

# **Economics of Floriculture in Sikkim**

*Dissertation Submitted to Sikkim University in Partial Fulfilment of the  
Degree of Master of Philosophy*

**Prepared under the supervision of Dr. Manesh Choubey**

**Suman Ghimiray  
Department of Economics  
School of Social Sciences**



**Submitted on: February, 2015  
Sikkim University, 6<sup>th</sup> Mile, Samdur, Tadong  
Gangtok – 737102  
Sikkim**



# सिक्किम विश्वविद्यालय

(भारतीय संसद के अधिनियमद्वारा स्थापित केन्द्रीय विश्वविद्यालय)  
गुणवत्तापूर्ण प्रबंधन प्रणाली ISO 9001:2008 हेतु प्रमाणित संस्थान

## SIKKIM UNIVERSITY

[A Central University established by an Act of Parliament of India in 2007]  
An ISO Quality Management System 9001:2008 Certified Institution

Date: 27<sup>th</sup> of Feb 2015

### Declaration

I, Suman Ghimiray, hereby declare that the issues and matters raised in this thesis entitled “Economics of Floriculture in Sikkim” are records of my own effort, that the contents of this thesis did not appearance for the award of any previous degree to me as well as to anybody else to my best of knowledge, and no part of this has been submitted by me for any degree in any other educational institutions.

This is being submitted to Sikkim University in partial fulfillment of the requirements of the degree of Master of Philosophy in the Department of Economics, School of Social Science.

Suman Ghimiray

Roll No. : 13MPEC09

Registration Number: 08AH0189

We recommend that this dissertation be placed before the examiners for evaluation.

(Dr. Manesh Choubey)

Head of the Department

Department of Economics

Sikkim University

Head  
अर्थशास्त्र विभाग  
Department of Economics  
सिक्किम विश्वविद्यालय  
Sikkim University

(Dr. Manesh Choubey)

Supervisor

अध्यक्ष  
Head  
अर्थशास्त्र विभाग  
Department of Economics  
सिक्किम विश्वविद्यालय  
Sikkim University

6 माईल, सामदुर, तादोंग, गंगटोक - 737102 सिक्किम, भारत  
दूराभाष : 00-91-3592 - 251067, 251403, फैक्स :- 251067/251757

6th Mile, Samdur, PO Tadong 737102, Gangtok, Sikkim, India  
Phones : 00-91-3592-251067, 251403, Fax - 251067/251757  
website : www.sikkimuniversity.in/www.sikkimuniversity.ac.in  
Email : sikkimuniversity@gmail.com



# सिक्किम विश्वविद्यालय

(भारतीय संसद के अधिनियमद्वारा स्थापित केन्द्रीय विश्वविद्यालय)  
गुणवत्तापूर्ण प्रबंधन प्रणाली ISO 9001:2008 हेतु प्रमाणित संस्थान

## SIKKIM UNIVERSITY

[A Central University established by an Act of Parliament of India in 2007]  
An ISO Quality Management System 9001:2008 Certified Institution

### Certificate

This is to certify that the dissertation entitled **“Economics of Floriculture in Sikkim”** submitted to Sikkim University in partial fulfillment of the requirement for the degree of Master of Philosophy in Economics is the result of research work that is carried out by Mr. Suman Ghimiray under my guidance and supervision. No part of the dissertation has been submitted for any other degree.

He acknowledges assistance and helps those he received during the course of this research.

Dr. ManeshChoubey

Department of Economics

Sikkim University

Place: Gangtok

Date: 28/11/15

अध्यक्ष  
Head  
अर्थशास्त्र विभाग  
Department of Economics  
सिक्किम विश्वविद्यालय  
Sikkim University

6 माईल, सामदुर, तादोंग, गंगटोक - 737102 सिक्किम, भारत  
दूराभाष : 00-91-3592 - 251067, 251403, फैक्स :- 251067/251757

6th Mile, Samdur, PO Tadong 737102, Gangtok, Sikkim, India  
Phones : 00-91-3592-251067, 251403, Fax - 251067/251757  
website : [www.sikkimuniversity.in](http://www.sikkimuniversity.in)/[www.sikkimuniversity.ac.in](http://www.sikkimuniversity.ac.in)  
Email : [sikkimuniversity@gmail.com](mailto:sikkimuniversity@gmail.com)

## ACKNOWLEDGEMENTS

I am heartily indebted to my supervisor Dr. ManeshChoubey, without his endeavors, critical guidance and sympathetic attitudes, this thesis would neither have been initiated nor possible to complete. It is pleasures to thank all the faculty members and staff of the department for their corporation.

I am extremely grateful to Dr. PradyutGuha, Dr. Komal Singh and other faculty member for their inspiration and guidance to conduct research work. Their continue support has made work possible.

The credit goes to library authority and all the staff member especially Mr. Govind (Kumar) of Sikkim University for their kind support. Even my thanks goes to University Grant Commission for their non-net fellowship.

My sincere appreciation goes to all those seniors and friends, especially Gorkhe Dai, AgyaTenzing, Bhaniz Dai, Bikash for his motorcycle to do survey, Arjun Dai and Amit Dai, Pranesh Dai for their critical and moral guidance and even sincere thanks to brother Mr. Tara for his selfless support.

Major thanks goes to all respondents for the preparation of thesis, especially all flower growers and sellers. Even thanks to Horticultural Departmental official and some brothers from SIMFED for briefing me about the scenario of marketing.

Lastly, I would like to express my deepest gratitude to my parents, brothers, sister for their moral support and consent without which research work would have been impossible.

All these are possible due to blessed of *Bhagwan*, thanks to god and hope you will support in future as well.

*Suman Ghimiray*

# CONTENTS

	<i>Page Nos.</i>
Acknowledgements	i
List of Tables	ii
List of figures	iii
Abbreviations	iv
<b>Chapter 1: Introduction of Floriculture</b>	<b>1-7</b>
1.1 Global Scenario	
1.2 Indian Scenario	
1.3 Sikkim: A Study Prospect	
1.4 Statement of Problem	
1.5 Motivation for Study	
1.6 Research Question	
1.7 Objective of Study	
1.8 Scope of Study	
1.9 Limitation of Study	
1.10 Chapter Plan	
<b>Chapter 2: Theoretical Background and Review of Literature</b>	<b>8-14</b>
2.1 Theoretical Background	
2.2 Literature Review	
2.2.1 Prospect of Floriculture	
2.2.2 Production Cost of Flower	
2.2.3 Marketing of Flower	
<b>Chapter 3: Methodology</b>	<b>15-20</b>
3.1 Research Design	
3.2 Data Source	
3.2.1 Secondary	

- 3.2.2 Primary
- 3.3 Data Analysis Technique
  - 3.3.1 Descriptive Technique
  - 3.3.2 Costing Calculation
  - 3.3.3 Break Even Price
  - 3.3.4 Benefit Cost Ratio
- 3.4 Marketing Analysis
  - 3.4.1 Marketing Cost
  - 3.4.2 Marketing Margin

## **Chapter 4: Results and Discussions**

**21-56**

- 4.1 Prospect of Floriculture in Sikkim
  - 4.1.1 Commercial Floriculture: A Historical Glimpse of Sikkim
  - 4.1.2 Geographical Congenial for Floral Development
    - a. Floristic Diversity of the Sikkim Himalaya
    - b. Climate
    - c. Soil
  - 4.1.3 Contemporary Development of Floriculture in Sikkim
    - a. Sikkim Organic Mission and Floriculture
    - b. State Government Approach
  - 4.1.4 Government Expenses for Horticulture Crops
  - 4.1.5 Production of Flower in Sikkim
  - 4.1.6 Existing Agro-Marketing Association
  - 4.1.7 Supply of Flower outside the State
  - 4.1.8 Corporate Involvement in Sikkim Floriculture
- 4.2 Cost of Cultivation and Marketing Analysis of Flowers
  - 4.2.1 Socio-Economic Profile of Sample
    - a. General Information of Sample
    - b. Growers Profile

#### 4.2.2 Cost Analysis of Flower Cultivation

- a. Cost Analysis of Gerbera Cultivation
- b. Cost Analysis of Orchid Cultivation
- c. Cost Analysis of Rose Cultivation

#### 4.2.3 Economics of Flower Cultivation

- a. Analysis of Break Even Price and BC Ratio of Flowers
- b. Net Present Value Analysis of Gerbera Cultivation
- c. Net Present Value Analysis of Orchid Cultivation
- d. Net Present Value Analysis of Rose Cultivation

#### 4.2.4 Marketing Analysis of Flowers

- a. Supply of Flower in Gangtok Market
- b. Revenue Collection by Sample Retailer
- c. Marketing Cost of Flower
- d. Marketing Margin of Flower

#### 4.2.5 Growers Share on Retail Price

#### 4.2.6 Problems Faced by Growers and Retailers of Flower

### **Chapter 5: Summary, Recommendations and Conclusion** **57-62**

#### 5.1 Summary

#### 5.2 Recommendation

#### 5.3 Conclusions

#### 5.4 Suggested Area for Future Research

### **Bibliography** **63-70**

### **Annexure** **71-73**

- ✓ Annexure G – A
- ✓ Annexure O – A
- ✓ Annexure R- A
- ✓ Annexure G- B
- ✓ Annexure O- B
- ✓ Annexurre R -B

### **Interview Schedule** **74-77**

## List of Tables

- ✓ Table 1: Study Area Profile
- ✓ Table 2: Government Investment in Horticultural Crop from 2008-09 to 2010-11 in Sikkim
- ✓ Table 3: State Production of Cut Flower
- ✓ Table 4 Supply of Flower outside the State (Average of last five year)
- ✓ Table 5: Basic Information of Sample
- ✓ Table 6: Growers Outline
- ✓ Table 7: Establishment Cost of Gerbera Cultivation (in Rs.)
- ✓ Table 8: Cost Analysis of Gerbera Production for 1000 sq ft. (in Rs./year)
- ✓ Table 9: Establishment Cost of Orchid Cultivation (in Rs.)
- ✓ Table 10: Cost Analysis of Orchid Production for 1000 sq ft. (in Rs./year)
- ✓ Table 11: Establishment Cost of Rose Cultivation (in Rs.)
- ✓ Table 12: Cost Analysis of Rose Production for 1000 sq ft. (in Rs./year)
- ✓ Table 13: Cost and Revenue Analysis of Growers (Flowering Year)
- ✓ Table 14: Estimation of NPV of Gerbera Cultivation (in Rs)
- ✓ Table 15: Estimation of NPV of Orchid Cultivation (in Rs)
- ✓ Table 16: NPV Analysis of Rose Cultivation (in Rs.)
- ✓ Table 17: Sales Revenue of Flower Retailer of Sikkim Market (In Rs.)
- ✓ Table 18: Average Marketing Cost of Various Flowers in Namchi and Gangtok Market (Rs./100 stick)
- ✓ Table 19: Analysis of Marketing Margin of Flower
- ✓ Table 20: Growers' Share in Consumer's Rupee
- ✓ Table 21: Major Problem faced by Growers and Retailers

## **List of figures**

- ✓ Fig. 1 Map of Study Area
- ✓ Fig. 2 Farmers Cultivating Flower
- ✓ Fig 3: Supply Chain of Sikkim Floral within Sikkim
- ✓ Fig 4 Proportion of Weekly Supply in Gangtok Market
- ✓ Fig 5 Greenhouses of Basilakha Village (East Sikkim)

## **ABBREVIATIONS**

APEDA	Agriculture and Processed Food Products Export Development Authority
DACS	Denzong Agriculture Cooperative Society Ltd.
DONER	Department of North Eastern Region
ICAR	Indian Council of Agriculture Research
MPCS	Multipurpose Cooperative Societies
NERMAC	North Eastern Regional Agricultural Marketing Corporation Ltd.
NPV	Net Present Value
NRCO	National Research Center for Orchid
PPP	Public Private Partnership
PPPP	Public Private People Partnership
SIMFED	Sikkim State Cooperative Supply and Marketing Federation Ltd.

# CHAPTER 1

## INTRODUCTION OF FLORICULTURE

Agriculture is broad in nature, it can be split in two branches one is for food crops and another one is for non-food crops. In non-food crops, floriculture is one of the major sector. Floriculture includes: garden plants, cut cultivated greens, cut flowers, flowering potted plants, foliage plants, floriculture propagative material.

Floriculture is the latest addition to the commercial economy of the agriculture sector and is developing with all its potential. In general, cultivation and business of traditional as well as non-traditional flowers and dry flower industry is also called floriculture industry or green industry. It includes production, processing and marketing of all types of flowers (Kadam, 2012).

### 1.1 Global Scenario

The world production of floriculture is budding at on an average rate of 10 percent per year. Presently nearly about 50 nations are actively involved in production of floriculture on a large scale. In terms of value of production, the Netherlands, the United States, Japan, Italy, Germany and Canada are the leading producers of cut flower and plants. China and India having the bulk of the world acreage under cut flowers and plants production in the world, the Asia-Pacific region has the major share (77 percent) of the total world area under floriculture production. Europe, the USA and Japan are the major consumers of floriculture products (Muthukumar<sup>1</sup>).

There has been an increase in the per capita consumption of floricultural products in the developed and developing countries (Hanafi; 2012). This led to increased many folds of world floriculture market and has reached to the level of billions of dollars in last few decades and it is growing annually at 10-15 percent.

---

<sup>1</sup> Access from <https://www.scribd.com/doc/235926779/Indian-Floriculture-Industry-Opportunities-and-Challenges> on 21st October 2014.

## 1.2 India's Scenario

In India floriculture is becoming a major source of employment and income. There is vast scope at growing floriculture product in India, because total area under floriculture is very small. Last two decade there is an increasing demand and supply of various types of flowers (Kadam; 2012).

According to Agriculture and Processed Food Products Export Development Authority (APEDA, 2013) about 253.65 thousand hectares area was under Cultivation in floriculture in 2011-12. The country has exported 27,121.88 MT of floriculture products to the world for the worth of Rs. 423.46 crores in 2012-13. There is high demand for these products in the domestic and international market and India has significant ability in floriculture and it has been identified as focus area of exports.

The Indian Floriculture industry has been growing at a compound annual growth rate (CAGR) of 25 percent over the past decade, which comprises the florist trade, nursery plants, potted plants, bulb and seed production, micro propagation material and extraction of essential oils from flowers (Muthukumar<sup>2</sup>). Flowers which are majorly grown in India are roses, marigold, aster, tuberose, crossandra, jasmine and gladiolus in open field while carnation, gerbera, orchids, anthurium, roses etc are grown under polyhouse or greenhouses. Major flower growing states are Karnataka, Tamil Nadu, Andhra Pradesh, West Bengal, Mharashtra, Uttarakhand, Uttar Pradesh, Delhi, Haryana, Kerala, Himachal Pradesh and North Eastern State.

The North Eastern region of India is blessed with beautiful natural flora throughout the year due to its unique physiography, distinctive weather and agro climatic condition. Large number of farmers grab this natural advantage of region by adopting floricultural activity in commercial pattern for cut flowers such as rose, orchids, gladiolus, carnation, anthurium, gerbera and lilies. . Sikkim is one of the state of NE region of India which has great potential to develop floriculture industry.

---

<sup>2</sup> Chief General Manager, Export Import Bank of India, Mumbai.

### **1.3 Sikkim: A Study Prospect**

Sikkim is a very small hilly state in India and located in the Eastern Himalayas with rich biodiversity and formidable physical features. More than 64% of the population of Sikkim depends on Agriculture for their livelihood directly or indirectly. Agriculture being back bone of the state's economy (Subba ; 2008). It has diverse agro-ecological zones ranging from the sub-tropical in the lower valleys to alpine conditions in the higher reaches, making it one of the most potential floriculture zones in the country along with the other seven states of northeastern India with only 16% of geographical area available for cultivation.

Sikkim having 610,577 inhabitants (2011 Census) 4,56,999 residing in rural areas and 153578 residing in urban areas and it is the least populous state in India and the second-smallest state after Goa in total area, covering approximately 7,096 sq km. The density of population in Sikkim is 86 persons/sq km and the sex ratio is 890 females/1000 males. The current literacy rate of the state is 81.40 per cent among which 86.60 per cent are male literates and 75.60 per cent are female literates. The state comprises four districts namely East, West, North and South with sixteen sub divisions. Agriculture and tourism sector predominates the economy of Sikkim.

Situated in the lower Himalayas, Sikkim is home to around 5,000 species of flowering plants. Main flower which are grown in commercial manner are Cymbidium Orchids, Carnation, Anthuriurm, Gladioli, Lillium, Gerbera etc. Climatic advantage coupled with a skilled workforce gives Sikkim a definite edge in the business of floriculture. Realizing the potential of this sector, many budding entrepreneurs are taking up floriculture. It has good potential to develop as state for the leading producer of special and geographically suitable flowers, which have potential to grab the international market. State Government also has positive response for the development of this sector. Just need is to start cultivating flowers in a commercial manner.

