FLORICULTURE IN NAGALAND: A COMPARATIVE STUDY OF DIMAPUR AND KOHIMA DISTRICTS

BY

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C E R T I F I C A T E

The thesis entitled **"FLORICULTURE IN NAGALAND: A COMPARATIVE STUDY OF DIMAPUR AND KOHIMA DISTRICTS"** submitted by Ms. Khriemenuo Pusa, bearing Registration No. 541/2013 (Dated: 14th June, 2013) embodies the results of investigations carried out by her under my supervision and guidance.

Further, certified that this work has not been submitted for any degree elsewhere and that the candidate has fulfilled all conditions laid down by the University.

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DECLARATION

I, Ms. Khriemenuo Pusa, hereby declare that the subject matter of this thesis is the record of work done by me, that the contents of this thesis did not form basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any research degree in any other University/ Institute.

This is being submitted to Nagaland University for the degree of Doctor of Philosophy in Economics.

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(KHRIEMENUO PUSA)

LIST OF ABBREVIATIONS

AEZs	Agri Export Zones
APEDA	Agricultural and Processed Food Products Export Development Authority
ASSOCHAM	Associated Chambers of Commerce and Industry of India
CAGR	Compounded Annual Growth Rate
FYM	Farm Yard Manure
GDP	Gross Domestic Product
GI	Galvanized Iron
GM	Gross Margin
GOI	Government of India
GR	Gross Return
HA	Hectare
HMNEH	Horticulture Mission for North East and Himalayan States
HS	Harmonized System
KIFA	Kunming International Flower Auction Market
MIDH	Mission for Integrated Development of Horticulture
MT	Metric Tone

m	Meter
mm	Millimeter
m^2	Square Meter
NA	Not Available
NEFA	North East Frontier Agency
NER	North East Region
NHB	National Horticulture Board
NHM	National Horticulture Mission
NSS	National Sample Survey
pH	Potential of Hydrogen
Ps	Price share
SHM	State Horticulture Missions
sq. km	Square Kilometer
TR	Total Revenue
TVC	Total Variable Cost
UV	Ultra Violet

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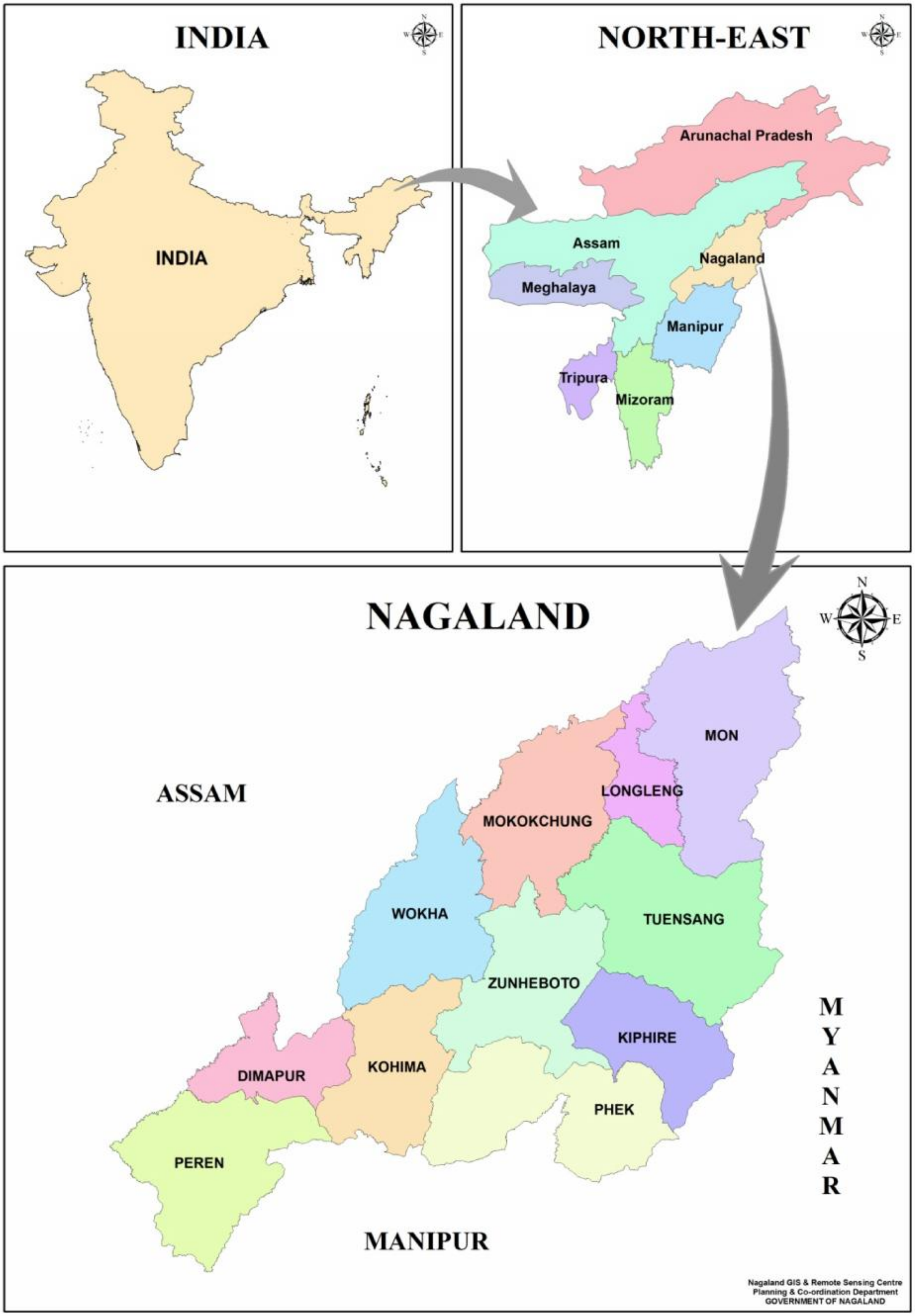
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Planning & Co-ordination Department
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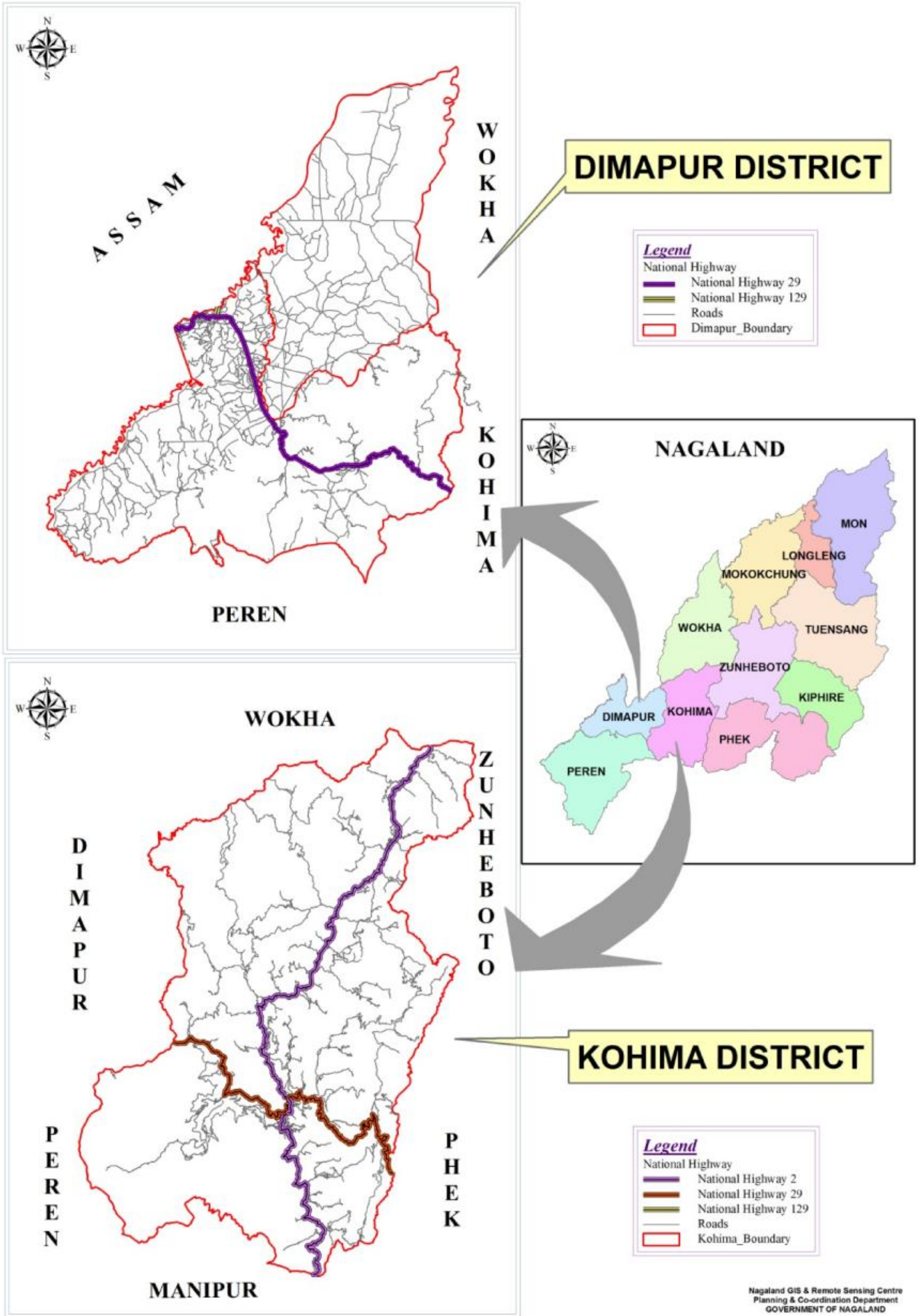
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CHAPTER I

INTRODUCTION

1. Introduction

Horticulture which is derived from the Latin words, *hortus*, meaning garden and *cultura*, meaning cultivation may be defined as the science and art involved in the cultivation, propagation, processing and marketing of ornamental plants, flowers, turf, vegetables, fruits and nuts. Horticulture has become one of the thrust areas for development in India contributing 30.4% of GDP to agriculture and 50% to total agri-exports with just 14% of the area. Employment generation from this sector is also three to four times higher than other agricultural crops (Chandra, 2015)[1]. After attaining self-sufficiency in food crops in the country, policy makers and researchers have diverted their focus towards those horticultural crops that are more remunerative and have export potentials. Keeping in view the importance of horticulture sector for faster development of the economy, the Government of India emphasized on horticulture research and development.

Various advanced and genetic engineering technologies were introduced in this sector for its rapid development to meet the need of growing population as well as to earn foreign exchange. The development of this sector is being witnessed when more areas were brought under its cultivation over the years i.e., the area under horticultural crops increased from 12.77 million hectares during 1991-92 to 23.69 million hectares in 2012-13, its production during this period has increased by nearly 2.8 times and productivity by 1.5 times[2]. Today this sector has enabled the farmers to increase their production, productivity and income sustainably. Horticultural production has increased several folds and has also generated more employment opportunities and earning foreign exchange. Among the horticultural crops, floriculture has been identified as sunrise industry by the

[1] Chandra, S. (2015), "India's Horticulture Enters Fast Lane", Krishi Jagran. Retrieved on 17/04/16 from www.krishijagran.com/Featured/Dr-S-Chandra/Indias--Horticulture-Enters-Fast-Lane

[2] Hand Book on Horticulture Statistics (2014), Government of India, Ministry of Agriculture, Department of Agriculture and Cooperation , New Delhi.

Indian Government and accorded 100% export oriented status i.e., duty free import of capital goods and exemption of certain export duties.

Floriculture occupies an important area in the field of horticulture, which is concerned with the cultivation of flowering and ornamental plants for direct use or for use in cosmetics and perfume industry or in pharmaceutical industry as raw materials. With the commercialization of floriculture products, floriculture sector has become one of the fastest growing segments of horticulture providing not only employment opportunities to unemployed youth but also increasing returns to the farmers, wholesalers and retailers. Cut flower (fresh) forms the most important item in the flower industry where most of the marketing of flowers in the domestic and international markets has been producing mainly for home decoration and commercial purpose. Cut flower production in the world gained importance in the early 20th century, especially after the Second World War, since then rapid development and changes have occurred in the production, storage, classification and marketing of cut flowers.

The international trade is around U.S $11 billion and cut flower contributed 60% of the world trade in floriculture in 2010. The global export increased over 10 folds from 0.5 billion in 1995 to 5.1 billion in 2005 which again is poised to double by 2025 (Singh *et al*., 2010)[3]. In 2013 global exports of cut flowers, cut foliage, living plants and flower bulbs amounted to US $ 20.6 billion as against US $ 21.1 billion in 2011 and nearly US $ 8.5 billion in 2001[4]. In the world more than 140 countries are involved in the production and marketing of flower. Netherland is the leading flower exporter by value in the world, while USA and Japan is largest consumer of flowers in the world. However, increase in global competition has been changing the percentage share of countries in cut flower export. For example, Netherland's share in global cut flower export decrease from 58% in 2003 to 52% in 2013 while Colombia's share increase from 14% in 2003 to 15% in 2013 and Ecuador's share from 6 to 9% in the above mention years. China, India and United States have the largest area under flower production among the flower producing countries.

[3]Singh, B.K., E.S. Rakesh, V.P.S Yadav and D.K. Singh (2010), "Adoption of Commercial Cut Flower Production Technology in Meerut". *Indian Research Journal of Extension Education*, Vol. 10(1), p. 50.
[4] World Floriculture Map (2015), *Rabobank Industry Note*, No. 475, p. 1.

Over the years many new techniques and technologies were introduced in the cut flower industry to improve the quality of flowers. With the advancement of technology, genetic engineering techniques were introduced in ornamental horticulture leading to the production of high quality flowers which are of high demand in the international market. The use of genetic engineering technology not only removes obstacles in commercialization but also reduces cost and the use of chemicals to control diseases and insects in flowers (Chandler and Lu, 2005)[5]. This high quality flowers which are grown under controlled condition i.e. under green houses and poly-houses are cultivated under controlled temperature, protected from direct sunlight, pests, diseases, wind, rain and humidity. Commercial cut flowers and potted plant industries exist not only to supply a general all round demand, but especially to satisfy out-of-season requirements and the supply of high quality blooms for special occasions such as birthdays, name-days, weddings and funerals (Morgan, 1985)[6].

This chapter is divided into three sections. Section I gives a brief introduction of floriculture industry in India and Nagaland, objectives and hypotheses of the study, limitations and significance of the study, tools and techniques used in analyzing the data; section II emphasized on the review of literatures both national and international; and section III on the profile of the study area.

