust growth from Rs.18.80 crores in 1993-94 to over Rs. 400 crores in 2006-07 and 22,000 metric tonnes of floriculture products which accounts about Rs. 547 crores (USD 82 million) in 2016-17 (Deshpande, 2018)[15]. The export increased from Rs. 546.71 crores in 2017 to almost Rs. 600 crores till February 2018 owing to the annual growth rate of 20 % in India itself.

Flower cultivation started in India in the eighties, however commercial venture for export purposes were started by Oriental Floritech at Pune in 1991. The Asian countries involved in floriculture industry has the potential to take a lead in volume and consumption of floriculture products and become a leader of the commercial floriculture globally. This would lead to a huge opportunity in marketing and production sector for cut flower development in Asia. APEDA, is the organization accountable for export promotion and development of floriculture in India, granting subsidies for creation of cold storage, precooling units, refrigerated vehicles, green houses and air freight subsidy to export.

According to a study by Prasad & Kapoor (2008)[16], India has now emerged as a secondary hub for sourcing flowers especially roses and foliage. The domestic as well as international market has shifted from traditional flowers to exotic blooms. India is the largest producer of flowers with a growth rate of approximately 20% and yet has a

negligible influence in the world market due to lack of export. The researcher further states that the progress of the Indian Floriculture industry depends considerably on foreign proficiency like greenhouse technology and planting materials.

Blessed with rich tropical and agro climatic conditions, which are well suited for cultivation of a wide range of flowers, India is fast emerging as a major exporter of floriculture products. Fresh flowers from India are reaching about 87 countries with a significant share going to countries like UK, Japan, Australia, UAE and Netherlands.

For the past few decades, there has been an exponential growth in the earning through the marketing of floriculture products, both in the domestic as well as international markets. A major development has been in the production of cut flowers for exports.

In a study by Lucksom[17], the person who pioneered floral studies in the Sikkim Himalaya during 1870s was Sir Joseph Dalton Hooker. Thereafter Sir George King and Robert Panthing further studied and researched and presented an extensive work in a book titled 'The Orchids of the Sikkim Himalayas'.

According to The Shillong Times (2013)[18], on an average Sikkim produces orchids worth approximately Rs. 20 million annually. A floret (cut stalk) gives a return ranging between Rs. 20 to Rs. 120 depending on its quality.

2.4. Need for Development

Flowers are perishable, and due to the increased number of intermediaries involved there is limited scope of direct marketing. As such the producers receive relatively less share in consumer rupee. The traditional flower market faces a number of obstacles like dominance of commission of agents, forced sale and unchecked activities of pre-harvest

contractors, risk in terms of price fluctuations associated with high commissions for agents, high transportation costs, lack of organized market ensuring competitive trading practices, absence of processing facilities to convert to other forms and lack of governmental backing as given to export oriented cut flower industry.

The export rejects of the commercial flowers often flood the market resulting in lower prices for domestic markets. There is a need to streamline the trading practices by establishing specialized flower markets managed by professionals.

The role of research is well known while establishing an industry. In India, the role of research on floriculture industry is still at a preliminary stage as compared to its western counterparts. Research is being conducted at Agriculture and Horticulture institutes and universities but on a limited scale. In many universities, floriculture and horticulture has been taken up as a course, therefore there is an increase in the number of technical persons with skills in this particular industry.

There is an immense scope for floral industries and its subsidiaries to expand. If floriculture is developed on industry pattern scientifically, it will flourish and generate tremendous money and employment (Sheela, 2008)[19].

In a study conducted by Liu and Meyer (2008)[20], the finding was a little different and unexpected. The consumers were willing to pay 15 % more if the flowers that they bought were grown sustainably. The consumers interest in environmentally friendly products has increased exponentially leading to the adoption of sustainable production techniques by farmers.

2.5. Requirements for Commercial Flower Production

Commercially, floriculture opens up great opportunities for farmers in the country. India has a diverse climatic condition which can be taken advantage of. It allows a lot of scope for growing several kinds of commercial flowers. Farmers can grow commercial flowers like marigolds, orchids, liliums and deploy a certain area of their land to growing flowers and earn more profit as compared to other agricultural products.

It can also be taken into mind that the farmers that sell flowers can come together as a society and sell their produce through a proper network channel thus eliminating the need for a middle man.

The business of nursery plants should be encouraged and organized on sound business lines so as to earn for the country a good amount of foreign exchange by the sale of such floral products.

India regards floriculture as a high growth industry. Commercial floriculture is becoming essential from the export angle. The liberalization of industrial and trade policies has paved the way for development of export-oriented production of cut flowers.

2.6. Protected Cultivation

Protected Cultivation is cultivating plants inside a structure which protects plant from wind, precipitation, excessive radiation, temperature extremes, insects and diseases. The area under protected cultivation has been expanded in recent years from 500-hectare area to around 5000-hectare area. Major flowers cultivated are roses, gerbera,

carnation, etc., under polyhouses mainly in Karnataka, Maharashtra, Uttarakhand and Gujarat. Anthuriums and Orchids are grown in poly houses or net house in Kerala, Goa, Arunachal Pradesh and Sikkim (Abrol & Baweja, 2019)[21].

2.7. Flower as a Blooming Industry

The potential of floriculture as an industry has not been exploited properly. Floriculture is an intensive type of agriculture and the income per unit area from floriculture is much higher than any other branch of agriculture if it is done in a scientific way. Cut flowers are needed in India mainly for hair decoration, garlands, worship, table decoration and various other uses during religious ceremonies and social functions. Some flowers, especially roses, are also produced primarily for making attar (perfume oil).

According to a study by Plasmeijer and Yanai (2008)[22], the demand for floriculture in the domestic and international market rose rapidly and the export of floriculture increased from Rs. 2.11 billion to Rs. 6.5 billion in just a year. Even the production of loose flowers rapidly increased to 0.92 million tons in 2006-07 from 0.66 million tons in the previous year.

The floriculture industry in India has huge potential for generating income, employment and enhancing export earnings. According to an estimate by the Agriculture Ministry the market for flowers and ornamental plants fetched a whopping Rs. 157 million for cultivars in 2018.

The North Eastern Region (NER) owing to its unique topography and climatic conditions offers an exhaustive potential for beautiful natural flora to flourish. The NER has an agro climatic advantage with tropical and temperate regions to grow varieties of floricultural products in addition to a rich genetic diversity.

The increased growing of cut flowers like gerbera, carnations, rose, anthuriums, etc., has led to their use in bouquets and arrangements for gifts as well as decorations for both home and workplace (Swain, 2010)[23].

India is renowned for growing traditional flowers such as jasmine, chrysanthemum, anthuriums, gerbera and aster. This gives a massive opportunity for commercial production and lucrative investment opportunity for the farmers and agro entrepreneurs across the NER.

Further, commercial cultivation of cut flowers such as rose, orchids, gladiolus, carnation, anthuriums, gerbera and lilies have also been adopted by farmers on a large scale. These products fetch high demand and prices in the domestic and international market.

A study by Sen and Raju (2006)[24], suggests that the price of the flowers is characterized by a high degree of volatility and is often subject to daily price fluctuations following the highs and lows in demand. Getting into a floriculture venture is a risky operation because of its extremely perishable nature and its high price volatility.

Keizer, Van der Vorst, Bloemhof and Haijema (2015)[25], in their study, state that the supply chain network consists of growers, auctions, traders, logistics service providers and market place. According to their study, FloraHolland, an organization based in Netherlands is the biggest flower auction company in the world and has six auction centres for trading in cut flowers and potted plants (about 70% and 30% of turnover each). This is a national intermediary organization with a very active transport department that functions internationally.

Kelly (1961)[26], in her study, states that cut flowers are more in demand in comparison to potted plants. Potted plants cost high in terms of transportation and its bulk makes it difficult for it to be shifted from producing areas to consuming areas.

A study by Seeley (1979)[27], in the same year, correctly predicted that the sales of cut flowers, bedding plants and the potted plants would increase over the next two and a half decades.

2.8. Challenges Hampering Export

Production areas are concentrated in the rural environments, but the consumption is concentrated in the cities. There is little direct communication between growers and consumers. The quality of most cut flowers produced is only equivalent to that of the second/ third grade in the international markets. The main reasons for the low yield and poor quality are:

- lack of specific knowledge and technology
- lack of finance to modernize the cultivation facilities
- lack of disease-free planting materials: in order to save money, many growers use recycled materials for propagation instead of buying commercial planting materials.
- lack of cold chain from growers to retailers.

Although several commercial tissue culture laboratories are in operation, all have limited operations to serve their own requirement or a small circle of associated farmers. As such, the scale of operations remains too small for a profitable undertaking and consequently investments in the motherstock of planting materials are not made. Specialized nurseries for ornamental saplings are not in existence as of today. Growers

are not able to follow the market trend quickly and multiplication is done in an inefficient way.

The development of the domestic market is a prerequisite for the development of export which requires high standard quality and large volume as well as competitive prices. The biggest snag in India is the non-availability of genuine and good quality planting materials. There are very few nurseries which are dedicated solely for this purpose but even then, the leading nurseries are not able to provide a good quality planting material. Unless the seeds are of good quality, the flowers grown from such seeds are also of a low quality. Hence, the commercial flower grower has to keep in mind the place where he buys the seeds from. The higher the quality of seeds and saplings, the higher is the commercial value of the full-grown bloom.

Organic practices have some constraints: -

- Lack of credible research and development
- Non-existence of technically developed successful business models of economic scale in organic agribusiness sector. Dedicated zones for agribusiness development are a rarity.
- Organic systems are thriving in various parts of India since the past few decades now, but no systematic research has happened to compare organic systems with conventional farming in terms of productivity, quality of produce and cost of cultivation (Menon, 2010)[28].

2.9. New Product Development

The taste and preference of people changes very frequently and there is a human need to want for newer things. Floriculture industry is no exception in this regard. Hence,

one of the best ways to improve is through hybridization between varieties of species, or interspecific hybridization within a genus or even intergeneric hybridization.

The hybridization work done in India has been limited to fewer flowers, (primarily roses) and has enriched the floriculture industry to a great extent. New hibiscus cultivars released by the Indian Institute of Horticultural Research, Bangalore, and others have also enriched our collection of ornamental plants. The next step that should be taken is to develop new hybrids suiting the different agro climatic conditions prevailing in the country.

Another important way of developing ornamental wealth is by mutation breeding. The natural mutant bougainvillea 'Mary Palmer' evolved spontaneously in a Calcutta garden and has been acclaimed all over the world. Natural mutants happen only by chance and so, other physical and chemical mutagens can be employed to get new attractive mutants. This will eventually lead to the enrichment of floricultural wealth. Easy and rapid propagation of ornamentals is sure to play a significant role in spreading the cult of floriculture in India.

Dwarfing of plants and ornamentals is being exploited commercially in advanced countries. With the modern lifestyle and a huge population living in flats in cities, where the scope of gardening is minimal, people opt to grow flowers that are manageable in size and hence, dwarfing has taken a huge role in the modern floriculture practice. Also, most ornamental plants that are commercially grown bloom only for a short period of time. This causes a glut in the flower market. Hence, methods have been taken up to propagate the flowers to bloom for longer periods and thus increase its commercial value in the floriculture market. Many of the gladiolus genotypes have been developed

by hybridization and selection which are commercially marketed these days (Poon, Rao, & Kumar, 2012)[29].

A study by Ruiz-Torres, Villalobos, Salvador-Jijon, and Alomoto (2012)[30], suggests different models where the flowers are modified and mixed in such a way throughout the planning horizon so as to accommodate various market fluctuations such as changes in demand and price for the various varieties being planted and harvested. In India, hardly 2% of the total production, which is about 140 million tonnes, is being subjected to value addition, against 70-80 % value addition in the developed countries. The post-harvest losses are to the extent of 20-35% due to improper harvesting, handling, storage, transportation and inadequate facilities for value addition during processing (Bawa, Chauhan, & Raju, 2010)[31].

Foliage and tropical cut flowers are the most common components of floral designs and is used the most in the 21st century (Paparozzi, 2003)[32]. The following table 2.1 shows the germplasm[5] of horticultural crops that are available at the IIHR (Indian Institute of Horticultural Research):

Table 2.1: Germplasm of horticultural crops at IIHR

	Name of the crops	**Number of accessions**
	Ornamentals	
1.	Bougainvillea	119
2.	Roses	464
3.	Gladiolus	120
4.	Chrysanthemum	180
5.	China aster	21
6.	Hippeastrum	52
7.	Hemerocallis	34
8.	Orchids	102

Source: Arora, (2009)[33]

[5] Germplasm: Living genetic resources (seeds, tissues, roots etc.) maintained for the purpose of preservation, breeding and other research uses.

There are severe constraints that the Indian horticulture sector faces such as underdeveloped infrastructure support like markets, roads and transport, cold storages etc., low productivity and limited irrigation facilities. There are heavy post-harvest and handling losses, low productivity per unit area and high cost of production resulting in lower share of farmers in consumer's rupee (Swain, 2010)[34].

2.10. Value Addition

The economic value and consumer appeal of any floral commodity is increased by proper value addition to it. The profitability of a commodity is increased when a raw material is converted into a value-added product. It increases the net cash return of a small-scale floriculture industry. Value addition gives high premium to the grower as well as provides quality products for the domestic and export market. Value addition in flower crops by employing techniques like colouring in white flowers, flower dehydration, flower processing, advances in flower arrangements etc., can add value up to 5 to 10 times. These new models of value addition in flowers have higher potential of export and plays a vital role in generation of strategies in the new flower market.

In the international floriculture trade, value added products obtained from flower crops are essential oils, flavours, fragrances and aromatherapy, pharmaceutical and nutraceutical compounds, pigments and natural dyes, gulkand, rose water, vanilla products, insecticidal and nematocidal compounds (De L. C., 2011)[35].

Ornamental horticulture in the country has undergone a huge change in the last one and a half decade. The expansion of commercial floriculture in the country has become a reality largely due to enthusiastic private entrepreneurship backed by the vision of policy makers. Innovations in product development and in production, handling and

transport technology have empowered the industry to ensure a year-round supply of high-quality flowers and plants on a large scale to the consumers (Ravishankar, 2010)[36].

Another study showed that grafting plays an important role in the development of a new product. Grafting is the process of uniting two plants or plant parts in such a way that they become one plant after cell division and union occurs. It is often used to propagate species or cultivars that cannot be propagated by other methods or create a unique plant with improved characteristics compared to the individual plants from which it was created. Normally, florists who have a certain degree of experience and understand the need of the customers opt to graft certain types of flowers to give a different and unique feature to the product that they sell.

Plant breeding has now become an important asset to all the exporters of the floral products. Research is often conducted by the public as well as private organizations to garner success in this field as the future of the entire floriculture industry rests on the development of new developments of products and species which can cater successfully to the demands of its consumers (Craig, 1976)[37].

Plant breeding has wider economic and environmental benefits, including for developing countries. Breeding programs for ornamental plants can be of substantial economic importance for an exporting country (Prasad, Patel, & Ram, 2010)[38].

Dry flower industry has been identified as a potential area for export and it constitutes 15% of the global floral business. Netherlands ranks first in export of dried flowers to USA followed by Mexico, India, Colombia and Israel. In India, export items include more than 70% of dry flower products and these products are exported to USA, Europe, Japan, Australia and the Far East.

Flowers dried in their natural colours offer a very good scope for export to Europe, the USA and Japan. Australia has specialized in this trade and is exporting these to Japan.

Gerbera; popularly known as 'Transval daisy' or 'Barbeton daisy', are commercially grown cut flowers that are short lived and perishable in nature. The concept of dried flowers offers a viable solution to preserve the floral beauty of these cut flowers and extend their marketability. This business in India is four decades old and its biggest consumer is the United States of America (Patil & Karale, 2012)[39].

2.11. Growing and Post-Harvest Handling

Planning for the post-harvest process starts during production and producers must monitor the post-harvest life of their crops vigilantly (Nell et al., 1989[40] ; Nowak and Rudnicki, 1991)[41]. A crop is at its highest quality at the time of harvest and must be properly handed to minimize the loss in quality.

To maintain quality during marketing and in the final consumers' location, containerized plants and cut materials must be handled at the correct temperatures, have a high carbohydrate level and be free from water stress and ethylene.

Efficient supply chain management and enhancement through value addition and processing will lead to better price realization and improved farm income leading to sustainable horticulture production and faster floricultural growth rate (Pattanayak, 2010)[42].

Flowers are highly perishable in nature and therefore when grown in a controlled environment, they need to be transported in similar conditions to maintain their quality

and freshness. For this, refrigerated vans for road transport and adequate warehousing space at the airport are required till they are loaded into the aircraft.

Every grower should routinely sample a few potted plants or cut stems of each species or cultivars to observe and determine the post-harvest life. New species or cultivars should be tested as they appear on the market. A post-harvest testing system does not need to be elaborate and should only take a few minutes to set up and monitor each day. The simpler the system, the more consistent and useful the results are likely to be.

Marketing is an important aspect of floriculture and before venturing to get into commercial floriculture business, it is necessary to make a market study in the region ascertaining the local preferences and fascinations. Flower, being a highly perishable commodity, the centre of production should normally be very near to the centre of consumption otherwise it would be uneconomical and unwise. But today, it is possible to grow flowers even at a reasonable distance due to faster transport facilities including air transport without hampering the quality of the products during transportation.

According to Morser and McRae, (2008)[43], the flower industry operates on very low margins but with a highly demanding quality standards and a fragile and time sensitive products. Most flowers survive storage for only 1-3 days; hence they must arrive on the shelves as soon as possible.

In his book, *Advances in Horticulture Science Research*, Arora (2009)[44], explains that in order to reduce the post-harvest losses, low eco-friendly on-farm storage structures can be built to store the flowers. Cool chambers have been designed in various institutes for this purpose which can be further used by the producers and farmers. He further

states that standardization of packing line operations and proper packaging is to be done for different horticultural commodities.

2.12. Cultivated Land Area for Floriculture in India

A report by APEDA, 2019, estimates the total area under flower crop to be around 34000 hectares, which includes 24000 hectares under traditional flowers such as marigold, jasmine, aster, rose, chrysanthemum, tuberose and 10000 hectares under modern flowers like carnation, rose, gerbera, gladiolus and anthurium.

In the North Eastern Region of India, only 0.1 % of the total area is used for flower production in the entire region. Out of about 1300 species of orchids reported so far from India, about 560 species are from Arunachal Pradesh. The agro climatic conditions of north eastern India support cultivation of flower products in the region.

In a study by Kalmegh and Singh, (2016)[45], adoption of hi-tech cultivation of flowers eventually led to the farmers earning 6 to 22 times more than the traditional crops and open cultivation of farmers. The study further suggested that diversifying the cropping pattern among high value crops is the alternative to sustainable agriculture and enabling this sector to make a significant contribution to the state as well as the domestic national earnings.

2.13. India's Export

De and Singh, (2016)[46], in their study, found out that 171 countries practiced floriculture globally in 2016. India occupied the 51st position in terms of exports and contributed Rs. 455 crores which amounted to just 0.06% of the entire global trade. The

study further detailed the top ten importing countries for the Indian flowers which is shown in Table 2.2 below:

Table 2.2: Top Ten Countries that Import Indian Flowers

Sl. No.	Countries
1.	United States of America
2.	Netherlands
3.	Germany
4.	United Kingdom
5.	United Arab Emirates
6.	Japan
7.	Canada
8.	Italy
9.	Australia
10.	China

Source: De & Singh, (2016)[47]

According to a survey conducted by Sampath (1962)[48], cut flowers weighing 10,500 tonnes and worth Rs. 9.26 crores are sold annually in five metropolitan cities of Calcutta, Delhi, Bombay, Bangalore and Madras. This survey no doubt is backdated and the volume of trade in monetary terms has increased manifold.

A proper method of packaging and prolonging the life of cut flowers will also help enlarge the domestic and foreign markets. Many of the floricultural by-products are of immense commercial value. The oils from jasmine, rose, and tuberose sell at a heavy price. At present, India mostly imports such oils rather than using the domestic products. This may be primarily due to the low-grade quality of the floral products or

lack of techniques and machinery to extract the superior quality of oil from such flowers. But with a little push and technological help, this industry can push boundaries and develop not just to meet the domestic demand but also to feed the export market.

The possibility of exporting cut flowers, plants, bulbs, dried flowers, etc., has not been explored properly and there is a very good potential for it. A few decades back, India didn't even make it to the list of countries exporting floriculture products though the business potential for it has always been huge. Slowly, India has gained a status as one of the top exporters of flowers and quite a lot of varieties as well. Yet the export volume is negligible as compared to advanced countries. In most parts of India, winter is the best period for producing most of the commercial flowers. This can be taken advantage of as the Indian market is abundant with cheap labour and can export the products during that period.

There is a great scope for live foliage and flowering plants in both domestic and export markets. The production of these plants can be taken up commercially in Orissa due to favourable agro climatic conditions. There is also a very good scope for the establishment of tissue culture units for rapid multiplication of quality planting materials, particularly indoor foliage plants, flowering plants like gerbera, anthuriums, orchids, carnation etc., at a cheaper running cost (Ray, 2010)[49].

Centres which can act as cold chain storage need to be developed near the airports so that the flowers can be air lifted without much delay to the place of consumption. Cut flowers which can find ready markets, especially during the winter are roses, chrysanthemums, orchids, gerberas, gladioluses, carnations and tuberoses.

The North Eastern Region alone boasts 870 species of orchids out of the total of 1300 species reported so far from India. Even with so many varieties of orchids grown, India still lacks the capacity to export good quality orchids anywhere in the world. Whatever is grown is consumed in the domestic market itself and leaves no scope for export to the world market even through in the US alone, the sale of cut blooms of orchids is a multimillion-dollar business.

Murray and Rao (2008)[50], in their study, tabulated the list of countries to which India exports a variety of floral products. These can be seen from the following table:

Table 2.3: Export Destinations of Indian Floriculture Products

Cut flower	Netherlands, Japan, UK, Germany and UAE
Dried flowers	USA, Germany, UK, Netherlands, Italy and New Zealand
Live plants	UK, USA, Netherlands, Germany and Sri Lanka
Dried plants	USA, Netherlands, Germany, UK and Italy
Bulbs and tubers	Netherlands, USA, New Zealand, Belgium and South Korea

Source: Murray and Rao, (2008)[51]

A study conducted by Misra and Ghosh, (2016)[52] presents a time series data analysis of the floriculture industry of India. The study found that during the two decades prior to this study, the production of cut flowers and loose flowers grew at a Compounded Annual Growth Rate (CAGR) of 26.66 % and 9.92 % respectively. The second decade saw an export increase at a CAGR of 4.33 %. The current share of India in the global trade of floriculture is a meagre 0.6 % only, yet the potential that exists for floriculture export from India is tremendous, if done properly.

2.14. Marketing

One major aspect of marketing of cut flowers is the way it is packed for the consumers. The packaging should be such that it ensures that garden-fresh quality of flowers is retained for the consumers. If packaging isn't done properly the flowers may wither or suffer mechanical injury during transit from the place of production to the market. But Indian farmers pay scant attention to such a vital detail. It may be due to various reasons including poor economic conditions of the grower who cannot afford the luxury of a modern packaging techniques. It has been noted that approximately 25 -30% of the floral produce goes as wastage during post-harvest handling. Hence the time has come for our growers to understand the need for proper packaging and marketing whereby they can get the optimum price for their produce.

Segmentation has always taken a priority while marketing a product. In a report by Reuters Editorial News (2018)[53], the global floriculture market was segmented by the application of its usage into the following four categories:

i) Personal use
ii) Conferences and activities
iii) Gift
iv) Others.

The study further categorizes the market by type viz.;

i) Cut flowers
ii) Bedding plants
iii) Potted plants
iv) Others.

The increase in sale of flowers through online channels in comparison with the retail stores and conventional florists' shops were quite noticeable in a world floriculture

industry statistic. The rise in supply chain costs is due to the perishable nature of the cut flowers (Global Information, Inc, 2018)[54].