Instead of having natural advantage, floriculture is not flourished as it should to be. There are many concern for this sector to develop. As such need is to have good infrastructure

facility as per need of floricultural development and the ultimate concerns for floriculture entrepreneurs is to access market easily.

This study tried to showcase the scenario of floriculture especially cut flowers of Sikkim and its economic prospect and the situation of marketing system.

#### **1.4 Statement of Problem**

Among many, some of the major problems of floriculture industry of Sikkim are taken into consideration for study purpose are as follows

- Much attention has not been devoted for production of flower as new source of livelihood.
- Market is inefficient within state for floral product and to access market outside the state.

#### **1.5 Motivation for Study**

According to Saha<sup>3</sup>, floriculture is an age old farming activity in India having immense potential for generating gainful self-employment among small and marginal farmers. In the recent years it has emerged as a profitable agri-business in India and worldwide as improved standards of living and growing consciousness among the citizens across the globe to live in environment friendly atmosphere has led to an increase in the demand of floriculture products in the developed as well as in the developing countries worldwide.

In the era of globalization, floriculture has become an essential commercial activity in agriculture. It has emerge as viable and profitable alternative, with a potential to generate remunerative self-employment among small and marginal farmers to increase the earning of the developing countries such as India (Muthukumar<sup>4</sup>). It shows that Sikkim, having small size of land holding due to its pattern of land system has tremendous potential to grow floriculture industry.

---

<sup>3</sup> Deputy Director, DGCI&S. Access from [http://www.dgciskol.nic.in/vaanijya0907/F%20Exp\\_floriculture.pdf](http://www.dgciskol.nic.in/vaanijya0907/F%20Exp_floriculture.pdf), on 21<sup>st</sup> march, 2014.

<sup>4</sup> Chief General Manager, Export Import Bank of India, Mumbai.

Flowers provide pleasure through enlightening colours and spreading fragrance. Therefore, people has always taken support of flowers as a token of expression of kind sentiments on number of occasions and consequently, ever increasing demand of flowers has made the floriculture of paramount importance for conducting economic evaluation and marketing investigation (Manzoor et al; 2001).

By knowing this feature, Pawan Kumar Chamling, the Chief Minister of Sikkim told in an interview (2012) that in Sikkim floriculture can become a big industry in few years' time from which we can meet the demands of domestic market were China, Australia, the Netherland and Taiwan used as dump zone for their flowers. Sikkim as having natural advantage to grow distinctive flowers which can build the many livelihood for the Sikkim's growing labour force.

With 80% literacy, coupled with an unemployment rate that is higher than the national average, the state thinks that floriculture can be the panacea for solving its socio-economic problems. As Boshale (2007) stated that because of the high literacy in the state, the propagation of technology use required in the floriculture industry will be easier. It is promoting as an alternative livelihood in the state among educated youth by providing free infrastructures, planting material and technology to cultivators to develop cut flower varieties.

So it is good source for livelihood to new generation and the need is to have economic evaluation for to authenticate its potential. In context of North East especially Sikkim, literature for the floriculture in economic prospect and its marketing aspect is rare or limited in nature, which led to offer the interest to study further details in context of economic evaluation of floriculture industry of Sikkim.

### **1.6 Research Question**

1. What is the nature of floriculture development in Sikkim and its prospects?
2. Examine the production cost and marketing scenario for floral of Sikkim?
3. What can be alternative ways to improve the floriculture industry of Sikkim?

## **1.7 Objective of Study**

Following are the objectives of study

- To study the prospect of floriculture in Sikkim
- To examine the cost of cultivation of flower viz. Orchid, Rose, Gerbera
- To Study the marketing aspects of flowers in Sikkim.
- To explore the ways and means to improvement of floriculture industry of Sikkim.

## **1.8 Scope of Study**

The opportunity of this study is to show the relevance of this new commercial branch of agricultural activity which emerges as farmer centric livelihood, in the era of lessening the interest of conventional way of farming. This makes floral industry sees as hopeful sector for future growth. As Tripathi (2012) stated that today floral industry has grown larger proportions and offers a wide scope for growth and profits.

## **1.9 Limitation of Study**

This study is purely based on some secondary and primary information which is collected from 90 growers and 37 retailers from different part of Sikkim. Meanam Garden is known for major flower exporter from Sikkim owned by current state Chief Minister's wife, due to some jurisdictional constraint this study doesn't incorporate business of this garden at all. So, this study could be consider as partial study of floriculture sector of Sikkim.

## **1.10 Chapter Plan**

To have more clear picture about study and its comprehensiveness and analytical presentation, the study was organized into five chapter.

The first chapter inaugurated as introduction focuses on the brief background of study with introduction of study area, nature of the problem, motivation for study, research question, objective of study and some scope and limitation of study and chapter plan.

Second chapter devoted for the theoretical background and survey of literature on study related issue to throw the light on issues which has been studied and take out the gap for further study.

The third chapter designates for research design and methodology and its methods.

The fourth chapter devoted for floriculture prospects in Sikkim and to analyze the economic prospect in which production cost and marketing are consider. Last and fifth chapter conclude by summary of study, suggesting the some of the new approach and ways and means for floriculture development for sustaining livelihood for Himalayan agriculture and conclusion.

## CHAPTER 2

### THEORETICAL BACKGROUND AND REVIEW OF LITERATURE

#### 2.1 Theoretical Background

Life is unique to our planet. It is earth's most precious asset. And there is plenty of it. We do not know the exact number of species: many estimates range from 10 to 12 million. India may have close to million species, the vast majority of which remain to be named or described. These hundreds and thousands of species in India live in many different types of ecological communities or ecosystem spread from deep seas to mountain tops (Bawa, 2010). Indeed, scenario for environment in this era of development are not so good. As nature falls prey to loot and plunder initiated in the name of development, growth and progress, a deeper understanding of man's interaction with environment is need of the hour (Laine and Subba, 2012). This need of interaction is may be for sustaining the livelihood. This mark the necessity of economic evaluation of different forms of development process and sources of livelihood which is directly linked to environment. Here development means to have a good standard of living which can be generate through worthy livelihood sources.

In context of livelihood, agriculture is considered as one of the major source. Within agriculture, in India, floriculture is emerging as an important commercial crop. This is a sector which is creating more employment and ensuring good return to the rural people and in addition to this it is used to satisfying aesthetic needs of the people. As Thipaiaha (2003) and Gowda (2009) asserted that the production of flowers is an age-old livelihood. The cultivation of flowers in the past was undertaken just to meet the family requirement and also meet the local religious and festival needs. Over a time, some farmers started growing flowers for the local market small quantities. As civilization advanced, the demand for these flowers increased both for domestic market and international market.

The reason behind the growing market for the flower is rightly pointed out by Gowda (2009), according to him rapid urbanization, increase in individual purchasing power among middle income groups as a result of increase in GDP and in addition to these increase in the number of corporate bodies, hotels, tourists, temples and changing

lifestyles, social values among the people. Even Getu (2009) cited that most developing nations which have geographic advantage take it as a solution to achieve rapid economic growth.

As market for floral is increasing, prospect of floriculture development in a region, production and marketing cost and margin evaluation is necessity for various purposes. For instance Trelogan and Zellner (1965) propounded that the costs and margin research helps to revealed the evidence and relationship about what is happening in the economic area between the farm and consumers. This information, helps to establish the suitable national policies, governmental programmes, administrative procedures and farm organization purposes. On this aspect review of literature was persuade.

## **2.2 Review of Literature**

As background to the study, different national and international published literature on various aspects of floriculture were reviewed. The literatures were reviewed under the following heads.

- a) Studies on Prospect of floriculture industry.
- b) Studies on production cost of flower.
- c) Studies on flower marketing scenario.

The study of literature provided below to highlight the focus of this research work.

### **2.2.1 Prospect of Floriculture**

In this section study gathered past study related to panorama of floriculture segment which is a one of the emerging branch of commercial or economical agricultural sector. As such, agriculture is the foundation of most economies and there is great interaction between agriculture and country's prosperity which cannot be overemphasized and as such all efforts to revitalizing this sector should be visualized as a means of economic liberation as stated by ZainabJoaque (2011).

In context of floriculture as a new branch in agriculture development, Peter (2008) emphasized that it (floriculture) is increasingly regarded as a viable diversification from traditional field crops due to increase per unit returns (marginal returns of flower) and

increasing habit of “saying it with flowers” during all the occasions, led to develop the floriculture sector in worldwide as a prominent source of livelihood. That’s why Srivastava (2000) revealed out that the agriculture sector is not only satisfying the basic needs of food, but is also a provider of livelihoods of larger size of population.

Diversification of agricultural production is seen as a priority for least developing countries to reduce dependence on primary commodities. The main reason is, despite high dependence on these commodities for their livelihood, declining trend of prices for primary agricultural commodities (Humphrey, 2006). Accordingly, floriculture sector is chosen for enhancing farm incomes and reducing poverty in developing countries. Fewer economies of scale and labour-intensive nature of production in cut flower industries are major sources of comparative advantage for these countries (Labaste, 2005).

Instead of having advantage, there is curiosity whether the expansion of area for floriculture cultivation hamper the food security. As Prakash (2002) expressed the way area is expanding for modern floriculture activity, which is likely to affect the food security, loss of man days, ecology, health hazards and groundwater. Because of these apprehensions, some of the studies advocate growing of food crops than flowers. Because, growing food crops with additional investments can generate more employment and employment without any ecological imbalances. In this, Thippaiaha (2003) argued that however, such apprehensions are likely to emerge when new crops are experimented. He continued his argument that India has already achieved self-sufficiency in food production, there is nothing wrong in expanding area under remunerative crops like modern flowers. However, some technological advances have to be made to reduce the ecological damages as a result of the modern flower cultivation.

Sen and Raju (2006) affirmed that highly valued diversification in agriculture has been recommended as one of the ways by which small farmers can increase their incomes. With a large number of incentives being given to floriculture in the recent years, it is important to understand the dynamics of flower cultivation particularly in the context of the benefits percolating to the poorer farmers. In perspective of farmers’ (Thippaiaha; 2005), stated that due to speedy urbanization and increasing demands of flower from several sectors has displayed better prospects of floriculture.

### **2.2.2 Production Cost of Flower**

This section prepared by collecting literature from various sources consistent to production and cost of floricultural activity. One study in Bangladesh found that flower-farming shows encouraging results to improve farmer's socioeconomic condition, increases self-employment opportunity, promotes entrepreneurship in both urban and rural areas and boosts export-trade to earn foreign currency, it proves to be a potential tool for poverty alleviation and sustainable growth in the economy (Mou et al. ;2012). Like developed countries, demand of flowers is now even vital in developing countries, where the cultivation of different types of flowers hold a capacity of increasing economic return. Economic return covers various aspects of floriculture such as flower growing pattern, cost of production, marketing channel and distribution of consumer's rupee among various intermediaries/functionaries involved in the marketing of flowers (Manzoor et al; 2001).

Ultimately, for the development of floral sector grower efficiency has to uplift. As Weddington (2003) asserted that to overcome the challenges facing today's grower, good management practices are essential. Members of the floriculture industry are primarily planter and the management of the business is a secondary concern. Growers are interested in producing a quality crop. However, to maintain a successful business, to distribute that quality crop to the gardening public, growers must also consider costs of production to ensure a return on their investments of time and money.

Kadam (2012) profound in his thesis that flower cultivation is labour intensive farming and dependency of family labour is high. In context of revenue generation Muhammad-lawal et al (2012) found in his study about floriculture in Nigeria that use of manure, labour, farm size, experience, educational level and age of the farmer were found to have significant influence on farmer's revenue.

Within this frame for production analysis, cost analysis is the key to evaluating business alternatives and developing an effective pricing strategy (Weddington, 2003) to sustain the cultivation of flower in economic aspect. Generally cost of cultivation divided in two parts one is establishment cost which includes expenses in land preparation, cost of seeds,

labour wages for pit digging, layout designing, wages for planting orchard etc and the maintenance cost includes expenditure on manure, labour wages for operations, expenses on plant protection chemicals, irrigation, harvesting, post-harvesting handling and transportation cost up to local market (Gangwar et al.;2008). As Baourakis et al. (2001) advocated that flowers are rapidly emerging as potential sources of money for many third world countries. As the global demand for floriculture product increases, it is obvious that increased production and marketing efforts are needed.

### **2.2.3 Marketing of Flower**

This section managed to have marketing aspect of flower. In this era of globalization and expanding market for cut flowers induced a macroeconomic reforms in which visible changes in Indian agricultural policy emphasis for high value crop diversification (Sen and Raju; 2006). But, Besemer (1966) statement is relevant in this context that to understand the prospect a sound research program in economics of floriculture is essential to the development of a more effective and efficient marketing system.

Many research says that economic analysis shows the importance of green industry to a state's economy. To analyze the economic dimensions of this industry one can survey the businesses to determine the contribution of sales, business size and employment generation. Even it is found that sales are vary significantly depend on the business size and market outlets (Uva;1991, Uva& Richards; 2003).To see the marketing aspect, we need to first know about the marketing cost and marketing margin.

The percentage share of the final price which is taken up by the marketing function is known as the marketing margin. "Margins" are often used in the analysis of the efficiency of marketing systems. Often they are misused even if they are calculated correctly. Total margins will depend on the length of the marketing chain, the extent to which the product is stored or processed, and the level of post-harvest losses. To know whether margins are reasonable researcher need to understand the costs (Shepherd;2007). Crawford (1997) mentioned, marketing costs are incurred when commodities move from the farm to the final market. It includes labour, transport, packaging, containers, rent,

utilities (water and energy), and advertising, selling expenses, depreciation allowances and interest charges.

As Gebreyesus&Sonobe (2009) stated that policies must aimed at promoting the non-traditional products and focus on innovation and building local capabilities, not only production but also marketing and logistic capabilities. Sen and Raju's (2006) study found that though the profitability of cut-flowers is substantially higher than that of the traditional crops, the participation of the smaller farmers in flower cultivation is lower compared to most of the other farm-size categories, primarily because of weak linkages with the market. So, market is important factor for the improvement of floriculture industry. But Usman et al. (2013) revealed that small farmers not only attained highest production but achieved highest total revenue as compare to medium and large farmers. Small farmers earn higher return as compared to medium and large farmers as they have small holdings of acreage and focuses on very much on their production and produce good quality static cut flowers, which fetch higher prices in the cut flower market.

Instead of this fact Sen and Raju (2006) argued that the participation of the smaller farmers in flower cultivation is lower compared to most of the other farm size categories, primarily because of weak linkages with the market. Even they stated that schemes of diversification of variety of crops are likely to face serious constraints unless resource-related and institutional barriers like access to market are overcome. An effective marketing strategy enables management to allocate scarce resources more efficiently while achieving a profit (Kotler 1984).

In context of Sikkim Orchid study, it is stressed that marketing linkage is of great importance in any production system to work as desired. Without well planned marketing facilities the producer will be reluctant to risk their efforts on new venture. Favorable prices for their produce without marketing constraint will generate interest amongst producers. Marketing system is so oriented with minimum middleman and complete transparency in market practices to enable producers to get good return on investments. The Co-operation and NGOs to take care of marketing needs growers as government cannot handle this directly because of inherent difficulties. For effective marketing necessary facilities in terms of collection, grading, processing and treatments, storage,

packing, forwarding and transport need to be created in assembling markets. Proper packaging materials and packaging system also require to be developed with cold chain transport system (Basnet, 1998; Lama et al . 2004).

All the above literatures indicates the importance of economic evaluation of any sector to see the prospect and put on track for the overall development by generating livelihood. So, in this context Sikkim is lacking behind and rare to find any studies makes us enthusiast to take up this issue to show the path for future improvement by learning from the economic default of this sector by analyzing the present and past experience.