SECTION I

1.1 Floriculture in India

Commercialization of floriculture in India started after 1990s. The liberalization of industrial and trade policies encouraged the Indian entrepreneurs for establishing and developing export oriented production of flowers on a large scale. In 2012-13, the area under floriculture production in India was 232.74 thousand hectares, which is the second largest area under floriculture in the world next to China, with a production of 1.729

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[5]Chandler, S.F. and C. Lu (2005), "Biotechnology in Ornamental Horticulture", *In Virto Cellular and Developmental Biology Plant*, Vol. 41(5), p. 593.
[6]Morgan, W.B. (1985), "Cut Flowers in Warsaw". *Geo Journal*, Vol. 11(4), p. 339.

million tones loose flowers and 76.73 million tones cut flowers. India's total export of floriculture in 2010-11 was Rs. 29604.04 Lakhs which increased to Rs. 46077.23 Lakhs in 2014-15 (APEDA, 2014)[7]. Top ten main export centers of cut flowers from India in 2014-15 are USA, UK, Germany, Netherland, UAE, Canada, Japan, Australia, Italy and Singapore.

However, India's share in the international market for flowers is still negligible, where its share was only 0.38% in 2004, 0.3% in 2008 and 0.65% in 2010 (EXIM, 2010)[8]. The income generated by the global floriculture market encouraged the Indian Government to promote this industry and soon this sector was identified as one of the growth engines to fuel economic growth with foreign exchange. During the last 20 years, taking advantage of the incentives provided by the Indian Government, large number of floriculture units were established to produce and export flowers to the global floriculture market.

Table 1.1: Distribution of area and production distribution of cut flowers in India.

Year	**Area (in 000 HA)**	**Cut flower production (000 Mt)**	**Year**	**Area (in 000 HA)**	**Cut flower production (000 Mt)**
1993-94	53	555	2003-04	101	1793
1994-95	60	519	2004-05	118	2071
1995-96	82	537	2005-06	129	2921
1996-97	71	615	2006-07	144	3716
1997-98	74	622	2007-08	161	4342.10
1998-99	74	643	2008-09	167	4794.20
1999-00	89	681	2009-10	183	6667.10
2000-01	98	804	2010-11	191	6903
2001-02	106	2565	2011-12	253	7507
2002-03	70	2060	2012-13	272	7541.30
CGR	2.80	13.99	CGR	10.40	15.45

Source: Indian Horticulture Data Base 2006-2013
Note: Area includes area under both loose and cut flowers.

[7]Agriculture and Processed Food Products Export Development Authority (APEDA), (2014). Retrieved on 16/04/16 from apeda.gov.in
[8] EXIM Bank (2010), "Floriculture a Sector Study", *Research Brief* No. 25, Retrieved on 16/03/14 from http://www.eximbankindia.com/flori.pdf

In India, floriculture is emerging as an important commercial crop. A lot of importance has been given to this sector due to its multiple uses, satisfying the aesthetic needs of the people, this is apart from creating more employment, ensuring higher rate of returns to rural people and facilitating earning more foreign exchange. More specifically, they are being used as raw materials in the manufacture of essence, perfumes, medicines and confectioneries for direct consumption by the society.

1.1.1 Floriculture in NER and Nagaland

The North-Eastern and the Himalayan States were also concentrated to promote commercial floriculture due to its immense biodiversity and pleasant agro-climatic condition suitable for the cultivation of varieties of flowers. Horticulture Mission for North-East and Himalayan states (HMNEH) was initiated in 2001-02 to promote and developed those horticultural crops, especially flowers, in the region that has a comparative advantage. This mission was initiated to promote the overall growth of horticulture sector by way of encouraging aggregation of farmers into farmer groups, enhance horticulture production, augment farmers, income and strengthen nutritional security, improve productivity, promote skill development and create employment opportunities. This horticulture mission covers the eight North-Eastern states namely, Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura and the Himalayan states namely, Himachal Pradesh, Jammu and Kashmir and Uttarakhand. With the inception of this mission by the Indian Government various improved technologies along with high quality inputs like planting materials, green house, drip irrigation system, feeds and fertilizers have been introduced to produce flowers of international standard to be exported in the global flower market.

Flower has been a part of the Naga society used as an ornament to beautify the houses since time immemorial and planting flowers were mainly carried out by women folks (Pusa and Giribabu, 2016)[9]. Commercialization of floriculture in Nagaland started in the year 2004-05 under HMNEH, since then rapid development has been taking place in the state. Based on the climatic conditions, easy accessibility and nearness to the

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[9] Pusa, K. and Giribabu M. (2016), "Floriculture and the Role of Women in Nagaland: A Case Study", *Arthshastra Indian Journal of Economics and Research*, Vol. 5(6), p. 43.

market, initially the State Horticulture Department selected four districts namely Dimapur, Kohima, Mokokchung and Wokha for commercial cultivation of flowers. With the introduction of advanced technology, flowers are being sustainably produced under controlled conditions protected from damages caused by wind, direct sunlight, rain, pests and diseases.

1.2 Concepts and Definition

Floriculture is the discipline of horticulture, which refers to the cultivation of ornamental plants, flowering plants, foliage plants, cut flowers, bulbs, seeds and seedlings (Gauchan *et al*., 2009)[10]. Floriculture refers to growing of high quality cut flowers under controlled conditions in poly-houses through the use of technology like tissue cultured plants, water soluble fertilizers, part-mechanization, cold chain, packaging and post harvest technology for export and domestics markets (MITCON, 2001)[11]. Cut flower forms the most important part of floriculture where most of the marketing is on cut flower. According to international trade classification, floriculture encompasses:-

(a) Bulbs, tubers and tuberous roots,

(b) Other live plants (including trees, shrubs, bushes, roots, cutting and slips),

(c) Cut-flowers and flower bulbs, fresh dried, dyed, bleaches, impregnator and

(d) Foliage, branches and other parts of tree shrubs, bushes and other plants and mosses, lichens and grasses, being good of a kind suitable for bouquets and ornamental purposes.

The Government of India has adopted a new trade classification, which is based on Harmonized System (HS) of commodity description and coding systems. The descriptions of flower according to this comprise of:-

[10]Gauchan, D.P., A.R. Pokhrel, M. Pratap and P. Lama (2009), "Current Status of Cut Flower Business in Nepal". *Kathmandu University Journal of Science and Engineering and Technology*. Vol. 5(1), p. 87.
[11]Maharashtra Industrial and Technical Consultancy Organization (MITCON) (2001), "Diagnostic Study Report of Floriculture", *Prepared under the Aegis of the United Nations Industrial Development Organization (UNIDO) Project: Support to Country Effort to Promote Small and Medium Enterprises Cluster Development in India.*

(a) Bulbs, tubers and tuberous roots: these are products that may be planted in pots, boxes or similar containers.

(b) Live plants: these are plants that are used for permanent or semi-permanent decoration in offices, homes and buildings. These are whole plants, which are suitable for planting or for ornamental purposes.

(c) Cut-flowers: these are flowers and flower buds with a suitable stem of varying length, which makes them suitable for bouquets or for ornamental purposes. Cut flowers are highly perishable having a life span of 3 to 7 days. They are usually used for decorative purposes and as gifts on special occasions. Examples of cut flowers are roses, carnations, lilium, alstroemeria, gladiolus, chrysanthemums, orchids etc.

(d) Cut foliage: these are leaves, twigs, grasses, shoots etc. The economic value of these lies not in the decorative effects of the blossoms but in its colour and shape.

(e) Others: these include dried flowers and foliage, propagation materials, tissue culture plants and starter and adult ornamental plants including houseplants.

1.3 Objectives of the Study

The study is mainly focused on the development made in the floriculture sector resulting in improved production and marketing efficiency of sample cut flowers and also to bring out the constraints hindering smooth functioning of the sector in the State. Keeping this in mind the study has been carried out based on the following objectives:

1. To analyze the trends in area, production and yield of floricultural crops in selected districts of Nagaland.
2. To study the infrastructural facilities available for floriculture development in selected areas in Nagaland.
3. To examine the problems and prospects associated with flower producers/growers in selected districts in Nagaland.
4. To assess the trends in domestic flower markets and marketing problems connected with flower retailers in selected districts.

5. To suggest policy measures for producers and retailers of cut flowers in Nagaland.

1.4 Hypothesis

1. Development of floriculture sector will improve the income levels of growers and retailers in Nagaland.
2. Availability of land holdings, capital, labour and market prices are the major factors that determine the production and productivity of cut flowers than education and experience of flower growers.
3. Transportation and investment on technology enhances the market potentiality in the state of Nagaland.

1.5 Limitations of the study

While care has been taken in collecting primary data from the respondents to avoid biasness and misinterpretation, however, the data so collected is not completely free from errors. Written records were maintained only by few respondents and the information extracted was mostly based on their daily experience and approximate calculations of the respondents. The unwillingness and indecisive nature of the respondents to reveal the quantity produced and marketed and income generation was also one of the main drawbacks and thus the data collected might not be in conformity with the actual facts and figures prevailing in the floriculture sector of Nagaland. However, in spite of these limitations viable efforts have been taken to encourage and educate the importance of this study to the respondents in order to minimize errors. Discussions with the authorities of State Horticulture Department of Nagaland and members of Naga Flower Growers Society further made it possible to cross check the collected data with caution.

1.6 Statement of the Problem

Floriculture sector which has been regarded as a growth engine to push the Indian economy forward suffers from various shortcomings. Though various developments has been made over the years in promoting the floriculture sector in India, especially Nagaland, it still lacks far behind compared to the global floriculture industry of Netherland, Germany, USA, Japan, etc. Commercial cultivation of flowers in Nagaland started in the year 2004-05 under the active support of Technology Mission for the North-East. Flower industry in Nagaland is still unorganised where there is lack of awareness about its potential, lack of quality planting materials, no regulated price, no proper market structure, lack of post-harvest facilities, weak database, absence of information on income and employment generation from different flower cultivators and no strong support from the state Government. Being mainly occupied by the women folks, they have weak bargaining power, social immobility and lack of access of interaction with the flower market outside the state. Since the production of flower takes place faster than consumption, the communication gap between the producer and retailer, absence of processing units and marketing linkages leads to the problem of surplus production and wastage. Moreover planting materials, pesticides, fertilizers, flower seeds etc that are being provided by the State government at subsidized rate are insufficient and not availed by all the farmers.

Earlier the Horticulture Department of Nagaland followed the buy-back policy where they not only provide planting materials to the growers but also help them in exporting their produce to other states and countries but this policy was stopped and now the producers have to search their own market for their produce. In this process some of the growers are unable to export their produce as they have no contact with the outside market and even if they are able to export they are usually exploited, in the form of delay payment and default payment, due to lack of market information about the marketing conditions outside the state.

All these problems stated above made it imperative to conduct economic evaluation and marketing investigation of the floriculture industry in Nagaland. The study will be of great significance for the policy makers, farmers and the different intermediaries associated with production and marketing of flower in India in general and Nagaland in particular.

1.7 Significance of the Study

Flower is associated with the people of Nagaland since ancient times however, commercialization of floriculture has emerged as a new avenue for the people of Nagaland for self employment through flower production and marketing. Efforts have been made by the State and Central Government to promote flower cultivation by adopting modern technologies so as to produce high quality flowers meeting the international standard. The study mainly concentrates on protected cultivation of cut flowers for commercial purpose. The study will assess the various trends in area, production and yields of floricultural crops in Nagaland under protected environment. It will provide information on the advanced infrastructural facilities and various developmental programmes that have been introduced to boost floricultural growth in India and particularly the North-Eastern Region which has been the prime focused of the policy makers to promote floriculture to earn foreign exchange. The study will analyze the production and productivity of selected cut flowers under protected conditions of the sample flower growers in the study areas. Marketing aspects in transferring the produce from producer to other intermediaries until it reaches the final consumers has been considered. It will examine the various problems associated with flower producers and retailers and highlight the prospects for the development of floriculture in the State. The study will further provide suggestions and policy measures for future development of floriculture sector in Nagaland. This will educate and help the policy makers in the formulation and implementation of strategies and also encourage the farmers and various intermediaries associated with floriculture sector to identify the opportunities for production and marketing of flowers.

1.8 Sources of Data

The study comprises of both primary and secondary data. Two types of questionnaires schedules were prepared for collection of primary data. One questionnaire was structured to collect information from cut flower growers while the other one was to collect information from the retailers. Primary data have been collected through field survey, interview and questionnaire methods. Whereas secondary data were collected from different sources such as Annual Administrative Reports of Horticulture

Department, Statistical Handbook of India and Nagaland, Indian Horticulture Data Base and from the various sources available in the form of published and unpublished information.

1.9 Sample Design

For the collection of primary data, proportionate purposive random sampling technique has been adopted. The respondents were divided into producers and retailers. All together 255 respondents were interviewed from the selected districts, comprising of 225 producers and 30 retailers. Growers from the selected districts has been classified according to the flower they produce i.e. in Kohima 52 growers are growing Alstroemeria, 50 are growing Lilium and 37 are growing Rose and in Dimapur 46 growers are under Anthurium and 40 under Gerbera cultivation. Besides being a producer, some of these growers collect cut flowers from their fellow growers at wholesale rate and sell it to the retailers. It is interesting to note that though the present study is a comparative analysis between the two districts, the flowers are not same between the districts because of different climatic conditions. So the growers are producing different cut flowers in both the districts in their respective poly houses.

The questionnaire focused on the information on socio-economic conditions, income, production of flowers, cost and returns, labour absorption, constraints faced by both the growers and retailers in growing and marketing of selected cut flowers, awareness to Government programmes for floriculture development and other related variables were collected from them.

1.10 Data Analysis

The data were analyzed by simple tabular methods. The simple averages, percentages, compounded growth rates and other appropriate statistical technical methods were used. Multiple Regression analysis has been used to bring out the relationship between the dependent variable and the predicators in the floriculture industry of the selected districts. While Stochastic Frontier Production model (half-normal case) has been used to analyze the efficiency of capital and labour in bringing out the resultant output. The following expressions have been used:-

i) Gross Return

GR = Total production × per unit price

ii) Gross Margin

GM = TR-TVC

Where, TR- Total Revenue

TVC- Total Variable Cost

iii) Compounded Annual Growth Rate

$$\text{CAGR} = \left(\frac{\text{Ending Value}}{\text{Beginning Value}}\right)^{\left(\frac{1}{\text{No.of years}}\right)} - 1$$

iv) Multiple Regression Analysis

$$Y_t = \sum_{i=0}^{k} {}_i \mathrm{X}_{it} + \text{«}_t$$

Where, Y_t is the dependent variable, the X's are the independent variables, and «_t is the error term. ${}_i$ is the coefficient, or intercept of the equation.

v) Stochastic Production Frontier Model (half-normal case)

$$\ln Out_i = \sim_0 + {}_k \ln K_i + {}_L \ln L_i + \frac{1}{2} {}_{KK} (\ln K_i)^2 + \frac{1}{2} {}_{LL} (\ln L_i)^2 + {}_{KL} (\ln K_i)(\ln L_i) + v_i$$

Where,

ln = Natural logarithmic value

Out = Total Output per m^2

K = Capital expenditure on fertilizers, pesticides, seeds and other expenditure excluding human labour in Rs. per m^2.