Baourakis, Gerasopoulos, Kalofolias, Kalogeras and Zoumis (2000)[55], in their study state that flowers are purchased only on special occasions but at a steady rate. This helps the sellers to predict the market demand for the flowers and work on their strategies accordingly.

Another major marketing strategy followed in the USA for floriculture that many producers use as a risk management tool is *forward contracting*. The producers and the exporters get into a contract beforehand with fixed rates and charges for the floriculture produce. This ensures a continuous reliable source of income (Hodges, Khachatryan, Palma & Hall, 2015)[56].

A reliable source of income gives incentive to the sellers to produce a substantial amount of produce. According to a study by Swain (2010)[57], the market surplus in case of horticulture produce is more than 80 % whereas in the case of food grains it is around 60%. However, there is a huge issue about the nature of the product namely perishability. The farmers have to sell their horticulture produce in the market immediately after the harvest because of perishability as well as absence of proper storage infrastructure. This leads to less profits and surplus of the flowers as compared to any other non-perishable products.

The major objectives of packaging are simple: long storage life and retaining the fresh quality of the flowers. In accordance to a study by Randhawa and Mukhopadhyay, (2012)[58], to fulfil the above requirements the ideal package should have the following

qualities: - small volume, airtight and waterproof or non-water absorbent packaging and should be strong enough so as to withstand handling.

Customers are the biggest players in the market. Plasmeijer and Yanai, (2008)[59] in their study, have set the top five criteria that the customers check when purchasing flowers:

- *Price:* this factor is absolutely important and takes the first priority, especially for flower shopping at open-air markets or supermarkets as they expect to find lower prices in such areas.
- *Occasion* is also an important factor and come in mind just after the price
- The *seasonality* of the flowers is understood to also be interpreted as the availability of the flowers
- The *colours* of the flower matters significantly to the customer, and
- *Appearance/ aesthetics* is also a crucial factor consumer consider when they buy a flower

The other less crucial attributes that the study includes are the country or place of origin and maintenance information regarding a potted plant/flower.

One major aspect of marketing of flowers is the retail link between the wholesaler and the customer. In a study conducted by Prahalathan and Rane, (2008)[60], they differentiate four types of retailers from whom the consumers buy the flowers: florists, supermarkets, street vendors and garden centres. According to the researchers, the retailers normally purchase from several wholesalers and keep only a limited or specific product rather than an entire range of flowers and plants.

The Supply Chain of floriculture has been explained by Londhe (2008)[61], using the following Table 2.4:

Table 2.4: Supply Chain for Floriculture

Input	**Cultivation**	**Processing**	**Marketing**	
Fertilizers	Open	Assembling	Producer	Customer
Land		Grading	Hundekar	
Water		Packing	Commission Agent	
	Greenhouse	Transportation		
Labour		Selling	Wholesaler	
Seeds		Storage	Retailer	
		Market Intelligence		

Source: Londhe (2008)[62]

Another study by Mortelmans and Damen, (2001)[63], considering the socio-demographic variable, suggests that females are believed to appreciate flowers and are avid buyers and use these for decorations or household purposes.

Keizer, Van der Vorst, Bloemhof, and Haijema, (2015)[64] in their study suggest that different products and markets have different characteristic and requirements that can influence the supply chain network. The storage conditions and mode of transport is determined by the various levels of perishability of different product types.

In accordance to a study done by Global Information, Inc. (2019)[65], the market can be segmented on the basis of distribution channel as unorganized retail, supermarkets and

hypermarkets, florists, online and others. The unorganized retail currently accounts for the highest share of the market.

There is an increasing demand not only for accurate and reliable horticulture database but also for its timely availability in view of globalization and integration of markets to facilitate business operations and regulate demand-supply chain of horticulture commodities and positioning the products in the market at competitive prices (Kumar & Gandhi, 2010)[66].

2.15. Government Policies

In their study Prasad and Kapoor, (2008)[67], they have stated that APEDA (Agricultural Processed Foods Products and Export Development Authority), NHB (National Horticulture Board), along with Ministry of Agriculture and Commerce have developed a comprehensive integrated policy to bring synergy into this blooming industry. The Indian Government further offers subsidies for phytosanitary labs, pre-cooling at farms, cold storage at farms, packaging, refrigerated transport, quality control procedures, air freight and marketing at International expositions, Research and Development, and client meetings.

All over the world, synthetic/chemical products are quickly being replaced by organic products. Sikkim has been recognized as the first organic state in the entire nation and practices floriculture organically as well.

Several recent research and development initiatives have been taken up for the development of floriculture industry in Orissa. To encourage and initiate flower cultivation in the state, demonstration programs were initiated which led to further

motivation among farmers to take up commercial production of gladiolus, rose, marigold, jasmine etc., (Ray, 2010)[68].

There has been a reduction on import duties of cut flowers, tissue cultured plants, flower seeds etc. Direct subsidy up to 50% of the precooling and cold storage units is available, as well as subsidy for using improved packaging materials is given by APEDA.

According to George, (2008)[69], the Government of India negotiated with the European Community (EC) to reduce the import duty on Indian cut flowers. The Commerce Ministry contemplated duty exemption on the import of equipments for greenhouses and tissue culture labs in view of the huge capital input.

The researcher further states that APEDA, the apex body which looks after the floriculture industry, has plans to accelerate flower exports to West Asia and to grab the markets in Australia and New Zealand. In addition to all of these, the government is working on providing extensive training and guidance to the producers and exporters of the floriculture industry.

On the topic of sustainable practices in floricultural operations, Hall, Dennis, Lopez and Marshall, (2009)[70], conducted a study to examine the factors affecting growers' willingness to adopt sustainable practices. The result showed that nearly two-thirds of the respondents (65.2%) perceived sustainability to be of greater importance to the environment and more than half of the respondents had inculcated sustainable practices in their operations (63%).

The United Nations Food and Agricultural Organization (FAO) in its report "Organic Agriculture and Food Security" explicitly states that organic agriculture can address local and global food security challenges (Menon, 2010)[71].

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CHAPTER 3

OBJECTIVES AND RESEARCH METHODOLOGY

In this chapter, the objectives are formulated, followed by details about the population, selection of the sample, design of the questionnaire, selection of flowers as well as districts covered and the sampling designs. This chapter also discusses a few concepts of the floriculture industry that are fundamental to the study.

3.1. Objectives of the Study

The following are the objectives of the study:

i) To study the development and issues faced by the floriculture industry since 1990.

ii) To identify the products available and the potential for new product development.

iii) To evaluate the current pricing policy and identify the price mechanism that best suits the industry.

iv) To identify the problems related to the distribution channel of the floriculture sector.

v) To identify the promotion related issues faced by the floriculture industry in Sikkim.

3.2. Research Gap

The potential of floriculture as an industry has not been exploited properly. Floriculture is an intensive type of agriculture and the income per unit area from floriculture is much higher as compared to any other branch of agriculture. Commercially, floriculture can open up great opportunities for all the stakeholders in this sector. Even though Sikkim, with its enormous genetic diversity, a varied agro-climatic condition and versatile human resources, can tap its huge floricultural reserves, the floriculture industry has been the monopoly of other states or foreign economies.

The floriculture industry in Sikkim comprises of flower trade in terms of cut, loose and potted plants yet it has failed to achieve the status that it deserves. Though it boasts numerous species and varieties, its share in the international as well as domestic market remains negligible.

3.3. Statement of the Problem

The floriculture sector hasn't gained the status of an organized industry though it has the potential to do so. When it comes to marketing of the floriculture products in Sikkim, it can be stated as an unorganized sector. The basic problem underlying the floriculture industry is the issue of marketing management. There is a lack of awareness on the variety of products available in the market. There is also no existing pre-planned pricing strategy to guide the stakeholders in the industry. Lack of proper infrastructural facilities in terms of warehouses and cold storages facilities further adds to the challenges of marketing the flowers. Moreover, absence of promotional activities has also led to improper marketing management of the products.

Hence, this study has solely been conducted to address and bring light to the issues that are prevalent and faced by the floriculture industry in Sikkim.

3.4. Methodology

This section presents a detailed description regarding the selection of sample units, the research design and the methods of analysis applied to justify the objectives of the study. The different concepts used and their estimation procedures have also been delved into in this part.

3.4.1. Nature of the Study

On the basis of the primary data, both subjective and statistical information gathered through a structured questionnaire, a wider perspective of the viability analysis is presented. An in-depth and extensive study led to the researcher being equipped with an analytical and erudite insight into various aspects of the problem. It is a basic research and descriptive research in nature.

3.4.2. Period of Study

The floriculture industry in India grew in prominence since the globalization movement in the 1990s. For the purpose of secondary data analysis, the period from 1990-91 to 2018-19 has been taken as a base. The primary data collected is for the year of 2017-2019. As floriculture is export oriented, be it within the national borders or abroad, it is subject to market sensitivities outside the state. As such this is a very important reason to constantly monitor the government policies regarding the floriculture industry.

3.4.3. Sources of Data

The data for the study consists of both, primary data and secondary data.

The secondary data has been used extensively for the purpose of literature review and to study the status of growth and performance of the floriculture industry not only in the state of Sikkim, but also the entire country of India as well as the global market. The sources of secondary data include annual reports from the Horticulture and Cash Crops Development Department of the State and journals relating to marketing of floriculture and articles related to marketing of cut/loose flowers in and across the

globe. Books by various authors on the topic of commercial floriculture and floriculture in general were also referred to by the researcher.

Survey reports and other reports of various departmental agencies both of the Indian Ministry of Agriculture as well as the reports of the state level departments have also been consulted. Periodicals and news reports have also been thoroughly examined to add value to this study.

The core of the study, i.e., the profile of the farmers practicing floriculture and the customers of such floral products is fundamentally collected via primary data collection using structured questionnaires and surveys. The data of the middle men who facilitate the connection between the buyers and the sellers have also been collected through interviews and discussions with them.

In addition, personal interviews with entrepreneurs, consultants, nursery people, growers, florists, departmental executives, etc. were conducted to give a wider perspective to the study.

3.4.4. Sample Size

The present study is predominantly based on the primary data that was collected from various sample units. The study in itself was segregated into the demand as well as the supply side of the floriculture industry and all the relevant population were taken into consideration.

The supply side includes the micro level farmers, the suppliers and the distributors who have been in the floriculture sectors for over a year and more.

The demand side includes the individual customers of the flowers, the hotels and tourism industry, religious places that includes temples and churches and various departments that organize programmes on a regular basis.

The objective of the study being an analytical focus on the floriculture as a viable business in Sikkim, the samples selected for the study are from within Sikkim. The total number of farmers practicing floriculture totals to be 6000 according to the documentation. But in actual practice, there are less than 1000 farmers who have been practicing floriculture for more than a year. Hence, 293 farmers were selected and surveyed using a semi structured schedule by the researcher herself. The semi structured schedule comprising of 50 major questions was widely canvassed to draw in the primary data.

A total of 393 customers were also provided with a structured questionnaire to understand the marketability of the floriculture products and the demand perspective of the same. Customers of this industry also include corporate structures like departments, universities, hotels, and temples, monasteries and other religious places.

Interviews were conducted of four officials of the Horticulture and Cash Crops Development Department of the east and south district, seven expert farmers who have been in the business for very long (over 20 years) and 13 nursery people, entrepreneurs and florists having a fair idea of the floriculture sector in the state. 15 middlemen were also interviewed on their role in the floriculture practice in the state.

3.4.5. Selection of Flowers

The commercial flowers under cultivation at present in the state of Sikkim comprise of cymbidium orchids, liliums, gerberas, anthuriums, carnations, gladiolus, and alstroemerias. Other flowers of lesser importance are roses, zantedeschias, chrysanthemums, marigolds, selected tropical orchids and ornamental plants grown as potted specimen.

3.4.6. Selection of Districts and Zones

The area of the study was selected from among the three districts out of the total four districts of Sikkim i.e., east, west and south. From each of these three districts, villages and areas with the maximum number of farmers were taken into consideration as it provided a homogeneous sample because of the similar flowers that they grew.

North district was excluded from the study because of its inactive participation in the commercial floriculture practice in the state due to its topographical features which does not support a commercial practice.

A district wise study was also conducted to find out the most suitable and profitable flowers in that district respectively.

3.4.7. Sampling Design

The entire study is basic and descriptive in nature. The researcher has tried to explore the issues keeping in mind the two following perspectives:

The first focus is on the issues faced by the farmers and the distributors (i.e., the supply side) and the second focuses on the problems faced by the customers (i.e., the demand side).

The study is both qualitative and quantitative so as to find out the issues responsible for the lack of proper management in context with marketing in the industry.

The population of the study comprises of all the farmers actively involved in floriculture activities in Sikkim and also the main customers of the flowers. The distributors and the retailers are also considered as important sources of inputs regarding pricing, distribution and promotion issues.

The sampling design for the customers is *purposive judgemental sampling*. The customers of this industry are categorized under various segments namely, individuals, research institutes, hotels and ceremonial halls and religious places and other institutions where the demand for flowers are high.

From each of the four districts, villages and areas with the maximum number of farmers were considered ideal sample as they provided a population of somewhat homogeneous society.

Hence, the sampling design followed in this study is *quota sampling* for the farmers depending upon the types of flowers that they grew.

Table 3.1: Number of farmers surveyed

District / Flowers	East	South	West	Total
Cymbidium	7	15	2	24
Lilium	9	18	3	30
Gerbera	19	18	6	43
Anthurium	28	36	0	64
Gladiolus	6	11	0	17
Alstroemeria	6	11	0	17
Carnation	5	14	0	19
Roses	26	14	39	79
Total	**106**	**137**	**50**	**293**

Source: Computed from primary data collected by the researcher

3.4.8. Research Instruments

The questionnaire as well as the structured schedule were used as research instrument to collect data from the customers as well as the farmers in Sikkim and were pre-tested among the samples. Upon their response, some of the questionnaire items were modified. The data using the structured schedules for farmers were collected first to gather knowledge as to what the actual ground reality was among the small local farmers and how they marketed their products. The second phase included collecting data from the customers using a questionnaire. Data was also collected from government officials in the related department to know their perspectives on what the

government initiatives has been for the floriculture sector with interviews and discussions.

The meaning of the same was described to each respondent and the respondents were asked to interpret accordingly. Five-point Likert scale and multiple-choice questions were used to collect the data for other questions and research aims. On using the five-point Likert Scale rating, open ended questions were asked to the farmers to know their actual views on the problems faced by them in marketing their products and suggestions were taken for the same.

3.4.9. Techniques for Analysis and Interpretation

The data generated from the structured schedules was coded and input into a data sheet. The data was then electronically analysed using Microsoft Office and SPSS. Bar charts, pie charts, weighted averages and frequency distribution were used to present analysis and structure of the floriculture industry in Sikkim. The data for the questions which used five-point Likert Scale was analysed using weighted averages, frequency distribution and mode.

3.5. Limitations of the Study

The study has been undertaken with the maximum care possible to make it fool proof but due to several constraints, the study could not be without limitations. Some of those limitations are:

- The floriculture industry is a relatively new concept even in a state like Sikkim which boosts a fairly large number of exquisite species of flora. Therefore, there exist a number of inadequacies and inaccuracies in data availability.

- The Government departments, units under survey and other associated agencies like NABARD[6], NHB[7] and MAINAM[8] Garden in Sikkim were reluctant to disclose the available data and this stands as a stumbling block in presenting data with a fair degree of uniformity.
- The population of floriculture practicing farmers is large and the study of the entire population is not possible as they could not provide systematic and proper factual information.
- The ratios, percentages and averages used as the tools of analysis are rounded off to the nearest decimal points for convenience of presentation and better understanding.

3.6. Significance of the Study

Floriculture has been of utmost importance in the state of Sikkim. Sikkim as a study prospect, especially in the field of floriculture hasn't been ventured by any researcher before. Therefore, it is a strong topic of research that needs immediate attention.

The lack of awareness among the growers as well as the customers can be held as the primary cause for such slow growth in the floriculture industry.

The present study is an attempt made by the researcher to understand the difficulties and issues faced by the farmers as well as customers. The findings of the study and the

[6] NABARD: National Bank for Agriculture and Rural Development is an apex development financial institution in India. It was established on 12 July 1982 on the recommendations of B. Shivaraman Committee by Act 61, 1981 of Parliament.

[7] NHB: National Horticulture Board, set up by the Government of India in April 1984 on the basis of the recommendations of the "Group on Perishable Agricultural Commodities", headed by Dr. M.S. Swaminathan. The NHB is registered as a Society under the Societies Registration Act 1860.

[8] MAINAM: A garden owned by the former Chief Minister Mr Pawan Kumar Chamling's wife, Smt Tikamaya Chamling at Namchi, South Sikkim. It is renowned as one of the best growers of various flowers in the entire state of Sikkim.

suggestions will contribute to the marketing management of the flowers and pave a path for the policy makers of this industry.

There has been enough evidence supporting the significance of floriculture for boosting India's exports. Even from a local perspective, the importance of the problem cannot be over emphasized. Economically, Sikkim as a whole is traditionally dependent on tourism industry. However, it is not to say, that the State is totally devoid of agricultural development. However even in this field, it has relied on major cash crops like large cardamom and floriculture. Thus, not only a study on floriculture but many other fields, generating employment on a large scale with relatively fewer financial inputs, is likely to benefit the region, if only, such studies can be converted into practical models.

The researcher feels that this study can help in eventually coming up with schemes that can be implemented in augmenting a flourishing the floriculture industry in the state.

3.7. Concepts

3.7.1. Floriculture

It is the art and systematic knowledge of growing flowers to perfection. It is a narrower concept than horticulture which includes the culture of flowers, foliage plants, trees and all other gardening activities.

3.7.2. Florists or Floriculturists

People who focus on the cultivation of flowering and ornamental plants for gardens, floral industry and often for export are called floriculturists. They also develop new varieties. A florist supplies cut flowers and plants to buyers.

3.7.3. Middle Man

An intermediary or an agent between two parties (between the farmers growing the flowers and the buyers buying the flowers) is a middle man.

3.7.4. Loose Flowers

Flowers which are usually harvested without stalk and are to be sold loose.

3.7.5. Cut Flowers

Flowers or flower buds which are cut from the stem. It is usually removed from the plant for decorative purposes.

3.7.6. Preserved Flowers

The preservation process enables the achievement of high quality, reasonably priced products while respecting the environment. This process maintains the natural characteristics and texture of flowers.

3.7.7. Green House/ Poly House

Also known as glasshouse or hot house, this is a building where plants (flowers and vegetables) are grown and under controlled conditions including but not limited to climate control.

3.7.8. Floral Preservatives

A floral preservative is a mixture of ingredients added to the water of a cut floral arrangement to increase the post-harvest life of flowers and greens. (Rudnicki et al. 1991)[1]

3.7.9. Hybrid

The offspring of two plants of different species or varieties especially produced through human manipulation for specific genetic characteristics.

3.7.10. Peak Season and Lean Season

The time of the year during which demand is the highest is peak season. The flower rates are doubled and sales are also high. When the rates are normal and the sales are regular it is known as lean season.

3.7.11. Cold Storage and Dry Storage

Storage spaces where the internal temperature changes as the temperature outside the spaces change are dry storage. On the other hand, cold storages are used for storing the floral products at cold rooms (like refrigerators) where the temperature is kept at a certain range which is specific to the product which is being stored.

3.7.12. Commercial Flowers

Flowers that are grown on a large scale to be sold in the market and often exported keeping in mind the climatic conditions and the suitability of the area for growing the flowers.

3.7.13. Post-Harvest Management

In floriculture, post-harvest management is the stage of crop production immediately following harvest which includes cooling, cleaning, sorting, grading and packing. The major objective of post-harvest management is to maintain the good quality of the

produce grown so that the produce can be competitive in the market when taken to be sold.

3.7.14. Value Addition

Value addition is the process of increasing the economic value and consumer appeal of any floricultural commodity. Profit potential is increased when an indistinctive raw commodity is converted into a unique product.

3.7.15. Greenhouse Standard Size

The standard greenhouse size is approximately 30 feet wide and 96 feet long for which the greenhouse infrastructure and materials are provided to the beneficiaries of different horticulture schemes by the Agriculture Department, Government of Sikkim.

3.8. Organization of the Study

This thesis is divided into six chapters. The organization of this thesis is as follows:

3.8.1. Chapter 1: Introduction to the Floriculture Industry

This chapter introduces the entire study and looks into the concepts and the definitions of the floriculture industry. Along with the global scenario of the floriculture industry and the market place for the exports and imports of the flower industry, the Indian floriculture sector has also been thoroughly discussed. Floriculture industry of the state of Sikkim has also been discussed at large.

3.8.2. Chapter 2: Review of Literature

The second chapter looks into the study of related areas. Extensive literature has reviewed by the researcher in the field of floriculture and its marketing and commercialization.

3.8.3. Chapter 3: Objectives and Research Methodology

This chapter shows the blueprint as to how the research has been carried out by the researcher. It also provides a basic understanding of the concepts of the floriculture industry by discussing the definitions and meanings in brief. Further, the problem statement and the objectives along with the importance of the study have also been discussed in this chapter. The period of study and the nature of it has been explained in this chapter. All of the relevant methodologies have also been thoroughly discussed.

3.8.4. Chapter 4: Issues related to the Product and Pricing Policies

This chapter provides a detailed background as to the status of the floriculture industry. The chapter also shows the guideline of the floriculture industry in the state of Sikkim and the measures taken for its growth and development by the Government. The product mix as well as the pricing policies have been discussed. It also shows the analysis of the data collected for product and pricing policies.

3.8.5. Chapter 5: Issues related to the Distribution Channel and Promotional Schemes

This chapter focuses on the distribution channels followed in the floriculture industry in the state of Sikkim and how the marketing of the products is done. The promotional schemes undertaken by this sector have also been discussed in detail.

3.8.6. Chapter 6: Conclusion and Suggestions

The final chapter of the thesis is the conclusion and suggestions and recommendations made by the researcher which have been discussed in detail. Efficient methods in which the floriculture industry can gain more precedence has also been included as part of suggestions and recommendations.

3.9. Reference:

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CHAPTER 4

ISSUES RELATED TO THE PRODUCT AND PRICING POLICIES

This chapter investigates the first three objectives of the thesis. Data has been analysed and interpreted and issues related to product and pricing policies faced by the stakeholders of the floriculture industry have been thoroughly discussed in this chapter.

This chapter deals with the issues faced by the floriculture industry in Sikkim and the objectives are set to bring forth the data and information regarding various practices and perspective in this sector.

4.1. Objective 1: *To study the development and issues faced by the floriculture industry in Sikkim since 1990.*

Sikkim is one of the biodiversity rich states of India. It is the second smallest state in the country having an area of around 7096 sq. km and is often termed as the paradise of naturalists. Over the past couple of years great emphasis has been applied to floriculture in the state. It has had a great impact in the lives of the local farmers and it can now be said that it is one of the most recent additions to the commercial sector of the agriculture industry. Today the state has gained international recognition in the field of floriculture. Widely hailed as a botanists' paradise, this tiny state is one of the 18 biodiversity hotspots in the world (Avasthe, Pradhan, & Bhutia, 2014)[1]. With variations in the agro-ecological situation, which ranges from hot, humid subtropical climate in the foothills to cold, dry, alpine climate in the higher altitudes, the region has ample scope for the development of floriculture.

As a very basic motive, this study focuses on how floriculture has evolved in the state of Sikkim and what its status is as of today. The floriculture sector has garnered a much-desired importance in the growth and development of the state today. Gangtok is now an agro export zone for Cymbidium Orchids, a status only enjoyed by a handful of areas in the entire nation. The variety of species of flora and fauna in this state is also astonishingly high and valued.

Sikkim has earned a name for itself in the field of organic farming and floriculture has benefitted from this. People have come to appreciate sustainability and hence being tagged the "Organic State" has added to the value of the produces of the state. Nevertheless, floriculture is a relatively new sector in the state. The area under floriculture cultivation is meagre in comparison to other horticulture products or tourism developments.