## **CHAPTER 3**

### **METHODOLOGY**

#### **3.1 Research Design**

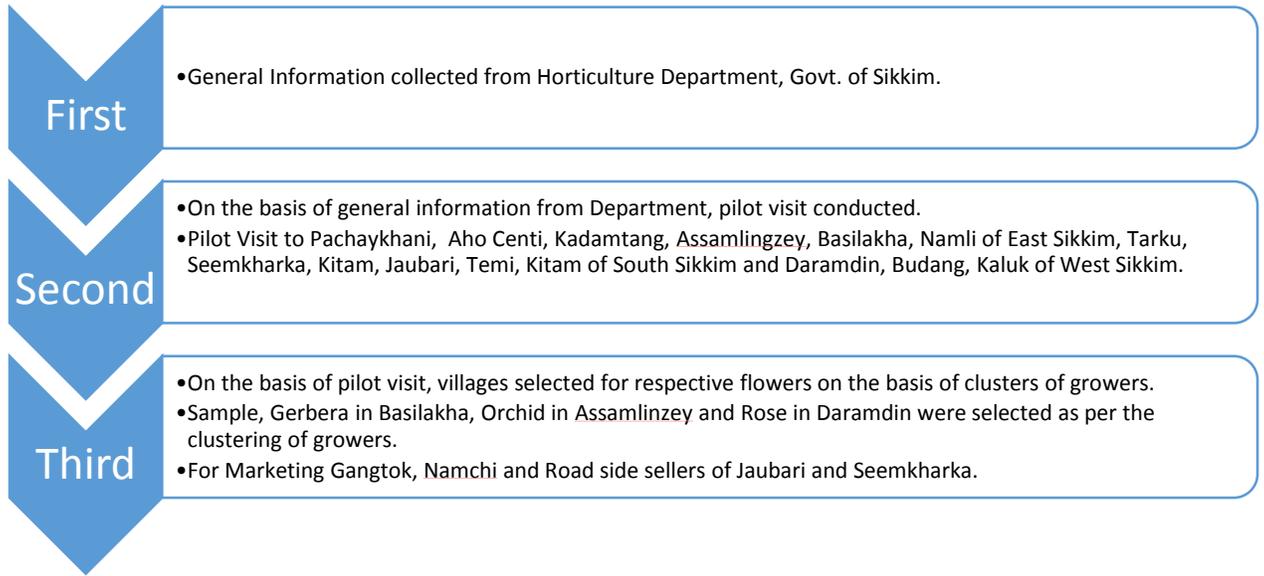
Sikkim was chosen for study purposes. The reason behind the selection of Sikkim for study purpose were, first and foremost reason was lack of utilization of this sector as an academic research area in this state and second most important reason was floriculture is considered as one of the alternative sources of livelihood for farmer and unemployed youth by State Government.

Sikkim is state where hundreds and hundreds flower are suitably grown but for the study purpose we chose only some of the commercial flowers which has grab market (local as well as outside the state), flowers namely Gerbera, Orchid (Cymbidium), and Rose. To collect detail information from place/villages of across Sikkim in which flower was commercially grown were selected as per the preliminary information from Department of Horticulture, Government of Sikkim followed by pilot visit to some of the area, where these flowers were grown. Villages in which pilot visit was taken were Pacheykhani, ChangeyShenti, Assamlingzey, Basilakha from East Sikkim, Tarku, Kitam, Simkharka, Jaubari were from South Sikkim, and Daramdin from West Sikkim.

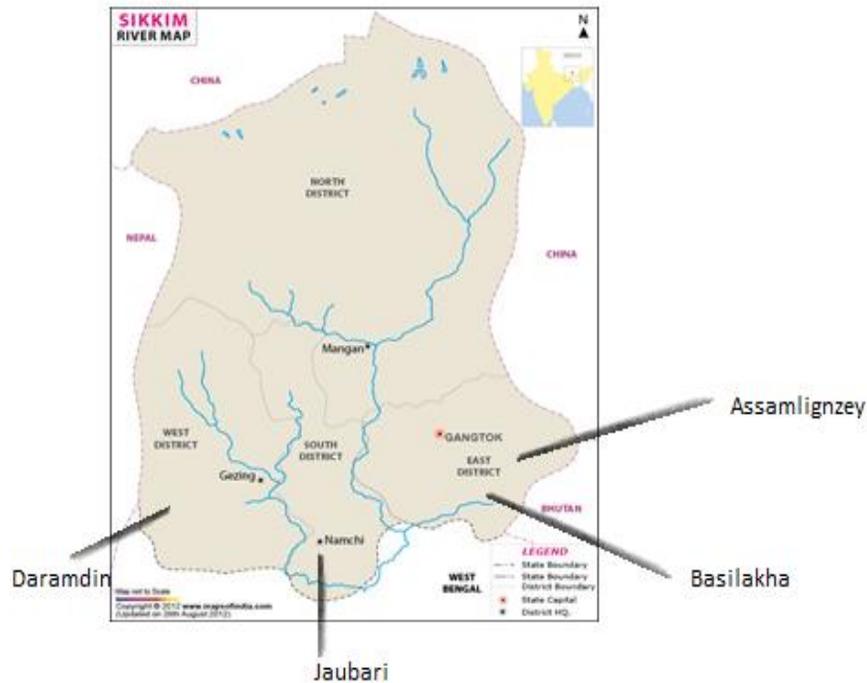
From some of these villages sample of grower as per cluster was selected purposively to capture the objective of study. In addition to this primary information, secondary information was also collected from different reliable sources to show case the macro level scenario of floriculture.

Collected information was analyzed by using mixed method of research, which says that uses of both qualitative as well as quantitative information, to authenticate the inferences by using both aspect in the form of supporting quantitative information by qualitative sense and qualitative information by quantitative elements.

## Sample Collection Design



**Fig:1 Map of Study Area**



**Table 1: Study Area Profile**

	Daramdin	Jaubari	Assamlingzey	<b>Basilakha</b>
Household	372	124	430	1126
Total Population	1886	579	2055	5128
Male	921	292	1065	2703
Female	965	287	990	2425
Literate	1408	330	1474	3624
Total Worker	775	306	1278	2870
Non Worker	1111	273	777	2258

Source: Census, PCA, 2011

Above table gives the idea about number of household, total population, gender distribution and others of the villages which were selected for the study purposes.

### **3.2 DATA SOURCE**

Both Primary and Secondary sources of information used to generate the authentic inferences.

#### **3.2.1 Secondary**

For to understand the macro viewpoint of floriculture aspect, study collected the information from the Horticulture Department of Sikkim State and their annual reports, literature, books, journals, and articles which was published by different reliable sources. Data sources form APEDA, National Horticulture Board etc.

#### **3.2.2 Primary**

For to understand the ground reality of floriculture development in Sikkim, researcher visited the grower and seller for personal interview to collect required information with structured, semi structured questionnaire. Samples and villages were selected on the basis of base information gathered in pilot visit for respective flower i.e. for Cymbidium Orchid and Gerbera from Assamlingzey and Bashilakha (in East Sikkim) respectively and for Rose Daramdin (West Sikkim). 30 sample growers selected randomly for each flower from respective villages which was popular for cultivation of that particular flower

to full fill the objective of study and to access the appropriate information without any bias.

For marketing details, Gangtok (in East district) and Namchi (in South district) market were visited in which it found 10 and 5 flower sellers respectively. Only this two market of Sikkim was having marketing outlet of flowers for whole week. In addition to this, 22 road side seller of flower from two villages i.e. Seemkharka and Jaubari of south Sikkim was interviewed. In an all, total sample for study purpose was 127 out of which 90 samples were grower and 37 were seller.

### **3.3 Data Analysis Technique**

Collected data were used for different forms of estimation to justify the objective of study. For the same purpose it was analyzed in form of tabular manner, descriptive analysis, and other techniques which were relevance for study to get an appropriate inferences.

#### **3.3.1 Descriptive Analysis**

In this, study used table, figures and mean, for to get an average value of estimation and other.

#### **3.3.2 Cost Calculation**

For calculating the cost of cultivation of flowers, data which were collected from sample was taken out on an average level of all factors and then production cost was calculated for 1000 square feet level, considering as base for other estimation. Then cost of different factors were divided into three part one i.e. Cost A, Cost B and Cost C. Cost A include the initial cost/investment for starting cultivation , Cost B include the cost A and interest on capital used in initial stage and Cost C include the cost B and imputed family labour value or manpower.

### 3.3.3 Benefit Cost Ratio

It is defined as the amount received in the shape of profit on the costs of one rupee. The BCR was computed by this method (Usman et al. 2013)

$$BCR = TR/Cost$$

Where, TR is Total Revenue and Cost.

### 3.3.4 Break Even Price

It is defined as the price at which grower neither gain nor loss just retain the average cost of production. It was calculated as total cost of production (in 1000 sqft) divided by the number of stick (no. of cut flowers) produce in a year (in 1000 sqft).

### 3.3.5 Net Present Value

Net Present Value (NPV) was calculated to infer the impact of project or flower cultivation on economic welfare. Specifically it concentrate on over-all benefit over the whole life of project or plant life<sup>5</sup>.

To get NPV we have to calculate present value for which, following formula was used

$$\frac{R_0}{(1+r)^t}$$

Where,

$R_0$  : It is return minus cost at time t.

r : It is the discount rate (or it is opportunity cost which means that the value one earn if he/she spend same amount on another project or source) in this case 'r' is considered as 10 percent, as per, majority of growers stated that if they didn't invest on floriculture activity then could save their money in bank. So, in bank maximum return can generate

---

<sup>5</sup> 'When and how to use NPV, IRR and adjusted IRR' Part of Toolkit for the Economic Evaluation of World Bank Transport Projects (Institute for Transport Studies, University of Leeds, 2003). Access from <http://www.its.leeds.ac.uk/projects/WBToolkit/Note1.htm> on 3<sup>rd</sup> March 2014.

in fixed deposit in which interest is averagely 9 and additional 1 is added to some other risk factor that makes discount rate is 10 percent.

t : It is the time of cost/return.

After estimating the present value of each time period, need to club together all PV for to get overall NPV of producing flower in its life.

$$\text{NPV}(r, N) = \sum_{t=0}^N R/(1 + 0.1)^t$$

Where, N is total number of period.

Implication of NPV, if the value of NPV is more than zero then the project or cultivation of flower is acceptable as a beneficial.

### **3.4 Marketing**

This section includes the marketing analyses mechanism. Marketing analyses mechanism are many but study try to concentrate two main things marketing cost and marketing margin of flower.

#### **3.4.1 Marketing Cost**

Marketing cost, it means that cost incurred for the marketing of product. It include the cost of transportation, labour, sorting and packaging, miscellaneous cost (electricity, water, cleanness, rent of shop etc). Cost was calculated in the average value for per stick of flower.

#### **3.4.2 Marketing Margin**

It is defined as the margin of retain by sellers after selling the product to consumer. Formula for analyzing marketing margin is

$$\text{Marketing Margin} = \text{SP} - \text{FP} - \text{MC}$$

Where, SP : Selling Price or Retail price

FP : Farm get price.

MC : Marketing Cost

## CHAPTER 4

### RESULTS AND DISCUSSIONS

#### 4.1 Floriculture Prospect in Sikkim

Sikkim has a comparative advantage in being a small natural resource rich state whose benefits should be harnessed for environmentally sound and sustainable development (Lama eds.; 2004). It is exist in high altitude, medicinal plants and floral wealth have great potential for cultivation, value addition and commercialization in the state.

Sikkim with only 0.2 percent of the geographical area of the country shelters around 25 percent of the flowering plants of India. Just by exploring 70 percent area of state, it appears that 10 largest plant families of Sikkim account for around 40 percent of the flowering plants of the state. The region is also rich in endemic as well as plants restricted to the eastern Himalayas. The state supports luxuriant tropical, temperate and alpine vegetation in its most pristine and virgins formal. Its unique geographical position, varied topography, high annual precipitation, minimum demography pressure make the area one of the rich botanical treasure house of the country. The vegetation of Sikkim can be broadly classified into the tropical, sub-tropical, temperate and alpine types (Singh and Chauhan, 1998; Lama et al. 2004).

The climate of Sikkim is conducive for growing a large number of high value cash crops. Even Sikkim has been declared as an Agro-Export zone with focus on floriculture (lama et al. 2004). With this background, this chapter provides the authentic information for to see the prospects for development of floriculture in the backdrop of historic, geographic, socio-economic and contemporary development.

#### 4.1.1 Commercial Floriculture: Historical Glimpse of Sikkim<sup>6</sup>

Chandrabinewar (1837-1900) and his brother Laxmidas from Bhaktapur nee Bhatgaon in Nepal reached Darjeeling (Hill station of West Bengal attached to Sikkim) and after some investment started grocery business and sell *gundruk* (Nepali's fermented food). Their approach of progress and development was so innovative that makes them popular in the Himalayan region.

At that time, Sikkim was small Himalayan Kingdom. The then authority of Himalayan kingdom of Sikkim invited to this brother for some innovative activity for the development of kingdom. They accepted the proposal of Maharaja of Sikkim and reached to Sikkim. Initially, he (Chandrabinewar) started clearing the wild forest for human settlement within the strong protest by group of local people. Instead, with such development and prosperous work done by him led to get support from many resident of kingdom in between 1872-80s and in future.

He became most powerful and great law enforcer who took many changes in Himalayan society even he build Sri SriSriDhaneshwarMahadevShivalayaMandir to bind the society together, which he think that *mandir* (Temple) can play. Due to his exemplary work and playing philanthropic role British honored him by declaring as title "Pradhan" chief of the society. Addition to this, British conferred to Chandrabinewar for his courage and enthusiasm as "BahadurSamsher". Later he passed this honor to his two sons as named RatanBahadur and DurgaSamsher.

In 1910, RatanBahadur Pradhan and DurgaSamsher Pradhan started Chandra Nursery for plant business in Rhenock, East Sikkim about 80 acres of land. There may be so many possibility to adopt this venture, one among the many reasons for successful nursery

---

<sup>6</sup> Various article and personal interview was referred for this section. They were,

Shrestha, RajivaShankara 'Shri Chandra Nursery Cenetary' access on 3<sup>rd</sup> March, 2014

[http://www.karunaguthi.com/uploads/4/6/3/1/4631829/the\\_chandra\\_nursery\\_cenetary.pdf](http://www.karunaguthi.com/uploads/4/6/3/1/4631829/the_chandra_nursery_cenetary.pdf)

'L B Sons and Nursery '(2010)

<http://darjeelingtimes.com/archive/opinions/social/1655-l-b-pradhan-a-sons-nurserymen.html> access on 4<sup>th</sup> March, 2014

culture due to the position of RaiSahebRatanBahadur who was the then charge of Rhenock Estate and also a member of the State Council positioned him to made excellent rapport with the Political Officer, several Governors and the guest of these dignitaries from the international (especially UK) who visit Sikkim frequently led to boost this business. That contact further boost up the interest in the plant business especially orchids which at that time, were highly priced among the British aristocracy.

Another brother DurgaSamsher had some knowledge of growing and hybridizing gardens plants like Bougainvilleas, Dahlias and Gerberas etc. But it is still mystery that neither they were botanist by gene nor by education, that how the idea of trading plants originated on them. Their only source of information can be the books ‘The Rhododendrons of Sikkim Himalayas by J.D. hooker (1854) and The Orchids of Sikkim by King and Pantling (1898)’ and the RaiSahebBhimBahadur ,the then Forest Manager as written by Rajiv (one of the family member of this Pradhan family) in his article.

RatanBahadur had a place to stay at Gangtok being a landlord-cum councilor. The Chandra Nursery reached a peak in 1930s. They build two storied bungalow and used it as office complex in Gangtok. Their nursery was popular in all over the world, from Buckingham Palace and Balmoral Castle to the Orchid House of Sanders and the Viceregal Lodge in Delhi.

Initially they don’t know the process of labelling, packing and forwarding. To know that they ordered orchids form nurseries in the UK and Australia and herbaceous plants from Duncan and Davies in New Zealand. It took three months to reach Sikkim by sea. All Gardener with owner gathered when parcel reached the destiny to check the details to imitate the process. Since cardboard boxes were not available, they devised woven bamboo baskets as per acceptability of post office. Then onwards there was no looking back. At that time, RatnaBahadur had backed by his son in law SurjyamanShresta, pleasant personality and gifted gardener his work could be still be seen around the Budha statue near the Tasshiling Secretariat in Gangtok.

It was this single establishment, rather an institution that spread the name of Sikkim far wide across the globe. When Mohan Pratap, former Chief Secretary and son of RatnaBahadur during his administrative training in Oxford UK in 1960 lined up along

with students from other Commonwealth countries to greet the Queen Mother, he was lost for words about describing his country of origin assuming Her Majesty wouldn't know where Sikkim was. Her majesty excitedly replied "Oh you are from Sikkim-the land of rhododendrons?" Even today curators at the Primulas and Rhododendrons growing in their gardens mostly came through the Chandra Nursery in Sikkim in the Himalayas. It was hub of plants and they imported plants of all types which they thought had commercial prospects.

This was regarded as the best or second in Asia in those days. Later this Chandra Nursery known to Woodland Nursery. Once, there was trip to Gnathang, Sikkim like a botanical excursion RaiSahebRatnaBahadur Pradhan- a naturalist- found and identified a new variety of cobra lily that was later Kew botanist C.E.C Fischer as *Ariseamapradhanii* (here last second word *pradhanii* use from the surname Pradhan of RaiSaheb) on his honour.