L = Total number of working days (Man days per m^2).

V_i = random error component represents stochastic effects.

vi) Marketing cost

$C = C_p + C_{m1} + C_{m2} + C_{m3} + \ldots.. C_{mn}$

Where, C = Total marketing cost

C_p = Marketing cost paid by the producer

C_{mi}= Marketing cost incurred by the *i*th middleman

vii) Producer's share (P_S) in consumer's rupee

$P_S = (P_P \div P_C) \times 100$

Where, P_P = Producer's price of the selected cut flowers

P_C = Price paid by the consumer

viii) Market Margin

a) Absolute Margin (A_{mi})

$A_{mi} = P_{ci} - (P_{pi} + C_{mi})$

b) Percentage Method (P_{mi})

$P_{mi} = P_{ci} – (P_{pi} + C_{mi}) \times 100 \div P_{ci}$

Where, P_{ci} = Total receipt per unit

P_{pi} = Purchase price per unit

C_{mi} = cost of marketing per unit

ix) Price spread (Ps)

$Ps = P_C - P_R$

Where, P_C = Price paid by the consumer

P_R = Price received by the producer

1.11 Period of Study

The study relates to the year 2013-14 for primary data, whereas the analysis of secondary data relating to export and import pertains to the year 2010-11 to 2013-14, while the area, production and productivity pertains to the period from 2005-06 to 2013-14.

1.12 Organization of the Study:

Chapter 1: Introduction

The first chapter is divided into three sections. Section one deals with introduction which provides in brief the status of floriculture in the state and selected districts, details of the objectives, hypothesis, methodology, statement of the problem and limitation of the study. Section two present a detail review of the existing literature on the subject and their relevance with the current study on floriculture production and marketing. Section three emphasize on the profile of the study of the State as well as selected districts.

Chapter 2: Development of Floriculture in Nagaland

This chapter analyzes the growth performance of floriculture in Nagaland and various development programmes initiated by the Government to promote floriculture sector in Nagaland. This includes development in transportation, pre and post-harvest handling, methods of production and marketing.

Chapter 3: Production and Marketing Condition of Floriculture in Nagaland

This chapter examines the production and marketing conditions of flower growers or sellers and its impact on their income, employment and standard of living conditions in study areas.

Chapter 4: Problems and Prospects

This chapter focus on the problems associated with producers and retailers in floriculture industry and highlights the prospects for floriculture in selected districts.

Chapter 5: Summary and Conclusion

This chapter deals with the summary and conclusion arrived at the previous chapters and further provide suggestions in order to draw lessons for the future development of floriculture sector in Nagaland.

SECTION II

1.2 REVIEW OF LITERATURE

This section gives a review of the various works on floriculture, production and marketing aspects within and outside India. It covers study conducted on the importance of cut flowers, development made to promote this industry both production and marketing especially export promotion, cost-benefits, floriculture related problems and suggestions recommended for further improvements and most importantly on income and employment generation. Studies on floriculture have different approach and result depending on the practice and area of study. Global floriculture industry presents a different scenario from India's flower industry. Studies on international floriculture industry mainly deals with research and development, airfreight rates, consumer's behavior in purchasing flowers, prolonging flower vase life etc. Thus this section has been divided into two sub sectors i.e. the studies relating to India and other countries.

1.2.1 Studies Relating to Floriculture in India

Narasimham and **Kishor** (1997)[12] Global liberalization and trade has opened up opportunities for countries like India to gain from foreign trade. The study on "*Floriculture Exports: Potential and Challenges*" analyse the nature of global floriculture market and the scope of India's floriculture export. Floriculture demand in the world grew at the rate of 12% to 15% per annum and annual growth of floriculture to about 25% to 30% during 1995-96. Changing life style of the people and other religious and cultural factors are boosting up floriculture market. Dutch floriculture industry plays an important role in determining the global price of flower through its auction market. Indian entrepreneurs were also attracted towards floriculture trade and have started producing varieties of flowers for commercial purposes.

In 1995-96 India exported Rs.60 crore worth floriculture products where USA was the main export destination consuming to about 25% of India's export followed by Germany, UK and Netherland. In spite of large area of 35000 hectares of land under

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[12]Narasimham, N.V. and N. Kishor (1997), "Floriculture Exports", *Foreign Trade Review*, Vol. 32(3), pp. 42-57.

floriculture in India its share in the global trade is less than 0.1% during 1995-96. India has the advantage of producing flowers for export because of its favourable climatic condition, low cost of production, set up tissue culture labs and nearness to global market. However the country suffers some of the drawbacks such as inexperienced producers, dependent on external sources for raw materials, high price of planting materials, high import duty, non-availability of quality planting material and lack of modern technology. The Indian Government realized the importance of floriculture industry and gave emphasis on promoting floriculture trade by introducing programmes and subsidies to the growers. It include introduction of 5 post-harvest handling centers, undertakings of APEDA, bank loans and setting up of auction market in Karnataka, air freight subsidies, import duty has been relaxed, etc.

Agarwal (1998)[13] Competitive advantage of a nation is best acquired from its domestic competition where domestic rivalries pressurize companies to innovate and improve. A case study is made to identify India's floriculture sector as having competitive advantage in the international market. India being endowed with varied natural resources, climatic conditions and technology adaptation advantage has not being able to increase its share in the global flower market. Some of the reasons for its low performance are lack of modern technology and planting materials, absence of post harvest handling facilities, high airfreight rate, lack of market information and poor transport facilities. Various development programmes have been initiated by the Indian government through the Ministry of Agriculture to increase flower production and promote its export. India has a competitive advantage of producing and exporting flowers due to its varied agro-climatic conditions, availability of skilled man power, nearness to the consuming countries, increase demand in the domestic market, availability of large number of tissue culture labs and domestic production of capital goods and other infrastructural facilities in flower industry. Thus, taking note of these advantages, Government of India have checked on import and export duties, introduced cold storage at international airports, reduced airfreight rates and introduced various schemes of

[13] Agarwal, R. (1998), "India's Competitive Advantage as a Nation for Exporting Floriculture: A Case Study of Floriculture Sector", *Paradigm*, Vol. 2(1), pp. 139-149.

setting up floriculture centre in both public and private sectors covering all the states and Union territories.

Ali and **Banerjee** (2000)[14] in their study "*An Economic Analysis of Marketing Aspects of Bela Flower in West-Bengal- A Case Study*" made an economic analysis of marketing aspects of bela flower in Howrah and Midnapur Districts in West Bengal. A total of 150 farmers were randomly selected from the study area and data pertain to the year 1992-93. Three markets i.e. one primary wholesale market, one secondary wholesale market and two retail markets were selected to examine fluctuations in monthly prices, price spread, marketing margin and different marketing cost in the study area. Two marketing channels, i.e. channel-I and channel-II were considered where whole price was found to be higher in channel-II than channel-I. Fluctuations in monthly wholesale price have been observed where maximum wholesale price occurs in June to August while minimum in the month of May due to differences in demand on special occasions. In all the three markets, it has been observed that higher marketing cost tends to increase its maximum price. Primary wholesalers make more profit than the other two markets and major items of marketing cost were found to be packing, transport, loading and unloading.

Sharma (2001)[15] presents an account of the production and marketing of Marigold flower in Jaipur district of Rajasthan. The study estimates various costs, returns and price spread in the production and marketing of Marigold. Primary data were collected through simple random sampling technique pertaining to the year 1996-97. The findings of the study indicate that during the reference year the overall input cost of marigold cultivation was Rs. 17909 per hectare where human labour accounted for 44.67% of the input cost, while manure constitute 26.84%, machine labour 14.46%, seed 5.15%, fertilizers 5.01%, chemicals 2.05% and irrigation 1.65% respectively. Of the total marketing cost spoilage of flowers (30.87%) constitute the major marketing cost followed by labour charges (28.14%), commission (14.31%) and transport (10.77%). From the

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[14]Ali, M.H. and B.N. Banerjee (2000), "An Economic Analysis of Marketing Aspects of Bela Flower in West-Bengal- A Case Study", *Agricultural Marketing*, Vol. 43(2), pp. 5-8.
[15]Sharma, P. (2001), "Economics of Production and Marketing of Marigold in Jaipur District of Rajasthan", *Agricultural Economics Research Review*, Vol. 14(2), pp. 163-169.

total consumer price, producers share is 31.27% and florist's share is 39.39%. The average net income was estimated at Rs. 59797 per hectare which clearly indicates the profitability of Marigold cultivation in Jaipur. Marigold flower being highly perishable in nature, there is a need to adopt its alternative uses and the market should be regulated.

Agro-Economic Reasearch (2003)[16]. Uttar Pradesh has diverse agro-climatic and ecological conditions favourable for flower cultivation at all seasons however due to one or the other problems and difficulties the state does not produce cut-flowers for export. Thus the study was undertaken to understand the problems and prospects of floriculture in Uttar Pradesh. Four districts namely, Dehradun, Muzaffernagar, Hathras and Meerut growing four selected flowers viz, gladiolus, tuberose, rose and marigold were selected for the study. The study comprises of both primary data, pertaining to the year 1998-99 and secondary data from 1992-93 to 1997-98. Findings of the study indicate that an increase in the growth of the selected flowers during the nineties but this increase was consumed mainly in the domestic market due to various internal and external factors. Some of such problems were high air freight rates, poor quality of the produce, poor infrastructure, lack of modern techniques of production, etc. To promote floriculture export the study emphasized on the following recommendations- (a) efforts on the part of the Government to increase flower production and productivity, (b) improvement of technical know-how, (c) protect the interest of the farmers, (d) provide financial assistance, (e) search new markets in top flower consuming countries, (f) reduce air-freight rates, etc.

Dhillon *et al.* (2003)[17] in their study "*Area and Production of Major Flower Grown in Haryana*" estimated the area and production of flowers in Haryana with special reference to the major flower growing districts namely, Gurgaon, Sonepat and Faridabad. All together 120 farmers from the selected districts were randomly selected on the basis of probability proportion to their size. The findings of the study indicate that the area under flower cultivation and its production increased from 1850 hectares and 31120

[16]Agro-Economic Research Centre (2003), "Development of Floriculture in Uttar Pradesh- Problems and Prospects", Agricultural Situation in India, Vol. 59(12), pp. 799-804

[17]Dhillon, A. and R.K. Khatkar (2003), "Area and Production of Major Flower Grown in Haryana", *Agricultural Situation in India*, Vol. 60(2), pp. 93-94.

million tons in 1996-97 to 2250 hectares and 40500 million tons in 1999-2000. Major flower grown in the study area were found to be Marigold, Rose, Chrysanthemum, Gladiolus and Tuberose, out of which Marigold occupied the maximum area followed by Gladiolus, tuberose and Rose. Based on the category wise in area Marigold was mainly produced on medium farms, Rose on large farms, Chrysanthemum on medium farms and finally Tuberose on small farms.

Thakur *et al.* (2004)[18]. Floriculture industry in Himachal Pradesh has started gaining momentum with the rest of the flower producing states of India since 1990. Lack of market information on production and marketing infrastructure hampers the smooth functioning of flower industry in Himachal Pradesh as a result the present study has been carried out to evaluate floriculture in the state and related infrastructure needed in future. Both primary and secondary data has been used in the study. For primary data, 212 flower growers were randomly selected from 115 villages under 7 districts in Himachal Pradesh pertaining to the year 1997-98. Average size holding of the flower growing household was found to be 2.806 hectares out of which operational holding accounted for 1.886 ha i.e., 67% of the total holding and 5% area was under flower cultivation. Flower cultivation was found to be capital intensive enterprise where on an average total capital investment on farm structure was estimated at Rs. 28,517 per flower farm and Rs. 7302 and Rs. 2114 per farm on farm and machinery and irrigation infrastructure respectively. The farmers met their capital investment from their own source (58%), bank finance (9%) and subsidy from Government (33%).

The structure and composition of price spread of cut flowers reveals that sale through co-operatives was most gainful for both producers and consumers. Some of the main production problems were lack of cold storage, high interest rate and non-availability of recommended packing materials. While non-remunerative price, high transport cost, malpractices by traders, delay payment, difficulty in transportation, lack of market information, inadequate arrangements for grading and storage and lack of regulated market were the main marketing problems. These problems and constraints

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[18]Thakur, D.R., A.S. Saini and K.D. Sharma (2004), "Floriculture Scenario in Himachal Pradesh-Infrastructural Needs", *Indian Journal of Agricultural marketing*, Vol. 18(3), pp. 40-52.

make it imperative to developed production and marketing infrastructure to promote flower industry in Himachal Pradesh.

Thippaiah (2005)[19], attempts to analyze the performance of floriculture in Karnataka, to identify the various problems and prospects and suggest policy measures for its healthy growth. The study comprises of both primary and secondary data. Primary data relates to the year 2001-02 whereas secondary data pertains to the period 1978-79 to 2001-02. The district of Bangalore was selected for the study purpose based on the concentration of area under flower cultivation. The contribution made by floriculture sector in income and employment generation has been higher compared to other horticultural and agricultural crops. The contribution made by horticultural crops to the agricultural sector GDP increased from 18.24% during 1990-91 to 26.69% during 1999-2000, out of this the contribution made by floriculture was 0.40% during 1990-91 and increased substantially during 1999-2000 with 2.45%.

Over the years with urbanization, increase in income, changing lifestyle, etc. there has been an increase in the production and productivity of flowers in Karnataka. However the development made on the production of flower in Karnataka is low compared to major flower producing countries like Japan, Italy, Brazil, etc, thus, requiring extensive policy measures such as generating more funds to develop the sector, creating better infrastructure facilities, improving the quality of flowers, etc.

Export-Import Bank of India (2006)[20]. The report gives an overview of world floriculture status with respect to export and import of flowers by the various countries of the world. The world's floriculture market is estimated to be worth US $ 60 billion where export comprises of US $ 12.39 billion and import stood at US $ 12.61 billion in 2004. India's export of flowers was US $ 18 million in 1996 and US $ 47 million in 2004. The findings of the study state that in spite of the increase in exports of India's flower to the world market there are certain challenges that India's floriculture industry is facing which needs to be tackled in order to develop this sector. The study concluded by focusing on

[19]Thappaiah, P. (2005), "Floriculture in Karnataka: Performance, Problems and Prospects", *Agricultural Development and Rural Transformation Unit, Institute for Social and Economic Change, Nagarbhavi, Bangalore*.
[20] Export-Import Bank of India (2006), "Floriculture: A Sector Study", Occasional Paper No. 112

the fast growing floriculture industry and emphasizing on the future growth of India's floriculture industry so as to supply quality and new flowers on regular basis.