The floriculture sector of the state falls under the Agriculture Department, Government of Sikkim and is not given the status of a separate department. This in itself shows that the floriculture sector is at a foundational stage.

4.1.1. Sikkim Floriculture

The age-old practice of hobby gardening has received a totally new image makeover. It is no more a backyard activity, but rather provides tremendous opportunities for livelihood. Many people have taken to floriculture as an economic venture earning handsome rewards for their risks and efforts.

Sikkim is reported to have around 4458 species of flowering plants. These species are represented under 197 families and 1371 genera. *Pedicularis, Primula, Rhododendron, Juncus, Dendrobium, Bulbophyllum, Gentiana* are some dominant species of flowering

plants found in Sikkim (Acharya & Sharma, 2013)[2]. There are 65 species of vascular plants that have been named after Sikkim as these species are known to have been found first in Sikkim. Naming the flowering plants after Sikkim just goes to second the fact that Sikkim is unparalleled within the country in terms of the richness and uniqueness of its floral diversity.

Sikkim has over 525 species of orchids, as well as numerous endemics. These species make up around 12% of the total flowering plants found in the State. In fact, Sikkim has been an object of attention of many botanists early in the days. Eminent botanists like J. D. Hooker, I.H. Burkill, B. Osmaston, D. Prain, G.A. Gammie, R. Pantling, J.M. Cowan, G.H. Cave, W.W. Smith, T. Anderson, G. King, C.B. Clarke and many more are a few of the great names that have been studying Sikkim and its botanical diversity.

4.1.2. Evolution

The fact that Sikkim was a separate kingdom should not take away from the fact that a country as rich as Sikkim in biodiversity would not have had any initiatives in this sector. However, the lack of data from this period does pose a conundrum to any research regarding the topic.

According to reports, the first instances of floriculture cultivation for the purpose of commercialization began during the era of the Chogyals[9].

The first known and documented nursery in the state seems to be the Chandra Nursery in Rhenock which was built in 1910 by Ratna Bahadur and Durga Shamsher Pradhan, who started the business in their lands extending over 80 acres. The nursery seems to

[9] Chogyals: The former Buddhist priest-kings of Sikkim who ruled the Kingdom of Sikkim before the kingdom was merged into the Republic of India in 1975.

have achieved considerable fame during the time with lots of visits by the who's who of the world, (which included Governors to Maharajas to eminent botanists like Sir George Taylor). The Buckingham Palace, the Balmoral Castle, the Orchid houses of Sanders and the Viceregal Lodge, all appear to have been decorated at some point or the other with flowers from the nursery. The high point of the establishment came when Her Excellency the Marchioness of Linlithgow (wife of the Viceroy of India: Victor Alexander John Hope) visited the nursery on December 12, 1940 (Sharma & Kumar, 2017)[3].

In the 1950s floriculture started gaining prominence in the state. However, it was still a small entity. Sources also mention that it was during these periods that some entrepreneurs in areas like Turuk, Sumbuk, etc., began importing flowers for cultivation. These included certain varieties of cymbidiums. There are also reports that the Gyalmo (Queen) of Sikkim also cultivated certain hybrids of Cymbidium in the Royal Palace.

It was in the 1960s that the first flower show in Sikkim was organized at the Royal Palace. Since then flower shows have become a regular feature in the state with the biggest one – The International Floriculture Show held in 2008 at Saramsa Garden attracting more than 50000 visitors on each of its three days.

It was during the sixties itself that reports of black marketing of exotic flowers also came into the notice of the authorities. It is said that many people, realizing the economic benefits of flowers, began to collect exotic flowers from the rich forests of the state and exporting them to places outside the state. The matter came to the notice of the Chogyal who put an immediate stop to the entire process. This particular incident cannot have been a new occurrence. However, this incident does show us that the

people of the state had begun to understand that flowers could also prove to be a source of economic growth.

The integration of the tiny kingdom into the Indian Union was formalized in the year 1975. However, it was only in 1985, 10 years after Sikkim became a state, that the first floriculture wing was established within the Agriculture Department**.** Prior to the creation of the wing, specifically for the purpose of looking after floriculture and allied activities in the state, the Forest Department was taking care of the sector by itself. The wing began its work with a minimal budget and utilized it for work with basic hybrids.

In 1990, an international flower show was organized at the White Hall in the capital city, Gangtok. Before 1990 the Department of Forest participated in flower shows in Delhi and other cities all over India. With the increase in participation of the state in such events, the budget for floricultural activities was also steadily increased and slow but steady commercialization of the sector began. Post 1990, i.e., post the liberalization of the economy, the Government of India also started to support initiatives related to floriculture and funds started to trickle into the department.

In 1994, a new political entity came to power in the state of Sikkim. With the change of guard came a lot of changes in the set-up of the various departments. From this time on, floriculture in the state received a huge boost.

4.1.3. Government Initiatives

The state government has been quite proactive in initiating the development of this sector in the state. The farmers or the entrepreneurs who show an interest in the sector are first trained by the state government locally and then given all the necessary resources to set up a floriculture unit in their own premises. Listed below are a few

other mandates of the Government department bearing significance to the floriculture sector:

- Sustainable horticulture production of fruits, vegetables, roots and tuber crops, floriculture, medicinal herbs, aromatic plants, bee-keeping, mushrooms, spice crops such as large cardamom, ginger, turmeric etc. for high domestic demand and export markets.
- Provide technological backup for commercial and sustainable development of this sector.
- Provide research support to the farmers and stakeholders through own research and sourcing research findings from Universities, Research Centres, etc.
- To explore commercial cultivation of agro-diverse medicinal and aromatic plants, floriculture, fruits, vegetables etc.
- Development of high-quality horticultural farms in recognized belts and make it pulsating with horticultural activities which will enable the development of commercial horticulture in such hubs and turn it into Agri Export Zones[10].
- Develop post-harvest and marketing infrastructures for promoting these important sectors for creating vital linkages of post-harvest management, cold chain infrastructures at wholesale and rural markets and distribution points.
- To provide facilities for primary processing horticulture products.
- Capacity building and training of farmers, NGOs, entrepreneurs on hi-tech floriculture.
- Organize horticulture events, facilitate participation in national and international events and provide exposure to farmers and field functionaries.

[10] Agri Export Zones: On March 2001, Government of India with an objective of boosting agricultural exports from India, announced a policy to set up Agri-Export Zones across the countries.

- To facilitate private investment in horticulture through back end subsidies of NHB, APEDA, NABARD and other joint ventures.
- To explore the export market for horticulture, produce through formation of Agri-Export Zones.

Floriculture activities in the State comprises of activities that aim at promoting production of flowers such as Cymbidium orchids, roses, liliums, gladiolus, anthuriums, carnations, gerberas, alstroemerias and zantedeschias.

The significance of floriculture in improving land use, promoting crop diversification, generating employment and providing income security to people has been recognized by and large by the common man, general public and policy farmers and programme implementers. Hence, floriculture features as an important area in the overall policy framework for the development of the State.

The Government also looks into other fields such as tissue culture developments. Tissue culture technology for multiplication of plantlets is rapidly developing and has been accepted on a wide scale for several flowers and ornamental plants. Sikkim also has an ideal climatological condition for growing flowers. It must be noted that till 2000, only 3-4 nurseries carried out all the floriculture trade in the state. After 2000, due to the various initiatives of the state government and the department, the state has seen an increase in the number of people who have stepped into this sector. The initiatives have resulted in a lot of employment generation in the state, be it in the private or government sectors. Various flower villages, like Cymbidium village, Rose village, Gerbera village etc., have been developed by the department at places like Temi, Simkharka, Basilakha, Daramdin, Assam Linzey etc**.,** spread primarily across three districts i.e., East District, West District and South District because of their favourable climatic conditions.

The table below shows the various programmes and initiatives taken up by the Government of Sikkim in the area of floriculture.

Table 4.1: Initiatives taken by the Sikkim Government

1994-1995	Mass distribution of gladiolus corns to the farmers for economic benefit in 1994-1995. This activity, undertaken by the SDF government as soon as it came into power, recognizes the importance of floriculture in the augmentation of the rural economy of the local population.
1996-1999	A National Research Centre for Orchids was established in Pakyong, in the East District of Sikkim.
1996-2003	This era also saw the introduction and mass import of elite planting materials of Cymbidium orchids, liliums, carnations, anthuriums, and gerberas.
2000	This year saw the release of the dendrobium hybrid 'Atal Behari Bajpai'.
2002-2003	The first PPP[11] model in floriculture in the country –A joint venture company 'Sikkim Himalayan Orchids Ltd.' was established.
2002-2003	A model floriculture center was established at Namli in East Sikkim
2004-2005	The second joint venture company 'Sikkim Flora Ltd.' was established.
2006	A new BLC[12] hybrid 'Miraya' was released at Sikkim House, in Delhi.
2006-2007	Tissue culture laboratories were established under the public and private sector for the multiplication of Cymbidium clones.
2007	A wholesale cum retail outlet for farm produce was established at Greater Kailash, New Delhi.
2008	Cymbidium Development Centre was established at Rumtek in East Sikkim.
2008	Hosting of International Floriculture Show, from 14-16 March at Gangtok, East Sikkim.

[11] PPP Model: Public – private partnership is a funding model for public infrastructure projects where the public partner is represented by the government at a local, state or a national level.

[12] BLC: An orchid variety Brasso Laelio Cattleya (BLC) created by a local flower grower, Mr. K.C Pradhan, who named the variety after Miraya, the granddaughter of Sonia Gandhi, an Indian politician.

2008-2009	A model floriculture centre was established at Maniram in South Sikkim.
2009-2010	An Integrated Flori Pack House (IFPH) was established at Rangpo, East Sikkim for the benefit of the cultivators
2013	Sikkim was declared as the Agri Export Zone for Cymbidium orchids.
2013	The International Flower Show was organized from 23-27 February at Gangtok.
2016	A grand flower show was organized as a part of the Sikkim Organic Festival at Ridge Park, Gangtok, in honour of the visit of the Honourable Prime Minister, Shri Narendra Modi, to the state. Two Cymbidium hybrids and one Lycaste hybrid were released during the occasion. The Cymbidium hybrids were *Cymbidium Sardar* and *Cymbidium Namo* while the Lycaste hybrid was *Lycaste Deendayal*.
2016	Construction of a Wholesale Regulated Market cum Integrated Pack House for flowers at Melli, South Sikkim was begun by the Agriculture Department.

Source: White Paper on 23 Years of Development Under Horticulture Sector (1994-95 to 2016-17), Government of Sikkim[4].

The departmental efforts in promoting protected cultivation have yielded several positive impacts, with almost every farmer including small and marginal farmers fully convinced about the merit of green house for cultivation of high value yielding crops. Intensive cultivation of different seasonal and off seasonal flower such as Cymbidium orchids, rose, anthurium, alstroemeria, etc. along with different propagating material of various crops inside the UV stabilized green house has helped in overcoming adverse climate conditions of high rainfall and low temperature experienced in the state.

There are instances of farmers producing excellent quality of rose and cymbidium cut flowers of international standard from different clusters like Daramdin, Ramaram, Namchi, Kartok, Basilakha, and Assam Linzey. More than 5000 families have benefitted from the support provided by the government through green houses, imported planting materials and drip irrigation systems in addition to other inputs like

fertilizers and soil amendments. More than three rose clusters and six Cymbidium clusters have been developed in various parts of the State. The following *Table 4.2* shows the area and production of flowers in Sikkim from the year 2009 to 2015.

Table 4.2: Estimates of Area and Production of Flowers in Sikkim

Year		**Cut/Pot Flowers (in lakhs)**	**Plants/Bulbs (in lakhs)**	**TOTAL FLOWERS**
2008-09	Area (‘000 ha)	0.082	0.093	0.175
	Production (‘000 tonnes)	107.663	92.337	200.00
2010-11	Area (‘000 ha)	0.089	0.099	0.188
	Production (‘000 tonnes)	114.08	98.42	212.50
2013-14	Area (‘000 ha)	0.110	0.126	0.236
	Production (‘000 tonnes)	138.46	111.44	249.90
2014-15	Area (‘000 ha)	0.114	0.128	0.242
	Production (‘000 tonnes)	142.08	112.64	254.72

Source: Horticulture and Cash Crops Department, 2016[5]

The State government has also ventured into various projects of floriculture under Horticulture Mission for North East and Himalayan States (HMNEH). The fund allocation to the state under this scheme is shown in Table 4.3 below:

Table 4.3: Fund allocation under HMNEH

Years	Amount in Lakhs Rs.	Years	Amount in Lakhs Rs.
2003-04	44.30	2010-11	721.51
2004-05	84.43	2011-12	554.87
2005-06	137.03	2012-13	553.95
2006-07	396.53	2013-14	770.34
2007-08	836.11	2014-15	521.90
2008-09	616.43	2015-16	725.05
2009-10	646.80	2016-17	648.73

Source: White Paper on 23 Years of Development Under Horticulture Sector (1994-95 to 2016-17), Government of Sikkim[6]

A grand total of Rs. 7257.86 lacs have been utilised by the State Government on account of expenditure on commercial flower production.

4.1.4. Issues of The Floriculture Industry in The State

Sikkim forayed into commercial floriculture in 2006 as part of the Union Ministry of Agriculture's Horticulture Mission for North-Eastern and Himalayan States. Sikkim's focuses on low volume horticulture crops with high value like spices, flowers and exotic vegetables.

Sikkim produced flowers worth Rs. 20 crores in 2006, no small achievement for a state that has only 600,000 people. Sikkim is trying to capture the top end of the cut flower trade with pricey orchids which stay fresh for a month in a vase. At present, cut flowers are being sent to Delhi, Bengaluru, Kolkata and Mumbai, while potted plants are sold in the North Eastern states.

But delivering flowers to faraway markets has proven to be extremely difficult. Only a few farmers who were initiated into commercial floriculture have agents and are associated with federations which collect and transport produce from farms to markets outside Sikkim. The rest of the farmers depend on local sales.

The floriculture sector in Sikkim is a burgeoning sector. The market is huge in the country and the rest of the world for floriculture produce and Sikkim is fortunate to have a huge demand for its prized flowers, especially orchids, gerberas, anthuriums etc. However, a sizeable gap between demand and actual supply is still prevalent in the sector and Sikkim has been unable to meet the demands of the market in this regard.

Flowers as a product are highly perishable and hence, the marketing of it is to be done with high efficiency and in very little time. Sikkim encourages its farmers to aim towards organic farming and takes great care to maintain that status. Flowers have gained a lot of importance as commercial crops during the last decade and a half. Flowers both cut/pot flowers and plants/bulbs together are grown on nearly 210 ha with more than 23 lakhs numbers of flower production during 2011-2012, all grown in a highly organic set up.

The vast agro climatic sweep across three major zones allows for the production of more than 4000 varieties of plants and shrubs and approximately 450 species of orchids alone. Despite local production, imports of flowers into the state are high in proportion to its exports to outside markets. Cymbidium varieties are imported from countries like the Netherlands, New Zealand, Australia and Taiwan.

The Agriculture Department has constructed a large number of specifically designed low cost bamboo treated greenhouses suited to our topography which are ideal for

vegetables and flowers. There structures are long lasting (almost up to 3-5 years) and serve as useful assets to the farmers. Micro irrigation system in the form of drip for gerbera, spray jet irrigation for Cymbidium orchids and sprinklers for different floriculture crops have helped increase labour efficiency and made floriculture venture management convenient.

By training the officials in different sectors of horticulture studies a milestone has been achieved in the field of Cymbidium tissue culture unit at Rumtek which produces tissue cultured seedlings to cater to the requirements of farmers in the state. Different hi-tech greenhouses of the departmental farm produce different types of flowers which are grown widely across the state.

Till date many officers have gone to various countries outside India like Bangkok, Australia, China, Indonesia, Germany, Vietnam, Netherlands, United Kingdom, Reunion Island, Korea to attend trainings, seminars, international flower shows, exhibitions etc.

The most important intervention in floriculture has been the mass import of planting materials during the early nineties, especially of Cymbidium. Exotic planting materials of floriculture were a major limiting factor for the development of this sector. After the launch of liberalized economy, all kinds of floriculture materials started to flood the country which gave a major boost to this nascent industry.

Flower cultivation in the state is a long tradition which has blossomed into a profession. The main flowers that are promoted for commercial purpose in the state are cymbidium orchids, gerberas, anthuriums, carnations, gladiolus and liliums. Besides these commercial flowers, varieties of bulbous flowers, ornamentals and seasonal flowers are

found in cultivation in home gardens, farm houses, public gardens and homestead, mainly for aesthetics. Wide ranging climatic variation and congenial environment, along with skilled and educated workforce gives Sikkim an added advantage in floriculture.

Flower cultivation which was mostly a household activity has, over the years, evolved into a flourishing and viable agri-business contributing substantially to rural economy. The floriculture sector has recorded phenomenal growth during the past decade which is mainly due to technical and policy interventions. Sikkim, no doubt, is on the verge of emerging as a front runner state in floriculture.

The main factors that have helped the sector to rise to this level are crop diversification, technology, intensive application of protected cultivation, cluster approach to farming and usage of high-quality planting materials and inputs. The International Flower Show held in Sikkim annually (since its inception in 2008) further promises to showcase the floriculture skills of the farmers on a global level. The objective of the flower show is to exhibit the floral bounty of Sikkim as well as to provide an opportunity to the growers to showcase their products to buyers.

The time has come to create an enabling environment for initiatives and development programmes with necessary support for certified organic production. In order to replace the conventional/ subsistence farming system into a local resource based, self-sustainable commercial organic enterprise, it is essential that the production system is strengthened and marketing of the organic produce of the State is facilitated. To this effect, the state began implementing a scheme, “Mission Organic Value Chain Development for North Eastern Region (MOVCD-NER)” from the year 2015-16.

There has been a development of end to end facilities under integrated and concentrated approach for the entire process starting from production, processing to marketing of commodity specific commercial organic value chains.

During the past, establishment of a regulated wholesale market was attempted at Rangpo. This experiment could not see the light of the day mainly due to logistic and practical difficulties. The primary reason for failure of this project was the lack of volume and the absence of traders on regular basis.

4.1.5. Marketing Issues of Floriculture Industry

Marketing and transport constraints have hampered the state from exploring its potential as a supplier of exquisite and unique flora to markets in the plains. Private growers of ornamental plants and flowers are left on their own for variety testing and developing appropriate cultivation methods. This results in expensive plus slow spread of adapted varieties and techniques for cultivation.

Institutional promotion to increase popularity of flowers and ornamental plants is still limited. Most of the cut flower production centres are scattered and located too far from the distribution point or airport. With regard to the market for cut flowers in Sikkim, it must be noted that no integrated domestic market exists. The market consists of a number of confined markets, larger towns and their supply regions.

The State also does not have sufficient quality planting materials to cater to the increasing demand of the domestic market. The flowers are perishables and need special arrangements for transport and marketing as the consumer centres are located in far off place. Most of the floriculture related activities are done on a small cottage type style. This proves to be rather uneconomical. Development efforts are being made to increase

quality production of cut flowers and bulb/plants in recent years. Earlier the floriculture sector was looked after by the Forest department under the Government of Sikkim. A model floriculture garden was set up at Namli and an Orchid centre is yet to come up at Pakyong.

4.1.6. SWOT Analysis of the Floriculture Industry in Sikkim

A detailed SWOT analysis has been done to show the strengths and weaknesses as well as the opportunities of the floriculture sector in the state.

Strengths:

1. *Natural Resource Endowments*

Sikkim is endowed with rich natural resources like floral and faunal biodiversity, good rainfall with favourable geographical variations.

2. *Favourable Climatic and Geographical Diversity*

The climatic and geographical variations make Sikkim suitable for cultivation of a wide variety of vegetables, flowers, crops, ornamentals and a large number of plant species. The South district receives the lowest rainfall while the North receives the highest.

3. *Farmer Oriented Political and Bureaucratic Set Up*

Sikkim is one of the few states in the country that supports a dynamic environment which includes co-operation among the farmers, the government, the bureaucratic support and the technological back up which provides a highly congenial environment to take the State in the right direction.

4. *Strong Livestock Backup*

   The first State in the country to go fully organic, Sikkim also boasts a robust livestock management system and huge biomass production which is the biggest strength of organic production and component interdependence.

5. *Well-Developed Land Use System*

Sikkim has a settled agriculture with well-developed land use system. This is one of the most sustainable farming systems with least pressure to the existing ecology which is inherently fragile due to the Himalayas under evolution. Though it is to be kept in mind that the growing population exerts pressure to the carrying capacity of the land which in itself is not a healthy development to the environment.

Weaknesses:

1. *Marginal Size Holdings*

The average size of holding in Sikkim is less than 1 Ha and the farmers follow an integrated farming system, growing all kinds of crops in their limited holdings. There is hardly any possibility of horizontal expansion. This has led to limited production of flowers grown.

2. *Nature Dependent Production Systems*

Though the state is richly endowed with natural resources like good rainfall, topographical variations and rich agro-diversity, too much dependence on the same is sometimes unadvisable to the farmers. Irrigation is just 11% that too seasonal.

3. *Low Cropping Intensity*

The cropping intensity in Sikkim is very low. Emphasis is given mainly to the major seasonal crops and a large chunk of land remains barren during winter seasons leading to low cropping intensity.

4. *Cultivation of Traditional Varieties Under Traditional Production Systems*

In Sikkim, the rate of varietal and seed replacement is very low and in case of crops other than rice and maize, largely traditional varieties are being grown. Since Sikkim is an organic state, nutrient supplementation from organic sources alone is usually much below crop requirement.

5. Poor Crop Diversification

Growing a large number of traditional crops on major portion of cultivable land leaves place for very little crop diversification. This has given rise to the soils becoming sick and void of certain plant nutrients. Proper scientific diversifications are yet to be practiced in and around Sikkim.

6. High Post-Harvest Losses

Poor infrastructure as well as the remote location of the state has affected the timely marketing of perishable and semi-perishable crops leading to significant post-harvest losses. In general, the post-harvest losses in case of vegetables, fruits and flowers are to the tune of 20% to 25%.

7. Low Production and Productivity

The cultivation within the state is largely rain fed and nature dependent and hence subjected to weather vagaries like excessive rains, draughts and floods leading to low production and productivity.

8. Poor Infrastructure Back Up

The production system is faced with market guts and shortages since the farmers have to go for distress sale due to lack of infrastructure, regulated marketing system and proper market out lets.

Opportunities:

1. *Crop Diversifications in Different Agro-Climatic Zones*

Continuous cultivation of the same crops may lead to soil health problems. The fallow land in the winter season has huge potential for rotation crop cultivation. Hence, floriculture can be practiced as an alternative to major crops.

2. *Off Season Horticulture Production*

Diversified agro-climatic conditions of most of the hill states in general and Sikkim in particular are suitable for cultivation of flowers and other plants during off seasons of the major crops.

3. *Advantage of Organic Production Policy*

The organic production policy of the state government is a step in the right direction and the wealth of natural resources could be an asset for this flagship programme of the government.

4. *Seed/ Planting Material Production*

Hill agro-eco-system provides suitable niches for seed production of flowers under natural condition. Hence, crop seed production and production of planting materials of bulbous ornamentals are some potential areas that need to be explored further to develop these into viable propositions for farmers and small entrepreneurs.

5. *Good Rainfall for Enhancement of Irrigation Potential*

The precipitation in the State varies from 1552.60 mm to 3650.16 mm which is quite high by any standards. However, rain water use efficiency for agricultural/horticultural crops is just below 7-8%, indicating that most of the water is drained off into the Bay of Bengal. Roughly 65-70% is lost as surface run off, 10-12% in the form of deep percolation and other 10-12% in the form of evapo-transpiration. There exists huge potential of rain water harvesting, enhancement of irrigation potential and ultimately

enhancement of rain water efficiency. The increase of rain water efficiency from the existing 7-8 to 10-12 % is expected to double the overall production of the State.