It was unfortunate that the nursery went downhill, after the demise of the elder brother in the mid-1940s. The younger brother took over the business but he was not into orchids. The business was divided between two families as the Chandra Nursery and the Woodland Nursery. Then many of their descendant settled in Kaliampong (town of west Bengal near to east side of Sikkim) start their own nursery, some of they are functioning and earned good reputation in floral sector. Then after to an extent business of floral slow down but in contemporary this floriculture business is growing in this tiny hills.

#### **4.1.2 Geographical Congenial for Floral Development**

Agro climatology of the North East (includes Sikkim) is much suitable for commercial floriculture and Ornamental horticulture. The region has great potential to become one such hub of commercial floriculture that can be comparable to Holland/Netherland (world largest market cum exporter of floral product) due to its climate. The need for providing artificial cooling can be done away with due to its mild climate round the year. Almost all the hilly states of the region have favourable climatic condition for commercialization of flower cultivation (Mishra and Misra;2008).

The geographical location of Sikkim, which allows it to do away with artificial temperature controls for growing flowers, is expected to give it production cost advantage over other flowers (specially orchid) growing nations like Holland and Australia (Boshale;2007).

#### **a. Floristic Diversity of the Sikkim Himalayas**

Presences of around 4500 species of Angiosperms (flowering plants) clearly indicate the floristic diversity of this Himalaya State. The country harbours 17,500 Angiosperms out of 2, 50,000 species of the world constituting about 7%; out of which the state (Sikkim) harbours about 25.17% of the country. Further, the state harbour 350 Gymnosperms (ferns and fern-allies) against the national record of only 64 species so far. Gymnosperm's world wealth is about 750 species, of which 46.67% is available in Sikkim. The region harbours a number of primitive taxa like *Exbucklandia*, *Houttynia*, *Magnolia*, *Michelia* and several species of *Annonaceace*, *Myrsinaceae*, *Piperaceae*, *Lauraceae* etc. An analysis of ten dominant families of flowering plants and of gymnosperms present in Sikkim further throws lights on floristic richness. *Orchidaceae* is the most dominant family with 515 species in Sikkim (J. R. Subba<sup>7</sup>; 2002).

#### **b. Climate**

The climate of a locality is the synthesis of day to day values of the meteorological parameters like precipitation, temperature, humidity, sunshines and wind velocity. The climate of a place is mainly governed by the following factors viz. latitude, longitude, position to large scale atmospheric circulation pattern like monsoon, local geographical features like forest vegetation and position relative to continents and oceans (Bandyopadhyay and Singh, 1998; Lama eds. 2004)

Sikkim is a land of great climatic contrast within very short distances. Latitudinally, the basin is located within the sub-tropical climatic regime. But due to the presence of high mountains, here one can experience climates as varied as temperate, alpine and even arctic type (Chaudhury, 1998). It has its own climatic peculiarities caused by its

---

<sup>7</sup> Shri Jash Raj Subba, was Director Horticulture, Government of Sikkim has been graduated in Agricultural Sciences. He has authored many books on Sikkim Himalayan state.

geographical location, relief and altitudinal variation. As such, temperature conditions vary from sub-tropical in the southern lower parts to cold deserts in the snowy north. It is the most humid place in the whole of the Himalayan range because of its proximity to the Bay of Bengal and direct exposure to the effects of the moisture laden southwest monsoon (Lama et al. 2004).

The State has a unique horseshoe type of physical feature, varied altitudinal zonation starting from alpine meadows to hot tropical valleys. The Sikkim Himalaya in particular possesses the maximum variation in the macro-climatic environments. The hot tropical valley penetrates deep inside the heart of the mountainous state with warmer southern and cooler northern aspects (SudhizongLuxsom<sup>8</sup>).

This nature of climatic condition is suitable for many thousands of flowering plant on which numerous contemporary commercial crop are also suitable to grown and seize locational advantage.

### **c. Soil**

Lama et al. (2004) quoted the Planning Commissions' (1981) statement that Sikkim enjoys a wide range of climates, physiography, geology and vegetation that influence the formation of different kinds of soils. In accordance with the physiographic sequence and terrain features, soils of Sikkim are in general acidic in reaction due to heavy rainfall and leaching of bases from surface soil to low horizons. They are somewhat excessively drained, coarse-loamy and fine-loamy in texture.

Natural variation of climatic conditions and wide range of parent materials involved in the soil formation of Sikkim have resulted in the development of acidic soils of diverse nature. Among the four districts of Sikkim, the frequency of soil samples having pH less than 5 are 50 percent in North Sikkim and in other districts it is below 12 percent (Bhutia et al. 1985; Lama et al. 2004).

---

<sup>8</sup> Writer is Retired Director of Forest, Govt. of Sikkim. Access from [http://sikkimforest.gov.in/Reports%20and%20Publications/Biodiveristy-of-Sikkim/7%20ORCHIED\\_125-148%20web.pdf](http://sikkimforest.gov.in/Reports%20and%20Publications/Biodiveristy-of-Sikkim/7%20ORCHIED_125-148%20web.pdf) on 30<sup>th</sup> October 2014.

Flowers which are grown in Sikkim as a commercially is highly supported in such conditions and nature of soil.

#### **4.1.3 Contemporary Development of Floriculture in Sikkim**

Indian floriculture is mostly in small scale and unorganized in nature. In different parts of the country, mainly small and marginal farmers are engaged in cultivation and production of floricultural products. Sikkim as a Himalayan state has high possibility for floriculture activity is in small scale.

Floriculture which is fast emerging as vibrant sector in bio diversity hot spot of Northeast India (Singh; 2013). It has a high potential as demand in India and abroad would continue to grow. The state (Sikkim) produces varieties of orchids, gladioli, anthuriums, rhododendrons, lilies, gerbera, alstroemeria, rose etc. Commercial cultivation is rapidly picking up (Sikkim Development Report; 2008). There is a good scope for commercial floriculture. The important factors which decide the scope for Commercial Floriculture are Soil, Climate, labour, Transport and Market. In context of soil and climate of Sikkim, it has advantage but for the transport and market need to concern. Even governmental policies are also on positive direction to make it as an alternative livelihood source.

##### **a. Sikkim Organic Mission and Floriculture**

After the merged with Indian territory as 22<sup>nd</sup> state, Sikkim followed the intensive agriculture by adopting the regional concept of agricultural development and divided the State in 9 regions and 7 sub-regions each having seed multiplication farms for seed multiplication and distribution to the farmers. A large number of improved and hybrid seeds were introduced for cultivation. Use of fertilizer and pesticides was at the maximum during this period. A number of improved and hybrid livestock were also introduced leading to intensive agriculture with mixed farming. As result, the sloppy lands of mountainous Sikkim were eroded, natural resource base depleted, and productivity declined (Subba, 2008).

He continued to mention that the state government realized the Sikkim being a mountainous region has no scope for intensive agriculture. Hence, the policy of organic

agriculture was adopted. This facilities low/slow use of natural resource-base and also provides ample scope for conservation and regeneration of natural resources. Thus, the state has adopted stall-fed livestock and precision farming with green house cultivation, drip irrigation, organic composting for growing organic high value horticultural crops based on regional advantage.

Sikkimese farmers are much more conscious about the use of manure than those in other parts of the country. Organic matter in one form or other has long been used to rejuvenate soil fertility. To the maximum extent their farming systems rely upon crop rotation, crop residues, animal manures. Organic manures have profound influence on soils physical, chemical and biological properties affecting its capacity to hold as well as release nutrients (Lama et al. 2004).

The impact of chemical fertilizers, machinery and diesel fuel energies on yield were estimated statistically non-significant with a negative sign as found by Banaeian and Zangeneh (2011) on their study of Walnut orchard of Iran. In case of Sikkim, this indicate that the way agriculture development is taking place has tremendously appreciative without using all above factor (inorganic) for sustaining and consistent production function.



Fig. 2: Farmers cultivating Gerbera

Once<sup>9</sup> reported that “Sikkim is promoting floriculture in the state as an alternative livelihood among the educated youth with free infrastructure, planting material and technology to cultivators to develop cut flower varieties. It is becoming a profession because we plan to make Sikkim an organic state by 2015. It will be the only state to grow flowers organically”. This has good prospects in local, national and global market when, people are more conscious about health disease caused by inorganic substances. This has advantage as Lahiri et al. (2001) pointed out that the current low chemical, fertilizer and pesticide use can be converted to an advantage by promoting organic farming and building up a brand, for floricultural development without the use of inorganic substances.

#### **b. State Government Approach**

As per the research and findings study reserved to state that government of Sikkim is main factor for the development of commercial floricultural activity in Sikkim. For to encourage the farmers to grow flower government provides variety of opportunity. It can be listed out like training, providing infrastructure (Green House), seeds, organic medicine and even to an extent marketing with the help of SIMFED (Sikkim Marketing Federation).

Sikkim is destination for floriculture development it's because as Misra (2013) stated in article that it is worth to notice the efforts which has been led by government to make floriculture blossom in Sikkim, which not only enhancing the beauty of state but also helping to farmers to make alternative livelihood.

Sikkim Government, Department of Horticulture extending its support to farmers by different sources. As such, different centers are established and even policy as packages for encouraging the farmers to start cultivating the commercial flower.

---

<sup>9</sup>Chief Minister Pawan Kr. Chamling Reported on The Political and Economic Journal of Sikkim, on January 2013 page 40, courtesy to Indo-Asian News Service (IANS).

- Cymbidium Development Centre – Cymbidium is the most important flower for the State and the departmental interventions in the form of updated technology and high quality imported planting materials has advanced this sector. For promotion of this flower to a level of industry, a center has been established at Rumtek, East Sikkim to coordinate critical activities like varietal screening, technology up-gradation training and skill development of farmers and dissemination of knowledge.
- Model Floriculture Centre – A Model Floriculture Centre has been established at Maniram (South Sikkim), 9<sup>th</sup> mile (Namli, East Sikkim) to serve as demonstration unit, act as a center for imparting training and standardize production technology for various flowers
- Pack Houses - To ensure reduction in post-harvest losses and quality retention of farm produce, one Integrated Pack House has been set up at Rangpo, East Sikkim to handle collection, grading, treatment, storage and various other related activities for fresh cut flowers.

### **National Research Center for Orchids<sup>10</sup>**

The National Research Center of Orchids was established on 5<sup>th</sup> October 1996 by the Indian Council of Agricultural Research (ICAR), New Delhi to organize research programme on improvement in productivity, quality and commercialization of orchids. The Sikkim state authorities handed over 22.19 acres of land belonging to Regional Agricultural Centre along with all other assets to ICAR for establishment of the centre. It is situated in Dikling, Pakyong, which is 27 km from the state capital, Gangtok.

**According** to NRCO there are over 1300 different species of orchids in India. Arunachal Pradesh, with more than 550 species, boasts of the largest number of orchid species. Next comes with Sikkim with 500 plus species which also include famous Nobile Dendrobium (consider as state flower). It has 35 poly houses which keep more than 800 varieties of orchids found all over the world. The orchids here are provided by the government solely for research purposes and not for commercial use<sup>11</sup>. These are later returned to the government or given away to local farmers. It has developed more than 11 distinct hybrids of orchids over the years.

---

<sup>10</sup> From NRCO, websites.

<sup>11</sup> Article on "Orchids Go Places" in The Political and Economic Journal of Sikkim, May 2013.

#### 4.1.4 Government Expenses for Horticulture Crops

**Table 2: Government Investment in Horticultural Crop from 2008-09 to 2010-11 in Sikkim**

(Ruppes in Lakh)

Sl. No	Crop Category	Investment in the Year			Total	Rank
		2008-09	2009-10	2010-11		
1	Species	330.2	247	253.13	830.33	5
2	Flowers	598	806	494.25	1898.25	1
3	Fruits	391.69	381.56	347.31	1120.56	3
4	Vegetables	338	443.95	244.69	1026.64	4
5	Root and Tuber Crops	31.85	39		70.85	6
6	Bee Keeping	26.4	41.65		68.05	7
7	Organic Farming	326	480	395	1201	2

Source: Biswas and Majumdar; 2013, Horticulture and Cash Crops Development, Govt. of Sikkim

It was found from the table above that from 2008-09 to 2010-11 overall investment from Horticulture Department to various horticultural crops, out of which investment in flower comes on top rank. It shows that government or department is realizing the potential of this sector for growth of a state economy.

#### 4.1.5 Production of Flower in Sikkim

**Table 3: State Production of Cut Flower**

(Area in, 000 Ha; Flowers in lakh Nos. ;)

	2009-10		2010-11		2011-12	
	Area	Production	Area	Production	Area	Production
Flower	0.175	200	0.188	212.5	0.21	235

Source: Biswas and Majumdar; 2013, Horticulture and Cash Crops Development, Govt. of Sikkim

Sikkim, use small area (about 11 percent) for agricultural activity (Biswas and Majumdar, 2013) out of overall geographical area. Table above infer that production as well as area for the floral cultivation was increased yearly. In 2009-10, production of flower was 200

(lakh nos.) and it increased by more than 17 percent within 1 or 2 years. Steadily production of flower in Sikkim is growing.

#### **4.1.6 Existing Agro-Marketing Associations**

There are many agencies working for the development of marketing channel for the agricultural product produce in Sikkim. There details are mention below.

- North Eastern Regional Agricultural Marketing Corporation Ltd (NERAMAC) under the Ministry of Development of North Eastern Region (DoNER, Govt. of India), New Delhi has its head quarter at Guwahati. The Sikkim Zonal Office is located at Tadong, Gangtok. The main objective of NERAMAC is to provide better price to the farmers of North Eastern States for their agricultural and horticultural produces. The zonal office of Sikkim started functioning from 2nd June 2008. But till date it does not have taken any step for the purpose of flower sector.

- Sikkim Marketing Federation (SIMFED): The Sikkim State Cooperative Supply and Marketing Federation Ltd. (SIMFED) was established in 1984. SIMFED was established as an apex marketing society for the state of Sikkim with the main intension of undertaking wholesale supply of consumer goods to the Multi-Purpose Cooperative Societies (MPCS) and Consumer Cooperative Societies (CCS) and to arrange for bulk marketing of the surplus Agricultural produce including the important cash crops of the state.

This federation, to an extent worked for the development of floriculture market but lack of mismanagement, may be because of inappropriate infrastructure and expertise, lessen their jurisdiction in this product.

- The Denzong Agriculture Cooperative Society Ltd: It was formed during the year 1965 under Sikkim Cooperative Societies Act, 1955 and with a view to help farmers in creating markets to enable the sales of marketable surplus. Initially, the society had a provision of enrolling progressive grower individual as members. Later with the enactment of the Cooperative Societies Act, 1978, the Society was converted to an apex Cooperative stature with primary co-operatives as its

members mostly MPCs. The organization is uninterruptedly supplying milk, fruits and vegetables, fish and fowls, meat, potato, onion and eggs etc. to the various military units stationed in Sikkim on yearly negotiated supply contract basis through its supply points located mostly in snow bound areas. The bulk procurement of farm surplus from local villagers is collected through member cooperative societies. In order to diversify the business activities, the DACS is in the process of formulating projects on cold storage, running of flour mills etc to meet increasing market demands and create employment opportunities.

#### 4.1.7 Supply of flower outside the state

**Table 4: Supply of Flower outside the State Yearly (Average of last five year)**

Flower	No. of Stem
Orchid	120000
Anthurium	110000
Gerbera	1200000
Alstrameria	50000
Carnation	50000

Source: Horticultural Departmental Official (October, 2014)

Table above infer that Sikkims' produce floral has good demand outside the state. Especially 5 flowers they are orchid, anthurium, gerbera, alstrameria and carnation are demanded outside the Sikkim as per government official. Due to its geographical location its produce has unique feature in terms of quality, floral days of lasting in artificial nature and other. That makes it high demand in outside the Sikkim market. One of the flower wholesaler of Flower Trade Center, New Delhi, which is considered as one of the largest flower market in Asia, revealed that Sikkims' product is unique in nature and even fetch good market price whenever it reaches to market with standard packaging and other then it would be good earning source to wholesaler as well as grower of Sikkim.

#### **4.1.8 Corporate Involvement in Sikkim Floral Production**

In the era of globalization, in each and every sector private sector/corporate is playing a vital role for the development. Within which, new trends is developed in which private sector is helping public sector in their scheme or project for to achieve the goal of project optimally.