Karthikeyan and **Lekshmi** (2006)[21]. The study was carried out in the Nilgiris district of Tamil Nadu to test the effectiveness of training modules and of different training modules in terms of knowledge gain related to skill practice. Three modules namely demonstration, practicing through coaching and video were selected and tested for their relative effectiveness. The data were collected through a well structured interview schedule and it was analyzed using statistical techniques such as paired 't' test, Mc Nemar test, analysis of variance and analysis of covariance. Of the three treatments of training used, video was found to be the most effective method in imparting knowledge about cut flowers to the growers. Through its audio-visual aid, training through video was able to make learning more easier and attract better attention of the growers than the other two modules of training.

Sen and **Raju** (2006)[22] in their article "*Globalization and Expanding Markets for Cut-Flowers: Who Benefits?*" made an attempt to examine the effectiveness of high-value diversification in increasing the income of small farmers in the specific context of floriculture. The study reveals that small farmers do not participate in the flower cultivation as actively as the larger farmers and even if they do so, they do not pursue it for a long duration. Given the resource constraints, the smaller farmers allocate comparatively less land to the more profitable flowers due to their high cost of cultivation and variability in their prices. They concluded by saying that high value diversification as a strategy to increase small farmer's income will not be successful unless it incorporates elements such as institutional credit for the profitable crops and farmer's direct participation in the market. Crop diversification in such a farming community is likely to face infrastructural and institutional constraints and ensuring access and linkages with markets is important in this context. They also added that lower-risk options of

[21]Karthikeyan, C. and P.S.S. Lekshmi (2006), "Effectiveness of Skill Teaching Methods for Cut Flower Growers an Expeimental Study", *International Journal of Extension Education*", Vol. 2, pp. 89-94.
[22]Sen, S. and S. Raju (2006), "Globalization and Expanding Markets for Cut-Flowers: Who Benefits?", *Economic and Political Weekly*, Vol. 41(26), pp. 2725-2731.

diversification into livestock assets and non-farm sector have to be incorporated to provide income and employment protection to the poor.

Saraswati (2008)[23] made a study on the floriculture industry of Himachal Pradesh and brought out various issues associated with it. Himachal Pradesh with its favourable climatic conditions and natural resources is suitable for the cultivation of flowers which gives it better prospect for commercializing floriculture. The study focuses on the marketing of flowers and stated that besides generating employment it is able to yield higher return than other agricultural crops. Some of the constraints that hamper the growth of flower industry were poor infrastructure, lack of technical know-how, lack of quality seeds hence poor quality of flowers, lack of market information and lack of planting materials. Suggestions were given to overcome these constraints and further encouraged on producing those flowers that are of high demand during off season and to cultivate those flowers that are suitable for growing only in hilly areas.

Singh *et.al* (2010)[24] conducted the study in Meerut and Ghaziabad districts of Uttar Pradesh where it made an attempt to find out the knowledge and adoption of commercial cut flower cultivation practices. Data were collected through survey method and the major tools used were interview schedules, in-depth discussion, secondary sources and various statistical tools were used to draw the conclusion. Majority of the cut flower cultivators possess high (31.3%), very high (28.8%) and medium (20%) level of knowledge of cut flower technology in the study areas. Majority of the respondents i.e. 80% were found to possess high to medium adoption in gladiolus production technology whereas 80% tuberose cultivators were found to posses medium to high adoption. The correlation analysis shows that age of both gladiolus and tuberose farmers have negative correlation with adoption while education and mass media exposure have positive and significant contribution with adoption. The young farmers having high adoption of gladiolus and tuberose cultivation technology should be encouraged and old group farmers should be educated regarding new innovations. Social participation of the flower cultivators should be improved by mobilizing them towards forming self help groups and

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[23]Saraswati, S.P. (2008), "Floriculture in Himachal Pradesh: Economics, Marketing, Constraints and Suggestions", *Agricultural Situation in India*, Vol. 65(7), pp. 455-461.
[24]Singh, B.K., E.S. Rakesh, V.P.S Yadav and D.K. Singh (2010), op.cit., pp. 50-53.

co-operatives associations. Further mass media services should be adopted to increase the use of cut flower technologies among flower cultivators.

Singh and **Kaviarasan** (2010)[25] examined the growth and instability in the flower production of Tamil Nadu. The study is based on secondary data collected from various issues of India Horticulture Database of National Horticulture Board for the year 1993-94 to 2007-08, Directorate of Horticulture, Tamil Nadu (1980-81 to 2007-08) and from various issues of Season and Crop Report of Tamil Nadu (1996-97 to 2006-07). Over the years India has witnessed considerable increase in the area and production of flowers where its area increased from 0.53 lakh hectare in 1993-94 to 1.44 lakh hectare in 2006-07, production of loose flowers from 2.33 to 8.80 lakh tons and cut flowers from 5552 to 37156 lakh during the reference period. Exports of flowers also increased from Rs. 105 crore in 1999-2000 to Rs. 649.8 crore during 2006-07. Tamil Nadu recorded the highest area under flower cultivation in India and among the 6 Agri Export Zones (AEZs) two are present in Tamil Nadu. Cuddy-Della Valle Index was used to measure instability in the area and production of loose flowers in India. The result of the index reveal that Tamil Nadu recorded lower instability in the area and production of loose flower which was less than India and most of the major flower growing states.

Oyi *et al.* (2012)[26] analyzed the prospects of orchid cultivation in Arunachal Pradesh. The study is based on primary data, collected through survey and interview from orchid research and development centers in Arunachal Pradesh. Out of 1150 species of orchids found in India so far, 870 species are from North-East India and 550 species of orchids are found in Arunachal Pradesh which creates an opportunity for it to develop this sector to earn more revenue through export and create more employment opportunity. Floriculture industry in Arunachal Pradesh suffers from various drawbacks such as lack of fund, insufficient labour force, lack of market information, etc. The study emphasize on the great potentiality of floriculture industry in Arunachal Pradesh and its

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[25]Singh, D.R. and K. Kaviarasan (2010), "Growth and Instability Analysis of Flower Production in Tamil Nadu", *Agricultural Situation in India*, Vol. 66(12), pp. 709-714.

[26]Oyi, D., N. Gibji, B. Sunya and C. Karma (2012), "Floriculture Prospects in Arunachal Pradesh with Special Reference to Orchids", *Journal of Biodiversity and Environmental Sciences (JBES)*, Vol. 2(3), pp, 18-32.

prospects of developing the state in various aspects if policy measures are taken up to develop this sector.

Sudhanagar (2013)[27] floriculture industry has been identified as an important industry to earn foreign exchange, especially cut flowers. In India more than 50% of the floriculture units are in the southern part where Karnataka, Andhra Pradesh and Tamil Nadu are the leading producers. Tamil Nadu with an area of over 20,801 HA under flower cultivation and production of 1.24 lakhs million tones of loose flowers during 1999-2000 is the leading flower producing state in the country. The study estimates the cost, return and profitability of floriculture under hi-tech in Hosur of Tamil Nadu. Marketing pattern of cut flowers by farmers, production and marketing constraints and problems were also considered. All together 60 growers were selected, of which 40 growers grows Rose, 20 growers grows Gerbera and 16 growers cultivate both Rose and Gerbera. Under Gerbera production, average cost of cultivation was Rs.11.12 lakhs, gross returns from its sale was Rs. 18.17 lakhs and thus total net returns or profit was estimated at Rs. 7.6 lakhs. On the other hand the average cost of cultivation for Rose was at Rs. 24.74 lakhs, the gross return was Rs. 37.73 lakhs, making the net return Rs. 12.99 lakhs which is higher than Gerbera. High investment cost was the major problem in cut flower production by the high-tech growers followed by irregular supply of electricity required for irrigation, scarcity of labour etc. While the problem faced by the growers in marketing are seasonality in demand, frequent power cuts, lack of adequate cold storage and price fluctuations.

The constraints faced by the wholesalers include lack of infrastructural facilities and non-availability of good flowers. While retailers are usually faced with fluctuations, irregular supply, wastage, lack of new varieties, etc. Seasonal indices were used to indicate the indices of Rose arrivals ranging from 85 to 123 and Gerbera from 17 to 285. Rose was found to be more stable in its arrivals than Gerbera. To promote floriculture in the country Government of India is taking important measures, such as reduction in

[27]Sudhanagar, S. (2013), "Production and Marketing of Cut Flower (Rose and Gerbera) in Hosur Taluk", *International Journal of Business and Management Invention*, Vol. 2(5), pp. 15-25.

import duties on cut flowers, material for tissue culture labs and green house and also set to introduce air freight subsidy on cut flower export.

Vadivelu and **Kiran** (2013)[28] agricultural marketing involves various interconnected activities where agricultural products are transferred from farmers to final consumers. For an efficient marketing system, market information plays a vital role as it enables market decision and regulates and simplifies market mechanism. Some of the problems that prevent market from expanding are lack of market information, low literacy rate of farmers, increase middle man, unorganized and unregulated market. Various reforms is needed in the marketing system to ensure fair price to the farmers such as providing loans at low interest rate, subsidized power supply, direct connection between farmers and consumers, check on black marketers, creation of local outlets, counseling centers for farmers, imposing single entry tax, etc. One of the important developments that need to be carried is the improvement of market information system in order to protect both producers and consumers from middle man and false market alarms. Small scale farmers have to be protected as most of them have low literacy rate and depend mainly on radio and TV for market information.

Birajdar *et al.* (2014)[29] the study was carried out in Pune and Satara districts of Maharashtra to identify the variables that affects management efficiency of cut flower growers. Primary data were collected from 50 Gerbera, Rose and Carnation growers, taking a total of 150 growers. Data collected were analyzed using correlation, multiple regression analysis and path analysis. Correlation analysis shows that out of the 10 variables taken to measure management efficiency, 8 variables namely, education, experience in cut flower production, participation in trainings, extension participation, economic motivation, scientific orientation and innovative proneness and organizational participation were found to have positive and significant relation with management efficiency.

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[28]Vadivelu, A. and B.R. Kiran (2013), “Problems and Prospects of Agricultural Marketing in India: An Overview”, *International Journal of Agricultural and Food Science*, Vol. 3(3), pp. 108-118.
[29]Birajdar, V.M., J.G. Angadi and A.A. Patil (2014) “Determinants of Management Efficiency of Cut Flower Growers”, *Karnataka Journal of Agriculture Science*, Vol. 27(4), pp. 489-492.

Multiple regression analysis indicates that 68% variation in management efficiency of Gerbera growers was due to the influence of the 8 variables and economic motivation and participation in trainings had positively and significantly contributed to changes in management efficiency. The regression analysis further shows that 71.50% variation in management efficiency of Rose growers was the result of the 8 independent variables, of which education and participation in trainings contributed towards positive and significant variation in management efficiency. On the other hand 68.90% variation in management efficiency of carnation growers was the result of 7 independent variables which was different as education was found to have non-significant relationship with management efficiency. Extension participation and innovative proneness present a positive and significant contribution to variation in management efficiency. Overall regression analysis of the sample growers shows 60.80% variation in management efficiency was the result of the 8 independent variables. However, extension participation, organizational participation and scientific orientation contribute less significant variation in management efficiency.

Path analysis indicates experience to have the direct largest effect on management efficiency, while scientific orientation, extension participation and innovative proneness have the largest total indirect effect. Thus, these variables especially experience, participation in trainings and economic motivation should be emphasized to increase management efficiency of cut flower growers in the study areas.

Gupta *et al.* (2017)[30] Floriculture has made an impressive progress in the country since liberalization. Areas under its production reached 232.74 thousand hectares during 2012-13 with production of 1.729 MT loose flowers and 76.73 MT cut flowers. North-Eastern region with its dynamic climate and geographical conditions is able to produce varieties of flowers where both open field and protected cultivation is practiced in the region. All the States in the region produce different varieties of flower depending on the suitability of flower to the region. In Assam flowers like marigold, Gladioli, Tuberose,

[30]Gupta, Y. C., B. Bhargava, P. Sharma and R. Agnihotri (2017), “Dynamics of Hill Floriculture”, *Advances in Indian Floriculture and Landscape Gardening, Central Institute of Horticulture*, Department of Agriculture, Co-operation and Farmer’s Welfare, Ministry of Agriculture and Farmer’s Welfare, Government of India, Medziphema, Dimapur, Nagaland, pp. 115-123.

Gerbera, Anthurium and Dendrobium are more concentrated for commercial purpose. Farmers in Arunachal Pradesh are mainly growing Gerbera, Anthurium, Rose, Carnation, etc. In Manipur, flowers such as Anthurium, Gerbera, Rose and dendrobium are cultivated.

In Meghalaya, Anthurium, Rose, Carnation, Lilium and Orchids are grown for cut flowers. While in Mizoram, Rose cultivation under Hi-tech green house has made its strong hold. Nagaland flower growers have been making extensive progress in the field of floriculture by earning a revenue of about Rs. 1.50 to 2 crore annually. Area under protected cultivation accounts for about 42 HA while it is 450 HA for open field cultivation. Sikkim is mainly known for its Orchids and Anthurium apart from other flowers such as Rose, Alstroemeria, Carnations etc. Flowers like Orchids, Gerbera, Lilium, Tuberose etc have been grown widely for commercial purpose in Tripura. Inspite of high potentialities of the region in growing high quality flowers, lack of infrastructural facilities stand as a hindrance for its development. To promote this region and to take advantage of its fertile soil and favourable climate, it is imperative to introduce research on modern lines to produce new cultivars by setting up tissue culture labs and developed transportation facilities, introduce proper cold chain facilities, provide training and improve the skills of those associated with floriculture, development and extension programmes should be introduced to meet the farmers and policy makers.

1.2.2 Studies Relating to Floriculture in International Scenario

Hitchcock and **Zimmerman** (1929)[31], through their article emphasized on the various chemical compounds used to prolong cut flower's life. All together 51 chemical compounds were used for experiment, which proved less effective in prolonging cut flower's life. Besides chemical compounds, temperature and humidity were also studied to extend flower's life. The study found out that different flowers require different temperature and humidity and that low temperature and humidity is most suitable for majority of the cut flowers especially carnation, rose and cooreopsis.

[31]Hitchcock, A.E. and P.W. Zimmerman (1929), "Effects of Chemicals, Temperature and Humidity on the Lasting Qualities of Cut Flowers". *American Journal of Botany*, Vol. 16(6), pp. 433-440.

Siegelman and **Stoutemyer** (1949)[32] in their article aim to state the various developments made in the cut flower industry in terms of storage and shipment. The study highlighted the various method of prolonging the life of cut flowers, some of which are coating the flowers with certain materials such as dipping or spraying, using an atmosphere with increased CO_2 concentration, storage of flowers in sealed containers under refrigeration etc. The study suggested that the advances of fundamental physiological knowledge of floral behaviour should contribute to further progress in this rapidly growing industry.