6. Potential of Vertical Enhancement of Production

Geographically the state is small with an overall cultivable area of less than 80,000 Ha. As such the possibility of horizontal expansion is minimal. The only possibility of production enhancement would be through vertical expansion i.e., all efforts have to be made to increase productivity per unit of time and per unit of space.

Threats:

1. Shrinking Natural Resource Base

With increasing population, the per capita availability of natural resources like land, water, biomass and forest-based wealth is fast depleting, and the rate of replenishment or regeneration is not equal to its extraction. Secondly, the method of extraction is destructive and does not leave propagation material behind for their regeneration. Over the years, a large number of important plant species including medicinal and aromatic plants, flowering and foliage ornamentals and other species have either become extinct or endangered.

2. Erratic Rainfall Distribution

Weather vagaries are often experienced during the peak period which affects the production and productivity significantly. Earlier good rains were experienced during the winter and spring seasons but in recent years this period remains dry with very scanty precipitation.

3. Diversion of Agricultural Land for Non-Agricultural Uses

Development has become the need of hour and other indicators of state gross domestic product (SGDP) also have to come on supplementary basis. In the early days of the last

quarter of the 20th century, infrastructure development was moving at a snail's pace, but of late, good and requisite infrastructures are coming up rapidly. However, in most cases, the development is happening at the cost of prime agricultural land. It is estimated that over the last two decades, about 10% of the agricultural land has been put for non-agricultural uses.

4. Continuous Land Fragmentation Leading to Un-Operational Holdings

Due to the concept of nuclear families, land fragmentation is taking place at a much faster rate and the size of the holdings are reducing significantly. If this process continues at the same pace, by 2025 the size of holding in Sikkim shall be less than 0.5 ha which will be altogether uneconomic for any kind of agricultural or horticultural activity.

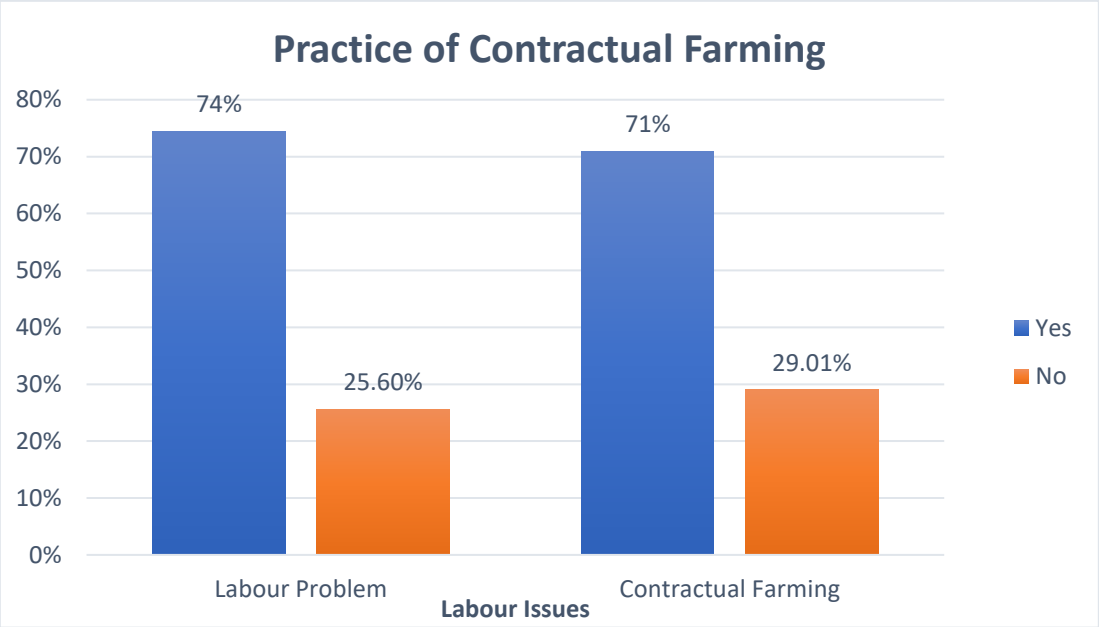
5. Climate Change

Climate change is a reality and the earth is warming at a much faster rate than expected. Glacial melt is affecting the water discharge in the snow fed rivers and its impact in the future could be devastating if proper remedial measures are not taken timely.

Another major issue faced by farmers practicing floriculture is the problem of availability of labour. Almost all the commercially grown flowers, at some phase or another requires tenacious labourers at the farm. The stages where labourers are required the most are during plantation, weeding, harvesting and post-harvest. But the investigation done through this study showed that labour problems have existed since the first phase. The farmers had to pay a huge price per day to hire labourers on contract. Paying them money wasn't the only option, the labourers also had to be fed during the day. Hence, availability of labour posed a huge problem mostly during the weeding and the plantation stages. The following *figure 4.1* shows that 74% of farmers faced labour problems and the remaining 26% managed on their own. Out of the total number of

farmers surveyed throughout the state (293), 71% of the farmers practiced contractual farming and the remaining farmers managed by employing members of their family, including their wives, sons, brothers etc. during the peak labour phases like plantation and weeding. This was primarily done to avoid the cost of labourers if they were to be hired.

Figure 4.1: Practice of Contractual Farming due to lack of labour.



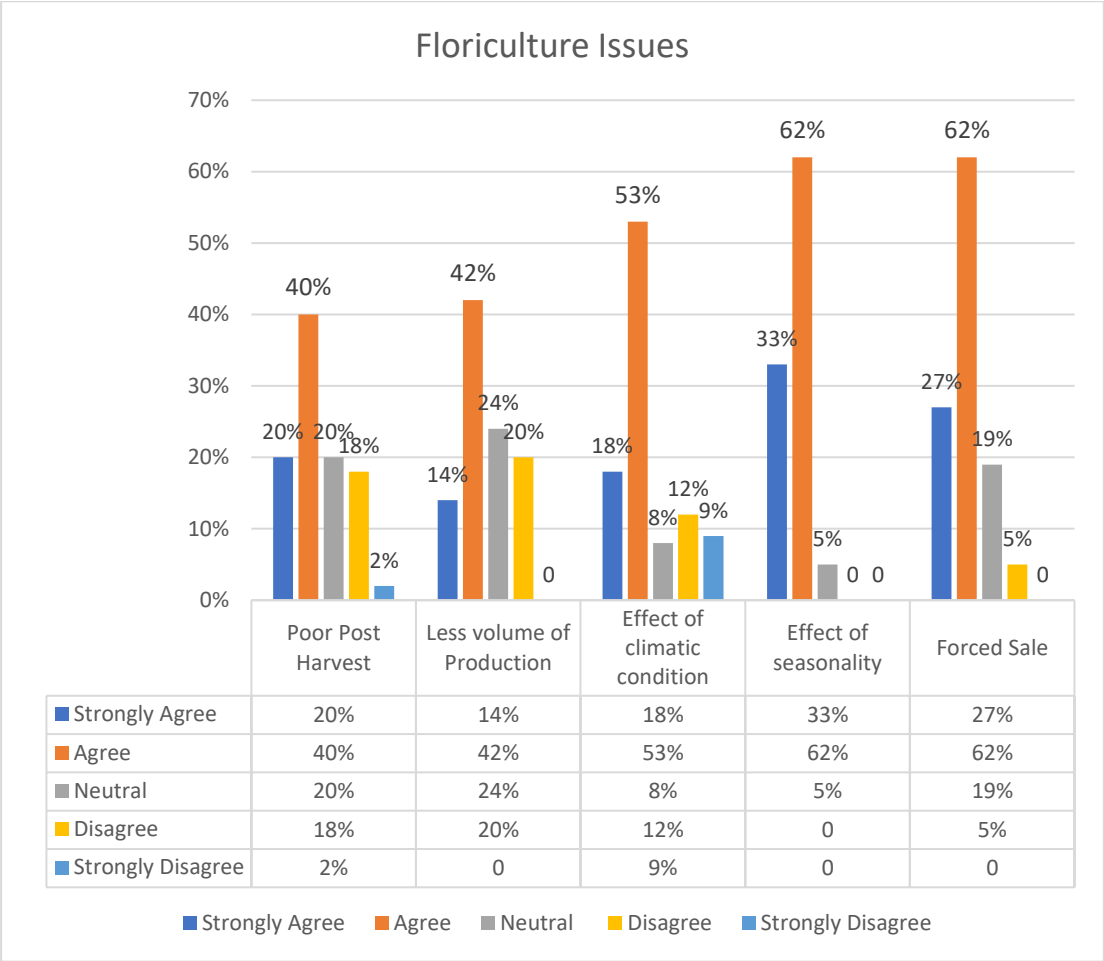
Source: Computed from primary data collected by the researcher

The study also suggested that all the commercially grown flowers except Cymbidium orchids required labourers in the above-mentioned stages. Plantation of Cymbidium orchids on a large scale requires a lot of organic manure of leaves and barks found mostly in the forest. The farmers growing orchids require extra hands for the collection of such manures.

One unique solution of the cymbidium growers who were located in the same village was barter system. The farmers would hire other farmers to collect manure when he required but in return, he had to help the others when they required labour to collect

manures. There was no monetary transaction involved and it worked quite well among the farmers.

Figure 4.2: Other Floriculture Issues



	Poor Post Harvest	Less volume of Production	Effect of climatic condition	Effect of seasonality	Forced Sale
Strongly Agree	20%	14%	18%	33%	27%
Agree	40%	42%	53%	62%	62%
Neutral	20%	24%	8%	5%	19%
Disagree	18%	20%	12%	0	5%
Strongly Disagree	2%	0	9%	0	0

Source: Computed from primary data collected by the researcher

Other matters that plague the entire floriculture industry are the issues of poor post-harvest management, low volume of production, the effect of seasonality and climatic conditions and forced sale due to the perishable nature of the flowers as shown in *figure 4.2*. 40% of the farmers surveyed agreed that there is an issue of poor post-harvest management because of which the farmers faced huge amount of losses. 20% of the farmers were undecided about this issue. Another 18% of the farmers disagreed that post-harvest management was even a problem.

Another problem faced by the farmers was the low volume of production which often leads to high demand and very less supply when needed in the market. The same *figure 4.2* shows that approximately 56% of the farmers were aware of the low volume of production and how it affected the demand and the supply equilibrium in the marketplace. 20% of the farmers disagreed on the issue of volume of production and rather were quite ignorant on the market conditions in terms of demand and supply. Hence, an initiative can be taken to help create an awareness among the farmers.

The climatic conditions of the area of production also plays a chief role in terms of growing the flowers. Floriculture hubs are mostly located in the hotter regions of the state. Cold climatic conditions do not favour the growth of any flowers commercially. In the study it was found that there weren't any farmers in the North District due to this very reason. The latter half of the chapters also delves into the concept of growing flowers during the summer and winter seasons.

It can be seen that the production fell to almost half or sometimes even more during the winter seasons. *Figure 4.2* shows that over 71% of the total farmers surveyed agreed that the climatic conditions in fact caused a major challenge in terms of production of flowers. An approximate 21% of the farmers disagreed and were of the opinion that climatic conditions could be manipulated inside a green house and the flowers could be grown. Although this would require manipulation of the temperature inside the poly house, it could be managed eventually.

Most commercially grown flowers in the state are seasonal except for Cymbidium orchids and gerberas. Farmers practicing floriculture for any other flowers considered this a huge problem in the industry. The months when the flowers didn't blossom would be dry month and no source of income could be expected from the flowers. Yet the

maintenance of the bulbs and the poly houses would still require a lot of resources in terms of manpower, time and money. Almost 95% of the farmers agreed on this and believed that seasonality of the flowers was a huge drawback for the floriculture industry.

There exists a huge issue of forced sale due to the perishable nature of the product. Upon investigation, it was found that due to lack of proper storage facilities, the farmers were forced to sell the produce within a day or two of harvesting them or it would just lead to wastage. Hence, no matter what the prices are paid to them, the farmers are forced to sell their produce. There also lies a challenge as to harvesting the flower at the correct time. Harvesting the cut flowers beforehand normally does not get the right money as well as harvesting them late leads to over flowering which is also a huge problem and eventually leads to lesser profits. Hence, the flowers are to be harvested right on time. And since no proper facilities exists for storage and transportation, selling them at a low margin is the only solution so far as shown in the *figure 4.2*. 90% of the farmers still have to face this challenge and sell their products forcibly within a couple of days.

4.2. Objective 2: *To identify the products available and the potential for new product development***.**

At present many varieties are being grown in Sikkim both local as well as imported. It becomes important to determine the varieties suitable for local growing conditions and the ones which match the consumer choice.

Sikkim just few years back discovered three locally developed varieties of Orchids. The Hon'ble Prime Minister of India, Shri Narendra Modi, on his visit to Sikkim in January

2016, unveiled these at the International Flower Show in Sikkim. He named two orchid varieties: *Cymbidium Sardar* (in honour of Sardar Vallabhbhai Patel) and *Lycaste Deendayal* (after Pandit Deen Dayal Upadhyay). The former Chief Minister of Sikkim, Mr. Pawan Kumar Chamling named the third variety, *Cymbidium Namo,* in honour of the Prime Minister himself (Nayar, 2016)[7]. This in itself shows how rich the flora and fauna are of the state. With the rapid development of the local market for cut flowers and ornamental plants, larger quantities of high-quality planting materials will be required. The varieties of flowers that are commercially grown are:

4.2.1. Gladiolus

The name gladiolus was coined by Pliny the Elder (A.D. 23-79), from the Latin word *gladius*, meaning a sword, because of the shape of the foliage. Another common name of gladiolus is 'sword lily'. This plant is a native of South Africa and Asia Minor (Pandey, Shankar & Dogra, 2010)[8]. It was introduced into cultivation towards the end of the 16th century. Coonoor grew some gladioli from corms and seeds in his garden (Apte, 1958)[9].

Gladiolus is one of the bestselling flowers in the international cut flower market. Its magnificent inflorescence with a variety of colours has made it attractive for use in herbaceous brooders, bedding, pots and for cut flowers. They make very good cut flowers with long vase life. There are hundreds of species of this plant alone yet no species is known to be the native to India. Gladiolus was introduced in India in the sixteenth century but cultivation began only in the 19th century. Gladiolus has been rated as one of the most popular flowers in the world occupying fourth position after rose, chrysanthemum and carnation in the international cut flower trade (Bose & Yadav, 1989)[10].

Grading:

Gladiolus spikes are graded into four categories based on overall quality, length of spike and number of florets in each spike (Wilfret, 1980)[11].

Table 4.4: Grades of Gladiolus

Grade	Spike Length (cm)	No of florets (minimum)
Fancy	> 107	16
Special	> 96 to ≤ 107	15
Standard	>81 to ≤ 96	12
Utility	≤ 81	10

Source: Apte (1958)[12]

Packaging:

For local markets spikes may be taken submerged in water but for distant markets these may be carried dry in cardboard or wooden boxes or in trunks. This way these can easily be retained for 12 hours whether it is for interstate export or to be lifted by air for international markets. Care should be taken to avoid bruising the flowers while packing. Between the spikes, inside the bundles, absorbent cotton may be placed near the swollen flowers to avoid flattening them by inadvertent pressure. The spikes may be arranged head to tail alternately, and tied with cotton wool so that they remain in position. The spikes carried dry should immediately be placed in water upon reaching the destination (Kofranek & Paul, 1974)[13].

Bundles of 50 to 100 spikes are prepared for air lifting in perforated and light proof cardboard boxes. The upper portion of the spikes may bend downwards if cardboards are not kept vertically. Refrigerated vans are also used to transport gladioli spikes to distant markets. After the spikes are put in vases, they continue to bloom for 10 to 15

days. One floret ordinarily lasts four days and generally one floret opens every day from the bottom to the top. While opening indoors deep colours become lighter (Mishra, Singh, & Palai, 2003)[14].

Various developments in the use of gladiolus have been prevailing since ages. Humans use them for medicinal purposes for headaches, diarrhoea, rheumatism and allied pains (Pandey, Shankar & Dogra, 2010)[15].

4.2.2. Lilium

Lily is one of the most important ornamental bulbous plants and is among the most aristocratic of all garden plants bearing large shaped flowers on a single tall stem endowed with showy flowers in form, appearance, colour and durable spikes. This particular flower is much in demand due to its variety of colours, fragrance and long shelf life up to one week. In the international market, lilium ranks fourth among cut flowers with a turnover of £ 142 million during 2013 (Barman, Rajkumar & Pokhrel, 2014)[16].

The genus lilium comprises of a large number of species, which can be found in temperate regions of the northern hemisphere. Lilium is being cultivated for centuries as an ornamental plant. The majority of the cultivated lilies are either hybrids or selections. A large number of species and varieties can be used in ornamental gardens even though lilium requires a little more attention than many other bulbs. Certain species of lily (*L. maximowiczii)* are also edible.

Lilies are natives of the Northern Hemisphere up to South Canada and Siberia and their southern limit is Florida and the Nilgiri mountains of India. A few species have been found in North East India also.

Lilies are wonderful ornamental plants with varied uses, grown in beds, pots and are excellent cut flowers of magnificent appearance and beautiful colours. Roman naturalist and writer, Plinius, recorded that oils were prepared from the leaves and flowers of the Madonna lily, or *L.candidum* (candidum means dazzling white). Dioscorides of ancient Greece indicated that lily leaves were placed on burns, injuries and snake bites. The white lily was used as a medicinal plant until the 17th century. Lily oil was an aid in child birth. Distilled lily extract was used as a remedy for neck ailments and leprosy. Bruised bulbs were used to cool infections. Lily was also prescribed as a remedy for fluctuating fevers. As a cure for wounds, they were highly valued. The plant was really more of a miniature household pharmacy. The white lily was also famous as a cosmetic. A product obtained by mixing the petals with honey was used to remove wrinkles from the face. Lily juice was also consumed by women to preserve youthful beauty. Moreover, lily oils were used as aphrodisiacs.

Ornamental lilies can be classified into five major groups as given below:

Asiatic Lilies: They are early in flowering, usually in June with as many as 12 fragrant flowers per stem. Large flowers bloom on top tall stems.

Oriental Lilies: They bloom between July and September. They come in white, pink and red and are usually spotted or striped with a strong fragrance in the evenings.

Tiger Lilies: They bloom from July through September and grow to a height of about 1.4 m. The usual colours are orange, pink, yellow and red.

Trumpet Lilies: They are also called Aurelian lilies. They have large, trumpet shaped blooms and grow up to 1.6 m. Blooms appear from late June through August.

Turk-cap Lilies: This species of lily is turban shaped and shorter in stature than the other lilies, reaching a height of only 30 inches.

Harvesting:

The flower stems are usually cut full length when they are on the verge of opening (Chittenden & Synge, 1956)[17]. According to Laurie, Kiplinger & Nelson (1958)[18], the stems are cut when the flowers are at least half open, but at this stage not all the remaining flowers may open, particularly if there are more than five buds present. Sometimes individual flowers or heads are cut when the bud count is high and the stem is cut later when fewer flowers are present. If the flower is sufficiently open, the anthers should be removed to avoid the messy appearance, created by sticky pollen.

Harvesting the lilies at 25% bud colour stage gives it the longest vase life in all cultivars (Kumar, Arora & Singh, 1999)[19]. Buds longer than 4.5 cm develop normally and open in preservative solutions (Song, et al., 1996)[20].

Vase life has been found to be best in winter when the stems were picked with more than 3 buds showing colour and in summer when 3 buds were coloured**.** Song, et al., (1996)[21] found that the best harvesting stage for Asiatic hybrid lily cultivars was when the first flower was fully open.

Post-harvest technology:

The post-harvest life of cut flowers is closely related to the temperature at which they are held after removal from the plant. As temperature decreases, the post-harvest life of cut flower is extended (Parthasarathy, Jana & Roychoudhury, 2003)[22].

Packaging:

Four or five stems are bunched together to make a bundle. At least 20 number of flowers are kept in a bunch. In case of loose supply, normally the farmers roll 20 stems in a paper. While packing, base leaves should be removed. Flower bunches are tied at the base and below the flower heads. Bunches are then sleeved in light polythene sheet. Lilies are often packed in standard corrugated boxes measuring 120 cm x 50 cm x 30 cm box (Barman, Rajkumar & Pokhrel, 2014)[23].

4.2.3. Gerbera

Gerbera is a stem less perennial herb. The daisy like flowers are in various colours. Some bi coloured double cultivars are very attractive on long leafless stalk. A study done on this species, grouped gerbera into single, semi double and double cultivars based on flower heads. There are about 40 species in the genus Gerbera which are hardy and perennial. The criteria considered for the development of new gerbera selections are: ease of growing, uniformity of growth, length of the cultivation period, availability in various colours, uniformity and strength of flower stems, and compactness of growth.

With changing life styles and increased urban affluence, growing of gerberas has assumed a definite commercial status in the recent two-three decades. The abundance of natural resources like diverse agro climatic conditions allows for the production of gerbera in temperate regions, almost throughout the year in some part of the state. In Sikkim, the most widely grown commercial flower is gerbera which in turn becomes a source of gainful and quality employment to scores of people (Barman, Khan, Pokhrel & Patil, 2014)[24].

Not just India, gerbera is an important commercial flower grown throughout the world. It is a perennial herb native to South Africa and Asia, which belongs to the family *Compositae*. Gerbera produces very attractive flowers in various colours and is ranked among the top ten cut flowers. It is also called Transvaal daisy, Barberton daisy or African daisy. Besides as a cut flower, it is also very ideal for beds, borders, pots and rock gardens.

The native distribution of this genus, comprising of about 30 species, extends to Africa, Madagascar and tropical Asia and South America (Bremer, 1994)[25]. In India, gerbera saplings are distributed from Kashmir to Nepal at an elevation of 1300 to 3200 m.

Harvesting:

The flowers of gerbera are generally harvested when the outer two rows of disc florets are perpendicular to the stalk. This stage of the harvest is very critical as the flower should not be cut before the outer whorl of flowers show pollen (Auman, 1980)[26]. Generally, re-cutting of stem before placing in water or preservative solution or at all stages of marketing is necessary to prolong the vase life.

Hence it is better to avoid cutting flowers too early and also better to use a vase life preservative when flowers are kept in water before marketing (Dubuc, Lebreux & Veith, 1985)[27]**.**

Gerberas are graded on the basis of the quality of flowers, colours, length, firmness of the stem and abnormalities of flowers. Flower diameter and the ripeness also determine the grade code. Further, grading is also done based on the stem length**.**

Storage:

Gerberas are not suitable for long term storage as the flowers lose 40% of their vase life and with regard to temperature, 17°C is optimum for short term storage (Staby, Robertson, Kiplinger & Conover, 1978)[28]**,** while they can be stored up to 8 days at 4°Celcius.

Proper harvesting, post-harvest handling and use of floral preservatives improve the keeping quality of cut flowers of gerbera. Several preservatives have been found to be effective in prolonging the vase life as well (Das, Samanta & Parthasarathy, 2003)[29].

Packaging:

Gerberas having a minimum stem length of 35-40 cm are packed in interior boxes; however, stem length less than 35 cm are supplied with water at the base or in an aqua box. Bunches of large flowered gerberas should have 10 stems while that of smaller flowers must have 25 stems with gerbera leaves as per international standard. It is usually placed in a bunch of 5 or 10 stems in a dry condition for local market supply. Farmers do not make a bunch with more than 10 stems as the chances of those getting damaged at the neck increases with the increase in the number of stems (Barman, Khan, Pokhrel & Patil, 2014)[30].

4.2.4. Anthurium

Bhatt, Desai & Sanyal, (2003)[31] in their study talked about anthuriums as tropical plants of great beauty grown either for the showy cut flowers or for their unusually attractive foliage. Anthuriums are highly popular cut flowers because of its lasting quality and its bold effect. These contribute to the elegance and attractiveness which are the

prerequisites for a quality design. Provided they are given the right greenhouse conditions they are easy enough to grow.