Similarly, for the development of floriculture sector, Government of Sikkim involved some of the corporate to establish joint venture. In Assam Lingzey (East Sikkim), orchid nursery has been set up as joint venture with Netsin Flora Firm and Department of Horticulture, Govt. of Sikkim. Even in Mazitar (East Sikkim), Florance Flora of Bangalore has joint venture with Department of Horticulture for growing Anthurium. Florance has entered into several joint ventures to set up flower production units for anthurium, gerbera, roses, orchids etc with different part of India. Their main aim is to provide the quality flowers at reasonable rate to the Indian market<sup>12</sup>.

In addition to this, the way tourism is flourishing in Sikkim, flower can play vital role by going organically to attract more tourist not only to roam the Sikkim but also for study purposes specifically organic agriculture activity and from which Sikkim can become model for others in organic cultivation.

All the above factors which were presented above indicate that, the way floricultural activity is developing with the help of government, farmers and corporate involvement and addition to this topographical advantage for flower production has establish tremendous potential for growth in floriculture sector for providing alternative source of livelihood.

#### **4.2 Cost of Cultivation and Marketing Analysis of Flowers**

This section dedicated to analyze the ground information of floriculture industry in Sikkim. It includes socio-economic profile of samples, production cost of flower cultivation i.e. Gerbera, Orchid and Rose. Cost analysis include cost of cultivation, break even prices, cost benefit analysis and other related issues. In addition to these, some

---

<sup>12</sup><http://www.agricultureinformation.com/mag/2009/12/florance-flora/> Access on 30<sup>th</sup> October 2014.

glimpse of marketing factor like supply chain of flower, marketing cost and marketing margin are analyzed. Details of study are given below.

#### 4.2.1 Socio-Economic Profile of Sample

This section incorporates the different socio-economic indicator for sample (it contains both sellers and growers) which includes the general information segment which provides the information like gender distribution, community and age and qualification of sample. Another segment focus on growers profile which incorporate the information like floricultural income of growers, growers' experience of commercial flower cultivation and in addition to this area used by growers for flower cultivation.

##### a. General Information of Sample

This segment try to incorporate the basic information of sample which were used for to understand the ground level scenario of floriculture in Sikkim. It incorporate gender, community and age and qualification of sample.

Table 5: Basic Information of Sample

Indicator	Frequency (No. 127)	Percentage	Indicator	Age (year)	Qualification (Year)
<b>Gender</b>					
Male	85	66.9	Minimum	23	2
		3			
Female	42	33.0	Maximum	70	15
		7			
			Mean	42.9	8.16
<b>Community</b>					
General	35	27.5			
		6			
Schedule Tribe	38	29.9			
		2			
Schedule Caste	6	4.72			
Other Backward Caste	48	37.8			

Source: Primary Survey

Information collected from 127 respondents out of which 85 (66.93 percent) respondents were male and 42 (33.07 percent) respondents were female member, which include both flower growers and sellers. Community here means the social division of the people on the basis of caste. As table above shows that 35 (27.56 percent) respondents were general, 38 (29.92 percent) were ST, 6 (4.72 percent) were SC and 48 (37.8 percent) were OBC.

In addition to these, study sampled include the respondent with minimum age of 23 years to maximum 70 years of age, in which 42.9 years was average years of age. Similarly, study gathered the information regarding the year of qualification of sample in which minimum was 2 years and maximum was 15 years of qualified people were engaged in floricultural activity which include cultivation of flower and selling of flowers.

#### **b. Growers Profile**

This segment incorporates the growers' information which were used to understand the grower income from floricultural activity and their experience on commercially cultivation of flower (which includes Rose, Orchid and Gerbera) and the allocated area for flower cultivation by growers.

Table 6: Growers Outline

<b>Indicator</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Indicator</b>	<b>Frequency</b>	<b>Percentage</b>
	<b>(90)</b>			<b>(90)</b>	
<b>Income From Flower (Rs/Month)</b>			<b>Area for Flower Cultivation (Sq. ft)</b>		
<b>0-2000</b>	27	24.1	<b>0-600</b>	1	0.9
<b>2000-4000</b>	32	28.57	<b>600-1200</b>	16	14.28
<b>4000-6000</b>	22	19.64	<b>1200-1800</b>	51	45.55
<b>6000-8000</b>	16	14.28	<b>1800-2400</b>	35	31.25
<b>8000-10000</b>	9	8.05	<b>2400-3000</b>	6	5.34
<b>10000 &amp; above</b>	6	5.36	<b>3000 &amp; above</b>	3	2.68

**Growers' Experience of  
Commercial Flower  
Cultivation (Years)**

<b>0 to 4</b>	41	36.6
<b>4 to 8</b>	43	38.4
<b>8 to 12</b>	27	24.1
<b>12 &amp; above</b>	1	0.9

Source: Primary Survey

This above table indicates that income earned by growers from flower cultivation, in which majority of growers (28.57 percent) earn between Rs. 2000 to Rs. 4000 per month. Even it was found that more than 5 percent growers earn more than Rs. 10000 per month and more than 41 percent of growers earn between Rs. 4000 to Rs. 10000 per month.

Growers' experience was calculated on the basis of the years of growing experience of flower in commercial purpose. In general, each respondents were subsistence farmer or having some other profession but side by side they were also cultivating flower for commercial purpose. Growing experience ranges from 2 years to 12 years and above. Study found average years of growing experience was 4 years.

In addition to these, the above table also infer about the area or land which were allocated by the growers for flower cultivation. It ranges from minimum 600 square feet to maximum 3000 and above square feet. On an average 1595.71 square feet area was used for the commercial floriculture activity out of overall average agricultural land of growers. In this allocated area, cultivation was done in poly houses (popularly known as greenhouses). Majorly, poly houses were provided by Government of Sikkim for the promotion of floriculture activity as an alternative sources of livelihood in hilly state of Sikkim (as shown in picture).



Fig: Greenhouses of Basilakha Village (East Sikkim)

#### **4.2.2 Cost Analysis of Flower Cultivation**

Analysis of costing of any production procedure and its input is important not only for profit motive but also to sustain the particular activity. Here to analyze the cost of cultivation, study initially collected the information regarding expenses on every factor for the their respective area and then total it out all the element respectively and evaluate average of each element by dividing the total number of observation and then it divide all average value of cost for each element by average area (unit in square feet) of cultivation from which it calculated the value/expenses for per square feet. Then, estimated the cost for 1000 sq. ft. per year for cultivation of flower and used as a base information.

Further cost was divided into three parts on the basis of their element on cost A, B and C. Given below the cost estimation of Gerbera, Orchid and Rose cultivation in different places of Himalayan state of Sikkim.

##### **a. Cost Analysis of Gerbera Cultivation**

Gerbera is an important commercial flower grown throughout the world. It was named after German naturalist Traugott Gerber. In Sikkim, production of gerbera is becoming good foundation to begin or to enter into the cultivation of commercial flower because it gives output within after 3 months of plantation and easy for cultivation as per growers' experience. Details cost of gerbera cultivation is given below.

**Table 7: Establishment Cost of Gerbera Cultivation (in Rs.)**

<b>Factor</b>	<b>Per Sq. ft</b>	<b>1000 sqft</b>	<b>Yearly costing</b>
Land Preparation (for 3 years)	4.706609	4700	1566.6
Structure (Green House) (for 8 years)	100	100000	12500
Seeds (plants life 3 years)	13.5577	13550	4516.66

Source: Primary Survey

Establishment cost includes the cost of land preparation, structure making cost i.e. green house shed and seeds, these cost occur only once at the time of establishment, all these were calculated on the basis of growers' expenses. These factors taken separately because these cost were only for once in plants life. So total establishment cost for 1000 sq. ft. was Rs. 118250 only. Last column shows the yearly<sup>13</sup> costing, which was calculated on the basis of growers' information regarding the life of Gerbera plants is 3 years. With this yearly estimate information of establishment cost, others cost i.e. organic manure, organic medicine, irrigation, land rent, interest on capital (for establishment cost @ 10% per year), manpower are produce in below table, which was divided in three part, cost A, cost B and cost C.

---

<sup>13</sup>Gerbera, plants life is 3 years (according to growers). So, land preparation cost and seeds cost (seeds @ Rs. 30 per) was divided by 3 to get yearly costing. For structure (Green House), its life is about 8 years as per gorwers' information so, its cost was divided by 8 for to get yearly cost.

**Table 8: Cost Analysis of Gerbera Production for 1000 sq ft. (in Rs./year)**

<b>Factors</b>	<b>Per Sq. ft</b>	<b>Yearly costing</b>
Land Preparation	4.706609	1566.6
Structure	100	12500
Seeds	13.5577	4516.66
Organic Manure	0.74218	742.1
Organic Medicine	0.660902	660.9
Irrigation	0.526	526
<b>Cost A</b>		20512.26
Land Rent	0.90383	903
Interest on Capital		11825
<b>Cost B</b>		33240.26
Family Labour (manpower)	10.01643	10016
<b>Cost C</b>		43256.26

**Source: Primary Survey**

**Note: Details of cost calculation specifically mention in Annexure G-A.**

Cost analysis of gerbera cultivation prepared on yearly basis. Costing was divided into three parts Cost A include the land preparation, structure making, seeds purchasing, organic manure, organic medicine and irrigation which was about Rs. 20,512.26. Cost B (Rs. 33240.26) includes cost A and the land rent, which was realized by land owner cum growers if he/she allot same plot of land to others and interest of capital spend @ of 10 percent. Cost C include cost B and imputed value of family labour as manpower, as study found that majority of growers they themselves work on field for cultivation. So at all cost of gerbera production was Rs. 43256.26 per year for 1000 sq. ft. area.

## b. Cost Analysis of Orchid Cultivation

Orchid, one of the most prominent flower of Himalayan state of Sikkim. Of the total 1229 orchid species estimated in the country, Sikkim alone harbours 523 species and is only next to Arunachal Pradesh having 620 species. But, when land to species ratio is considered, Sikkim perhaps is the world's richest orchid diversity hot spot according to Sudhizong<sup>14</sup> in his article. It has different varieties, among such Cymbidium Orchid is geographically and commercially viable in this region. That's why growers in this state enthusiastically cultivate Cymbidium Orchid variety.

**Table 9: Establishment Cost of Orchid Production (in Rs.)**

Factor	Per Sq. ft	1000 sqft	Yearly costing
Land Preparation (for 15 years)	10.33	10330	688.6
Structure (for 8 years)	100	100000	12500
Seeds (for 15 years)		73500	4900

Source: Primary Survey

Establishment cost includes the cost of land preparation, structure making cost i.e. green house shed and seeds, these cost occur only once at the time of establishment, all these were calculated on the basis of growers' expenses. So total establishment cost for 1000 sq. ft. was Rs. 183830 only. Last column shows the yearly<sup>15</sup> costing, which was

---

<sup>14</sup> Writer is Retired Director of Forest, Govt. of Sikkim. Access from [http://sikkimforest.gov.in/Reports%20and%20Publications/Biodiveristy-of-Sikkim/7%20ORCHIED\\_125-148%20web.pdf](http://sikkimforest.gov.in/Reports%20and%20Publications/Biodiveristy-of-Sikkim/7%20ORCHIED_125-148%20web.pdf) on 30<sup>th</sup> October 2014.

<sup>15</sup>Orchid, plants life is 15 years on an average as per growers' experience. So, land preparation cost and seeds cost (seeds @ Rs. 50 per) was divided by 15 to get yearly

calculated on the basis of growers' information regarding the life of Orchid (Cymbidium) plants i.e. 15 years. With this yearly costing information of establishment cost, others cost i.e. organic manure, organic medicine, irrigation, land rent, pot, interest on capital (for establishment cost @ 10% per year), manpower were produce in below table, which was divided in three part, cost A, cost B and cost C.

**Table 10: Cost Analysis of Orchid Production for 1000 sq ft. (in Rs./year)**

<b>Factor</b>	<b>Per Sq. ft</b>	<b>Yearly costing</b>
Land Preparation	10.33	688.6
Green House Structure	100	12500
Seeds		4900
Organic Manure	7.31	7310
Organic Medicine	0.83	830
Irrigation	0.68	680
Pot		2450
<b>Cost A</b>		29358.6
Land Rent	1.28	1280
Interest on Capital		18383
<b>Cost B</b>		49021.6
Family Labour/Manpower	16.38	16380
<b>Cost C</b>		65401.6

**Source: Primary Survey**

**Note: Details of cost estimation is in annexure O-A**

---

*costing. For structure (Green House), its life is about 8 years as per growers' information so, its cost was divided by 8 for to get yearly cost.*

Cost analysis of orchid cultivation prepared on yearly basis. Costing was divided into three parts Cost A include the land preparation, structure making, seeds purchasing, organic manure, organic medicine and irrigation and pot which was about Rs. 29358.6. Cost B (Rs.49021.6) includes the land rent, which was realized by land owner cum growers if he/she allot same plot of land to others and interest on capital spend (establishment cost) on starting @ of 10 percent. Cost C include all above cost and imputed value of family labour, majority of growers themselves work on field of cultivation. So at all cost of orchid production was Rs. 65401.6 per year per 1000 sq. ft. area.

### c. Cost Analysis of Rose Cultivation

Rose is known as flower of friendship and king of flower. It is associated with mankind since time immemorial. In India, several species of wild rose are mostly grown in the Himalayas ranges. The Mughal Samrat Babar introduced the Persian or Denmark rose (*Rosa damascene*) in India during 1526. The Scented rose (*Rose barbouniana*) was introduced in 1840 during the British rule. These two species of rose are scented and are cultivated in India to a large extent (Bahirat and Jadhav; 2011). Rose, one of the universally commercialize flower having major share in market of flower. Given below the cost of production of rose in Sikkim.

Table 11: Establishment Cost of Rose Cultivation (in Rs.)

Factor	Per Sq. ft	1000 sqft	Yearly costing
Land Preparation (for 8 years)	2.55	2550	318.75
Structure (for 8 years)	100	100000	12500
Seeds (for 8 years)	36.6	36600	4575

Source: Primary survey

Establishment cost includes the cost of land preparation, structure making cost i.e. green house shed and seeds, these cost occur only once at the time of establishment, all these were calculated on the basis of growers' expenses. So total establishment cost for 1000 sq. ft. was Rs. 139150 only. Last column shows the yearly<sup>16</sup> costing, which was calculated on the basis of growers' information regarding the life of Rose plants i.e. 8 years. With this yearly costing information of establishment cost, others cost i.e. organic manure, organic medicine, irrigation, land rent, interest on capital (for establishment cost @ 10% per year), manpower were produce in below table, which was divided in three part, cost A, cost B and cost C.

**Table 12: Cost Analysis of Rose Cultivation Yearly (In Rs./ 1000 sqft)**

<b>Factor</b>	<b>Per Sq. ft</b>	<b>Yearly costing</b>
Land Preparation	2.55	318.75
Structure	100	12500
Seeds	36.6	4575
Organic Manure	0.48	480
Organic Medicine	1.17	1170
Irrigation	0.28	280
<b>Cost A</b>		19323.75
Land Rent	0.58	580
Interest of Capital		13915
<b>Cost B</b>		33818.75
Family Labour/Manpower	5.41	5410
<b>Cost C</b>		39228.75

Source: Primary Survey (Details of Cost estimation is given in annexure R – A.)

<sup>16</sup>Rose, plants life is 8 years on an average as per growers' view. So, land preparation cost and seeds cost (seeds @ Rs. 40 per) was divided by 8 to get yearly costing. For structure (Green House), its life is about 8 years as per growers' information so, its cost was divided by 8 for to get yearly cost.

Cost analysis of rose cultivation prepared on yearly basis. Costing was divided into three parts Cost A include the land preparation, structure making, seeds purchasing, organic manure, organic medicine and irrigation which was about Rs. 19323.75. Cost B (Rs. 33818.75) includes the land rent, which was realized by land owner cum growers if he/she allot same plot of land to others and interest of capital spend (establishment cost) on starting @ of 10 percent. Cost C include all above cost and imputed value of family labour/Manpower. So at all cost of rose production was Rs. 39228.75 per year per 1000 sq. ft. area.

#### 4.2.3 Economics of Flower Cultivation

**Table 13: Cost and Revenue Analysis of Growers (flowering year)**

	<b>Gerbera</b>	<b>Orchid</b>	<b>Rose</b>
<b>Land (Sq. ft)</b>	1000	1000	1000
<b>Output (Sitck)</b>	20780	1470	13800
<b>Cost (Rs.)</b>	43256.26	65401.6	39228.75
<b>Revenue<sup>#</sup> (Rs.)</b>	83120	117600	69000
<b>Net Gain (Rs.)</b>	39863.74	52198.4	29771.25
<b>Break Even Price (Rs.)</b>	2.08	44.49	2.84
<b>Benefit Cost Ratio</b>	1.92	1.79	1.75

**Source: Primary Survey**

**# Revenue estimated with an average price received by the growers @ Rs. 4, Rs. 80 and Rs. 5 to Gerbera, Orchid and Rose respectively.**

This above table infer about the cost, revenue, output, gain and other important indicators of Gerbera, Orchid and Rose cultivation. Estimation of all these based on the land of 1000 square feet area. In 1000 sq. ft area production of gerbera, orchid and rose has been (in numbers) 20780 sticks, 1470 sticks and 13800 sticks respectively in flowering year. Cost includes the preparation of land, seeds, poly house structure and others like use of manure, irrigation, organic medicine, manpower etc on 1000 sq. ft area has highest on

Orchid production then Gerbera and Rose which was about Rs. 65401.6, Rs. 43256.26 and 39228.75 respectively.