Fossum (1953)[33] in his article made a comparative study between horticultural and agricultural sector in terms of manufacturing and marketing in the U.S economy. The perishability of flowers made the flower producers to cultivate in those areas with higher population. The study stated that till 1950's there was little or no knowledge about grading and standardization of flowers unlike food items. It further stated that it was only after 1950 that technological changes took place in the ornamental horticulture sector and since then efforts have been made to bring about improvement in this sector relating to production, distribution and consumption.

Deloach and **Miklius** (1961)[34] made an attempt to analyze the probable effects of air freight rates and regulations in California on the volume of flower sales to out-of-state markets. The study found out that though Southern California had lower air freight rates than Northern California, their cut flower production declined, making them to state that factors other than transport rate might be responsible for the relative decline in out-of-state sales from South California. Demand for flowers in California is relatively inelastic and there is lack of competition among the growers. A fall in the whole sale prices due to increased supply does not lead to a fall in customer's prices. They concluded that reduction in air freight rates does not lead to an increase in the demand for flowers nor the competitive position of California growers in out-of-state markets. Therefore flower

[32]Siegelman, H.W. and V.T. Stoutemyer (1949), "Recent Development in Cut Flower Storage and Shipment", *The Scientific Monthly*, Vol. 69(2), pp. 126-127.
[33]Fossum, M.T. (1953), "Horticulture Specialties: a Neglected Segment of U.S. Agriculture", *Journal of Farm Economics*, Vol. 35(4), pp. 1-14.
[34]Deloach, D.B. and W. Miklius (1961), "Effects of Air Freight Rates on Cut Flower Sales", *Journal of Farm Economics*, Vol. 43(3), pp. 683-690.

growers and shippers in California should find other cost components to lower their total unit cost and compete with growers whose transportation and packaging costs are lower because of their nearness to markets. Thus the combination of a rapidly growing population and higher per capita income in California would further increase total cut flower sales marketed within the state.

Kelly (1961)[35] in his article "*Floriculture Sales in Mass-Market Outlets*" aims to study the consumer acceptance of cut flowers and potted plants offered for sale in selected mass-market retail outlets and to recommend procedures for applying results to other flower, plants and outlets. For experimenting she took three periods, i.e., from 1955-56, 1956-57 and 1957-58, to understand the method of displaying cut flowers and potted plants in three outlets, namely supermarket, variety store and floral shop. During these three periods efforts were made to study the trend of cut flower and pot plants sold weekly in the three outlets and found out that total sale increases when new type of plants were added to display. The study concluded that display of flowers had the desirable impact of high margins, fast turn-over and above-average profits as measured by relatively high weekly sales and returns per square foot of display space in the supermarket.

Morgan (1985)[36] conducted the study to examine cut flower production in and around Warsaw. Cut flower production in Warsaw uses highly intensive method like green houses and other specialized farms to produce high quality flowers to be marketed domestically and internationally. The study shows the trend in flower production and consumption around Warsaw using published data. The study stated that production of commercial flowers reached its peak in 1980-81, mostly contributed by the private farms. The study further presented the rapid change in agriculture and flower industry in and around Warsaw as a result of the use of various specialized inputs such as greenhouses, artificial soil, seeds, seedlings, fuel, heating system, etc. The study emphasize on giving more efforts to expand the existing diseconomies and the possibilities of relocation.

[35]Kelly, R.A. (1961), "Floriculture Sales in Mass-Market Outlets", *Illionois Agricultural Economics*, Vol. 1(2), pp. 19-23.
[36]Morgan, W.B. (1985), op.cit., pp 339-348.

United States International Trade Commission (1989)[37] in order to promote US rose industry domestically as well as in the international market, made a study to identify competitive factors affecting United States Rose growing industry, to analyze the effect of European Community's tariff on world trade in cut roses and bring out those foreign trade practices and barriers affecting US growers to participate in world cut rose trade. The study relates to the period 1985 January to December 1988 and data were collected from published sources and by interviewing company representatives, Govt. officials and researchers.

Import of cut rose which started in the late 1970s in the US saw an increase in its import by 86% i.e. from 159 million stems in 1984 to 314 million stems in 1988, Columbia enjoyed a major share of US import of cut roses of about 76% in 1988. Majority of these imports of about 85% passes through Miami, FL, custom district. On contrary to that, US export of cut roses showed a declining trend which fell from 8.0 million stems in 1984 to 4.7 million stems in 1987. At the same time there has been increase in domestic production from 476.5 to 521.9 million stems (by 9%) in 1985 to 1988. Increase consumption of cut rose in the US was reported with the increase in domestic production, increase in import and decrease in export. This increased consumption was from 637.2 million stems in 1985 to 829.8 million stems in 1988. Programmes and activities were taken up by the US Govt. to promote production and ensure competition among growers. Non-Govt. organization on the other hand took up measures to promote marketing, consumption and other promotional activities. Factors such as market share, production, entry of new growers, prices, profitability, investment in production facilities, consumer preferences and exchange rates were taken to measure market competitiveness for US cut rose industry.

The study found that US growers have been exposed to obstacles from other rose growing countries especially Latin America where the labour rates are lower than the US and other regulations. In spite of the problems, US rose growers have the advantage of market being closely located, advanced technology, better research and development and

[37]United States International Trade Commission (1989), "Competitive Conditions in the US and World markets for Fresh Cut Roses", *Report to Congress on Investigation No. 332-263 Under Section 332(g) of the Tariff Act of 1930 as Amended*, United States International Trade Commission Publication 2178.

better investment facilities. European Community's dual tariff rate has impacted world trade, i.e. 24% ad valorem during summer or peak season to protect its rose growers from foreign competition and a tariff of 17% ad valorem during winter to supplement market demand during off-season when demand is high. Subsidies provided by foreign Govt. to its growers in the form of reduced loan rates, tax rebates, energy conservation inducement and research grants were found to be unfair trade practices and barriers that prevent US growers in the world cut rose market.

Behe *et al.* (1992)[38] study segmentation of supermarket floral customers in Ohio, Columbus, on the basis of their demographic and psychographic characteristics to enable supermarkets and floral managers to make better decision on the variety of flower products they sell. 106-item questionnaire were constructed to measure the area of issues pertaining to supermarket floral purchases which was reduced to 34 factors. Cluster analysis was adopted to arrange homogeneous individuals within groups, thus five homogeneous consumer segments was created on the basis of their attitudes, floral buying behaviour and demographic characteristics. Friendly buyers constitute 20% in the age group of 25 to 34 years who buy flowers for gifts and for themselves. They look for flower package and color and is not concern about the price. Married men also form 20% of the consumers who are in the age group of 45 to 54 years. They buy flowers for their spouse and price and color are important attributes. Selfers form 30% of the consumers who are usually female and are between the age of 25 to 34 years. They purchase flower for their own use and price of flower is important. Annual buyers constitute 25% of the consumer and belong to the age group of 35 and 44 years. They buy flowers once a year and are not concern about the price, color or fragrance. Educated mothers i.e. 45 to 54 years of age, comprise of 5% of the consumers price and they use to buy flowers for special occasions that needs care instructions. Through this segmentation of supermarket floral consumers, supermarket managers can target specific market segments and assist in developing effective marketing strategies that can accurately meet consumer's demand.

[38]Behe, B.K., T.A. Prince and H. K. Tayama (1992), "Market segmentation of Supermarket Floral Customers", *HortScience*, Vol. 27(5), pp. 459-462.

Rooyen and **Rooyen** (1998)[39]. This paper gives an overview of the South African flower industry with respect to its competitiveness and its comparative advantage from an international point of view. To study South Africa's competitiveness in international trade, Balassa's Revealed Comparative Advantage Model has been used and the result shows that South Africa has a comparative advantage in the floriculture sector but has a comparative disadvantage in its share in world exports due to political problems, increase domestic market and low quality flowers. In conclusion the study emphasized the importance of government's support to further develop South African flower industry.

Manzoor *et al.* (2001)[40] made a case study of flower marketing in Pakistan. The main objective of the study was to determine the economies and marketing of selected flowers from producers, retailers, auctioneers to the final consumers to identify the constraints in flower business and to provide the benefits of enhancing flower business in Pakistan. The study was based on primary data collected from Lahore flower market during 1994. Marketing of flowers like Rosestem, Tuberose, Gladiolus, Rose and Marigold were considered, where consumer's rupee was shared between the producer and retailer. They discussed the various problems faced by the producers, retailers and consumers and suggested measures to improve their conditions in the market. They recommended the need to establish a research wing to develop better methods of flower cultivation in order to reduce cost and increase the income of growers and provide valuable information to the producers of flowers to improve quality and reduce wastage during harvesting. They also emphasise the diversion of surplus labour into different activities of flower business and the need to boost export of cut flowers in Pakistan.

Rooyen *et al.* (2001)[41]. This paper makes a comparative study of the competitiveness of the South African and Australian flower industry by applying different methods of analysis. The first method defines the determinants of competitiveness, the second method uses the revealed comparative advantage model and

[39]Rooyen, I.V. and J.V. Rooyen (1998), "Economic Aspects of the South African Flower Industry", *Agrekon*, Vol. 37(4), pp. 541-550.
[40]Manzoor, R., S.A. Shahid and M. Baluch (2001), "Economics of Floriculture in Pakistan: A Case Study of Lahore Market", *Pakistan Economics and Social Review*, Vol. 39(2), pp. 87-102.
[41]Rooyen, I.M.V., J.F. Kirsten and C.J.V. Rooyen (2001), "The Competitiveness of the South African and Australian Flower Industries: An Application of Three Methodologies", *Paper Presented at the 45th Annual Conference of the Australian Agricultural and Resource Economics Society, Adelaide, South Australia.*

the third uses the Policy Analysis Matrix. The study found out that Australian flower industry has an advantage over South Africa in the first method, while South Africa has a distinct advantage over Australia in the second and third methods. The paper concluded by stating that Australian flower industry has a competitive advantage over the South African flower industry. Further South African flower industry has a revealed comparative advantage than the Australian flower industry and the former can produce and compete more competitive and efficient than the Australian flower industry.

Armitage and **Laushman** (2003)[42] through their book give detailed information on the various important methods of producing different cut flowers and post harvest handling methods. The study stated that consumers tend to demand more of those cut flowers which have longer life span. The study emphasize on improving post harvest handling methods for increasing the life of cut flowers and it also highlight the various process of drying cut flowers. The book further presents the various steps for cultivating quality flowers starting from germination to post harvest handling.

Korovkin (2003)[43] in this study deals with evolution of Ecuador's cut flower industry and its effect on rural employment and workers participation on community organizations. The objective of the study was to argue that flower plantation has diminished the problems of peasant facing landless and soil depletion, increase in gender equality at the household and community level and at the same time it has negative effect on the family and on community organization. The study found out that there is an increase participation of rural women as flower workers in cut flower industry and that this industry has help in controlling crises in peasant agriculture. The study suggested that in order to have a share in the international market, Ecuadorian flower exporters have to increase their competitiveness in terms of both quality and production costs. The study concluded by saying that women engaged in cut flower industry tend to spend less time with their family and does not take part in community organization. This leads to weak

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[42]Armitage, A.M. and J.M. Laushman (2003), "Speciality Cut Flowers: The Production of Annuals, Perennials, Bulbs and Woody Plants for Fresh and Dried Cut Flowers", Publishers: Timber Press, Inc., USA.

[43]Korovkin, T. (2003), "Cut Flower Export, Female Labor and Community Participation in Highland Ecuador", *Latin American Perspective,* Vol. 30(4), pp. 18-42.

organizations and is likely to cause deterioration in the already low quality of life in the rural areas.

Chandler and **Lu** (2005)[44] aims to outline the importance and benefits of genetic engineering techniques in ornamental horticulture. They explained about the importance of genetic modification of both cut flowers and pot plants in the form of extending plant life, altering flower colour and scent, reducing black spot disease, resistance to grey mold etc. The study highlighted the obstacles faced by the producers or growers in controlling cost to reduce the use of chemicals to reduce diseases and insects in flowers. The use of genetic engineering technology not only removes obstacles in commercialization but also reduce the cost. Finally the study concluded that there were prospects of more genetically modified ornamental products to be released in the future and this will increase public awareness, but at present there is economic barrier due to high costs associated with the use of genetic engineering technology.

The article, "*Development of Commercial Floriculture in Asia and the Pacific-Issues, Challenges and Opportunities*" by **Khan** (2005)[45] tends to highlight the various countries in Asia and the Pacific that are engaged in marketing of commercial floriculture. The study examines the various issues, challenges and opportunities that are associated with marketing of commercial floriculture and suggested measures to develop it. The study found that increasing production of flowers among the Asian and the Pacific countries has led to competition in the floriculture market, as a result there exist the requirement to produce high quality flowers to be exported to global market. The study suggested that introduction of floriculture crops could be an important intervention as this will enable the farmers to earn more income by exploiting the available natural resources more efficiently. Net profit against investment is much higher from these crops compared to other conventional crops. Further, government should sharpen policies and private initiatives to make it an important player in the world trade of floricultural products.

[44]Chandler, S.F. and C. Lu (2005), op.cit., pp. 591-601.

[45]Khan, M.A. (2005), "Development of Commercial Floriculture in Asia and the Pacific-Issues, Challenges and Opportunities", *The National Seminar on Streamlining: Production and Export of Cut-Flowers and House Plants, Horticultural Foundation of Islamabad, Pakistan,* pp.29-42.

To find out the reason for the sudden boom in flower export in Ecuador, **Sawers** (2005)[46] in his article "*Non-traditional or New-traditional Exports: Ecuador's Flower Bloom*" discusses Ecuador's economy during the pre-reform period and examines the policy changes and the changes in traditional and non-traditional exports that could have probably affected flower exports. The study also analyzed the global flower market to find out whether public policy regime or external conditions are the result of Ecuador's comparative advantage in flower export. The finding of the study shows that the reason for the sudden increase in cut flower exports from Ecuador has been the reduction in anti-export bias of its policy regime by the government, permitting non-traditional exports to exploit their comparative advantage. Further various activities in the global market also added to the boom in Ecuador's flower export. The study concluded that both policy reform in Ecuador and reorganization in the global flower market contributed to the success of flower industry in Ecuador. Ecuador's flower exports are thus both a non-traditional and new traditional exports.

Bolo *et. al.* (2006)[47], studies the contribution made by research in Kenya's cut flower industry. There are weak linkages between the research system and the flower growers because the flower growers are reluctant to share their trading situation to ensure their survival and competitiveness in the market and at the same time the slow procedures in the local research system make the growers to depend on international research institutions. The different attitude of the farmers towards researchers creates weak linkages. This gap created the need to improve the relation among the scientists, researchers, farmers, policy makers and service provider. In conclusion the study emphasized the need of well structured policies to promote the small-scale farmers, identify their innovations and provide them with market information.