The name anthurium is derived from Greek *anthos* meaning flower, and *oura* meaning tail, referring to the spadix. These evergreen plants are native to Colombia, Peru, Central and South America, Brazil and Venezuela and have been grown in England since the early nineteenth century. Anthurium is one of the Hawaii's principal cut flower export. Among the tropical flowers, the world trade of anthurium stands second only to orchids. In Asia in particular, its popularity is increasing.

Cultivars:

A good Anthurium variety should have the following qualities: compact plants producing suckers profusely, bright clear colour, showy, heart shaped spathe, with plenty of blisters and symmetrical overlapping of basal lobes. The present-day flowering Anthurium are mostly hybrids of different species, involving mainly *A. andraeanum* and *A. scherzerianum.*

The flowers after harvest are graded following USDA standards as mentioned below (Singh, 1998)[32]:

Table 4.5: Grading Process of Anthurium

Grade	**Spadix measure (average length and width in cm)**
Miniature	< 8
Small	8-10
Medium	10-13
Large	13-15
Extra Large	>15

Source: Lalbiakthangi (2020)[33]

Anthuriums are generally harvested when the spadix is almost fully developed. Flowers picked too early wilt quickly. Development of true flowers on spadix are also used as a criterion for determining the harvest stage. Mechanical injury is the most common reason for rejection of flowers after harvest, followed by curved petiole (Hara, Nishijima, Bushe & Sato, 1989)[34].

4.2.5. Alstroemeria

According to Parthasarathy & Bose (2003)**[35],** alstroemeria is also known as Inca or Peruvian lily. It is grown in gardens for their showy multicoloured flowers. Now the flowers of Alstroemeria hybrids are one of the ten important cut flowers in the whole market. The spotted flowers in various shades of pink, rose, red, white, yellow, orange and bronze are popular as cut flowers. In India, it is mostly grown in the Nilgiris and Bangalore.

Alstroemeria is a recent addition to the floriculture industry in Sikkim and has become a major cut flower. It is also used as potted flowering plants for home decoration as well as herbaceous landscape plant. They are often grown for use as a colourful addition to cut flower arrangements. Alstroemeria can be placed in a clear vase to show off colours and vibrancy. The plants have ever-blooming habit in the garden and continue flowering all through summer and fall until the frost. In 2013 international cut flower industry Alstroemeria ranked 13th with a turnover of £13 million (Barman, Rajkumar & Pokhrel, 2014)[36]**.**

Alstroemeria is a hardy perennial, easy to grow in bed, border and pot and are used for garden display. In a dry border, it may be allowed to remain undisturbed for years. Large clumps of any of the varieties will produce brilliant flowers. Straight and erect

flower stems of various colours are used as cut flowers which stay fresh in a vase for several days.

The genus Alstroemeria has about 60 species, mostly native to south America.

Table 4.6: Cultivars of Alstroemeria

White	Amanda, Mona Lisa, White Wings
Red	Carmen, King Cardinal, Red Sunset, Valiant
Pink	Capitol, Fiona, Olympic, Rito, Trident, Veronica, Pink Triumph
Orange	Harlequin, Sunrise
Yellow	Canaria, Eleaner, Friendship, Orchid, Zebra, Yellow King
Red-purple	Marina, Purple Joy, Sunstar
Bronze	Butterscotch
Lavender	Barbara, Butterfly, Jubilee, Jupiter

Source: Barman, Rajkumar & Pokhrel (2014)[37]

Harvesting:

The flowers are harvested when colour appears on first flower. The flowers are sensitive to ethylene and the leaves are fragile and turn yellow after harvest. Cut flowers are stored at 2 - 4°C in water for 2 – 3 days, but dry storage is not recommended.

4.2.6. Cymbidium Orchids

Cymbidium is the most fascinating and beautiful among all orchids. It exhibits a wide range of diversity in form, size, colour and texture of flowers, and a very long vase life which is unimaginable. That is why it is considered as the ‘king of all flowers’. Above all rarity in the market makes it one of the most priced flowers. Cymbidium cut flowers

rank first among the orchids and in floriculture crops and account for 2.7% of the total cut flower production of world trade (Barman, 2014)[38].

Orchids are traded for a wide range of purposes and at many different scales, from large scale commercial trades to subsistence use (e.g. as medicines, materials for wearing ornaments, food, dyes etc.). There are also other emerging commercial uses of orchids such as perfumes and cosmetic products that have been subject to little published research (Hinsley, De Boer & Fay, 2018)[39].

According to a study by De & Singh (2016)[40], out of the total 1331 species of orchids reported, 856 species are found in the North Eastern region of India. Out of these 856 species, few of them are endangered and rare species.

Sikkim also boasts the largest collection of germplasm of Cymbidiums which are not available in other part of the country. The Cymbidium varieties were all introduced from famous Cymbidium breeders from Australia and New Zealand and have promising commercial value as cut flowers.

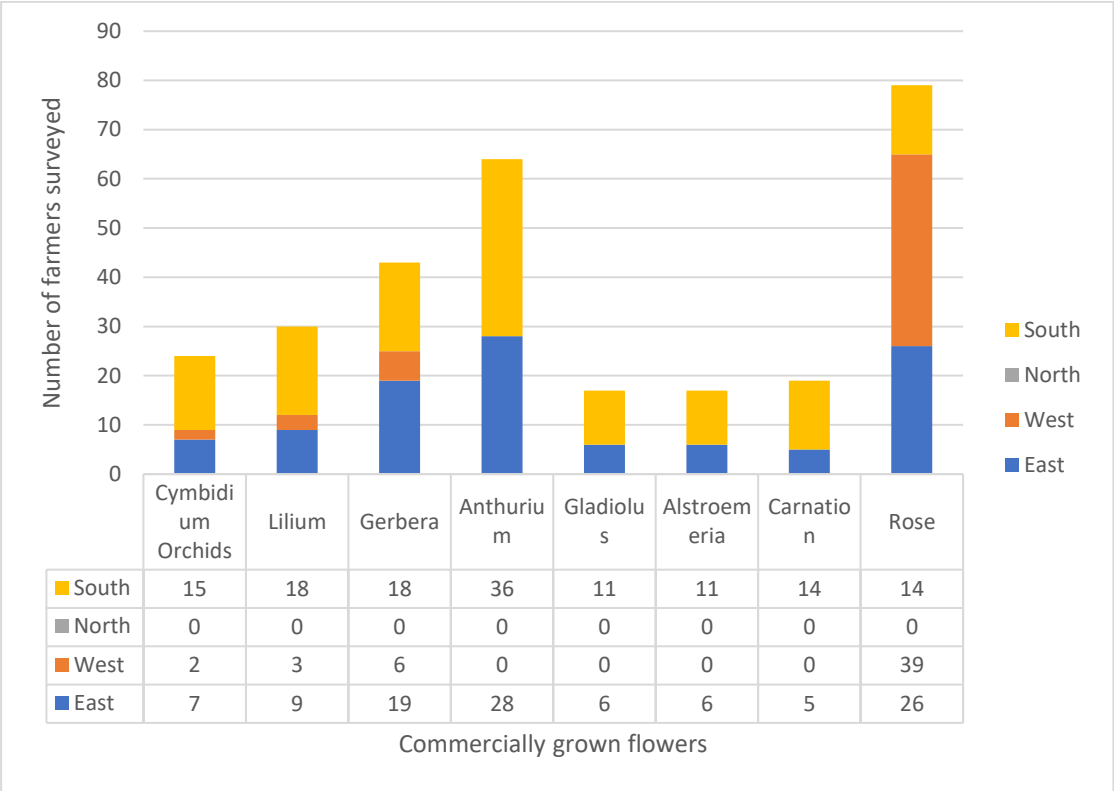
It has been found that most of the Sikkim orchids are beautiful but short lived. But there are species like *Cymbidium eburneum, C. hookerianum* and *C. irridioides* which were under exploitation since time immemorial and have been the mother plants of today's modern Cymbidium hybrids. The orchids of Sikkim are still being smuggled out of Sikkim indiscriminately under the very nose of strict vigilance of the Government. It means that somewhere else in the world (technically advanced countries) these insignificant orchids are being used to produce beautiful orchid hybrids. So, it is high time that one should realize the importance of our rich orchid diversity and act sensibly, giving due thought to developing the existing technology knowhow by sending

promising individuals and experts to developed facilities in countries with such facilities to learn and excel in the art of hybridization.

4.2.7. Others

Other commercially grown flowers that are cultivated and marketed widely in the State are roses, carnations, marigold, chrysanthemums, etc. These flowers, though produced at select locations, contribute almost equally to the growth of this sector.

Figure 4.3: Commercially grown flowers in Sikkim



	Cymbidium Orchids	Lilium	Gerbera	Anthurium	Gladiolus	Alstroemeria	Carnation	Rose
South	15	18	18	36	11	11	14	14
North	0	0	0	0	0	0	0	0
West	2	3	6	0	0	0	0	39
East	7	9	19	28	6	6	5	26

Source: Computed from primary data collected by the researcher

The above *figure 4.3* shows the availability of commercially grown flowers in Sikkim. The data also shows the number of farmers surveyed per flower from the different districts of Sikkim. It is imperative to notice that there are no farmers who divulge in commercial cultivation of flowers in the north district of Sikkim. This is because the

climatic condition of the northern region is too cold to support any growth of flowers without extra nurture and manipulation of the temperatures. This would lead to heavy investments in terms of capital and technology and might not give the expected results.

The same figure also shows that Cymbidium is grown mostly in the South of Sikkim followed by East district. So is the case with Lilium. This flower is mostly cultivated in the South followed by East.

Gerbera on the other hand is grown mostly in the East District followed by the south district. Few farmers also practiced gerbera plantation in the West as per the *figure 4.3.* On thorough study, it was found that gerbera is the most preferred flower of them all. It requires much less maintenance and labour in comparison to any other flowers. Plus, it grows all through the year. The 10 months from February to November yields quite a lot of flowers adding to the income of the farmers. Whereas, the remaining two months also do not go dry. Flowers still bloom though the yield almost falls down to half of what is grown in the summer.

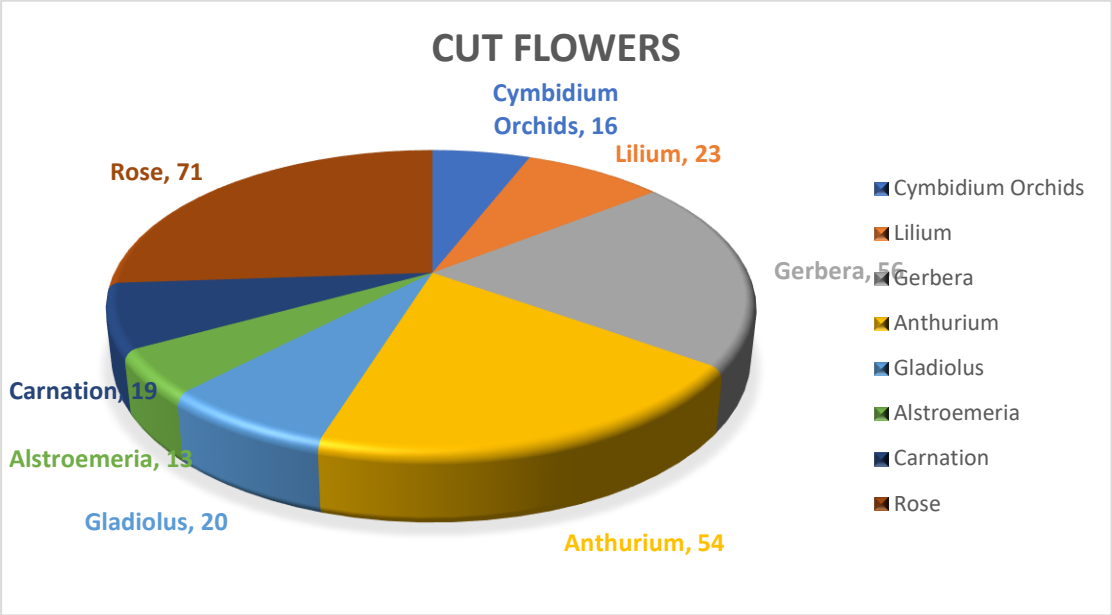
Anthurium had its largest production in the South District. The climate there favoured growing of anthuriums the most. Anthuriums are quite royal to see and last long in terms of vase life if kept with care. The market for anthurium isn't just the town of Gangtok. Instead growers prefer to sell it to Kalimpong, a district of West Bengal but much closer to reach in terms of distance than Gangtok. The farmers are located in a cluster and practice the idea of pooling in their quantity and marketing it if the demand is high during peak seasons. The flowers are mostly taken by hotel owners and ceremonial halls in Kalimpong.

Other flowers like gladiolus, alstroemeria and carnations are also cultivated the most in the South District followed by the East. The quantities grown are also far less compared to other commercially grown flowers.

Roses on the other hand had most of its production located centrally in the West District of Sikkim (like Daramdin, Sombaria, etc.,). These places favoured the cultivation of roses the most followed by East and then the South Districts of Sikkim. But most of the roses in the Sikkim market or locally exported roses come from the farms of the West district.

There are certain ways in which a flower can be eventually sold. The most relevant types are cut flowers, bulb, or potted. In Sikkim, the most preferred type of sale was cut flowers as shown by the chart in *figure 4.4.* Out of the 293 farmers surveyed, 272 farmers preferred selling it through this mode. For flowers like gerbera, anthurium, alstroemeria, carnations, etc., there is not much choice as to how they are sold. But there are farmers who prefer selling Cymbidium orchids in pots and this in fact yields much greater profits compared to selling cut flowers. There were farmers who also sell bulbs of gladiolus and gerbera and have made it a business. Though the bulbs yield less profits in term of per unit, the sale can be done in a much higher quantity.

Figure 4.4: Number of farmers selling cut flowers



Source: Computed from primary data collected by the researcher

4.2.8. Value Addition and New Product Development

Medicinal Plants

With the advancement in modern technology, it has now become possible in creating new flavours with medicinal uses to cater to the pallets of the local and global consumers. The commercial potential is immense and India with more than 8000 medicinal and 2000-2500 aromatic plants can gain tremendously by exploring the global markets (B.R. Rajeswara Rao et al., 2008)[41].

According to a study by Titz, A. (2004)[42], the following are the list of countries which practice the art of traditional medicines:

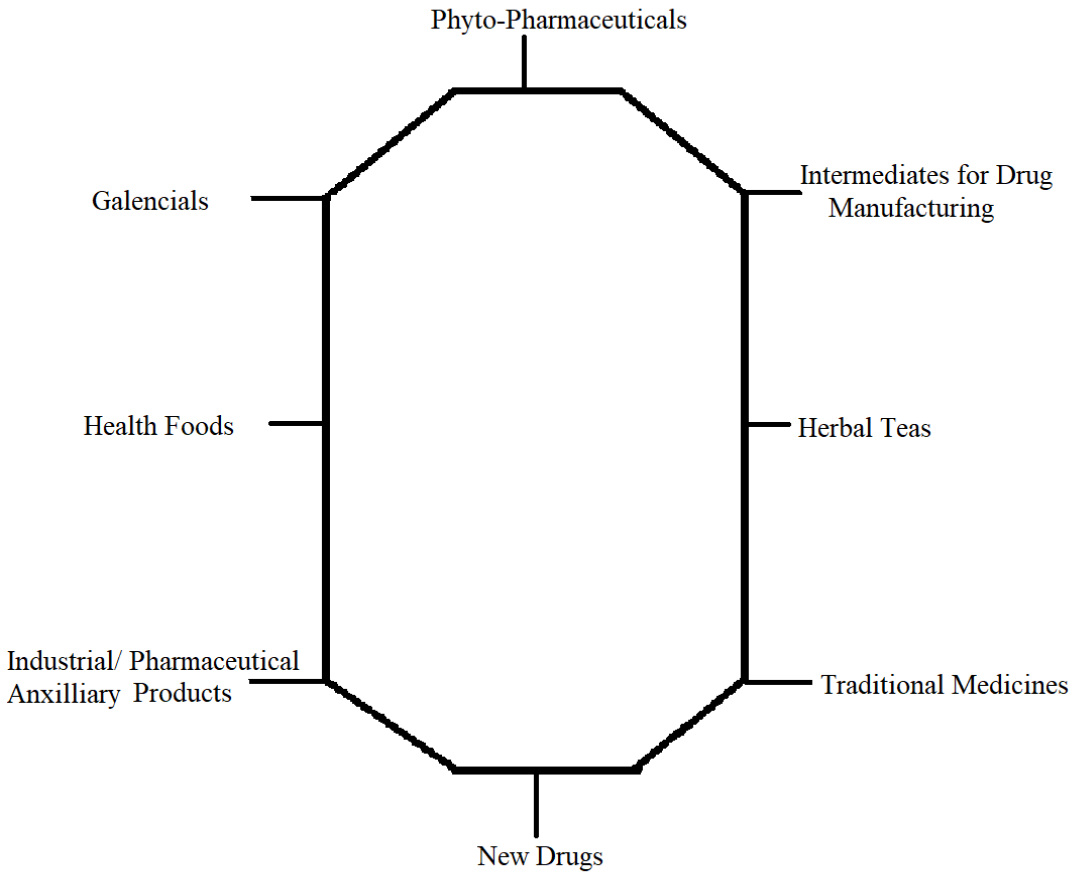
- 100% in China
- 100% in the UAE

- 70% in India and Pakistan
- 70 – 80% in Africa

It can be seen that India itself has a huge in-house demand for the medicinal flowers. The medicinal plant trade in India is substantial with a total turnover of Rs 2300 crores in both ayurvedic and herbal products. This shows that the medicinal plants have a rising demand for wider variety of species and newly developed end usage.

According to another study by De Silva, T. (1997)[43], the range of products that can be obtained from medicinal plants are shown in the *figure 4.5* below:

Figure 4.5: Industrial Uses of Medicinal Plants



Source: De Silva, T. (1997)[44]

The use of plants as a means to cure certain ailments and diseases is an age-old practice throughout the world. From time immemorial, the practice of using herbal medicines has been gradually nurtured and brought up to its present position, with continuous additions. All the ethnic communities of Sikkim practice certain traditional ways of treatment using parts of medicinal plants (Acharya & Sharma, 2016)[45].

Sikkim is considered a rich repository of medicinal plants. Around 460 species of plants of therapeutic value occur in Sikkim. Previously, medicinal plants were only used by the local communities and were collected in smaller quantities. With better understanding of their therapeutic uses and recent commercialisation, the demands and exploitation has increased manifold. Due to this reason, the collection of medicinal plants from the wild has been banned for almost a decade and transit for commercial purposes isn't allowed.

In addition to floral beauty, Cymbidium has medicinal uses as well. The entire plant of *Cymbidium aloifolium* is used as purgative, emetic, tonic and in treating ear ache. Decoctions of the roots of *Cymbidium ensifolium* in water is used in curing gonorrhoea; decoction of flowers is used for treating sore eyes. In certain parts of north eastern India, the juice from crushed leaves of *Cymbidium iridiodes* is said to be utilized for clotting of blood in wounds. In North Queensland, fruit and pseudobulbs of *Cymbidium canaliculatum* and *Cymbidium madidum* are also used in case of dysentery. The latter variety of the plant is also used as oral contraceptives by few native habitants in Sikkim (Barman, 2014)[46].

Orchid back bulb shoot

It is a known fact that Cymbidiums are lovely and rightly termed as the king of all flowers. It occupies a position among the top ten ranking cut flowers that are traded in the international market. It also fetches the best prices per spike among all the flowers traded. With a rapid rise in demand of the Cymbidium flowers, it has now become an essential feature to propagate Cymbidiums in larger quantities.

Upon study of the farmers in the state, many were found to practice the art of developing a back bulb on orchids. The bulbs generally sprout into shoots in a year's period and take a minimum of three years to fully grow. The difference in terms of monetary benefit between the original flowers and the new back bulbs is quite vast. An orchid cut flowers sells at Rs. 30-80 on an average, but the farmers were able to sell the cut flower stick from the bulbs at approximately Rs. 100 per stick.

As such there is a need for development of an effective propagation technique for multiplying the planting stocks of Cymbidium so that it reaches the farmers' level. During the survey, it came to light that few farmers who understood the value of Cymbidium had themselves started propagating the flowers using the back bulbs which resultantly added up to more quantity of the flowers and eventually the profits.

One major advantage of growing the flowers using back bulb technique is that the new plants can be regenerated without adding to the cost of the farmers.

It was also found that potted orchids are more in demand than the cut flowers. Though a typical orchid has a vase life of 2 – 3 months provided necessary care is given to it, customers were known to prefer potted orchids over cut or bulb. On interviews with the experts in the field it came into light that instead of miniature orchids, standard orchids

are in greater demand. The miniature orchids are hybrids that are grown at even cooler temperatures than the standard orchids. But the demand for standards are seen to be higher than the miniatures.

The other most widely known usage in the state for cymbidium orchid is for decorative purposes.

Lilium bulbs

Lilium bulbs are edible and bitter in taste but when properly cooked they make a tasty dish. In the remote places in Sikkim with native population, even today, lily serves as a medicinal plant due to its medicinal properties. The mucilaginous substance present in bulbs is used as ointment for tumours, ulcers and inflammation. It is also used as an ointment for softening corns and healing burns.

Value Addition

Most advanced countries sell 70 – 80% of their products through value addition. In Sikkim, the value addition is almost negligible. Farmers still practice traditional methods of selling and no innovations or additions are done to the products. This is a major demerit in terms of gaining profits.

On a survey of the customers, almost 59% of the customers were willing to try out preserved flowers. Most of the customers who were against the idea of preserved flowers were in fact unaware as to what constitutes a preserved flower. Hence, an awareness drive can be conducted on this issue and customers can be introduced to the selling varieties other than just cut flowers through proper advertisements and marketing. This in turn would lead to less wastages or forced sale for the farmers/growers.

The other value additions that can be implemented is selling bulbs in addition to cut flowers. The bulbs can be sold in those months when there is no sale of cut flowers. Value addition to a floricultural product increases the economic value and customer appeal. The dry flower industry is identified as a promising area of export. According to a global study, the dry flower industry constitutes 15% of the global floral business. The export items from India includes more than 70% of dry flower produce and are sold to the USA, Japan, Europe, Australia and the Far East. The same study suggests that the export of dried flowers and plants, from India, is approximately to the tune of Rs 100 crores annually.

Potpourri is quite common in the western market. But Sikkim and India in general have failed to attract customers in this aspect. Potpourri is a mixture of plant materials, dried and naturally scented flowers which gives a gentle fragrance for a long period of time at the place it is decorated and kept. These are normally kept in decorative bowls in the middle of rooms in a residential setting. The fragrance is natural and pleasant and not too strong. This has quite a strong market hold. Indian flowers are mostly exported as dried flowers to the UK, US etc. Hence, there is an ample opportunity for the growers here who could also learn the art of drying flowers and selling it to make larger profits.

Hardly, few farmers practice the art of making crafts and handloom products with the natural materials of plants. Orchid plants are quite sturdy and can be made into baskets or natural vases. But this hasn't been explored yet in Sikkim. Farmers are too focused on selling the entire flower in a pot or through the conventional means of cutting it off. These farmers could also be trained in these crafts to add more value to their products. At present types of trainings are conducted on a regular basis by the Indian Council of Agricultural Research (ICAR) located at Pakyong.

Sikkim has garnered quite a name when it comes to alcoholic beverages and their quality. Wine production is a business that has a tremendous amount of money. Moreover, natural organic wine is something that does extremely well in the market. Growers could learn the art of making wine from natural flowers which are edible and organic in nature and sell it in the markets. The wine made from flowers hold a special place in the market and is a substantial revenue earner for the state. Commercialization can be improved by bringing in standardization and quality control in production of such beverages. The wine does very well locally and can aim to appeal to the customers at national level as well as international level provided it is prepared as per set standards and benchmarks for its wider acceptance in the market. Hence, wine making can also be taken as an allied industry of the floriculture sector and can help farmers garner more revenue through its commercialization.