Total revenue received by growers by selling their stick of flower were Rs. 83120 (@ Rs. 4), 117600 (@ Rs. 80) and Rs. 69000 (@ Rs. 5) of Gerbera, Orchid and Rose respectively. Net gain has been higher in Orchid cultivation (Rs. 52198.4) followed by Gerbera (Rs. 39863.74) and least beneficial among three flowers was Rose (Rs. 29771.25). Instead of having higher cost of cultivation of Orchid, its net gain was higher than other flowers (Gerbera and Rose) due to its higher price in market, it may be because of its long life feature. In addition to this, grower felt that due to climatic suitability and other natural advantage orchid grown in Sikkim has unique feature than orchid grown in other part of nation.

#### **a. Analysis of Break Even Price and BC Ratio of Flowers**

From the table above, study can refer the break-even price and BC ratio of flower cultivation. Here break-even price, as mentioned in methodology part, try to showcase the price at which cost of production retain, so that grower reached in point where he/she should face no profit no loss situation. In this context, break-even price for Gerbera was estimated Rs. 2.08, (it was calculated on the basis of costs divided by yield or output i.e.  $\text{Rs. } 43256.26 / 20780$  it resulted to Rs. 2.08). Similarly, break even prices of other flower were Rs. 44.49 and Rs. 2.84 of Orchid and Rose respectively. This indicates that if growers sells their flower at this price then they will earn neither profit nor loss and if they sell it in higher than this price level then they earn supernormal profit and if it sell below this level they will face loss.

BC ratio of flowers, which was calculated on the basis of revenue per cost (i.e. revenue/cost). By using this mechanism, it was try to generate the idea whether cultivation of flower was beneficial or not, it state that if the value of BC ratio is more than 1, then it is considered as economical. Accordingly, study estimated the value of BC ratio for each flower which was resulted as 1.92, 1.79 and 1.75 to Gerbera, Orchid and Rose respectively. It indicate that benefit cost been highest for Gerbera followed by Orchid and Rose.

**b. Net Present Value Analyses of Gerbera Cultivation**

Table 14: Estimation of NPV of Gerbera Cultivation (in Rs.)

Year	Cost	Return	Net annual cash
0	118250	0	-118250
1	24673	70131	45458
2	27140.3	83120	55979.7
3	29854.33	91432	61577.67
			44765.37

Note: Details of calculation is given in annexure G - B

It was found that Net present value of gerbera production in its life span wasRs. 44765.37. This shows that it has good prospect for the farmers in Sikkim.

**c. NPV analysis of Orchid Cultivation**

Table15 : NPV Analysis of Orchid Cultivation

Year	Cost	Return	Net Return
0	183830	0	-183830
1	47313	0	-47313
2	52044.3	0	-52044.3
3	57248.73	0	-57248.73
4	62973.60	117600	54626.4
5	69270.96	129360	60089.04
6	76198.06	142296	66097.94
7	83817.86	156525.6	72707.74
8	92199.65	172177.56	79977.91
9	101419.61	189395.32	87975.71
10	111561.57	208334.85	96773.28
11	122717.73	218751.59	96033.86

12	134989.5	229689.17	94699.67
13	148488.45	241173.63	92685.18
14	163337.29	253232.31	89895.02
15	179671.02	265893.92	86222.9
			637348.62

*Details of yearly cost is given in Annexure O-B*

This above table infer that after the cultivation of orchid of about 15 years it generate value Rs. 637348.62 on the basis of present value. This indicate it has good prospect.

#### **d. NPV Analysis of Rose Cultivation**

**Table 16: NPV Analysis of Rose Cultivation (in Rs.)**

<b>Year</b>	<b>Cost</b>	<b>Return</b>	<b>Net Return</b>
0	139150	0	-139150
1	21835	13872	-7963
2	24018.5	69000	44981.5
3	26420.35	75900	49479.65
4	29062.38	83490	54427.62
5	31968.62	91839	59870.38
6	35165.48	96430.95	61265.47
7	38682.03	101252.5	62570.47
8	42550.23	106315.12	63764.89
			249246.98

*Details of cost estimation is given in annexure R - B*

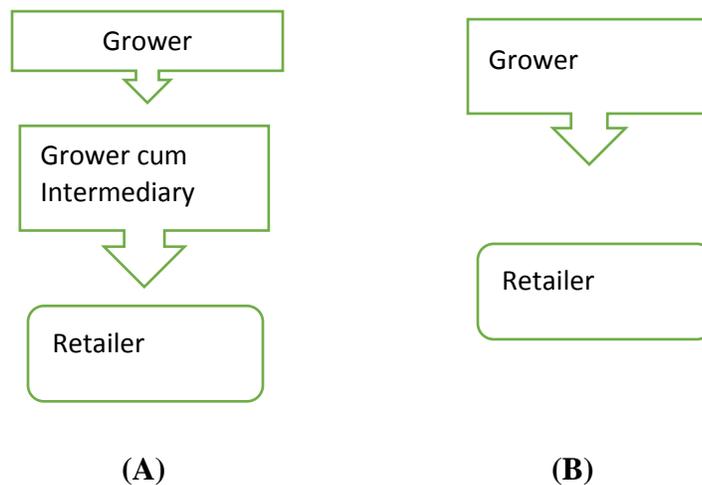
It was found on the calculation of NPV of rose cultivation whose average life span was about 8 years was that Rs. 249246.98. As like to other flower above, rose also has good economic prospect of cultivation.

#### 4.2.4 Marketing Analysis of Flower

Marketing system is defined as an institution whose role is to execute all activities involved in flow of goods/product from its origin to ultimate consumer of the product. It should be efficient for proper functioning of market. Kumar et al. (2014) asserted that in efficient marketing system, both producer and consumer derive satisfaction and receive remunerative price in relation to the amount invested and physical labour exerted. They continually argued that in reality, these two counter parts are severely affected as consumers have to pay hefty price for the commodity which he/she has to buy and producer receives less margin of profit for the product he has produced. Even it is argued that involvement of intermediaries in the marketing chain is detrimental to the interests of both producers and consumers.

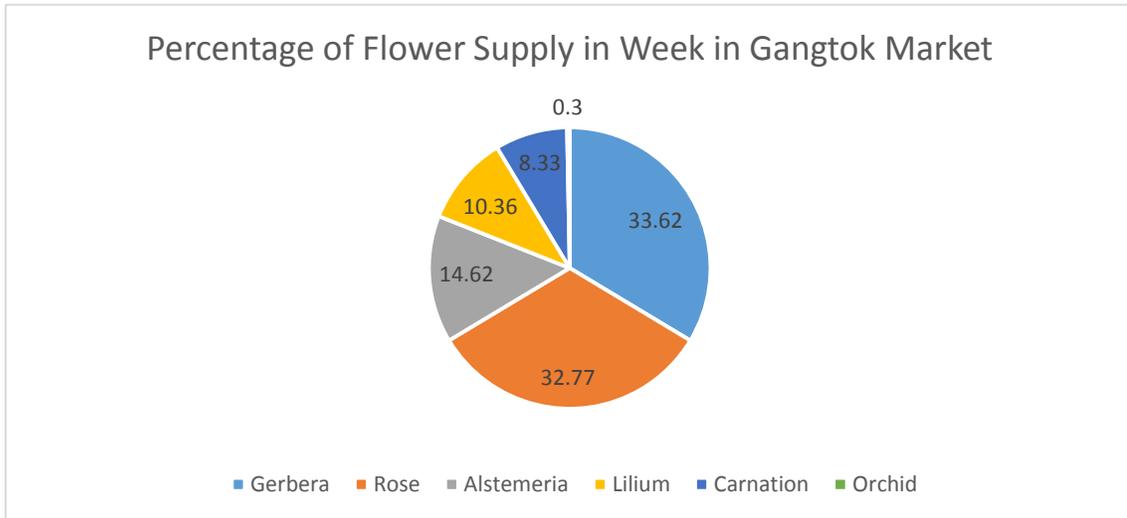
Marketing chain of flower market in Sikkim was yet to be simple in which study hardly found any intermediaries and it has directly connection between growers and retailers (in fig. B). In case of intermediaries (in fig. A), he/she was also a grower who had having contact with retailers used to collect flower from growers of own or neighboring villages and supply it to retailers, this means whoever collect the flower for marketing, who was also a growers cum intermediaries, as per field observation

Fig 3: Supply Chain of Flower within Sikkim



**a. Supply of Flower in Gangtok Market**

**Fig. 4: Proportion of Weekly Supply of Flower in Gangtok Market**



Source: Primary Survey, 2014

Gangtok market, which is major market for the floral in Sikkim. Due to its political feature i.e. capital of state and one of the big market in Sikkim. Above figure revealed that Gerbera and Rose has major share in floral market (weekly supply) followed by Alstemeria by 33.62 percent, 32.77 percent and 14.62 percent respectively and then others.

**b. Revenue Collection by Sample Retailer**

It was estimated that sales revenue of flower (all the flower which were sold in market i.e. Gerbera, Orchid, Rose, Alstemeria, Lilium and Carnation) seller generated in Gangtok market in daily basis was approximately Rs. 43,056 and in Namchi is Rs. 7482 and road side sells especially in two villages viz. Seemkharka and Jaubari of south Sikkim was Rs. 8690. This was calculated on the basis of rational method i.e. collected maximum and minimum sales revenue on daily basis over the year and addition to these to get more reliable value even collected the value of sales revenue of previous day of interview date, then estimate the average of these value. On this basis, over the year value of flower business of Gangtok, Namchi and road side sells was estimated about Rs. 21322080 (excluding the value of export i.e. supply outside the state and the sales value of weekly market selling by grower themselves).

Table 17: Sales Revenue of Flower Retailer of Sikkim Market (In Rs.)

	Gangtok	Namchi	Road Side	Total
Revenue (per day)	43056	7482	8690	59228
Monthly Revenue	1291680	224460	260700	1776840
Yearly Revenue	15500160	2693520	3128400	21322080

Source: Primary Survey, 2014

In Gangtok, floral retailer sell their product under the corner of public stairs (in Hospital Dara) and some of the seller put their product outlet in narrow place on the way to Lal Bazar of Gangtok. In Namchi, floral seller puts their outlet in middle of the market on the shed of big tree. In both the market sellers lack the basic facility and even the cold storage which is important to perishable product. Yet, the market of floral is increasing just need is to supply of quality product from growers and other infrastructural support from state authority.

### c. Marketing Cost of Flower

Table 18: Average Marketing Cost of Various Flowers in Namchi and Gangtok Market (Rs./100 stick)

Cost Component	Gerbera	Rose	Alstemeria	Lilium	Carnation	Orchid
Transportation (for 100 sticks)	50	50	50	50	50	50
Labour (for 100 sticks)	30	30	30	30	30	30
Sorting and Packaging (for 100 sticks)	45	45	45	55	45	150
Miscellaneous	20	20	20	25	20	50

(Water, Electricity, Cleaning, Rent etc) (for 100 sticks)						
Total Marketing Cost (for 100 Stick)	145	145	145	160	145	280
Average Marketing Cost	1.45	1.45	1.45	1.6	1.45	2.8

Source: Primary Survey

It was found that in the flower market of Sikkim the cost of marketing for Gerbera, Rose, Alstemeria and Carnation was similar i.e. Rs. 1.45 per stick of flower. It may be because of process of caring and lasting of flower for sales in shop was averagely 4 days. But for Liliium it was Rs. 1.6 per stick and for orchid it was estimated Rs. 2.8 per stick due to its long lasting feature.

#### d. Marketing Margin of Flower

It is defined as difference between retail price and summation of marketing cost and farm get price of a product. Technique used for analyzing marketing margin was

Marketing Margin = Average Retail Price – Farm get Price – Average Marketing Cost

Table 19: Analysis of Marketing Margin of Flower

Flowers	Average Retail Price	Average Farm get Price	Average Marketing Cost	Marketing Margin
Gerbera	10	4	1.45	4.55
Rose	10	5	1.45	3.55
Alstemeria	8	3.5	1.45	3.05
Liliium	25	15	1.6	8.4
Carnation	15	8	1.45	5.55
Orchid	100	80	2.8	17.2

It was established that marketing margin of flower was different of respective flower. For Gerbera and Rose was Rs. 4.55 per stick and Rs. 3.55 respectively, and for Alstemeria was Rs. 3.05 per stick of flower. Marketing margin of Liliium, Carnation and Orchid was about Rs. 8.4, Rs. 5.55 and Rs. 17.2 per stick of flower.

#### 4.2.5 Growers Share on Retail Price

Grower share on retail price is defined as the price received by growers as percentage of consumer's paid or retail price. This is very helpful in deciding the appropriate strategies for reducing the market costs and to balance the price of producer and consumer (Jagtap et al. 2014).

**Table 20: Growers' Share in Consumer's Rupee**

Flowers	Average Retail Price	Average price paid to Grower	Share of Producer (in %)
Gerbera	10	4	40
Rose	10	5	50
Alstemeria	8	3.5	43.75
Liliium	25	15	60
Carnation	15	8	53.4
Orchid	100	80	80

Above table revealed that Orchid followed by Liliium and Carnation producer gets more than 50 percent share of consumer price. Other Gerbera, Rose and Alstemeria has 40, 50 and 43.75 percent gets share by producer respectively.

#### 4.2.6 Problems faced by Grower and Retailer of Flower

Major resistance on this profession was marketing as shown in table below about 64.3 percent of grower and retailer complain about the problem of marketing, which includes supply chain, low market price and market infrastructure. Main market for flower within state was Gangtok and Namchi and to an extent road side outlet in village area especially in South district of Sikkim. There was no full fledged provision for marketing outside the Sikkim. Sikkim Marketing Federation (SIMFED), is an apex body of Government of Sikkim basically for agricultural product marketing but grower couldn't able to use this existing organization to optimize the marketing facility. It may be because of the deficiency of SIMFED action and their management scale or it don't want to take the risk of perishable product (i.e. Flower) due to lack of infrastructural facility like cold storage and other upgraded technology for flower.

**Table 5.17: Major Problem faced by Growers and Retailers**

Problems	No. of Respondents (total 127)	Percentage
<b>Marketing Problems</b>		
Inadequate supply chain	110	86.6
Low Market Price	78	61.1
Lack of Marketing Infrastructure	56	44.4
<b>Technical Problems</b>		
Lack of proper extension services	114	90
Lack of financial assistance	116	91.1
<b>Infrastructure Problems</b>		
Cold Storage	106	83.3
Less Qualitative Green House plastic and packaging centers	92	72.2

**Source: Primary Survey**

Another resistance was technical problems which includes lack of proper extension services and lack of proper financial assistance. Similarly, another major problems was infrastructure problems which includes cold storage and low quality of greenhouse shed and packaging centers.

In addition to this retailers has grievances that due to cultivation of new flowers, majority of growers shows less interest on traditional flower cultivation which has traditional and cultural values for hills people like *Saipatri* and *Makhmali*(in Nepali), at present demand of this traditional flower in hills are full filled from others state market especially from Silliguri market of West Bengal (which is major market for Sikkim and Darjeeling). So, some of the growers and retailers suggested that, government should take some step and guide the growers to cultivate traditionally valued flowers as well.

## CHAPTER 6

### SUMMARY, RECOMMENDATIONS AND CONCLUSION

#### 6.1 Summary

Flowers are indivisibly related to human life throughout the universe from immemorial. In present era of globalization its significance is not only confined to social, cultural, religious and aesthetic but also to economic avenue for the people to sustain their livelihood. Floriculture Industry in Sikkim demonstrate great potential for development.

This industry offers new source of livelihood that's why it has socio-cultural and economic importance. Till date to a large extent this industry has been traditionally organized by local farmers, in exceptionally varied ecological and economic conditions. Still, local initiatives and governmental development contribution did not give enough worthy result due to poor infrastructural and management mechanism.

This study on Economics of floriculture industry in Sikkim was intended to produce the basic information regarding the economics of floricultural activity which is expanding up in hilly states of Sikkim. Study proceed with the following objective

- To study the prospect of floriculture in Sikkim
- To examine production cost of flowers viz. Gerbera, Rose and Orchid.
- To explore the ways and means to improvement of floriculture industry of Sikkim.