[46]Sawers, L. (2005), "Non-tradional or New-traditional Exports: Ecuador's Flower Bloom", *Latin American Research Review*, Vol. 40(3), pp. 40-67.
[47]Bolo, M., N.M. Muthoka, R. Washisino, V. Mwai and D. Kisongwo (2006), "Research Priorities for Kenya's Cut Flower Industry: Farmer's Perspectives", *Technology Brief 14*.

Pun, A.B and **U.K. Pun** (2008)[48] The paper entitled "*Floriculture Research in Nepal*" highlights the various researches on floriculture that has been carried out so as to make research strategy and plans to promote future floriculture growth in Nepal. Nepal being richly endowed with favourable natural resources suitable for the cultivation of flowers however is not able to produce high quality flowers due to lack of modern technology. Development of floriculture sector in Nepal has been mainly contributed by the private sectors with little or no support from the Government. The study therefore emphasized to take up more research work to developed floriculture sector in Nepal in order to promote off-season export of high quality flowers, using specialized method of production.

The article entitled, *"Cut Flower Production and Marketing in Turkey"* by **Baris** and **Uslu** (2009)[49] aimed to study the increase in cut flower production and marketing in Turkey and the problems associated with it. They stated that economic and cultural developments and cooperation with international organizations have further developed cut flower production in Turkey. Cut flower industry not only provides employment and earn net returns but also contributes to fertilizers, agriculture and transportation industries. They highlighted various problems faced by cut flower industry in Turkey. They suggested that different kinds of cut flowers with high market value and marketing techniques should be introduced to the producers and exporters. Since transportation by road takes long time and depreciate the quality of the cut flowers, cargo planes should be introduced to avoid expensive transportation by air freight. Introduction of professional is necessary in production, marketing and training activities to fill the gap of technical knowledge.

Gauchan *et.al* (2009)[50]. This article cover all the aspects of cut flower business in Nepal to provide information on the status of producers and retailers in market condition, area of cut flower production, consumer's demand for flower and import of various cut

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[48]Pun, A.B and U.K. Pun (2008), "Floriculture Research in Nepal", *Agricultural Research for Poverty Alleviation and Livelihood Enhancement. Proceedings of the third Society of Agricultural Scientists, Nepal (SAS-N) Convention*, pp. 266-271.
[49]Baris, M.E. and A. Uslu (2009), "Cut Flower Production and Marketing in Turkey", *African Journal of Agricultural Research*, Vol. 4(9), pp. 765-771.
[50]Gauchan, D.P., A.R. Pokhrel, M. Pratap and P. Lama (2009), op.cit., pp. 87-98.

flowers and plants during off-seasons. With increase in income, urbanization and modernization there has been an increase in the demand for flowers, but lack of development in cut flower industry compelled them to import flowers from other countries during off seasons. The study concluded by giving the following suggestions for the development of cut flower industry: the government should provide financial assistance to the growers at low rate of interest, both the government and the private sector should coordinate, producers and retailers should be trained, modern technology should be adopted, foreign collaboration should be initiated, etc.

Jahan (2009)[51] made an attempt to analyze the costs and return structures of cut flower production, post harvest handling and marketing in Bangladesh. The study was based on primary data collected from 80 respondents in 2006 covering farmers, local traders, wholesalers cum retailers and retailers. The study highlighted the various cost incurred in the process of production and marketing of flowers. The study further examined the various problems faced by the farmers in the process of production as well as the problems faced by the different intermediaries in the process of marketing. The findings of the study indicate that production of flower is a profitable business where its yield is double the cost of production. The study suggested that with the growing demand for cut flower in the domestic as well as international market, effort should be made by the Government and private entrepreneurs to develop floriculture industry on scientific lines.

Ahmad *et al.* (2010)[52] studies present status and future prospects of cut rose production in Punjab, Pakistan. Primary data were collected from 67 growers out of which 40 growers were randomly selected. Out of the 40 growers, 26 growers have educational qualification below grade 10 and the remaining 14 above grade 12. 57% of the growers have small holdings i.e. below 1 hectare. Flowers were marketed in the domestic market as their produce was of low quality. It is interesting to note that majority of the growers demanded training facilities in post harvest handling and soil and nutrition

[51]Jahan, H. (2009), "Production, Post Harvest Handling and Marketing of Cut-Flowers in Bangladesh: An Agribusiness Study", *South Asian Association for Regional Corporation Journal of Agriculture*, Vol. 7(2), pp. 1-14.

[52]Ahmad, I., J.M. Dole, M.A. Khan, M. Qasim, T. Ahmad and A.S. Khan (2010), "Present Status and Future Prospects of Cut Rose Production in Punjab, Pakistan", *HortTechnology*, Vol. 20(6), pp. 1010-1015.

management to enable them to improve the quality of flowers. Over the years there has been an increased participation in cut rose production, its importance has been realized and efforts were made to developed cut rose production in Punjab.

Kargbo *et al.* (2010)[53]. This paper focuses on the progress and issues confronting floriculture industries of the Netherlands, China and Kenya. The Netherland is the largest producer and exporter of flowers in the world having a market share of 70-75% but its export declined to 3.9% in 2008. The Netherlands shifted its export item to planting materials with its major market in the African and Asian countries, Kenya importing 17.2% of the Dutch planting materials and China 36.6% in 2008. The Netherland's world flower production formed only 10% while the country's export volume stands at 60% in 2008. In later years it became the largest auction centre for flower producing countries. China with low labour cost is able to produce flowers at low cost and became a major producer whose market grew at an annual rate of more than 20% between 2004 and 2006. China also started online marketing of flowers but due to its perishable nature success of flower market mainly depend on efficient transportation system. Kenya flower industry solely depends on global markets for its planting materials as well as market for its produce which posses a thread for future sustainability of the industry. Environmental pollution through the use of chemicals in flower industry has been a threat to this industry and so efforts should be made to use best production practices for pollution free environment.

Mano *et al.* (2010)[54]. This paper attempts to examine the employment process through local and personal networks and the emergence and development of the labour market in Ethiopia's cut flower industry. The study is based on primary data collected through filed survey where 320 workers were randomly selected from all 64 farms. Employment through local and personal network tends to generate lower wages than those employed formally because in the early period of employment the referred workers are inexperience but as years pass they are able to increase their productivity and hence

[53]Kargbo, A., J. Mao and C. Wang (2010), "The Progress and Issues in the Dutch, Chinese and Kenyan Floriculture Industries", *African Journal of Biotechnology*, Vol. 9(44), pp. 7401-7408

[54] Mano, Y., T. Yamano, A. Suzuki and T. Matsumoto (2010), "Local and Personal Networks in Employment and the Development of Labour Markets: Evidence from the Cut Flower Industry in Ethiopia", *National Gratitude Institute for Policy Studies Discussion Paper 10-29.*

wage difference disappears. The paper in conclusion emphasize on the role played by the Government to developed the labour market and emphasize the importance of education in order to have better skills fitted for cut flower industry in Ethiopia.

Qin *et al.* (2010)[55]. This article made an attempt to analyze the development of Chinese flower auction market and makes a comparative study between two flower auction market i.e. Flora Holland of Netherland, world's largest flower auction market, and Kunming International Flower Auction Market (KIFA), China's largest flower auction market. The study found that the reason for the gap between the two auction market while comparing their operational goals and performances. Compared to KIFA of China, Flora Holland is more developed and organized in terms of structure, transaction services and information on market, stability and reliability of supply, destination of sale, logistics systems and standardization. Various strategies have been emphasized for developing Chinese flower auction markets such as improving the services provided to the growers and buyers, achieve highest possible price at the lowest possible expense for the participants, standardizing the products, adopting proper mechanism and improving operational performance.

Bagchi and **Raha** (2011)[56] have emphasized on post harvest losses of selected flowers and its impact on farmer's net price, marketing margin and efficiency and also estimate producer's share in consumer's price at different stages of handling of the produce. The study is based on primary data collected from 95 respondents selected randomly from the districts of Jessore and Dhaka in Bangladesh. The study estimated the post harvest losses at 39.82% for retailer, 27.52% for wholesaler, 18.87% for producer and 13.78% for local traders for hundred of all flowers. Farmer's net income after deducting post harvest losses for rose, marigold, gladiolus and tuberose were 6.22%, 39.56%, 2.79% and 5.53% respectively. With post harvest loss, marketing margins were found to be 8.88% for wholesalers, 7.65% for retailer and 6.14% local traders and producer's share in consumer's price for rose, marigold, gladiolus and tuberose was

[55]Qin, K., X. Jiang and B. Yang (2010), "How to Develop Chinese Flower Auction Markets: Results from a Comparative Analysis", *iBusiness*, Vol. 2, pp. 382-388.
[56]Bagchi, M. and S.K. Raha (2011), "Post Harvest Loss of Flower and its Impact on Flower Marketing in Bangladesh", *Economic Affairs*, Vol. 56(2), pp. 205-211.

20.05%, 22.51%, 30.32% and 35.35% respectively. Tuberose was found to be the most efficient flower in the market. Some of the major reasons for post harvest loss of flowers were due to lack of storage facilities, weak transportation and communication system, lack of infrastructure, traditional packing and post harvest methods. To improve the condition of the grower the study recommend to provide flower storage facilities, scientific method of production, development of floriculture research, development of infrastructure and post harvest management.

Kaur and **Saleem** (2011)[57] in their study examined to understand the role of cut flower in the world trade and to make comparative analysis of export-import of cut flowers in India with top five floriculture countries in the world, namely Japan, UAE, Italy, Canada and Australia, on the basis of secondary data collected. There has been a decline in India's export of cut flowers from 2007-08 to 2009-10 because of paucity of motivation from the Government. Indian exporters are unable to increase their exports due to lack of infrastructural development like bad interior road, inadequate refrigerated transport and storage facilities, lack of professional back up of delivery etc. The study suggested that the Government of India should encourage the growth of cut flower industry and make effort to increase its exports. Since flower business is still in its growing stage efforts should be made by the Government to improve this business by organizing various seminars, programmes, conferences etc.

Mou (2012)[58] made an attempt to estimates the productivity and profitability of flower production versus its competing crops to determine the value chains and channels of flower marketing in Bangladesh. Primary data were collected through stratified random sampling method from 32 farmers and 21 traders, wholesalers cum retailer and retailers in Mymensingh district. Per hectare return over cash cost of flower and vegetable production were Tk. 1359824.20 and 46362.14 respectively. This shows that production of flower generates more revenue than that of vegetables. Some of the problems faced by the farmers and intermediaries associated with flower production were

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[57]Kaur, K. And I. Saleem (2011), " The Growth of Cut Flowers in India and its Trade with Japan, United Arab Emirates, Italy, Canada and Australia", *Journal of Asian Business Management*, Vol. 3(2), pp. 353-364.

[58]Mou, N.S. (2012), "Profitability of Flower Production and Marketing System of Bangladesh", *Bangladesh Journal of Agricultural Research*, Vol. 37(1), pp. 77-95.

lack of mother stock, high price of fertilizers and insecticides, lack of scientific knowledge and training, attack by pest and disease, poor transportation and communication system, spoilage, etc. Keeping these problems in mind floriculture industry can be developed through increased participation of government and non-government agencies, improve the market information system and providing credit to the farmers and entrepreneurs.

According to **Muhammad-Lawal *et al.*** (2012)[59] floricultural activity has the ability to add to a country's economy by realizing its aesthetic value and promoting its development. In Nigeria this sector has not been given due importance in spite of its contribution to their economy and so this study was made to examine the economics of floricultural plant production and assess the determinants of its return in the study area. A total of 41 registered floricultural nursery operators in the state of Kwara, Nigeria were interviewed. Frequency and percentages were adopted to study socio-economic characteristics and marketing strategies of the respondents on the other hand regression analysis was used to measure cost and returns taking into account the variability of dependent and independent variables. The study found that majority of the respondents were in the age group of 26 to 40 belonging to the family size of 1 to 6 members, majority of them have higher education and the average years of experience was 11.1 years. The respondents used two marketing channel i.e. direct sales alone (34.20%) and contract and direct sale (65.80%). Regression analysis reveals that of the eight variables, i.e. age, experience, household size, farm size, fertilizer used, manure used, labour man-days and educational level have expected signs and statistically significant with dependent variable and accounted for about 91.66% variation in the total revenue. Inadequate capital was reported to be the major problem for the respondents to increase their productivity. To conclude the study, for development of this sector, loans should be made available to the farmers to increase production and create awareness on the use of flowers and encourage youth to enter into this business and create self employment.

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[59]Muhammad-Lawal, A., A.H. Adenuga, K.B. Olatinwo and T.A. Saadu (2012), "Economic Analysis of Floricultural Plants Production in Kwara State, North Central Nigeria", *Asian Journal of Agriculture and Rural Development*, Vol. 2(3), pp. 373-380.

Usman *et al.* (2014)[60] made an economic analysis of rose cut flower in Punjab, Pakistan to estimate the gross margins, net income, benefit cost ratio and the impact of various socio-economic and agronomic factors on the rose cut flower productivity. Cobb-Douglas production function was used to analyze cut flower production data. The study reveals that medium and small farmers tend to receive higher prices than the larger farmers because they have small holdings which enable them to concentrate on producing quality cut rose flowers and thus fetch them higher prices in the market. The study shows that medium farmers have highest yield per acre per year i.e. 812683 pieces followed by large farmers i.e. 769562 pieces and small farmers 736426 pieces. Gross margin per year was highest for small farmers (Rs. 785473) followed by large farmers (Rs. 699200) and medium (Rs. 546088). The net incomes for small farmers were Rs. 759065, medium farmers were Rs. 519680 and large farmers were Rs. 672792. Benefit cost ratio was highest for the small farmers i.e. 2.84:1 followed by large 2.57:1 and medium 2.23:1. Different socioeconomic and agronomic factors have positive and significant impact on the yield of rose cut flower. In conclusion the study suggest the need to provide formal education on production, investment in land preparation technology and agriculture labour productivity, development of market and infrastructure, introduction of cheap and effective pesticides and promote the use of FYM.

SECTION III

1.3 PROFILE OF THE STUDY AREA

Floriculture in Nagaland has emerged as a major diversification option in the agri-business over the last 10 years. Based on the accessibility and agro-climatic suitability, the Horticulture Department of Nagaland selected the districts of Kohima, Mokokchung, Wokha and Dimapur for commercial production of high quality flowers which are of international standard under Horticulture Mission for North-East and Himalayan States (HMNEH). However, for study purpose the districts of Kohima and Dimapur have been

[60]Usman, M., M. Ashfaq, S. Taj and M. Abid (2014), "An Economic Analysis of Cut-Rose Flower in Punjab, Pakistan", *Journal of Ancient Plant Science*, Vol. 24(2), pp. 651-655.

selected keeping in view the difference in climatic conditions and infrastructural facilities and the maximum concentration of flower production and marketing in these two districts. In addition to this, the district of Kohima being the capital of the State and Dimapur being the only city and the commercial hub of the State.