4.3. ***Objective 3****: To evaluate the current pricing policy and identify the price mechanism that best suits the industry.*

Flowers are perishable products and hence it becomes essential to price them correctly. It helps establish a good floriculture business or lead to failure if pricing policies aren't done properly. For instance, a sudden rise in the price can lead to higher profits for the farmers or on the other hand, a sharp decline can inflict heavy loss which can often be unbearable. Therefore, an ideal pricing policy should be adopted for marketing the floriculture products.

The following few objectives should be kept in mind while coming up with the ideal pricing policy for the flower growers:

- Prevention of fall in price in the event of over production

- Protecting the interest of the farmers by ensuring a minimum support price for their produce if in case the market conditions are volatile and the prices fall.
- Providing price stability in the floriculture product.
- Ensure a rise in the production and exports of the flowers, etc.

A system of support price can be adopted by the government to help the farmers. A support price assures the farmers that just in case, the market is unfavourable in terms of price of those products, the government can step in and buy the products from the farmers at a guaranteed price and sell it further. This helps reduce the burden on the farmers and they can be rest assured that their products won't be sold at a very low rate that would be unprofitable to them.

Minimum Support Price: The minimum support price acts as an assurance to farmer against the possibility of post-harvest losses due to steep decline in the market prices. But more positively, it serves as an enticement to farmers and stimulates them to go for larger volume of production with the use of modern techniques and inputs. The support levels are determined keeping in mind many factors such as the cost of production, the effect on cost of living, general price levels, the demand and supply of the products and many more other factors.

The Third Five Year Plan also stated that the farmers were assured that "the prices of agricultural products would not be allowed to fall below a reasonable minimum price". The minimum support price, in simple terms, is a reserve price announced way in advance of the production, mostly for the benefit of the farmers. Hence, even the state government can adopt the policy of minimum support price for its farmers.

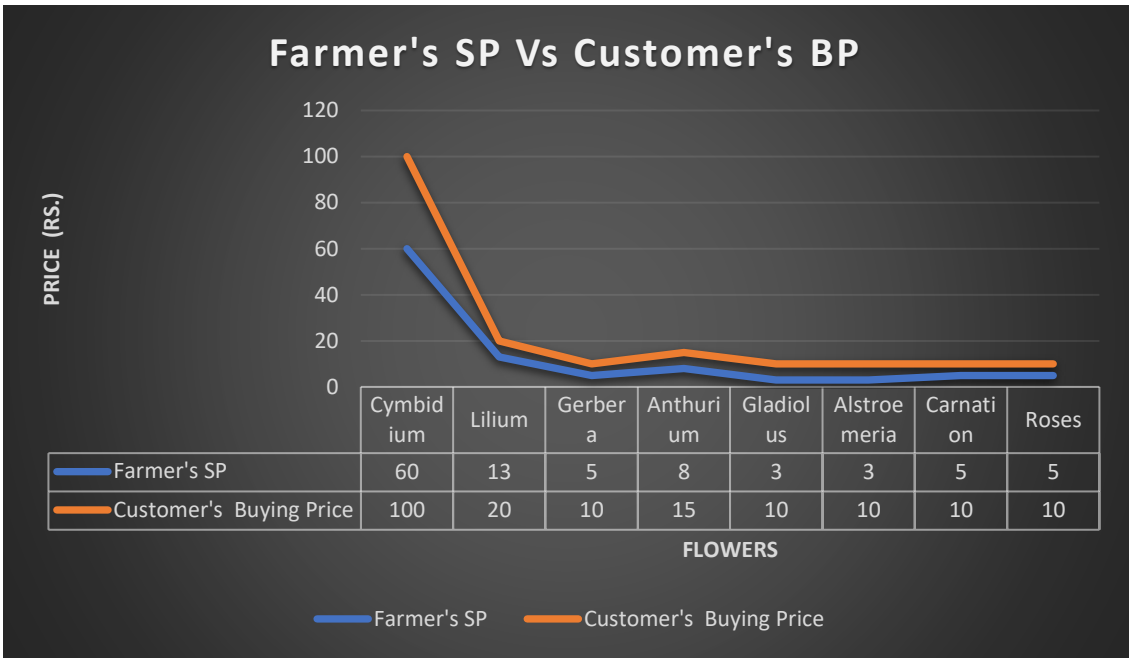
Each flower that is grown has different prices. The same flower grown in different areas might have different prices. Even the flowers grown in the same area but different colours have varying prices.

It is well established that there aren't any homogenous pricing policies for the flowers grown in the state. With each species, the price varies. In fact, during the course of the study, the researcher faced quite a conundrum with regards to figuring out the best pricing policy when comes to the selling of flowers.

The prices of cut flowers of orchids when sold by the farmer ranges from Rs. 30 to Rs. 150 approximately. The price for orchids depends on its size, variety, colour, sturdiness, and the quality of the flowers. Other criteria include length of the stalk, the time of its harvest and its fragrance. On an average the cut flowers are sold at an approximate price of Rs. 60 and eventually bought by the customers for an approximate Rs. 100 or more as shown in the following *figure 4.6.* The difference in between goes straight into the pockets of the middlemen or few growers who acted as middlemen by collecting the entire produce of the farmers in an area and pool it before selling it off to big customers.

In the same figure, it can be seen that only Cymbidium orchids are more highly rated than any other flowers. It is because of the rarity of such flowers as well as the longer vase life of these flowers. The other flowers that are commercially traded last for a week or more when kept in a vase. Orchids on the other hand, has a vase life of 2-3 months with proper nurturing and care when keeping it in a vase. Hence, the vast difference in the price.

Figure 4.6: Price variation of commercially traded flowers in Sikkim



Source: Computed from primary data collected by the researcher

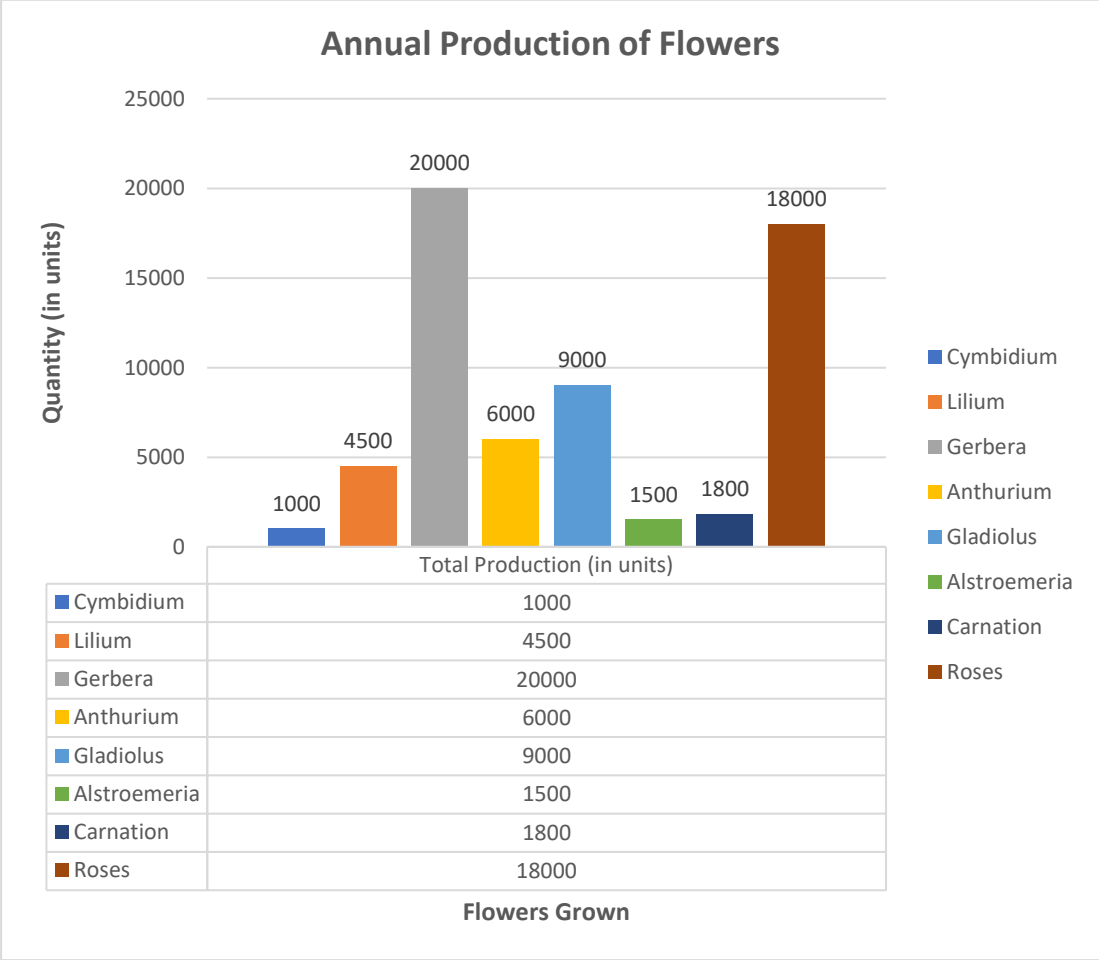
The same *figure 4.6* shows that farmers sell almost all the flowers at nearly half the price of what the customers pay for it eventually at the market if taken by the middlemen. The farmers are unable to reap most of the benefits on their own. Lilium as shown in the figure is sold by the farmers at approximately Rs 13 but bought by the customers at Rs 20 per stick. The same goes for almost all the flowers. Even the selling price keeps on changing depending on the quality, colour, length and the flowering stage of each individual stick. This can often lead to dissatisfaction among the farmers if their products are deemed to be of lesser quality.

Most flowers have grades and are paid a certain price for each grade.

Let us take a real-life example of roses sold in the markets of Daramdin. Roses are categorised into four grades: A – the highest quality, B, C and D- the lowest quality of the flower. For a stick which belongs to the A grade, the middlemen are willing to pay

a price as high as Rs. 6-7; for a stick which belongs to the B grade, the farmers get Rs. 5; for C grade roses, they get paid Rs. 4 and Rs. 3 for the lowest quality roses. The quality or the grade is determined by looking at the colour, the volume of petals, the length of the stick, the sturdiness of the stick and most importantly the stage of bloom the flower is at. If the flowers have already bloomed while harvesting, it won't have a longer vase life and hence it is graded either C or D.

Figure 4.7: Annual Production of Flowers (Quantity)



	Total Production (in units)
Cymbidium	1000
Lilium	4500
Gerbera	20000
Anthurium	6000
Gladiolus	9000
Alstroemeria	1500
Carnation	1800
Roses	18000

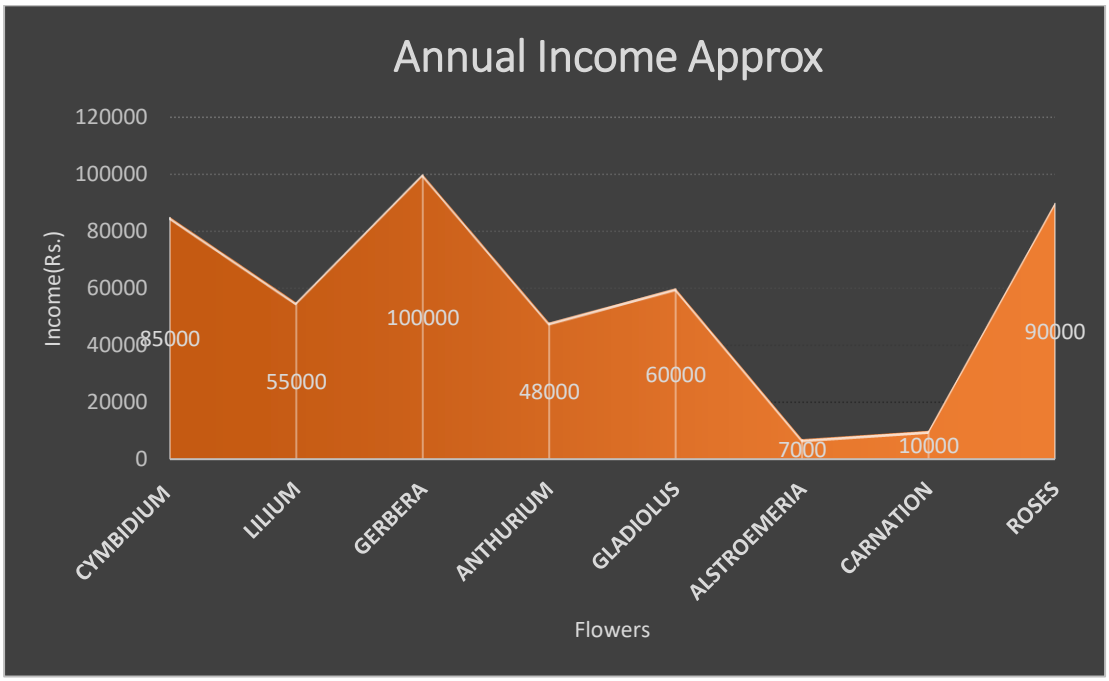
Source: Computed from primary data collected by the researcher

Figure 4.7 shows the volume of production in terms of number of units for each individual flower. The lowest volume of cut flower production is of Cymbidium orchids. This is because the Cymbidium growers prefer selling more of potted plants

than cut flowers. Annually the average number of pots of orchids that are sold by the farmers is approximately 300 pots. This would give a rise in income by Rs. 80,000 – Rs. 85,000 depending on the value of each individual pot which ranges from Rs. 300 – Rs. 1500 per pot. The variation in price is quite large due to the fact that each individual cultivar and species fetches a different price. All the elements such as length of the flower, bloom at the time of harvest, colour, sturdiness, volume of petals, vase life, etc., play a huge part in determining the prices.

The same figure shows that the highest volume of production when it comes to quantity is that of gerbera. Farmers reap tremendous profits when they trade in gerbera as shown in *figure 4.8* below. Annual production of gerbera is an approximate 20,000 sticks garnering an income of approximately Rs. 1,00,000 per year. This is because gerberas are grown all throughout the year and these aren't seasonal like the other flowers. Hence, the number of farmers who had a choice when it comes to the cultivation of flowers opted for gerberas. Another flower which garnered a lot of profit due to its production quantity is rose. Roses are grown in protected conditions and harvested throughout the year. The similarity between gerbera and roses is that during the summer seasons the yield in terms of quantity is very high in comparison to what the farmers harvest in the winters. Hence, maximum income could be earned only in the summer seasons. The following *figure 4.8* is a proof of the statement. It shows the annual income in terms of rupees for various flowers. The figures aren't the exact amount of income, rather they are an approximate average calculated from the information gathered from various farmers cultivating similar kinds of products.

Figure 4.8: Annual Income of the farmers



Source: Computed from primary data collected by the researcher

Figure 4.8 shows that cultivation of cymbidium orchids, gerbera and roses yields a much higher annually income than any other flowers with an average of more than Rs. 80,000 per annum. The other profitable flowers are gladiolus with an average income of Rs. 60,000, lilium with an income of Rs. 55,000 and anthurium with an income of Rs. 48,000 approximately.

The remaining flowers which are seasonal aren't just grown on their own. They are grown simultaneously with other major income earning flowers because of the lack of income earning capability of the seasonal flowers. Hence, this study shows that the most suitable flowers in terms of earning good income and fetching the best prices are gerbera, cymbidium orchids and roses followed by anthurium and the others.

MOST COMMERCIALLY GROWN FLOWERS IN SIKKIM FOR TRADE

ALSTROEMERIA

GERBERA

CARNATION

CYMBIDIUM ORCHIDS

ROSES

ANTHURIUM

GLADIOLUS

LILIUM

ORCHID

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CHAPTER 5

ISSUES RELATED TO THE DISTRIBUTION CHANNEL AND PROMOTIONAL SCHEMES

This chapter focuses primarily on the issues related to the distribution channel of the floriculture industry in Sikkim and the promotional efforts and lack thereof undertaken by the stakeholders in this sector. Data has been collected and analysed and interpretation with regards to the place and promotion mix has been discussed elaborately.

5.1. *Objective 4**: To identify the problems related to the distribution channel of the floriculture sector.***

The marketing system that plagues India when we talk about floriculture are inadequate market information, large number of middlemen who take commission or major portion of the profits, insufficient funds, malpractices of traders, lack of proper transport facilities, etc.

The availability of various commercial floral products as well as the pricing mechanism has been an issue for the farmers for a long time now. But the persistent problems of post-harvest are among the worst in the state. Farmers receive absolutely no help from the government in this regard. The small local marginal farmers are left to fend off for themselves. Storage and shed facility for the farmers are almost negligible and this poses great problems for them. No farmer on the survey had access to storage facilities and hence had to look for low cost storages near to their fields

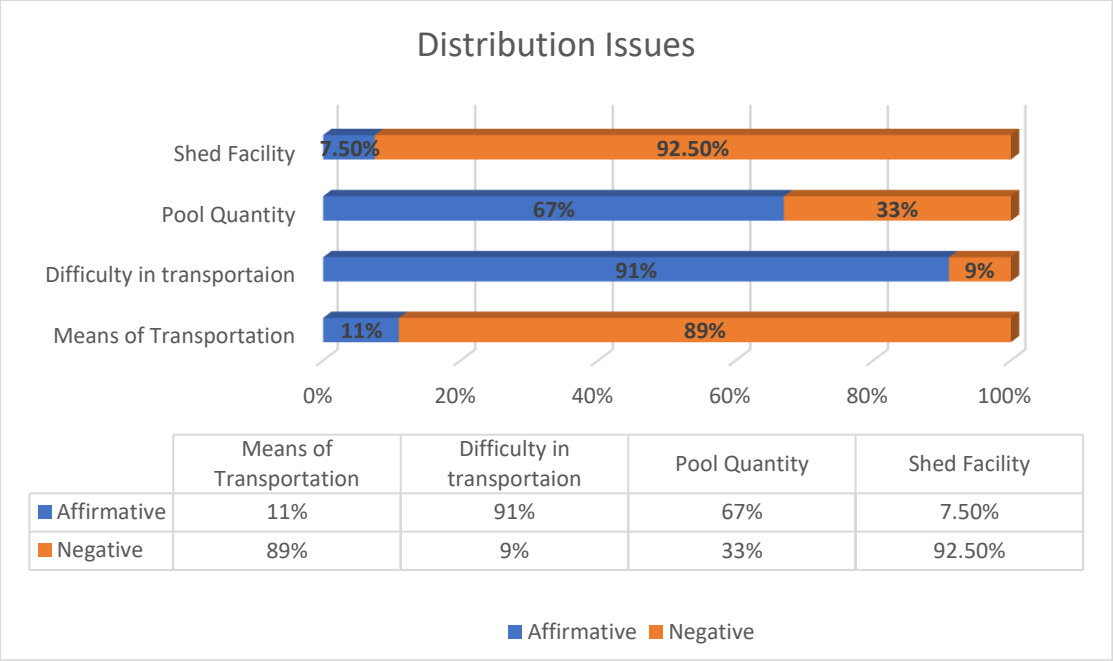
with cool temperatures, or sell their produce to bigger growers who had in-built made-up storages, which is comparatively much better than no storage at all. This lack of storage facilities proved to be a major hurdle in the growth of floriculture sector.

The greatest demerit of not having any cool storage facility is that the profit earning capacity of almost all the flowers diminishes. Along with the absence of the storages an even bigger obstacle emerges i.e., the transportation facility. Lack of properly maintained road, absence of vehicles plying regularly from the flower producing hubs to the market and lack of marketing federations have put the floriculture sector in a dire state.

On investigation, it was found that out of the 293 farmers surveyed, only 11% owned their own means of transport. The remaining 89% have no means of transportation and rely on the taxis that ply on a regular basis to the capital or other major towns. As per *figure 5.1;* it can be seen that 91% of the farmers face great difficulty in transporting their goods from their farms to the markets.

The entire system of supply of the flowers to the market also depends a whole lot on the availability of space in these vehicles. Due to some reason, if the vehicle fails to travel, the whole output of the farmer is jeopardised. As there is a lack of storage facility, this becomes all the more problematic for the farmers. Hence, transportation is a huge issue when it comes to distribution of the products.

Figure 5.1 Distribution Issues



	Means of Transportation	Difficulty in transportaion	Pool Quantity	Shed Facility
Affirmative	11%	91%	67%	7.50%
Negative	89%	9%	33%	92.50%

Source: Computed from primary data collected by the researcher

As seen in the *figure 5.1*, 67 % of the farmers have sorted out a short-term solution wherein, they harvest their products on a very specific day of the week and pool in most of their quantities. This is followed by sending out the flowers out on a large scale to the market by just one of the farmers/growers. Once the flowers are sold, all the farmers who had pooled in their quantity get the amount of profits for their respective flowers. The flowers are graded exactly in front of the farmers during the collection process by a larger grower who eventually takes the produce to the market. This ensures that there is no issue of cheating or malpractice in terms of giving the right value to the farmers. All these are recorded in a log book. But this solution is only applicable if the farmers growing homogeneous products are located in the same geographical area. If that isn't the case, then this solution of pooling the produce fails.

Another major drawback found during the research was the lack of proper shed facility near to the growers where they could sell their produce on their own and

eliminating the need of middlemen. It can be seen that almost 92.5 % of the total farmers surveyed had no shed facility in the nearby towns where they could sell. The remining 7.5 % has sheds but were forced to pay a certain rent for using those spaces. Hence, even that added to the cost of production to a decrease in the annual profits earned by them.

If the sheds are available at a minimal or nominal rent, this eliminates the need for middlemen to a large extent. What would the results be? Higher profit margins, employment opportunities etc., to the farmers and his family. To facilitate this, the government should take initiative to build many more sheds to help the farmers to sell their produce in the nearby local markets.

The study further indicated that commission agents and wholesalers are considered a better channel of distribution. Though the farmers have to part with a substantial amount of profits, yet they are saved the trouble of transportation, and actual sale in the market. Private vendors and retailers stand next as an average choice of channel. This is so because wholesalers help the farmers by purchasing large number of flowers unlike retailers. Retailers only buy on a need basis and that leads to a huge dissatisfaction among the farmers.

***5.2. Objective 5*:** *To identify promotion related issues faced by the floriculture industry in Sikkim.*

The last marketing ‘P’ discussed in this study is the promotion mix. Promotion is what creates an awareness among the customers about the availability of the products, the varieties of the products and their prices. This is by far one of the most important P of the marketing mix. It is the one that brings about a huge turnover for any

producer. Same is the case with flowers. The more people are aware of the presence of various products, the better it is for the growers.

The development of the North Eastern Region needs to be brought at par with the rest of the nation, for which concentrated emphasis needs to be allotted to agriculture and its allied sectors.

The last five-year plan i.e., the Twelfth Five Year Plan, states that the NE region is not at par with the rest of India when it comes to agricultural productivity, usage of pesticides and fertilizers, irrigation, cropping intensity, organizes markets, availability of credit schemes, availability of warehouses and cold chain storages, insurance of crops and production and marketing of value added products.

For holistic and systematic development of horticulture in the North East Region, the already established Central Institute of Horticulture, Dimapur needs to be strengthened and make it more efficient to provide for the horticultural needs to all the North Eastern states. For the specific development of the floriculture sector, a floriculture institute should also be established in the NE Region. This institute could focus on training, in plantation, selection of the good quality seeds, packing and marketing and the other aspects of business of floriculture.

A great advantage of the NE Region is the nature of the soil. This region has the ability to produce the best quality floral products and can fetch a handsome price for the same.

The Ministry of Food Processing Industries has set the *Central Sector Scheme of Cold Chain, Value Addition and Preservation Infrastructure* in motion since 2008-09. This scheme targets the reduction of post-harvest losses of horticulture and non-

horticulture produce and provides integrated cold chain facilities to help the produce reach the consumers from the farm gate with minimal damage and value reduction to the products.