The study begins with comprehensive introduction, which throws the light over the floriculture scenario in world and narrow down to nation and then to region to state. In addition to this, it contains the statement of problem, objective of study and research question.

It was an intensive study undertaken in three district of Sikkim East, South and West. In East district two main villages for Orchid and Gerbera cultivation i.e. Assamlingzey and Basilakha and for marketing aspect Gangtok, state capital, was visited. In district of south researcher collected the information for road side marketing from two villages Simkharka and Jaubari and Namchimarket which is district headquarter of South. From West district,

researcher selected one famous village in terms of floriculture development especially for Rose cultivation i.e. Daramdin. These selection of study area was based on preliminary information from Horticulture department of Sikkim and researchers' pilot visit of different part of Sikkim and then selected that major villages for production of Orchid, Gerbera and Rose on cluster based. In last, collected details information of these selected villages for respective flowers. In addition to grower, marketing information also gather from different area with in Sikkim. Total sample for the thesis preparation was about 127.

### Prospect

- As a tiny Himalayan state, it has a comparative advantage in terms of rich natural resource and varieties of indigenous flowering species.
- Even, Sikkim has historical advantage in terms of floriculture development. It already has good prospect in international market.
- Geographically it has congenial environment for the cultivation of varieties of flower.
- Governmental positive approach towards making it as alternative sources of livelihood for conventional farmer.
- Organic mission of state government has great prospect for the future market of floriculture where consciousness of ill effect of inorganic product is on the process of emerging.
- For the marketing development, Sikkim has existing marketing association viz. SIMFED, DACS, NERMAC.
- It is observed that there are visible shifts from traditional flower to cut flowers for marketing purposes.
- Corporate involvement for the production of flower in Sikkim in joint venture with government of Sikkim like Bangalore based company Florence Flora for Anthurium production and Netsin Flora for orchid cultivation. In addition to this promotion of tourism led to throw light on floricultural development.

All the above factors suggest that for floriculture development, Sikkim has positive prospect.

## Cost

- Cost of cultivation of Gerbera in 1000 square feet area was Rs. 43256.26 in main flowering season. Its cultivation benefit cost ratio was about 1.92.
- Cost of cultivation of Orchid in 1000 square feet area was Rs. 65401.6 in main flowering season. Its cultivation benefit cost ratio was about 1.79.
- Cost of cultivation of rose in 1000 square feet area was Rs. 39228.75 in main flowering season. Its cultivation benefit cost ratio was about 1.75.
- Growers' revenue generation from flower cultivation was also shows good prospect. Value of NPV was estimated about Rs. 44765.37, Rs. 637348.62 and Rs. 249246.98 of Gerbera, Orchid and Rose cultivation respectively in their plants life, which indicates the economic benefit of flower cultivation in Sikkim.

## Marketing

- Sikkim has good potential to trade it's floral outside the state as it was found that 120000 stems of orchid, 110000 stems of anthurium, 1200000 stick of gerbera, 50000 sticks of carnation and alstrameria was supply averagely outside the Sikkim in yearly basis from different sources.
- Marketing channel of Sikkim is not rigid, it depend on villages to villages, in most of the villages one among the grower used to collect the flower and supply it to market.
- By marketing of flower, as sampled infer, yearly Rs. 2,13,22,080 was generated as revenue with in Sikkim (it includes Gangtok, Namchi and two road side retail outlet i.e. Simkharka and Jaubari of south district of Sikkim).
- Grower share on consumer rupee differ in flower, Liliium, Carnation and Orchid growers receive more than 50 percent of consumer rupee but Gerbera, Rose and Alstemeria growers receive less than 50 percent share of consumer rupee.
- Growers and retailers face many problem such as marketing problem in which lack of marketing infrastructure, lack of proper supply chain and technical problem such as lack of proper extension service and inadequate infrastructure facility like cold storage and packaging centers.

## 6.2 Recommendation

The researcher after going deep into the various aspect of commercial flower cultivation and its marketing wishes to make the some of the suggestion for giving consideration and timely implementation.

- Tourism promotion through green or floriculture industry with its unique mission to make state organic.
- However with the development of new floral in Himalayan state, it should not replace the aesthetic and cultural value of *Saipatri* and *Makhamali*, for this government need to develop new scheme with in state for its promotion as per of growers and retailers suggestion.
- For to introduce the new and innovative methods in the production and marketing of flowers to boost the net gains from floriculture to state economy, government should take step for more Public Private People Partnership (PPPP) than Public Private Partnership (PPP).
- Aesthetic value only one can enjoy when he/she is enough food for fill up his/her empty stomach. So, farmers need to encourage this (floriculture) livelihood without hampering the activity of food production.
- For future development, open auction system must be introduced in the flower market of Sikkim for the nationwide participation for purchase and selling of flowers.
- Self Help Group or growers organization needs to arrange for production and marketing as what study found in Daramdin, West Sikkim and its success.
- Instead of having existing marketing association or corporative, the major role for floral marketing play by individual retailers. But for them, government response was less which demoralizing the willingness to continue the retail outlet of floral in Gangtok and Namchi market. So state authority need to provide adequate assistance i.e. financial subsidy, hands training on upgraded techniques of packaging and others.
- Attention need to be given for providing the proper manage marketing stall for flower seller. Till date flower seller adjust themselves in unshaded area. So,

government/market should allocate a place having all such facility which is required to seller.

- Adequate financial assistance to both growers and sellers.
- Proper management of data source of agriculture (especially floriculture) for the further research is essential.

### **6.3 Conclusions**

Due to limited availability of literature in this context this research work is considered to be explorative in nature. Floral eco system of Sikkim is quite unique and it should be treated as reward of landscape. It is essential to develop this Himalayan state as an especial zone for floriculture by utilizing its natural advantage. With governmental support and their scheme growers are enthusiastically involved in this agricultural activity but for sustaining this enthusiast need to develop accessible supply chain for proper management for produced flower to reach in the hand of consumer with less post harvesting loss.

From this study, researcher would like to take reservation to state that this venture of livelihood is an economically profitable, financially feasible and socially acceptable business of growers in Sikkim. The researcher even reserve the rights to express optimistic prospect that this research work would offer adequate nutrition for thought to innovative researches and help to give the idea about to sustaining this floricultural activity in Himalayan state as good source of livelihood to farmers without the hampering the nature because flower cultivation is environmental and sustainable activity.

#### **6.4 Suggested Area for Future Research**

1. Intensive study need to be done especially for prospect of floriculture development and organic mission of Sikkim.
2. Details study of marketing chain for floral within state and outside the state.
3. Study need to be taken about the government initiative and progress of floriculture in grassroot level.
4. Explorative study can be conducted regarding food sufficiency of state and floral development.
5. Case studies on success stories for maintaining sustainable livelihood by cultivating flower for its promotion in Himalayan state.

## BIBLIOGRAPHY

Annual Report (2010-11), "Horticulture Mission for North East and Himalayan States", Small Farmer's Agribusiness Consortium, New Delhi, from Horticulture Department of Sikkim.

Annual Report 2011-12 Department of Horticulture, Govt. of Sikkim.

Bahirat, J.B. and Jadhav, H.G. (2011). 'To study the cost, returns and profitability of rose production in Satara district, Maharashtra'. *Asian Journal of Horticulture*, 6 (2) : 313-315.

Banaeian N. and Zangeneh M. (2011). 'Estimating Production Function of Walnut Production in Iran Using Cobb-Douglas Method'. *Agriculture Tropica ET Subtropica*, Vol 44 (4).

Baourakis, G. Marko, M. Tsakiridou, E. & Tzimitra-Kalogianni, I. (2001). 'The Floriculture Market and its Relation to Consumer Behaviour: a Greek Perspective'. *Agriculture Economics Review*, Vol.2, No.1, January 2001.

Bawa, S. Kamaljit (2010). 'Our Biodiversity, Our Life, Our Future: What can arrest the steady decline of our ecosystems?'. *The Hindu, Survey of the Environment*, 2010.

Behari, O.P. (1993). 'Marketing of cut flowers in India: An Overview'. *Agriculture Marketing*. 36:1, pp. 6-22.

Belwal, R. and Chala, M. (2008). 'Catalysts and Barriers to Cut Flower Export: A case study of Ethiopian Floriculture Industry'. *International Journal of Emerging Markets*. Vol. 3 Issue: 2, pp. 216-235.

Besemer, Seward.T. (1966). 'An Economic Analysis of the Carnation Industry in the United States'. In partial fulfillment of the requirements for the Degree of Master of Science Colorado State University Fort Collins, Colorado August, 1966.

Bhattarchayya, Ruma. (2013). 'Cut Flower Production: A Source of Incremental Income for the Marginal Farmers of the State of West Bengal in India'. *World Academy of Science, Engineering and Technology*, vol:7 -06-23.

Bhutia, D.T., Gupta, R.K. and Biswas, A.K. (1985). 'Soil Bulletin on Fertility status of soils of Sikkim'. Department of Agriculture, Govt. of Sikkim, KrishiBhawan, Tadong, Gangtok.

Bose, T.K., Yadav, L.P., Pal, P., Parthasarathy, V.A. & Das, P. (2003). *Commercial Flowers*. 2<sup>nd</sup> revised edition, volumn 1 & 2, published by PS BasuNayaUdyog, Kolkata.

Boshalay, J. (2007), "Sikkim in talks with foreign players for Floriculture Hubs", *TNN* November 6, 2007, <http://articles.economicstimes.indiatimes.com/> retrieve in 20 March, 2014.

Bowler, I.R. (1981). 'Some Characteristics of an Innovative Form of Agriculture Marketing'. Published by Royal Geographical Societies Vol. 13, No. 4 (1981), pp. 307-314

Choudhury, M. (1998). 'An outline of the physical geography of Sikkim', pp 17-23. In S.C. Rai, R.C. Sundriyaland E. Sharma (eds.) *Sikkim: Perspectives for Planning and Development*. Bishensingh Mahendra Pal Singh, Dehra Dun, India.

Crawford, I.M. (1997). 'Agriculture and Food Marketing Management', FAO Corporate Documentary Repository, ISBN 92-5-103904-6.

Dadlini, Narendra. 'Cut Flower Industry in India'. Access from <http://www.fao.org/docrep/005/ac452e/ac452e04.htm> on 24th March, 2014.

Gangwar, L.S., Singh, Dinesh. Mandal, Goutam (2008), "Economic Evaluation of Peach Cultivation in North Indian Plains", *Agriculture Economics Research Review*, Vol. 21, pp 123-129.

Gebreeyesus, M & Sonobe, T (2009), "Governance of global value chain and firms' capability in African floriculture", 1<sup>st</sup> Draft. [www.merit.unu.edu/MEIDE/papers/2009/1235983352\\_MG.pdf](http://www.merit.unu.edu/MEIDE/papers/2009/1235983352_MG.pdf) retrieve on 15 April 2014.

Getu, M. (2009). 'Ethiopian Floriculture and its Impact on the Environment'. Vol.3, No 2. Available: <http://www.ajol.info/index.php/mlr/article/viewFile/54011/42554> [2011-04-28] Retrieve in 30 October, 2014.

Gowda, M.V. Srinivasa (2009). 'Hi-Tech Floriculture in Karnataka'. Occasional Paper 49, Department of Economic Analysis and Research and NABARD, Mumbai 2009. Access from <https://www.nabard.org/pdf/Hi-Tech%20Floriculture.pdf> on 23<sup>rd</sup> August 2014.

Gudeta, Degtynu Tilahun (2011-12), "Socio-Economic and Environmental Impact of Floriculture Industry in Ethiopia", Thesis submitted in partial fulfilment of the requirements for the joint academic degree of International Master of Science in Rural Development from Ghent University (Belgium), Agrocampus Ovest (France), Humboldt University of Berlin (Germany), Slovak University of Agriculture in Nitra (Slovakia) and

University of Pisa (Italy) in collaboration with Wageningen University (The Netherlands).

Gulia, Kuldip.Singh. (2005). 'Human Ecology of Sikkim; A Case Study of Upper Rangit Basin'. Kalpaz Publication, New Delhi.

Hanafi, Y. S, (2012), "Ecology and Agriculture in the Himalayan Region". Concept Publishing Company Pvt. Ltd., New Delhi, India.

Humphrey, J. (2006). 'Horticulture: Responding to challenges of poverty reduction and global competition'. *Acta Hort.* 69: 19–38. Access from [http://www.actahort.org/books/699/699\\_1.htm](http://www.actahort.org/books/699/699_1.htm) on 25 June, 2014.

Jagtap, P.P., Mhaisdhune, S.H. and Shingane, U.S. (2014). 'Price Spread of Dry Chilli (*CapiscumAnnuam L.*) In Amravati Distict (Maharashtra)'. Research Note. *Indian Journalof Agricultural Marketing*, Vol. 28, No..1.

Joaque, Zainab (2011). 'Agriculture: A prospect to economic development. International Conference on Innovations in Extension and Advisory Services'. Access from <http://extensionconference2011.cta.int/node/660> on 28th July 2014.

Kadam, P.H. (2012). 'An Economic study of floriculture in Pune'. Synopsis submitted to Tilak Maharashtra Vidyapeeth, Pune for the degree of doctor of philosophy [PhD] in economics under the guidance of Dr. Praveen Jhadav, HoD of Economics.

Kargbo, Abu. Mao, Jing. & Wang, Cai-yun (2010). 'The Progress and issues in the Dutch, Chinese and Kenyan floriculture industries'. *African Journal of Biotechnology* vol. 9(44), pp.7401-7408.

Kotler, P. (1984). 'Marketing Management: Analysis, Planning and Control'. 5<sup>th</sup> edition, Prentice Hall, ISBN 10: 0135579279 .

Kumar, Brijesh. Prakash, Swadesh, Kumar, N.R., Sharma, Rama. And Das, Apu. (2014). 'Marketing Process, Costs, Margins and Price Spread of Fish in Bharatpur District of Rajasthan'. *Indian Journal of Agricultural Marketing*, Vol. 28 NO.1.

Labaste, P. (2005). 'The European horticulture market: Opportunities for Sub- Saharan African Exporters'. Working Paper No. 63, The World Bank, Washington.

Laine, Nicolas &Subba, T.B. (2012). 'Nature, Environment and Society: Conservation, Governance and Transformation in India'. Orient BlackSwan Pvt. Ltd. Hyderabad, India.

Lama, Mahendra.P., et al. (2004). Sikkim Study Series; Geography & Environment Vol-1. Authored by KC Pradhan, Eklabya Sharma, Gopal Pradhan and AB Chettri. Published by Information and Public Relations Department, Government of Sikkim, Gangtok.

Lawal-Muhammad, A., Adenuga, A.H., Olatinwo, K. B. and Saadu, T.A. (2012). 'Economic Analysis of Floricultural Plants Production in Kwara State, North Central Nigeria'. Asian Economic and Social Society, Volumn 2 No. 3 September 2012.

Lehman, D.R. (1989). 'Market Research and Analysis'. 3rd edition, R. R. Donnelley and Sons Company, Boston.

Lucksome, Sudhizong. 'The Orchid Diversity in Sikkim and Effect of Change of Environment on the Distribution of Native Orchids in Sikkim Himalaya, India. [http://sikkimforest.gov.in/Reports%20and%20Publications/Biodiveristy-of-Sikkim/7%20ORCHIED\\_125-148%20web.pdf](http://sikkimforest.gov.in/Reports%20and%20Publications/Biodiveristy-of-Sikkim/7%20ORCHIED_125-148%20web.pdf) access on 24<sup>th</sup> November 2014.

L B Sons and Nursery (2010)

<http://darjeelintimes.com/archive/opinions/social/1655-l-b-pradhan-a-sons-nurserymen.html> Retrieve in 20 December, 2014

Manzoor, R. Shahid, Shaukat Ali. Baluch, Mazhar-Ul-Haq.(2001), 'Economics of floriculture in Pakistan: A Case Study of Lahore Market'. *Pakistan Economic and Social Review* Volume XXXIX, No. 2 (Winter 2001), pp. 87-102.

Majumdar, Sujata. & Lahiri, Debabrata. 'Cost-Benefit and Sensitivity Analysis of Cut Flower Roses and Comparison with other Floriculture Crops'. Access from <http://eands.dacnet.nic.in/Publication12-12-2012/1486-feb12/1486-1.pdf> on 28th November, 2014.

Mathur, Rossy. & Pachpande, Priti. 'Floriculture-Prospects and Opportunities'. ASM's *International E-Journal of Ongoing Research in Management and IT*, e-ISSN-2320-0065.