1.3.1 Geographical location of Nagaland and the districts of Kohima and Dimapur

Nagaland became the 16th State of India in 1963 after emerging from the state of Assam and North East Frontier Agency (NEFA). Statehood of Nagaland brought about major changes in the land by paving the way for peace, stability, improved investment and economic development. Nagaland is located in the North-Eastern part of India bordering the state of Assam in the west, Arunachal Pradesh and part of Assam in the north, Myanmar in the east and Manipur in the south. The state has 11 districts inhabited by 16 major tribes making the districts unique with their socio-political, traditional, cultural and linguistic characteristics. The State is mainly hilly and mountainous and agriculture is the main occupation of the people where 71% of the population is engaged in agriculture. Rice being the staple food of the people constitutes about 70% of the cultivated area. Traditionally land use pattern of cultivation is jhum or shifting/slash and burn and this is widely practiced across the State.

Table 1.3.1 shows the geographical features of Nagaland and the selected districts i.e. Dimapur and Kohima. The state covers a total geographical area of 16,579 sq. km constituting about 0.5% of the country's geographical area. It lies between the geographical coordinates of 25˚6′ and 27˚4′ North latitudes and 93˚20′ and 95˚15′ East longitude. The altitude varies from 194 m in the plains to 3840 m above sea level in the hills. The State receives an annual rainfall of 2000 mm and the maximum average temperature in summer is recorded to be 31 degree Celsius while winter temperature goes down to as low as 4 degree Celsius. The State is well endowed with favourable agro-climatic condition suitable for the cultivation of varieties of agricultural and horticultural crops, which mainly depends on rainfall for irrigation. However, massive deforestation in recent years has led to tremendous change in the climate of the State. The population of the State is predominantly rural with 71% living in villages.

Table 1.3.1: Geographical characteristics of Nagaland and the selected districts

Geographical features	Nagaland	Districts	
		Kohima	Dimapur
Area (sq. Km.)	16579	1595	927
Northern Latitude	25˚6′ and 27˚4′	25˚40′	25˚54′
Eastern Longitude	93˚20′ and 95˚15′	94˚07′	93˚44′
Altitude above sea level	194 m and 3048 m	1444.12 m	260 m
Climate	Humid and moderate	Moderate	Hot and humid
Annual Rainfall	2000mm	2000mm	1504.7mm
Major irrigation source	Rainfall	Rainfall	Rainfall
Major rivers	Dhansiri, Doyang, Dikhou and Tizu	Dzii	Dhansiri

Source: Statistical Handbook of Nagaland 2014, Directorate of Economics and Statistics, Nagaland; Kohima.

Kohima, the State capital of Nagaland is one of the oldest districts in the State. It is situated at an altitude of 1,444.12 m above the sea level and covers a total geographical area of 1595 sq. Km. constituting about 19% of the total geographical area of the State. The latitude of the district is 25˚40′ north and longitude is 94˚07′ east. Kohima is surrounded by the state of Assam and Dimapur district in the west, Phek district in the east, Manipur State and Peren district in the south and Wokha district in the north. Kohima district has a pleasant and moderate climate receiving an annual rainfall of 2000mm. The temperature of Kohima ranges from 25 to 16 degree Celsius in summer and 23 to 8 degree Celsius in winter. It is mainly inhabited by the Angamis and Rengmas however the district is also inhabited by various other communities.

Similarly, in Dimapur district, one and only city in Nagaland is situated at an altitude of 260 m above sea level, covering an area of 927 sq. Km. and it constitutes 5.59% of the total geographical area. The latitude of the district is 25˚54′ north and longitude is 93˚44′ east. It is situated at a distance of 74 km from the State capital Kohima. Dimapur district is bounded by Kohima district in the south and east, Karbi Anglong district of Assam on the west, Karbi Anglong and Golaghat districts of Assam in the west and the north. The district is known as the ‘rice bowl of Nagaland’, as the famous ‘Ghaspani Nagaland Special’ is cultivated in Medziphema area. The district of Dimapur has hot and humid climate during summer and cool and pleasant climate during winter. The average summer temperature ranges from 22 to 36 degree Celsius while winter temperature ranges from 12 to 28 degree Celsius and receives an average annual rainfall of around 1504.7mm. The district has heterogeneous population where the majority population comprises of Naga tribes and the rest from different parts of the country.

1.3.2 Demographic Profile

The demographic information of Nagaland according to the 2011 census is indicated in table 1.3.2. As per the table, the state has a total population of 1,978,502 comprising of 1,024,649 male and 953,853 female, it accounts to 0.16% of the total population. The density of population is 119 persons per sq. km. Sex ratio is 931 females per 1000 male, with 940 females per 1000 male in rural areas and 940 in urban areas. The literacy rate is 79.55% with 82.75% male and 76.11% female. The state has a total number of 1307 villages, 266581 households and 52 blocks according to the Data Based on Village Level Development Indicators compiled by Directorate of Economics and Statistics Nagaland, Kohima. The total working population is 974122 of which main workers constitute 741179 people, among the main workers, cultivators are 56.72%, agricultural labourers are 3.04 %, workers in household industries are 1.28% and other workers are 38.95%. On the contrary to that marginal workers constitute 232943 and the total non-working population comprises of 1004380 people. It is interesting to note that non-working population in the State is higher than working population during the census year of 2011.

Similarly, in Kohima district as per 2011 census, recorded a total population of 267988 comprising of 138966 males and 129022 females. The density of population is 183 persons per sq. km. with sex ratio of 928 females per 1000 male (924 in rural 934 in urban areas). The district has a literacy rate of 85.23%, male literacy at 88.69% and female at 81.48%. Based on the findings from the Village Level Development Indicators, Kohima district have 98 villages, 34912 households and 7 blocks. The total working population stands at 114825 of which main workers constitute 99408 and marginal workers constitute 15417. Of the main working population, cultivators consist of 38.24%, agricultural labourers only 0.92%, workers in household industries 2.97% and other workers constitute 59.70%. The total non-workers population stands at 153163.

Table 1.3.2: Demographic features of Nagaland and selected districts (2011 census)

Sl. No.	Demographic features	Nagaland	Districts	
			Kohima	**Dimapur**
1.	Population	1978502	267988	378811
	a) Male	1024649 (51.79)	138966 (51.85)	197394 (52.11)
	b) Female	953853 (48.21)	129022 (48.14)	181417 (47.89)
2.	Density of population	119	183	409
3.	Sex ratio	931	928	919
	a) Rural	940	924	937
	b) Urban	908	934	903
4.	Literacy rate	79.55	85.23	84.79
	a) Male	82.75	88.69	87.54
	b) Female	76.11	81.48	81.77
5.	No. of villages	1307	98	217
6.	No. of household	266581	34912	39255
7.	No. of blocks	52	7	8
8.	Total workers	974122	114825	151350
	a) Main workers	741179 (100)	99408 (100)	122358 (100)
	i. Cultivators	420379 (56.72)	38017 (38.24)	20591 (16.83)
	ii. Agricultural labourers	22571 (3.04)	911 (0.92)	4506 (3.68)
	iii. Working in household industries	9525 (1.28)	1131 (2.97)	2338 (1.91)
	iv. Other workers	288704 (38.95)	59349 (59.70)	94923 (77.58)
	b) Marginal workers	232943	15417	28992
9.	Total non-workers	1004380	153163	227461

Source: Statistical Handbook of Nagaland 2014 and Data Based on Village Level Development Indicators as on 31/03/14, Directorate of Economics and Statistics Nagaland, Kohima.
Note: Figures in parenthesis are percentage to the total.

Whereas in Dimapur district, according to 2011 census, the total population is 378811, which is higher than Kohima, with 197394 male and 181417 female population. The density of population stands at 410 persons per sq. Km. Sex ratio is 919 female per 1000 male (937 in rural and 903 in urban areas) which is lower than Kohima's sex ratio indicating higher gender disparities. Literacy rate of Dimapur is also lower than Kohima i.e. 84.79%, with male literacy at 87.54% and female at 81.77%. Dimapur has 217 villages, 39255 households and 8 blocks. The total workers and non-workers is however higher than Kohima i.e. 151350 and 227461 respectively. Total working population which is divided between main and marginal workers as shown in the table above comprises of 122358 and 28992 respectively. Other workers form a major share in the main working population with 77.58% while working population in household industries the least with 1.91%. The table reveals that Kohima district is slightly better than Dimapur district in demographic condition during the study period.

1.3.3 Land Distribution under Different Uses

Table 1.3.3 gives an illustration of land use pattern in Nagaland and the selected study districts. The state covers a total geographical area of 1657900 ha out of which, area under forest covers 862930 ha, land not available for cultivation is 95378 ha., land under other uncultivated land excluding fallow is 160638 ha., fallow land covers an area of 149342 ha., net sown area is 383851 ha., total cropped area, area sown more than once, net irrigated area and gross irrigated areas are 500073 ha., 116222 ha., 96850 ha and 106000 ha respectively.

Similarly the land distribution under different uses in Kohima and Dimapur districts is also presented in table 1.3.3. The table indicated that in Kohima district which covers a geographical area of 159500 ha have been distributed for different uses. Forest covers an area of 101200 ha, land under non agriculture and barren land covers 9365 ha, other uncultivated land covers 7108 ha, while fallow land and net sown area constitute 7617 ha and 33849 ha respectively. Land available for cultivation is 10310 ha and net irrigated area is 9460 ha.

On the contrary to that the district of Dimapur covers a geographical area of 92700 ha forming only 5.59% of the total geographical area of the state which is lower than that of Kohima. Its area under forest cover, uncultivated land and fallow land is also lower than that of Kohima, i.e. 16571 ha, 4037 ha and 3911 ha respectively. Whereas, the area available for cultivation (10700 ha), net sown area (57368 ha), net irrigated area

(35890 ha) and gross irrigated area (37790 ha) is higher than the counterpart district of Kohima.

Table 1.3.3: Land use pattern in Nagaland and the selected districts (2014-15)

(in Hectares)

Sl. No.	**Land Particulars**	**Nagaland**	**Districts**	
			Kohima	**Dimapur**
1.	Geographical area	1657900	159500	92700
2.	Reporting area for land utilization statistics (a to e)	1652139	159139	92587
	a) Forest	**862930**	**101200**	**16571**
	b) Non available for cultivation (i+ii)	**95378**	**9365**	**10700**
	i) Land put to non agriculture uses	92882	9170	10449
	ii) Barren and uncultivable land	2496	195	251
	c) Other uncultivated land excluding fallow land (i+ii)	**160638**	**7108**	**4037**
	i) Land under miscellaneous tree crops & groves not included in net area sown	92216	2552	2025
	ii) Cultivable waste land	68422	4556	2012
	d) Fallow land (i+ii)	**149342**	**7617**	**3911**
	i) Fallow land other than current fallow	98950	5510	2556
	ii) Current fallow	50392	2107	1355
	e) Net Area sown(3-4)	**383851**	**33849**	**57368**
3.	Total cropped area	500073	44699	80866
4.	Area sown more than once	116222	10850	23498
5.	Net irrigated area	96850	9460	35890
6.	Gross irrigated area	106000	10310	37790

Source: Directorate of Agriculture, Government of Nagaland.

1.3.4 Cropping Pattern

Agriculture practice in the State is largely based on traditional method of cultivation, mostly organic with little knowledge of fertilizer usage, using traditional tools and old method of irrigation which depends mainly on rain. Within the State farmers follow different cropping pattern based on the different climatic conditions and soil fertility prevailing in different districts which again reflects cropping intensity. Varieties of crops are cultivated in the State which has been categorized as cereals,

Table 1.3.4: Area and production of principal crops in Nagaland and the two selected districts

(Area in Hectare and Production in MT)

Major crops	**Area and production**	**Nagaland**			**Kohima**			**Dimapur**		
		2011-12	**2012-13**	**2013-14**	**2011-12**	**2012-13**	**2013-14**	**2011-12**	**2012-13**	**2013-14**
Cereals	Area	264750	267050	273300	20640	20800	21510	52750	53550	54490
	Production	533270	558510	583680	41400	43420	46150	119130	125430	131040
Pulses	Area	34940	36200	36750	2910	3020	3020	2050	2340	2480
	Production	37170	40450	41600	2930	3270	3320	1860	2330	2490
Oil seeds	Area	66280	66820	67100	5380	5410	5450	8680	8780	8850
	Production	67580	68900	69300	5580	5580	5640	7940	8610	8710
Commercial crops & others	Area	31240	34900	32930	3660	4160	3800	6230	5970	6450
	Production	385800	443750	404350	35880	41950	38460	74630	79660	77270
Total	Area	397210	404970	410080	32590	33390	33780	69710	70640	72270
	Production	1023820	1111610	1098930	85790	94220	93570	203560	216030	219510

Source: Statistical Handbook of Nagaland 2014, Directorate of Economics and Statistics, Government of Nagaland, Kohima.

pulses, oil seeds, commercial crops and others for discussion which is illustrated in table 1.3.4.

a) Cereals

Cereals, which include rice, maize, millet, wheat etc, occupy the major area under cultivation and also constitute majority of the agricultural production in Nagaland. It is evident from the table (table 1.3.4) that the State has witnessed and increasing trend both in area as well as production during 2011-14. Total area under cereals in 2011-12 was 264750 HA with a production of 533270 MT which increased to 273300 HA producing 583680 MT in 2013-14. In Kohima district it increased from 20640 HA producing 41400 MT in 2011-12 to 21510 HA producing 46150 MT in 2013-14, whereas in Dimapur district it increased from 52750 HA to 54490 MT in 2011-12 and 2013-14 respectively.

b) Pulses

Total area and production under pulses in the State is also showing an increasing trend, where its area increased from 34940 HA producing 37170 MT in 2011-12 to 36750 HA producing 41600 MT in 2013-14. Similarly in Kohima district area under pulses was 2910 HA in 2011-12 which increased to 3020 HA in 2013-14 showing a steady growth. In Dimapur district, in 2011-12, area under pulses cultivation was 2050 HA and in 2013-14 it increased to 2480 HA which is lower than that of Kohima district during the same period.

c) Oil seeds

In 2011-12, total area under oil seeds production in the State was 66280 HA which was further expanded to 67100 HA in 2013-14, accordingly, its production increased from 67580 MT to 69300 MT during the same period. Area under oil seeds cultivation in Kohima district was 5380 HA in 2011-12 and in 2013-14 it increased to 5450 HA whereas in Dimapur district it increased from 8680 HA to 8850 HA in 2011-12 to 2013-14 respectively.

d) Commercial crops and others

Commercial crops also form an important item of agricultural products which constitute sugar cane, potato, tapioca, ginger etc. Total area under commercial crops and others in the State during 2011-12 was 31240 HA producing 385800 MT and in 2013-14 it was increased to 32930 HA where its production stands at 404350 MT. In Kohima and Dimapur districts, area under commercial crops and others increased from 3660 HA to 3800 HA and 6230 HA to 6450 HA during 2011-12 to 2013-14 respectively.