Sikkim Government has also taken the initiative of providing each floricultural hub across the state with Village Level Workers and departmental experts and officers to monitor the progress of the farmers on a timely basis and provide them with necessary trainings as well. Furthermore, the state could come up with a suitable mechanism for broadcasting of the essential information regarding the technical knowhow and assistance for the growers.

The further initiatives taken by the Horticulture and Cash Crops Development Department, Government of Sikkim for the promotion of floriculture sector in the state are remarkable. On study, it came to light that 91% of the farmers have access to the floriculture schemes run by the government.

Moreover, the permanent structure of the greenhouse erected are constructed under the government run scheme named Technology Mission and the state government also supports the construction of the low-cost poly houses in consultation with the infrastructure experts for the scheme holders.

Flowers such as orchids and roses are generally grown under controlled or semi-controlled environment. It is also found out that maximum percent of the farmers practice mono crop cultivation in Sikkim with units for the highly profitable flowers like gerbera, cymbidium and roses.

Unfortunately, the farmers seem to be unaware of the schemes that are centrally introduced by the Indian Government and hence, there is lack of adequate knowledge

as to the productivity of the crops per hectare cultivated in this weather conditions for maximum benefit to the farmers. Also, the overall awareness level of the farmers/growers with regard to certain policy changes such as tariff rates, preferential trade agreements (PTA), regional trade agreements, or removal of any restrictions regarding imports or exports are almost negligible.

The study further indicates that lack of knowledge is widespread when it comes to practices followed in post-harvest management. There is also lack of awareness as to the grading done on their flowers that the farmers sell to the middlemen. Additionally, barely a handful of them keep their produce at the cold storage facilities.

The farmers should also be made aware of the pest management and the common diseases that infects the crops so that proper steps are taken by them to minimalize the loss due to such viral, bacterial and fungal infections and nutritional deficiency. The state has been declared organic and hence use of only organic fertilizers needs to be promoted for the management of diseases and pests.

The Horticulture and Cash Crops Development Department under the Agriculture Department has so far played a vital role in the floriculture sector when it comes to providing the basic infrastructure and saplings and trainings to the farmers. Unfortunately, the departmental assistance stops there. Hence, the government can set up special cell to look primarily into the marketing of the flowers which would ultimately be a huge burden taken off from the shoulders of the growers. Marketing of the flowers currently are done either through local market intermediaries or through few of the knowledgeable growers who have connections in the local markets. There are only a handful of markets within and at the vicinity of the state like, Gangtok,

Kalimpong, Darjeeling, Namchi, Jorethang and Siliguri, that are accessible to the farmers.

There is lack of knowledge and awareness concerning the up keep of produce and quality standards by maximum number of farmers. Most farmers complain of heavy rejections from the middlemen and the markets because of the low-quality produce and yet they seem to fail in taking the corrective action because of no training concerning the quality standards.

Though the Government takes up training of the farmers in the state, most percentage of farmers fall under the category of beginners. So, unless they have a hands-on experience on the farm, just knowledge with no practicability isn't of much use to them. Hence, a regular training at each stage (pre-production, plantation, pest management, harvest, post-harvest) can be organized by the departmental experts and officials to improve the knowledge further and assess as well as monitor the progress of the farmers at various stages till the time of sale of the flowers. Few expert growers of the floriculture hub are also given exposure visit and connected with other farmers growing similar crops so that they can exchange their experience and expertise concerning the cultivation and marketing of the flowers. Hence, exchange of idea benefits the entire village on disseminating of such knowledge by the expert grower.

Nearly all the farmers except a few depend on the guidance of the department to handle their issues and for any information. The study finds that just about all the growers are knowledgeable of the schemes and the initiatives taken by the state department.

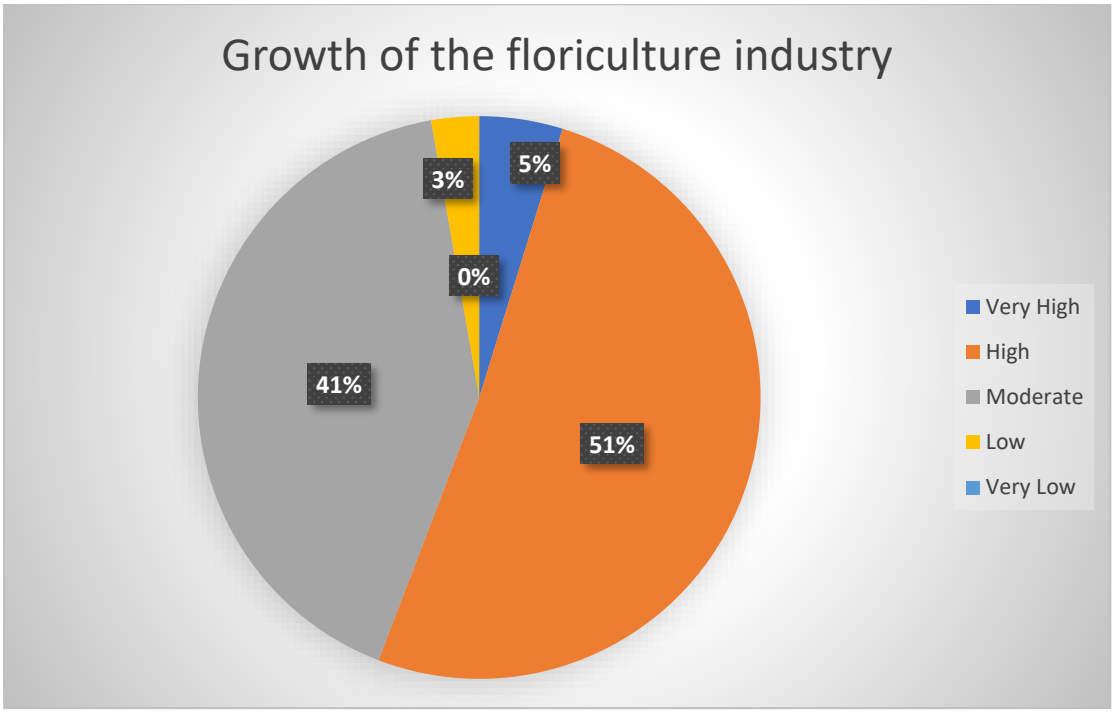
A remarkable percent of the farmers are aware of the cold chain facilities and storages available at the state and yet only a handful of them actually make use of such infrastructure. The study found that the farmers have not utilised these facilities because of a handful of reasons like the distance to the cold storage was quite vast, less quantity of flowers grown, lack of transport facilities to the storage and an overall resistance to such new infrastructure.

In future, the promotion activities and the initiatives by the department should include making growers aware of the post-harvest management as well and not just focus on the pre harvest of the flowers. Though the sector has seen a drastic change in its graph form the nascent stage to where it stands today, the promotional activities needs to be further boosted to bring about maximum benefit to the state as a whole from this promising sector and help in the economy of the state.

The pie chart in the *figure 5.2* shows the growth of the floriculture industry in the past 3-5 years according to the customers. 51% of the people are of the opinion that the growth has been quite high in the last few years. 41% of the people think that the growth has been moderate. In fact, this group believe that the promotional activities before the past five years were better than the promotions that were done in the last couple of years. 3% of the people thought the growth of the industry is quite low and has quite a potential for growth.

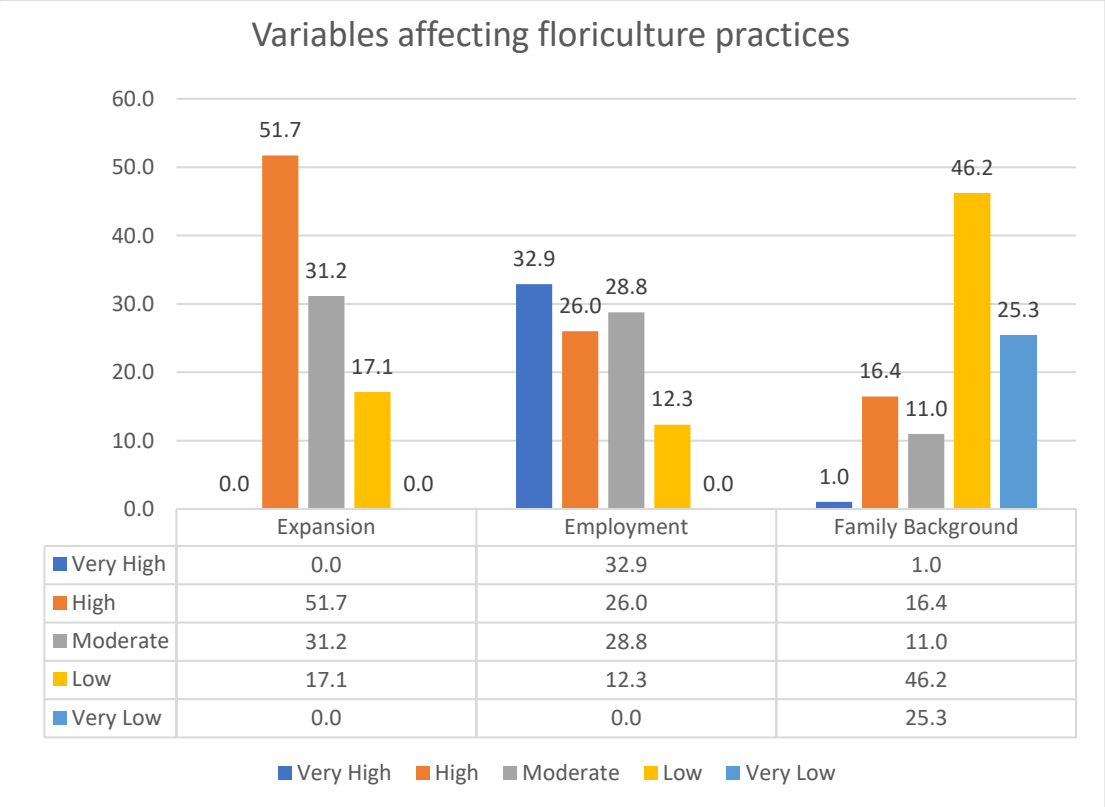
Nevertheless, even though the chart shows a favourable aspect of the promotional activities due to which there is growth, better promotional activities such as advanced marketing techniques, brand building, value addition to the flowers, and awareness campaigns should be taken up by the government or a flower board after its inception.

Figure 5.2: Growth of the floriculture Industry



Source: Computed from primary data collected by the researcher

Figure 5.3: Variables affecting floriculture practices



	Expansion	Employment	Family Background
Very High	0.0	32.9	1.0
High	51.7	26.0	16.4
Moderate	31.2	28.8	11.0
Low	17.1	12.3	46.2
Very Low	0.0	0.0	25.3

Source: Computed from primary data collected by the researcher

Figure 5.3 also shows certain variables that have played a huge part in the farmers taking up the practice of floriculture. There are farmers who have been practicing floriculture for over 45 years, 22 years, 20 years and so on. But most of the farmers are just a couple of years old in terms of floriculture. Only those farmers have been surveyed who have been in the floriculture industry for more than a year so as to gather actual data. The first part of the chart shows that approximately 52% of the farmers were willing to expand their business in the coming years. 31% of farmers had no plans as of now and had not given a thought to it. The remaining 17% were content with their own scale of production and had no plans of expansion. This was mostly due to the lack of technology and labour and marketing support of the government. They were competitive and earned quite handsomely and hence didn't want to disrupt the current practice and routine.

The other variable that the survey looked into was the desire for self-employment. It was found that most farmers, upon study of their demography, were primary school drop-outs. They also belonged to the age groups of mostly 40 years plus. Due to lack of employment in the government sector then, they had opted for the floriculture practice. The most successful farmers in the entire study were found to be the ones who were least educated in terms of degrees but had gained a vast practical knowledge in terms of marketing and sales due to their day to day trade in the market place. Approximately 69% of the farmers had a strong sense and desire for self-employment and hence got into this practice. 12% were of the perception that self-employment played no part in taking up floriculture practice. They took up floriculture not because they had no choice of jobs but rather, they enjoyed their work and the climatic conditions in their areas favoured the business. These growers were mostly educated and wanted to expand their business into a profitable one.

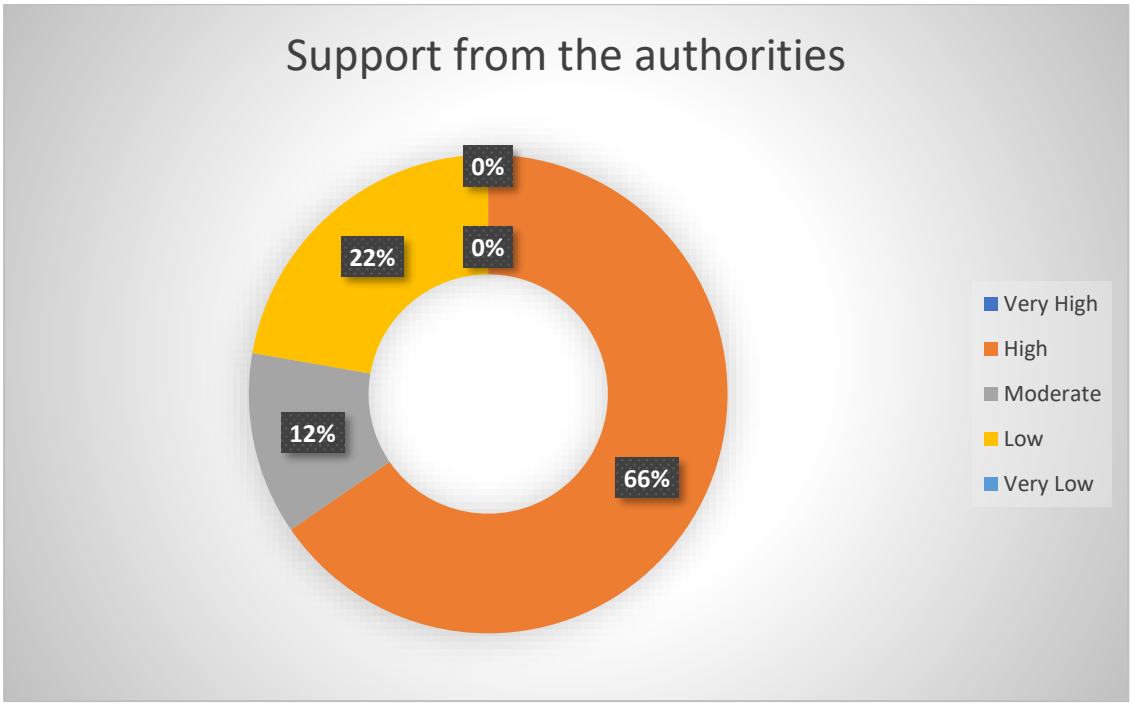
The last variable that has been studied in this research is the influence of family and their background. As the study has already mentioned, most farmers fall in the category of 40 years and above and have been practicing floriculture for a long time. Hence, family background did not play much role in them choosing floriculture as a profession. In fact, 71% of the farmers responded that their family played an insignificant role in them taking up floriculture practice. These growers can be considered the pioneers and the next generation of growers could take up floriculture under their guidance.

The pie chart in the following *figure 5.4* shows the support availed by the farmers from the government in terms of starting their enterprise or floriculture practice. It was learned the government plays a major role during the initial stages. They provide the farmers with green house materials, saplings and even a beginner's training as to the concepts of flower beds, pest management, and other technical advices through the Horticulture and Cash Crops Development section of the Agriculture Department and other experts. However, immediately after the initial help, most of the growers are left on their own. Once the flowers have blossomed and are harvested, the post-harvest is also completely dependent on the farmers themselves. Any kind of support from the government or marketing federations like SIMFED aren't available as of the time of the study.

Upon study it was discovered that most farmers were grateful of the support provided but were lost on their own. In fact, they wanted some authorities to take responsibility for the marketing of the flowers off their shoulders. The *figure 5.4* shows that 66% agreed that the support provided by the government was high whereas 22% of the

farmers were vocal as to their need of support from the local authorities in other areas of the floriculture industry, mostly marketing.

Figure 5.4: Support of the Government



Source: Computed from primary data collected by the researcher

Upon analysing all of the data collected from the farmers/growers, customers and the government officials, it just goes on to prove that the first step has been taken to establish a strong hold on the floriculture industry no doubt. But there is a lot of work left on the part of the government as well as the stakeholders to bring about drastic changes in this sector.

The floriculture sector has started to gain a strong hold in the market. People have started becoming aware of it. The government too has done quite a lot in terms of promotion of the industry by organising regular carnivals, exhibitions, festivals to commemorate the rise of this sector and showcase it to the entire world to see.

Tourism plays a huge part and when these festivals are organised, the flowers are showcased too. This in turn promotes the entire industry.

The government's support towards any sector for its development cannot be ignored or considered insignificant. For example, we can look at the initiatives taken by the Assam State Government in the floriculture sector:

- In 2014-15, a special scheme was introduced which targeted at the overall development of the floriculture sector in the entire state keeping in mind the cultivation, training and marketing etc., and the state would further provide planting materials, quantity of shade nets for the polyhouse/ greenhouse and one garden tool kit for the beneficiaries of the said scheme. This would be the Government's share.
- The beneficiaries of the scheme on the other hand, would have to set up the bamboo/steel structure on their own but under the constant supervision of the departmental officers or experts who can suggest the proper size for the type of flower that is to be grown in the greenhouse. This would be the beneficiary's share.
- Last but the most important would be the departmental officer's involvement in imparting training to the beneficiaries and providing complete technical support.

This scheme was well received by the farmers in the state and applauded as in intricated the involvement of both the government as well as the beneficiaries. The major focus of the state in flower products is orchids as Assam alone is credited with 191 impressive species having varied forms and range of numerous colours.

National Sample Survey Office (NSSO) 70^{th} round survey gives a clear picture that about 59% of the farmers do not get technical assistance from the government funded research institutes and farms and have to rely on the progressive farmers or the

traders, media and commercial agents for farm inputs such as the best quality seeds, suitable fertilizers to be used or for any technical knowhow, according to the Economic Survey conducted on 2014-15.

The initiatives taken by the Indian Council of Agricultural Research (ICAR) and various agricultural universities throughout the country is huge. The development taking place in the field of horticulture is equally eminent. The research centres are constantly researching in the field of new varieties of seeds, plant materials and alternate methods of cultivation. But for the farmers to actually benefit from all of these, the seeds, new techniques of cultivation or in fact the very basic information should reach them at an early stage.

The NE Region has a unique topography compared to the rest of the nation and is more prone to flash floods, landslides, hailstorm, erosion, pest attacks etc., which adversely affects the crops causing a huge deal of loss to the growers. To minimise such losses, it becomes essential that for all farmers to insure their crops. The facilities provided by the Central Government Crop Insurance Scheme can be availed by the farmers at a very low premium. Hence, such information regarding the importance of crop insurance can be disseminated to the farmers at an early stage when they become a beneficiary of the state sponsored schemes or at various trainings taken up by the farmers that are organized by the state department.

The insurance benefit can be availed by the farmers if a mechanism is developed by the concerned department by setting up a cell that looks after the insurance schemes and helps and assists the farmers in availing those schemes.

Sikkim has been declared as an organic state a couple of years back. Even the NE region can be a centre for organic products as it is said to be naturally organic by default. On recognizing the potential for organic farming, a Central Sector scheme "Mission Organic Value Chain Development for North Eastern Region" has been launched by the Ministry of Agriculture and Farmers Welfare during the Twelfth Five Year plan for further implementation in the north eastern states (Arunachal Pradesh, Sikkim, Assam, Nagaland, Mizoram, Manipur, Meghalaya and Tripura). This centrally sponsored scheme targets the development of certified organic products. To bridge the gap between the growers and the consumers a link needs to be established and proper support has been given for development of the entire value chain. The other initiatives of the scheme are to provide proper inputs, seeds, certification, set up of facilities for collection of the produce, aggregation, then segregation according to the grades, marketing and brand building. The north eastern states have been given this opportunity by the central government to take advantage of this scheme and further promote the organic farming culture in their respective states.

CHAPTER 6

CONCLUSION AND SUGGESTIONS

This chapter summarises the entire thesis and provides valuable suggestions and recommendations based on the data analysed and interpreted by the researcher.

6.1. Suggestions and Recommendations

A study by Global Information, Inc, (2018)[1] estimates that the global floriculture market will reach USD 61885.42 million in 2024 with a compounded annual growth rate of 4.26% during the period between 2017 to 2024. This shows the potential and the future of the floriculture industry in the global as well as the domestic market. Countries which deals with flowers have a disadvantage when it comes to their agro climatic conditions. The countries which are into floriculture trade also face winters during which time their trade falls down. This is exactly when the Indian market can target the audience in the global platform. India has a diverse agro climatic condition with little winter in most areas. As such, the flowers can grow almost perennially throughout the entire year. The Indian climate favours the growth of almost all types of flowers that are on demand in the world market.

Sikkim too has had a national presence when it comes to quality products in this sector. It is specially known for the best quality Cymbidiums grown in the state and has been accorded the status of an agro export zone for Cymbidium orchids by the Government of India. Organic farming has further helped Sikkim retain its status as a state that looks after sustainability as well as the needs of the people. But the challenges faced by the state in trading these flowers are tremendous.

The post-harvest losses of horticultural produce are to the tune of 25 -30%. The cost of saving these losses is less than the cost involved for their production. Post-harvest losses must be controlled by adopting suitable strategy, integrating the right time of harvesting and adopting appropriate methods of harvesting, proper packaging, grading as per standards, safe transportation, development of storage facilities, development of co-operative marketing etc.

As mentioned most post-harvest losses occur after the stage of blooming of the flowers and at the time of marketing. For preventing these losses proper storage, cold preservation, packaging and transport methods with Hazard Analysis Critical Control Point (HACCP) norms have to be given more thrust.

Future researches may be oriented towards developing varieties with prolonged vase life with better processing qualities, standardization of Modified Atmosphere Packaging and Storage systems (Singh & Hasan, 2010)[2].

This entire study focuses on the issues and problems faced by the farmers and the floriculture industry in general in Sikkim. Hence, the researcher has suggested a few measures through which the industry can eliminate certain challenges or in the least reduce the losses to a certain degree when it comes to marketing of the products.

-On thorough investigation on the field, it was found that the farmers lacked proper storage facilities. Even though the state government has set up a number of pack houses in places like Rangpo, Melli etc., the farmers, due to various reasons (lack of proper transportation facilities, low volume of production, nonexistence of grading techniques, deficiency of market information and knowledge, etc.,) are unable to use those resources. Hence, *a low cost eco-friendly on farm storage structure can be built*

to store the flowers. This would in turn help the farmers store the flowers for more than a few days rather than selling the produce within a day or two no matter how unprofitable it is for them. The farmers can harvest the flowers on time if they have a farm storage of their own. It would help the farmers to avoid harvesting during the wrong phases i.e., too early or too late.

- While conducting the surveys of the said farmers, it was also found that though the consumption is mostly concentrated in the cities, production is concentrated in the rural areas. Moreover, there is little direct communication between the growers and consumers. On investigation, it showed that the farmers travelled at least a minimum of 90-100 kms to bring the flowers to the major towns like Gangtok, Kalimpong, Namchi etc. But even this did not guarantee that the entire produce would get sold. Hence, establishing a direct contact between the farmers and the customers would eventually benefit all the parties involved.

The state government or the marketing federations like SIMFED could focus on bringing the farmers and the regular consumers in closer communication. Establishing a link between these parties would solve a major hurdle that of the removal of the middlemen and the minimisation of the loss of profits. This would help both the parties in turn. The farmers will have a secured income and the consumers would get the best produce right off the farm with the best quality and long vase life intact.

Another major suggestion to the concerned authority would be to provide trainings for the post-harvest management of the various flowers. One major aspect of marketing of the cut flowers is the way it is packed for the consumers. The packaging should be such that it ensures that the garden-fresh quality of the flowers is retained.