Mishra, A.K. & Misra, J.P. (2008). 'Quest for Resource Sustainable and Economically Highly Remunerative Alternatives to Agriculture Development in North Eastern Region of India'. In Edited book 'Agriculture Development in North-East India; Issues and Options' by K.K. Bagchi in Abhijeet Publication, Delhi.

Misra, Prachi Raturi (2013). 'Blooming Glory'. The *Political and Economic Journal of Sikkim*, vol. 1 Issue 5.

Mou, N.H. (2012). 'Profitability of flower Production and Marketing System of Bangladesh'. *Bangladesh J. Agril. Res.* 37(1): 77-95, March 2012

Murray, E.V. & Rao, K.R.P (2006). 'Export Opportunities for Indian Floriculture' access from

<http://cab.org.in/CAB%20Calling%20Content/India's%20Agricural%20Exports%20-%20Opportunities%20and%20Challenges/Exports%20of%20Indian%20Floriculture.pdf> on 11/11/14

Oommen, Annamma . 'Flower Power'. access from

[http://www.ibef.org/download/Floriculture\\_271108.pdf](http://www.ibef.org/download/Floriculture_271108.pdf) on 10th October, 2014

Parvez, Safdar. & Rasmussen, Stephen F. (2004). 'Sustaining mountain economies: Poverty reduction and livelihood opportunities'. Published on Edited book by Price et al. "Key Issues for Mountain Areas" United Nation University Press, Tokyo Japan.

Peter, K.V. ed. (2008). 'Flowers for Trade'. *Horticulture Science Series-10*, New India Publishing Agency, New Delhi.

Prakash, T.N. (2002). 'High Tech Floriculture, Sustainability and Food Security Issues – The Case of Rose Cultivation around Bangalore City', in Vandanasiva and GitanjaliBedi (eds.) *Sustainable Agriculture and Food Security: The Impact of Globalisation*. New Delhi: Sage Publication.

Prasad, B.V.S. & Kapoor, Srikant ed. (2008). 'Commercial Floriculture: Global and Indian Dynamics'. The Icfai University Press.

Rao, Radhakrishna (2006). 'Indian Floriculture Industry: Challenges and Opportunities'.

Access from

[http://www.infa.in/index.php?option=com\\_content&task=view&id=626&itemid=42](http://www.infa.in/index.php?option=com_content&task=view&id=626&itemid=42) on 3 May, 2014.

Saha, A. (Deputy Director, DGCI&S) 'Export Growth and Prospect of Floriculture in India'. [http://www.dgciskol.nic.in/vaanijya0907/F%20Exp\\_floriculture.pdf](http://www.dgciskol.nic.in/vaanijya0907/F%20Exp_floriculture.pdf) retrieve on 15 April 2014.

Sarkar, A.N. (1994). 'Integrated Horticulture Development in Eastern Himalayas'. M.D. Publications Pvt. Ltd., New Delhi.

- Sarkar, D. (2013). 'Sikkim foray into global floral market of \$25 billion'. *Economic Times*, 23 Feb, 2013.
- Sen, S., & Raju, S. (2006). 'Globalization and Expanding markets for cut flowers': Who Benefits?'. *Economic & Political Weekly*, Vol. XLI. No. 26
- Shepherd, A.W. (2007). 'A Guide to Marketing Cost and How to Calculate'. Food & Agriculture Organization of the United Nation, Rome.
- Shrestha, Rajiva Shankara. 'Shri Chandra Nursery Centenary' access from [http://www.karunaguthi.com/uploads/4/6/3/1/4631829/the\\_chandra\\_nursery\\_centenary.pdf](http://www.karunaguthi.com/uploads/4/6/3/1/4631829/the_chandra_nursery_centenary.pdf) on 15th September, 2014.
- Shumacher, S.K. & Marsh, T.L. (2002). 'Economics of Scale in Greenhouse Floriculture Industry'. Presented at the 2002 Annual Meeting of the Western Agricultural Economics Association July 28-31, 2002 Long Beach, California
- Sikkim Development Report, 2008.
- Singh, P. and Chauhan, A.S. (1998). 'An overview of plant diversity of Sikkim'. In S.C. Rai, R.C. Sundriyal and E. Sharma (eds.) *Sikkim: Perspective for Planning and Development*. Bishensingh Mahendra Pal Singh, Dehra Dun, India.
- Singh, B (2013). 'Given the rupee fall, Floriculture of Northeast India facing heat over rising cost of imported planting materials', *ET Bureau* Aug 23, 2013. Access from [http://articles.economictimes.indiatimes.com/2013-08-23/news/41440655\\_1\\_import-bill-northeast-india-export-options](http://articles.economictimes.indiatimes.com/2013-08-23/news/41440655_1_import-bill-northeast-india-export-options)
- Srivastav, Nirankar. (2000). 'Survey of Research in Economics on North East India 1970-90'. ICSSR-NER Centre, Shillong.
- Subba, J. R. (2002). 'Biodiversity of The Sikkim Himalayas'. Published by Sukhim Yakthung Mundhum Saplopa Gangtok, Sikkim.
- \_\_\_\_\_. (2008). 'The Evolution of Man and the Modern Society in Mountainous Sikkim'. Gyan Publishing House, New Delhi-110002.

- Thippaiaha, P. (2005). 'Floriculture in Karnataka Performance, Problem and Prospects'. Agricultural Development and Rural Transformation Unit, ISEC, IX/ADRT/105
- Trelogan, Harry.C .and Townshend-Zellner, Norman (1965). 'On Benefits of Agricultural Marketing Research'. *Journal of Farm Economics*, Vol. 47, No. 1 pp. 36-50. Access from Jstor on 07/11/2014.
- Tripathy, A. (2012). 'Indian Floriculture Industry: An Overview'. *Kurukshetra*, Vol.60 No. 9, July 2012 p. 52
- Weddington, M (2003). 'Economic and Cost Analysis of the Floriculture Industry Differentiated by Market Segment'. A Master thesis submitted to Graduate Faculty of North Carolina State University.
- World Bank (2004), "The European horticulture market: opportunities for sub-Saharan African exporters", working paper No. 63, The World Bank, Washington DC.
- Wright, T. A. (2004). 'Flowers and Gardens: A Manuals for Beginners'. Published by Biotech Books, Delhi.
- Usman, Muhammad. Ashfaq, Muhammad. & Ali, Imran. (2013). 'Economic Analysis of Statice Cut-Flower Production in Punjab, Pakistan'. *Pakistan Journal of Agri. Sci.*, Vol. 50(2), 311-315; 2013
- Uva, W.L. (1991). 'An analysis of the economic dimensions of the New York state greenhouse industry'. Res. Bul. 99-08.
- Uva, W.L., & Richards, S. (2003). 'New York greenhouse business summary and financial analysis'. NY Coop. Ext. Bul. 2003-09.
- Yadav, L.P., Dadlani, N.K., Pal, P. and Malik, R.S. (2002). 'Rose' in edited book by Bose, T.K., Yadav, L.P., Pal, P., Parthasarathy, V.A. & Das, P., Commercial Flowers, vol 1 published by NayaProkash, Calcutta.
- Yadav, L.P., Bose, T.K. and Choudhury, T. (2002). 'Orchid', in edited book by Bose, T.K., Yadav, L.P., Pal, P., Parthasarathy, V.A. & Das, P., Commercial Flowers, vol 1 published by NayaProkash, Calcutta.

#### **Article from Internet**

‘Budding entrepreneurs take up floriculture in Sikkim’ (Jan, 2014) Access from <http://www.aninews.in/newsdetail2/story96064/buddingi-entrepreneurs-take-up-floriculture-in-sikkim.html> on 25th March 2014

‘Floriculture can be Big Industry in Sikkim: Chief Minister’ (Dec, 2012). IANS, access from [http://www.daijiworld.com/news/news\\_disp.asp?n\\_id=159518](http://www.daijiworld.com/news/news_disp.asp?n_id=159518) on 22 April, 2014.

‘Floriculture Industry to cross Rs. 8,000 crore by 2015’ (Feb, 2012) PTI. Access from [http://articles.economictimes.indiatimes.com/2012-02-08/news/31037581\\_1\\_floriculture-industry-global-floriculture-flower-industry](http://articles.economictimes.indiatimes.com/2012-02-08/news/31037581_1_floriculture-industry-global-floriculture-flower-industry) on 25 April, 2014.

‘Kalpana Blooms in Sikkim, so does Atal’ (April, 2013). Access from [http://www.telegraphindia.com/1130424/jsp/siliguri/story\\_1681221.jsp#.U1j34PmSwj4](http://www.telegraphindia.com/1130424/jsp/siliguri/story_1681221.jsp#.U1j34PmSwj4) on 23<sup>rd</sup> April, 2014.

## **ANNEXURE**

### **Annexure: G-A**

*Labour (manpower) cost, in general 8 hrs/day wages is Rs. 200, but for gerbera cultivation on an average growers spend 2 hrs a day for cultivation, then it is estimated that Rs. 50 per man days (Rs. 25 for 1 hrs.) for about 2000 sqft area.*

*Organic Manure, it is basically cow dung. 1 doko (bamboo basket) is weightage is approximately 40 kg for Rs. 30/ doko.*

*Land Rent and Irrigation are evaluate on the basis of growers' rough estimation or expenses.*

*Organic Medicine, its cost is purchasing price.*

### **Annexure O - A**

*Labour a days (8 hrs), normal wages is Rs. 200 which is @ Rs. 25/ hrs.*

*For pot, it is consider a polythin/plastic which cost is Rs. 100 per kilo, which contain 60 pieces of plastic. So, it is measured that one pot is for one sapling on that basis its cost is calculated.*

*Manure: It includes wild manure, Bricks, Coal, and Coconut Crush and others for one pot approx. cost is Rs. 5.*

*Land Rent and Irrigation are evaluate on the basis of growers' rough estimation or expenses.*

*Organic Medicine, its cost is purchasing price.*

### **Annexure R – A**

*Note: Labour (manpower) cost, in general 8 hrs/day wages is Rs. 200, but for rose cultivation on an average growers spend 2 hrs a day for cultivation, then it is estimated that Rs. 50 per man days (Rs. 25 for 1 hrs.) for about 2000 sqft area.*

*Organic Manure, it is basically cow dung. 1 doko( bamboo basket) is weightage is approximately 40 kg for Rs. 30/-.*

*Land Rent and Irrigation are evaluate on the basis of growers' rough estimation or expenses.*

*Organic Medicine, its cost is purchasing price.*

### **Annexure: G-B**

*Note: Year zero cost include the cost of preparation of land, constructing structure of green house and purchasing of seeds.*

*From 1<sup>st</sup> onwards to 3 year (life of plant) cost include the cost of labour, organic manure, organic medicine, land rent, irrigation increase by 10 percent per year. Return includes the return after selling the flower stick @ Rs. 4 after 3 months of planting, in 1<sup>st</sup> year.*

*2<sup>nd</sup> Year and 3<sup>rd</sup> year return includes selling of flower stick whole year and return increase by 10 percent in 3<sup>rd</sup> year from 2<sup>nd</sup> year.*

### **Annexure: O - B**

*Note: Year zero cost include the cost of preparation of land, constructing structure of green house and purchasing of seeds.*

*From 1<sup>st</sup> Year onwards till 15 years (life of orchid plants), cost includes the cost of labour, organic manure, organic medicine, land rent, irrigation and pot (plastic) and yearly it increases by 10 percent.. It will take minimum 3 years (depending on care and seeds quality) for flowering. It gives flower once in a year and return include the value after selling the flower stick @ Rs. 80 yearly.*

*Return was calculated increased by 10 percent on preceding year cost after 4 years till 10 years and then increase by 5 percent from 10 to 15 years, due to higher age of plant leads to less return.*

### **Annexure: R – B**

*Note: Year zero cost include the cost of preparation of land, constructing structure of green house and purchasing of seeds.*

*From 1<sup>st</sup> Year onwards till 8<sup>th</sup> year (rose plants life), cost includes the cost of labour, organic manure, organic medicine, land rent, irrigation and it is increased by 10 percent*

*per year.. It will take averagely 8 months (depending on care and seeds quality) for flowering. So in first year, only last 4 month will produce, so to get 4 month production we divided yearly production by 12 month and average value multiplied with 4 (month). Return include the return after selling the flower stick @ Rs.5.*

*Return increased per year by 10 percent of preceding year. After 5 year of production (as per grower experiences) its return decline resulted its return just increase by 5 percent per preceding year.*

## INTERVIEW SCHEDULE

Place:

Flower(s) Grow:

1. Name : \_\_\_\_\_ Age : \_\_\_\_\_ Gender: M/F
2. Community : \_\_\_\_\_ Education level: \_\_\_\_\_ Profession: \_\_\_\_\_
3. No. of family member :
4. How many family member involve in this cultivation:
5. Land Ownership: Personal/Lease/Rented
6. How much land do you have:
7. Since how long you are growing flowers:
8. What encourage you to grow flower commercially?
9. What was your profession prior to this?
10. What is the advantage to do floriculture (like soil, climate and others)?

### **Production**

1. Area : \_\_\_\_\_ (in hectares)
2. Open/Green House cultivation
3. No. of Sapling: (In starting time: \_\_\_\_\_ ) & ( In Present: \_\_\_\_\_ )
4. No. of manpower in a year: \_\_\_\_\_ (If possible, use of labour/500 saplings: \_\_\_\_\_  
Approxly.)
5. Wage per labour: Rs.
6. What manure used for production:
7. Cost of Manure: Rs.
8. Cost of chemical for disease protection:
9. How many year (month) flower takes to grow after sapling day? \_\_\_\_\_.
10. From each plant how many flower (stem) produced in a year? \_\_\_\_\_.
11. What is the period (life span) of plant? \_\_\_\_\_ (in year).
12. In Last production period, how much you produced? \_\_\_\_\_ (in Nos.).
13. Any post-harvest technology used or processed product prior to supply? Yes/NO  
(Explain briefly).
14. Initially to setup field and sapling, how much cost incurred (capital investment)?  
Rs. \_\_\_\_\_
15. For floriculture land, if you rented to others then how much do you expect from farmer  
(in Money term)
16. Total income earn and how much from flower alone..... !

### **Marketing**

1. Marketed at :
2. How you supply product to market? (just like through broker or any other way)
3. If it is supplied directly to market then how much cost incurred? (per 100 stem)
4. Losses at harvesting or difference in no. of stem harvested and packed for market.....

## Prospect & Suggestion

1. Do you get support from Government? Yes/No (What, how.....)
2. Do you want to use new technology to upgrade flower production? Yes/ No (Why.....)
3. Do you ever get training for such technology? ( Where and what..... )
4. What are the hindrances in this profession? (explain briefly related to production, marketing and other aspect)
5. For the improvement of production and marketing what can be done and how?
6. Do you want to continue growing flower? Yes/ No (Justify.....)
7. Whether your children taking interest on your work? Yes/ No (how? .....)
8. Do you want to encourage to your children to carry on this profession? Yes/ No (Why?..)
9. Do you think this profession prosperous for life? Yes/No (Why and How)

## For Sellers

### Market:

1. **Name:** \_\_\_\_\_ Age: \_\_\_\_\_ Gender: Male/Female
2. **Community:** \_\_\_\_\_
3. Since how long you are marketing flowers: \_\_\_\_\_
4. What encourage market this product? \_\_\_\_\_
  
5. Do you have your farm? Yes/No
6. From where and how do you collect flower?
7. Suppose, you receive 100 stem from growers, how many stem you cannot able to sell and it waste? (what are the reason for this)
8. How much do you paid to grower per stem (flower wise)? Rs.
9. How you transport the product from field? (if sellers purchase directly from field)
10. Any Processing done before selling? Yes/No (if yes, What)
11. Selling price/ stem: Rs.
12. What are problems do you face on this profession?
13. Govt. has provided any facility? Yes/No (Mention briefly)
14. What suggestion do you have to improve flower business?

### **Sales Information**

- 1. No. of Flower stem receive daily/weekly. (differently each flower)**
- 2. How many days one flower can put for sale..... ?**
- 3. From received stem, how many flowers (approxly) are wasted or not able to sale.  
(reason for waste of each flower)**
- 4. Maximum no. of sale (each flower)**
- 5. Minimum no. of Sale (each flower)**
- 6. Today's no. of sale (each flower)**
- 7. Peak season and lean season for marketing of flower (Month)**
- 8. How do you store surplus flower?**
- 9. Consumer type and for what purpose people buys ....!**

### **Department Official**

- 1. Cost of greenhouse structure (per sqmtr.)**
- 2. History of floriculture development through govt.**
- 3. From where seeds are import.....**
- 4. Cost of seeds.....**
- 5. Total area for floricultural activity**
- 6. Corporate involvement**
- 7. Future plan**