A packaging standard could be established with a minimum and maximum numbers of stems/sticks in a bundle and then sent to the market. The post-harvest losses at present are to the tune of 25%– 30%. A training programme on proper post-harvest management would standardize the way of marketing and enable the proper handling of the produce.

Few studies even suggest that proper management during the post-harvest stages would benefit the farmers more than growing an entire range of products and selling it all over again. Hence, proper post-harvest training would serve a lot of purposes. Therefore, *a serious suggestion to the authority would be to provide trainings to the farmers in packaging and marketing the products.*

A major hurdle that the growers and exporters face is problems of infrastructure. These include bad interior roads, inadequate refrigerated transport and storage facilities. These can only be taken care of by the government. Today, due to the lack of smooth roads, the flowers on transport are mechanically injured and wilt and get damaged before they even reach the market. This adds to the post-harvest losses faced by the farmers.

- The development of the domestic market is a prerequisite for the development of export which requires high standard quality and large volume as well as competitive prices. The biggest snag is the non-availability of the good quality planting materials. Though there are nurseries and tissue culture laboratories specifically designed to produce good quality planting materials, the same planting materials do not reach the farmers. It is a known fact that unless the seeds are of good quality, the flowers grown from such seeds are also of a low quality. It becomes essential that the commercial flower grower has to keep in mind the place he buys the seeds from. Hence, good

tissue culture laboratories could be established at more places looking after flowers that are grown in those areas. They could also serve as a counselling centre for the growers who could use their expertise in the care and nurture of the flowers.

One major issue for low productivity in the region is unavailability of good quality certified seeds. Experts believe that with the use of good quality seeds, the yield would increase by 30% even without the use of fertilizers. Therefore, it becomes essential to set up facilities for producing good quality seeds and distributing the same to the farmers on time.

Another suggestion that the researcher came up with is that upon study, more than half the customers surveyed were willing to try the concept of drying flowers and preserving it. Preserved flowers are freshly cut flowers that undergo a process in which the flowers absorb the preserving ingredients used combined with colour enhancers that are safe, non-toxic and harmless. This allows the flowers to retain their moisture and keep it in a permanent state of youth for few years.

A training could be provided to the local farmers by the concerned authorities to try and spread the concept of preserving the flowers so that they can sell the same produce for a much higher value than cut flowers. This would benefit the farmers to a large extend and introduce a new product in the market.

Potpourri is another development the farmers can look into. Potpourri involves drying of flowers with the fragrances intact and using it for decorative purposes in a residential dwelling. Potpourri is an old product in the western markets and has been tried and tested but would be a new product in the state. Hence, trainings could be

provided for this purpose as well to the farmers so that they make larger profits than what they are used to just by selling cut flowers.

Selling cut flowers shouldn't be the only option for a farmer. He also needs to look towards increasing his income by getting in the business of selling varieties of products like seeds, saplings, bulbs etc. Awareness programmes to the effect of educating farmers from rural areas could be conducted by the Agriculture Department.

Drip irrigation and other minor facilities can also be started in the dry areas like Sadam, Kerabari etc. so as to increase the volume of production. This would help the farmers to also raise the quality of their flowers by a large scale.

Pest management is another segment that the farmers need to be educated about. Upon survey it was found that many farmers faced various kinds of pest issues and were unaware as to how to deal with it. Hence, awareness programmes (like the ones conducted by ICAR Pakyong, such as trainings on a regular basis to growers about value addition, new planting techniques, etc.) can be introduced for the farmers by the authorities etc.

Many young farmers who have ventured into this lucrative business seem to have a better understanding of what the market demands than the older generation of growers. Many fresh growers indulged in bouquet making, flower arrangements for weddings, government functions, carnivals, festivals etc. But even then, they couldn't meet the market demand. Hence, the farmers who are still following the conventional methods of selling the produce could be taught better and more profitable means of earning through such value additions to their products. This would in turn help in

more commercialization and better prices for the products. The department could organize visits between the progressive growers and the conventional growers whereby both could benefit from the knowledge of each other.

Other value-added products that can be delved into by the farmers are the making of essential oils (mostly for roses), and natural perfumes. The perfume industry is a big industry all around the globe and this can be taken advantage of. Flowers dried in their natural colours offer a very good scope for export to the international as well as national markets.

The possibility of exporting cut flowers, plants, bulbs, etc has not been explored properly though there is a very good potential for those in the market. The best way to organize this trade is to develop the centres of cultivation with prospective export-type flowers, nearer to the transport viable markets, so that flowers can have a short distance of travel and can reach the customers without much delay.

One vital step in this direction will be to set up an organization for certifying the seeds and standardizing the nursery stocks. At present, there are no such organization and the customers are cheated with sub-standard products. To do all of these, the state should have a separate Flower Board to look into the marketing aspect of commercial floriculture. All value-added products could be sold using the Sikkim Flower Board brand name. This would create awareness among the customers and the farmers can also rely on the board for marketing of the flowers. It would also generate employment for the local populace. Promotional activities such as exhibitions and carnivals are good means of creating awareness about marginalized products and products from remote areas. This has helped create the awareness required at the

initial stages, but a board or a brand would be something a farmer can rely on all throughout the year.

To following paragraph briefly sums up the suggestions and strategies for improvement:

1. The first and foremost requirement at present is to develop an Integrated Cold Chain for flowers right from the point of origin (growers) to the point of consumption (customers).

2. Developing the non-traditional production areas may help in meeting the growing needs of both domestic and international market.

3. Develop and propagate varieties indigenously to ensure regular supply of quality inputs such as planting material. Quality labs can be established at state level or regional level that caters to the North Eastern Region as a whole with assured quality control over the products.

4. Establish training centres and organize programmes for development of skilled manpower

5. Establish a network of support systems with the involvement of government, private sector and public institutions.

6.Government may enhance its efforts in negotiating preferential tariff regimes with countries to reduce import tariff.

7. Periodic re-plantation

8. Shifting to Integrated Supply Chain Model i.e., integrating small and medium scale growers into large-scale producer supply chains, may help in attaining economies of scale in the industry

9. Training for the farmers on value addition to the flowers. A farmer's co-operatives at village or regional level can be established that can help the farmers to sell directly to exporters.

10. Establishing a Sikkim Flower Board to look after the marketing of the products.

The State government is committed to making the floriculture sector grow to its utmost potential. The main strategy adopted for boosting this sector is promoting such flora through regular floriculture shows and exhibitions. In recent years the exhibition conducted such as International Floriculture Show at Saramsa in 2008, and another International Flower Show at Ridge Park a few years later have helped to garner a lot of attention and focus in this sector at a national as well as international scale.

The floriculture sector is a thriving economic activity in the state. But nevertheless, the area under flowers is almost negligible in comparison to other horticultural crops, the economic returns per unit area are comparatively much more than other crops. Thrust has to be laid on production of quality planting materials through establishment of high-tech nurseries in public sector and nurseries in private sector.

According to the officials of the floriculture department, tissue culture production of Cymbidium Orchids has been successfully achieved through establishment of tissue culture laboratories. There are three such laboratories under public sector and two under public sector. Annually around 2-3 lakh Cymbidium clones are produced through tissue culture though these benefits have not reached the farmers on the ground.

Emphasis has been laid on development of infrastructures that support production, post-harvest and marketing of all kinds of horticulture produces but these infrastructures have failed to benefit the local farmers whose production is comparatively low.

Integrated pack houses have also been developed but these have failed to function fully to support any kind of marketing efforts. Though, many cold storage facilities of different capacities have been set up in different production clusters yet the farmers haven't been able to take advantage of this due to multiple reasons which include lack of proper roads and connectivity, deficiency of knowledge etc. The main idea to all this was to create an open platform for direct linkage with consumers for maximum returns. The government has made a lot of effort to support this sector yet it has failed to bring out the best in the farmers.

Though India boasts of having the largest cold chain storage capacity of more than approximately 32 million tonnes, yet the NE Region has a very low share in the same when we talk about storage capacity. Hence, with the Central Government's help, the states may come up with a proposal or a scheme for training in the field of processing the produce, packaging and marketing, low cost scientific storage, value addition etc., to avoid wastages and give the farmers maximum benefit for their products.

Moreover, all the above activities undertaken in the horticulture sector are implemented through different schemes which include

- Horticulture Mission for North East and Himalayan States
- National Ayush Mission
- National Agro Forestry and Bamboo Mission

- Mission Organic Value Chain Development in North Eastern Region
- Sikkim Organic Mission

Besides these, some programmes have also been implemented through the North Eastern Council and State Plan Funds during different periods of time. The major interventions that have gone on to impact the floriculture development include the application of modern technology, quality planting materials and intensive capacity building of farmers. Besides these interventions, many infrastructures that support production as well as post-harvest operations, value addition and marketing have been developed (Horticulture & Cash Crops Development Department, 2019)[3].

6.2. Conclusion

The age-old practice of hobby gardening has received a totally new image makeover in recent years. It is no more a backyard activity, but provides tremendous opportunity for livelihood. Many people have taken to floriculture as an economic venture earning handsome rewards for their risks and efforts. Intensive usage of plastics in the shape of polygreen house, drip irrigation, polybags has provided a great boost to the horticulture initiatives in the state. Noteworthy progress has been made in the field of floriculture through different kinds of poly green houses. Infrastructure development to support production, post-harvest and marketing are being given sufficient importance. Integrating all ongoing programmes by the government is critical for attaining overall success in the floriculture sector.

For sustaining the area expansion programme of the department in different segments, there is a need for quality planting materials in adequate quantity and making them available to farmers at affordable prices. To achieve the desired target of planting

material production, suitable infrastructure to support these initiatives have to be developed. Work has commenced at tissue culture laboratories for multiplication of orchids, ornamentals and other commercial flowers but these needs to be operationalised in different centres to support the farmers of those areas. Though infrastructure has been created to provide the necessary forward linkage including post-harvest management, processing, value addition and marketing, they still need to be optimized with qualified officials at the top who specialize in marketing techniques and so on to ensure proper usage and optimal results.

This industry is an international, multi-billion dollar industry that includes the production of ornamentals, foliage plants, cut flowers, flowering and potted plants as well as floriculture materials. There is a lot that can be done to bridge the demand supply gap. With the government's help, many youngsters have now taken initiatives to get into floriculture. These youngsters need to be trained properly and helped to ensure that they do not fall prey to lack of technology or any facilities.

The development of well-established wholesale market is needed in Sikkim to have a positive impact on the development of this sector.

Major quantities of horticultural produce are lost after harvest mainly due to improper handling. In Sikkim too, such losses abound which is mainly attributed to inadequacy of infrastructures, faulty handling, lack of proper marketing strategies and gross absence of systematic marketing network. It is imperative to provide full support in establishing infrastructures like handling units, quality grading units, ancillary units for post-harvest management of horticultural produces, Phyto sanitary centres, etc., besides creating a system for market information and intelligence on a real time basis.

Therefore, vital linkages of post-harvest like cold chain, marketing infrastructures and consolidated centres are extremely necessary for systematic marketing of perishable farm produces. Even though efforts for establishment of such infrastructure have been made in the past, there is still a lot to be done in this sector. Support to the individual growers, growers' associations or co-operatives and marketing federations and individual entrepreneurs in the form of transport subsidy, packaging units, technology and promotional activities is critical to the development of sustainable marketing system.

Floriculture sector is a lucrative business and it is high time that the state decides to do more to reap the benefit of this beautiful gift of nature.

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APPENDIX

SCHEDULE FOR FARMERS/GROWERS

This questionnaire is designed to get information regarding the floriculture industry in Sikkim. The information being asked for is exclusively for my PhD degree. You are requested to fill the questionnaire. Your identities will not be revealed and your replies will be kept confidential.

1. Name: _____
2. Sex: M ☐ F ☐
3. Age: Below 30 years ☐ 30 – 40 years ☐ 40 – 50 years ☐ Above 50 years ☐
4. Place _____ District: E ☐ W ☐ S ☐ N ☐
5. Size of land holding under operation:

   Below 1 acre ☐ 1- 2.5 acres ☐ 2.5 acres– 5 acres ☐ 5-10 acres ☐ Above 10 acres ☐

PRODUCT

a. Please tick the correct options of the flowers grown by you and traded from the following:

Commercial Flowers			**Selling Price/ piece**			**Area (Ha)**	**Total Production**	**Total Quantity Sold**
			Cut	**Loose**	**Potted**			
	Cymbidium Orchids							
2.	Lilium							
3.	Gerbera							
4.	Anthurium							
5.	Gladiolus							
6.	Alstroemeria							
7.	Carnation							
8.	Roses							
9	Others							

Which are your most profitable products and why? (Rank them accordingly)

i)

ii)

iii)

iv)

v)

_____

Please give the following information regarding the mode of sale:(b-g)

b. Name the market agency to whom the produce is sold:

i. Private traders ☐ ii. SIMFED ☐

iii. Co-operative marketing society ☐ iv.Others(specify) ☐

_____

c. Reason of sale through the mode: _____

i) Immediate payment ☐ iv). Less chance of malpractice ☐

ii) Right price ☐ v). Time saving ☐

iii) Any other (please specify) _____

d. Days you have to wait for the sale of flowers to the mode:

1 day ☐ 1-3 days ☐ 3-5 days ☐ more than 5 days ☐

e. Problems regarding the mode:

_____

_____

f. Do you sell the entire crop to the mode? Yes ☐ No ☐

g. If no, what is done with rest of the crop and why?

_____

If sold on your own:

h. Is there any proper facility or shed for keeping the flowers when it is kept for sale?

Yes ☐ No ☐

i. If yes, give the following information:

i) Sheds/ space provided is proper Yes ☐ No ☐

ii) Any money charged Yes ☐ No ☐

iii) Problems? _____

iv) Suggestions: _____

j. How many laborers work at your farm?

_____

k. Do you practice contractual farming? Yes ☐ No ☐

l. Do you face problem in regard to labour? Yes ☐ No ☐

m. If yes, then at which stage?

i. Plantation ☐ ii. Weeding ☐ iii. Harvesting ☐ iv. Post-harvest ☐

n. How do you manage this problem?

i) By paying higher wage rate ☐ iii. By using family members ☐

ii) By hiring from outside the locality ☐ iv. Others _____

o. Have you any suggestions to improve this problem?

_____

p. Please give your opinion regarding the following statements: (Please tick the appropriate box)

	Very High	**High**	**Moderate**	**Low**	**Very Low**
Difference in quality specifications of buyers/ distributors					
Poor post-harvest management					
Small volume of production					
The unpredictable agro climatic conditions					
Effect of seasonality of trade					
Forced sale due to perishability					
The accessibility of greenhouse technology for floriculture production					
Is unwarranted rejection a problem?					
Underutilization of capacity					
Availability of floriculture technology know how					
Developed required skill set for floriculture business					
Previous experience in floriculture business					
Had knowledge/ experience in floriculture production or trade					

q. What are the types of fertilizers used?

_____

r. New product development _____

s. If yes, how long did you take to make/ develop this product?

_____

How does it differ from the original flowers?

_____

Is there significant difference in the quality of the flower/product?

_____

Is there any cost difference?

_____

Do you benefit (monetarily) because of the new variety in comparison to the original flower?

_____

PRICING POLICIES

a. Have you covered your production and service delivery cost? Yes ☐ No ☐
b. Are your prices in line with your longer-term business goals? Yes ☐ No ☐
c. Which products are in greater demand even at higher costs?

_____

d. Are certain flowers in greater demand at one time of the year than another? If so, why?

_____

e. Do your customers expect a certain price range?

_____

f. What effect will price change have on your market share?

_____

g. How does the nature of your flowers affect their price?

_____

h. How does your method of distribution affect price?

_____

i. Do your promotional policies affect price?

_____

j. Please tick the appropriate options:

	Very High	**High**	**Moderate**	**Low**	**Very Low**
Unhealthy competition among the growers					
Delayed Payments by the middlemen					
Declining profit margin					
Fluctuation of price					

k. How would you rate the following based on your satisfaction level?

	Highly Satisfied	**Satisfied**	**Not Satisfied nor Dissatisfied**	**Dissatisfied**	**Highly Dissatisfied**
Mode of collection of flowers					
Mode of payments of flowers					
Procedure of grading of flowers					
Price paid for flowers					
Time taken in selling the flowers					
Packing facility provided for flowers					

PLACE/DISTRIBUTION

Problems faced in marketing of flowers:

a. Do you have your own means of transportation? Yes ☐ No ☐

If no, then;

b. Do you have difficulty in transportation? Yes ☐ No ☐

c. If yes, then what are those problems and how do you handle it?

_____

_____

d. If you have small quantity of produce, then do you pool this quantity with quantity of other's produce before transportation? Yes ☐ No ☐

e. How much commission do you pay to commission agents? _____

f. Give your suitable opinion regarding the following sentences: (Please tick the correct option)

	VeryHigh	**High**	**Moderate**	**Low**	**Very Low**
What is your opinion about the commission charges by agents?					
Infrastructural bottle necks for reaching the market in time					
Unrealistic delivery schedules					
Access to right floriculture trade partners					
Easy availability of middlemen					
Exploitation by middlemen					
Non-availability of new technology					

g. If selling on your own:

i. Distance from farm to selling place: _____
ii. Total cost of transportation: _____
iii. Packaging Cost: _____
iv. Rent of shop/ space/ mandi fees: _____
v. Capital invested: _____
vi. Unsold quantity: _____
vii. Wastage quantity: _____
viii. Approx. price of wastage/ unsold quantity: _____
ix. License fee/year: _____
x. Maintenance expenditure: _____
xi. Expenditure on stationary: _____
xii. Other expenses: _____

h. If selling through agents/ middlemen:

xiii. Total cost of transportation: _____
xiv. Loading and Unloading costs: _____
xv. Storage costs: _____
xvi. Market fee/Octroi: _____
xvii. Spoilage: _____
xviii. Price received by farmers: _____
xix. Farmer's Profit: _____

PROMOTION

	Very High	**High**	**Moderate**	**Low**	**Very Low**
Is there a lack of long-term buyers' commitment?					
What will be the growth of floriculture market in the future?					
Availing support and advice from floriculture development officials and bankers					
Poor market information regarding floriculture practices					
What is the status of promotional activities taken by the government today?					
How were the promotional					

activities 5 years back?					
Do you have any plans of expansion of existing floriculture related activity?					
Desire for self-employment and personal interest in the floriculture industry.					
Family background favored getting into floriculture business					
Expansion of existing floriculture related activity					

QUESTIONNAIRE FOR CUSTOMERS

Hello! I am Manjari Sharma, a Research Scholar of Sikkim University, Department of Management. I am conducting a survey on *A Study on the Marketing Perspectives of the Floriculture Industry in Sikkim* and would like to thank you immensely for your efforts in fulfilling the objectives of my research by filling out the questionnaire. The data collected will be kept confidential and would be used for the sole purpose of this research. I am extremely grateful for your contribution.

Thank You!

1.Name:_____2. Gender: _____

3. Phone no. _____ 4. Place: _____

5. District: East ☐ West ☐ South ☐ North ☐

6. Location: Urban ☐ Rural ☐ Semi Urban ☐

7. Marital Status: Single ☐ Married ☐ Widowed ☐ Divorced ☐ Separated ☐

8. Education level: Less than Class X Class X ☐ Graduation ☐ Post-Graduation ☐ Other (specify) _____

9. Age: Below 20 ☐ 20-30 ☐ 30-40 ☐ 40-50 ☐ above 50 ☐

10. Employment: Student ☐ Govt Service ☐ Self-employed ☐ Homemaker ☐ Retired ☐ Unemployed ☐ Employed ☐ Part time employment ☐

11. Level of Income p.m.: below 10000 ☐ 10000 - 20000 ☐ 20000-30000 ☐ 30000-40000 ☐ 40000-50000 ☐ 50000-70000 ☐ 70000-90000 ☐ 90000-100000 ☐ More than 100000 ☐

Commercial Flowers Bought: **Price/ per piece**

		Bulb	Potted	Cut
Cymbidium Orchids	( )	_____	_____	_____
Lilium	( )	_____	_____	_____
Gerbera	( )	_____	_____	_____
Anthurium	( )	_____	_____	_____
Gladiolus	( )	_____	_____	_____
Alstroemeria	( )	_____	_____	_____
Roses	( )	_____	_____	_____
Carnation:	( )	_____	_____	_____
Seasonal (others)_____				

PRODUCT

12. Which products do you buy most and why? (Rank them according to your buying behavior)

i) _____ii) _____ iii) _____
iv)_____ v) _____

i. On average how often do you buy flowers or plants?
-every week ( ) - every 2 weeks ( ) - once a month ( )
3-4 times a year ( ) -less often ( ) -more often ( )
-special occasions only ( )

ii. Is buying flowers an impulse purchase or a considered spend?
Impulse Purchase ( ) Considered Purchase ( )

iii. How much do you spend per year on flowers/plants?
- Less than Rs 500 ( ) Rs. 500 to Rs. 1000 ( )
- Rs 1000 – Rs 2000 ( ) more than Rs 2000 ( )

iv. Would you describe your product as luxury or essential?
Luxury ( ) Essential ( )

v. What kind of items do you buy?
Cut ( ) Bulb ( ) Potted ( )
Loose ( ) Others ( )

vi. Where do you buy flowers/plants from?
Roadside farmers' stall ( ) Market ( ) Garden/ Farms/ nursery ( ) Others (specify): ( )

vii. Are you satisfied with the quality of the flower?
Yes ( ) No ( )

viii. What would you expect from a local flower shop? (Rank them accordingly)
- Variety ( )
- Quality & Freshness ( )
- Originality/Creative ideas ( )
- Fair prices ( )

- Special offers and discounts ( )
- Tailored offer (the possibility to create your own bouquet choosing the flowers that you want) ( )
- Others ( )

ix. What would be your main reason for buying flowers at a supermarket?

- I don't buy it at the market at all ( )
- Affordable prices ( )
- Convenience (buy them when doing other shopping) ( )
- Discounts and other offers (flowers and a box of chocolates)( )
- Don't have to wait for them to be prepared ( )
- Others ( )
-

x. Have you heard of preserved flowers/ dried stabilized flowers?

Yes ( ) No ( )

(Preserved flowers are freshly cut flowers that undergo a process in which the flowers absorb the preserving ingredients used combined with color enhancers that are safe, non-toxic and harmless. This allows the flowers to retain their moisture and keep it in a permanent state of youth for few years).

xi. Would you buy this kind of preserved flowers?

Yes ( ) No ( )

xii.

Sl. No.	Particulars	Very High	High	Moderate	Low	Very Low
1.	Is there fluctuation of prices of flowers?					
2.	Do you delay your payments to the florist?					
3.	What do you think is the floriculture markets' growth in the near future?					
4.	Do you have market information on the floriculture business?					

Sl. No.	Particulars	Yes	No
1	Do you think floriculture is a high profit yielding business?		
2	Do you have Prior market contacts in the floriculture business?		
3	Do you consider there to be a lack of adequate storage facilities?		
4	Is there a lack of efficient market channel?		
5	In your opinion, do you consider floriculture to have high export prospects?		
6	Do you think that you as a customer play a part to encourage floriculture business?		
7	Are you aware of the trade reforms and government initiatives related to floriculture industry?		
8	Do you think the trade reforms and government initiatives related to floriculture industry has positive impact?		
9	Do you wish the government has to continue with trade policy reform related to floriculture industry?		
10	Would a new flower shop/ florist opening in your area be of any interest to you?		
11	Do you think there is an absence of Sikkim flower board/brand?		

GLIMPSES OF THE FIELD VISITS

I. Varieties of Orchids displayed at the Flower Festival, Saramsa Garden, East Sikkim

II. Scholar conducting her survey with an Anthurium grower at MelliPaiyong, South Sikkim

III. A variety of Orchid grown at Nation Research Centre for Orchids, Pakyong

IV. Roses gathered at a small out house to be taken for further sale at Daramdin, West Sikkim

VALUE ADDITION

Use of Dried Flowers in Candle Making Industry for Value Addition

Value Addition to Flowers: Potpourri