1.3.5 Infrastructure

Infrastructure is the key to socio-economic development of every society. Developmental activities can only take place when a sound infrastructural facility in the form of schools, roads, hospitals, safe drinking water etc. is available to the population at large. The State Government has adopted various strategies and programmes to provide basic infrastructure to the people to develop them socially and economically. The success of the State Government in infrastructural development is evident from table 1.3.5.

The table indicates that number of schools in 2007-08 was 2533 which rose to 3415 in 2013-14 in the State and the no. of Degree College increased from 58 in 2012-13 to 61 in 2013-14. No. of Banks in the State stood at 62, district hospital 10, community health centre, and primary health centre was 18 and 112 respectively. The no. of district and sub-district industries centre were 11 and 6 while surface and unsurface road stood at 570 and 928 respectively. The no. of postal service, marketing shed and public toilet were 247, 414 and 429 respectively.

Similarly in Kohima district, the number of degree colleges was 20 and Dimapur district was 24, on the other hand the total banks were 11 in Kohima and 23 in Dimapur, no. of district hospitals, community health centre, and primary health centre were1, 3 and 14 in Kohima and 1, 2 and 8 in Dimapur respectively. Both the districts have 1 district and 1 sub-district industries centre each. Surface and unsurface road in Kohima was 64 km and 48 km and in Dimapur it is 77 km and 158 km. Dimapur have 111 marketing shed whereas Kohima have only 42 which is not even half of Dimapur as per 2013-14 data. No. of public toilet in Kohima which stood at 54 is also lower than that of Dimapur in which the total number is 67. The study reveals that in infrastructure facilities, Dimapur district is better than that of Kohima during the year 2013-14, in which Dimapur is commercial and business hub for the State of Nagaland.

Table 1.3.5: Infrastructural facilities in Nagaland and selected districts (2013-14)

Sl. No.	Particulars		Nagaland	Districts	
				Kohima	Dimapur
1.	No. of School Level Educational Institutions		3415	NA	NA
	a) Central		28	NA	NA
	b) State		2649	NA	NA
	c) Private		738	NA	NA
2.	No. of Degree Educational Institutions		61	20	24
	a) Government		15	3	1
	b) Private		46	17	23
3.	Number of Banks		62	11	13
4.	District Hospital		10	1	1
5.	Community Health Centre		18	3	2
6.	Primary Health Centre		112	14	8
7.	District Industries Centre		11	1	1
8.	Sub-District Industries Centre		6	1	1
9.	Road	Surface	570	64	77
		Unsurface	928	48	158
10.	Postal service		247	35	37
11.	Marketing shed		414	42	111
12.	Public toilet		429	54	67

Source: Statistical Handbook of Nagaland 2014 and Data Based on Village Level Development Indicators as on 31/03/14, Directorate of Economics and Statistics Nagaland, Kohima.

Recapitulation

This chapter reviewed on the past literatures on floriculture especially cut flowers, production and marketing, issues and challenges, prospects and policy implications for development of flower industry, which has been used as the base for this research work. Profile of the study area i.e. Kohima and Dimapur districts have been discuss pertaining to the geographical location, demography, land distribution for different uses and infrastructure availability.

Chapter II

DEVELOPMENT OF FLORICULTURE IN NAGALAND

2. Introduction

This chapter discusses the various developmental activities and policy programmes that were introduced in the floriculture industry especially cut flowers to promote this sector in order to enable the flower growers to earn a subsistence living. Since 2004-05 efforts have been made both by the State Horticulture Department and growers to develop this sector with improved methods of production and to meet the increasing demand of local consumers. Though flowers can be produce in all parts of Nagaland, during the initial stage of commercializing floriculture, the State Government have focused mainly on four districts namely Kohima, Dimapur, Wokha and Mokokchung to cultivate commercial cut flowers due to easy accessibility and nearness to the market which was later on extended to the remaining nine districts of the State.

This chapter is divided into three sections. Section I discusses the various developmental activities adopted by the Indian Government; section II studies the activities and programmes adopted by the State Government and State Horticulture Department to promote floriculture sector; and section III deals with the socio-economic profile of the selected growers and retailers in Dimapur and Kohima districts.

SECTION I

2.1 FLORICULTURE DEVELOPMENT IN INDIA

Floriculture sector in India is perceptible from the various improved and modern technologies that have been introduced. Apart from this, efforts has also been made to promote this sector by organizing floral expo by private undertakings which is a combination of International Landscape and Gardening Expo and International Florist and Floral Art Expo organized by the Media Today Group and iFlora. Such flower expo was for the first time held in Bangalore in 2005 where both national and international flower growers and other intermediaries associated with floriculture were able to come together to showcase their produce and interact with each other to further supplement their knowledge. Realizing the importance of floriculture industry in enabling the country to earn foreign exchange, Government of India (GOI) have confided Agricultural and Processed Food Products Export Development Authority (APEDA) as the main agency in promoting floriculture exports from the country.

Taking into account the importance of horticulture and floriculture in particular and its contribution to agricultural sector, GOI has introduced various developmental programmes through various schemes, some of which are Agricultural and Processed Food Products Export Development Authority(APEDA), National Horticulture Board (NHB), National Horticulture Mission (NHM), Horticulture Mission for North-East and Himalayan States (HMNEH), Mission for Integrated Development of Horticulture (MIDH) etc.

2.1.a Agricultural and Processed Food Products Export Development Authority (APEDA)

Agricultural and Processed Food Products Export Development Authority (APEDA)[61], established by the Ministry of Commerce, Government of India, under the Agricultural and Processed Food Products Export Development Authority Act was passed by the parliament in December 1985 which came into effect from 13th February, 1986. It is an agri-export community to reach out to exporters in different parts of the country. It is actively looking after market development, development of export oriented industries, improvement of infrastructure and quality to promote export of agricultural products and also provide financial assistance to registered exporters under this scheme for market development, infrastructure development, quality development, improvement in packaging, providing training for the scheduled products and transport assistance.

[61] Agricultural and Processed Food Products Export Development Authority (APEDA). Retrieved on 16/4/2016 from apeda.gov.in

2.1.b National Horticulture Board (NHB)

National Horticulture Board[62] was initiated by the Department of Agriculture and cooperation, Ministry of Agriculture, GOI in 1984 as an autonomous society under the Societies Registration Act 1860 with its headquarter at Gurgaon. It covers all States and Union Territories of the country focusing mainly on commercial horticulture. The funding of the board is solely by the GOI in the form of grant-in-aid. The Board was started to promote integrated development of horticulture, help in coordination, sustaining production and processing of horticulture crops, promote post harvest management, developed hi-tech production of commercial crops, establish better infrastructure in the field of production, processing and marketing to reduce loss, promotion and market development of fresh horticultural crops and promote Research and Development.

Through this board, various trainings were initiated on production of horticultural crops using advanced technology, horti fair and melas were organized to enable the farmers to showcase and market their produce, financial subsidies were allotted, modern technologies were also imported from Israel, field demonstration on the use of imported machineries were imparted to the farmers, etc.

2.1.c National Horticulture Mission (NHM)

National Horticulture Mission (NHM)[63] was launched under the Xth Five Year Plan in 2005-06, during the XIth Five Year Plan assistance from the Government of India was 85% and 15% was from the State Government. It was implemented by State Horticulture Missions (SHM) in selected districts of 18 States and four Union Territories. This Mission covers all States and Union Territories except North East and Himalayan States. It was started with the objectives to provide all round growth and development of horticulture products, post harvest management, improve nutritional security and financial support to farm households, disseminate technologies by intermixing both

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[62]Annual report 2009-10, National Horticulture Board (NHB), Ministry of Agriculture, Government of India.

[63] National Horticulture Mission ,Government of India. Retrieved on 9/11/2016 from https://en.m.wikipedia.org>wiki>Natio...

traditional and modern scientific knowledge and create employment opportunities for both skilled and unskilled persons, especially unemployed youth.

2.1.d Horticulture Mission for North-East and Himalayan States (HMNEH)

Technology Mission for integrated Development of Horticulture for North-East[64] was initiated in 2001-02 to improve livelihood opportunities and to bring prosperity in North-East region. It was further extended to Jammu and Kashmir, Himachal Pradesh and Uttarakhand in 2003-04 and was renamed as Horticulture Mission for North-East and Himalayan States (HMNEH). The Mission looks into technology and technological development, demonstration of technologies, expansion of area for production, introduction of quality planting material, organic farming, efficient water management, post harvest management, processing of horticultural produce and marketing. It gives more emphasis to high value crops like tomato, capsicum, strawberry and flowers to ensure quality production. The aims of the mission have been achieved through four mini missions namely:-

a) **Mini Mission I – Research**: This mission is coordinated and implemented by Indian Council of Agricultural Research. It concentrates on introduction of modern technologies suitable for the region. Through this Mission, production and supply of seed and quality planting materials, technology upgradation, standardization and refinement of the produce and farm demonstration and trainings are provided to the farmers.

b) **Mini Mission II – Production and Productivity**: This mission is coordinated by Department of Agriculture and Cooperation and implemented by State Departments of Horticulture or Agriculture. It aims at improving production and productivity by adopting modern technologies.

c) **Mini Mission III - Post Harvest Management and Marketing**: This mission is coordinated by Department of Agriculture and Cooperation

[64] Annual Report, 2010-11, Horticulture Mission for North-East and Himalayan States, Small Farmers' Agribusiness Consortium (SFAC), Ministry of Agriculture, Government of India.

and implemented by Directorate of Marketing and Inspection and National Horticulture Board. It aims at efficient post harvest management and techniques and development of cold storage facilities and transport and marketing aspects.

d) **Mini Mission IV – Processing**: This mission is coordinated and implemented by Ministry of Food Processing Industries, Government of India. It aims at setting up of new processing units and upgradation of the existing units.

2.1.e Mission for Integrated Development of Horticulture (MIDH)

Mission for Integrated Development of Horticulture (MIDH)[65] was started during the 12th Five Year Plan in the year 2014-15.It has integrated NHB, NHM, HMNEH, National Bamboo Mission, Coconut Development Board and Central Institute for Horticulture, Nagaland. This is a centrally sponsored scheme for the overall growth of horticulture sector. Under this mission, 85% of the total outlay is financed by the Government of India, 15% is financed by the respective State Government except North-East and Himalayan States. In North East and Himalayan States 100% is financed by the Government of India.

The main aim of this mission is to enhance horticulture production and productivity, encourage skill development and generate employment opportunities for rural youth in horticulture and post harvest management. It also aims to increase production, farmer's income and strengthen nutritional security, improve productivity through germ plasm, planting materials and efficient use of water through micro irrigation[66].

The above mention schemes were all started to promote horticulture sector and floriculture have been accorded a priority to earn foreign exchange. Through these schemes flower growers in the country have been benefitted to improve their flower

[65] Mission for Integrated Development of Horticulture (MIDH), retrieved on 09/11/2016 from nhm.nic.in>midhschemes

[66]Operational Guidelines, Mission for Integrated Development of Horticulture (MIDH) during XII Plan. Retrieved on 12/03/2016 from www.careerride.com

production and productivity both traditional and modern flowers, improve marketing system both domestic and global, improve market information delivery system, and have been accustom with scientific method of production. Besides earning huge profits both from national and international markets, more employment opportunities have also been created through the development of this sector. Rural labourers have been able to earn their livelihood by engaging in floriculture activities while some of the labourers have started their own nurseries.

2.1.1 Floriculture Scenario in different States in India

Globalization, which has created awareness among Indians to cultivate flowers for commercial purpose has encouraged many Indian States to enter into this line to earn a livelihood. Increase participation of various States in the country having varied agro-climatic conditions suitable for the cultivation of commercial floriculture has been witnessed over the years.

2.1.1.1 State-wise Area under Floriculture in India

Next to China, India has the largest area under flower crops. Continuous increase in area under flower production in flower producing States of India especially the top flower producing States of Tamil Nadu, Karnataka, West Bengal and Maharashtra has been witnessed. Table 2.1.1 indicates the area under flower crop in Indian States. The table shows that among all the States, Tamil Nadu contributes major role followed by Karnataka, West Bengal, undivided Andhra Pradesh etc. In 2005-06 area under flower production in Tamil Nadu was 24.75 thousand hectares which was 19.23% of the total area, whereas in 2009-10 and 2010-11 showed a constant growth of 32 thousand hectares. However in 2011-12 it was 32.30 thousand hectares (16.76%) but decline to 29 thousand hectares in 2012-13, whereas in 2013-14 showed a significant increase to 55 thousand hectares at 21.57% of the total area, indicating a compounded growth rate of 9.28%. Similarly, in Karnataka, in 2005-06 it was 21.10 thousand hectares constituting about 16.40% of the total area, a constant growth of 27 thousand hectares was witnessed in 2009-10 (14.76%) and 2010-11 (14.14%) and it increased marginally to 30.60 thousand hectares in 2013-14 (12%), thus showing 4.22% in the compounded annual growth rate.

Table 2.1.1: State-wise area under flower production in India (Area in 000HA)

States	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	CGR
Andhra Pradesh	17.51 (13.61)	21.66 (15.04)	23.52 (14.63)	19.5 (11.71)	21.4 (11.70)	21.8 (11.42)	64.2 (25.31)	35 (15.05)	20.4 (8.00)	1.71
Gujarat	7.12 (5.53)	8.42 (5.85)	9.74 (6.06)	9.7 (5.82)	12.5 (6.83)	12.5 (6.55)	16 (6.31)	17 (7.31)	17.3 (6.78)	10.37
Karnataka	21.10 (16.40)	23.02 (15.98)	22.34 (13.90)	26 (15.61)	27 (14.76)	27 (14.14)	29.2 (11.51)	30 (12.90)	30.6 (12.00)	4.22
Maharashtra	9.44 (7.34)	14.76 (10.25)	16.74 (10.41)	16.4 (9.85)	17.5 (9.57)	17.5 (9.17)	18.9 (7.45)	22 (9.46)	23 (9.02)	10.40
Odisha	0.59 (0.46)	0.59 (0.41)	2.40 (1.49)	5.65 (3.39)	7.1 (3.88)	7.4 (3.88)	7.5 (2.96)	8 (3.44)	7.4 (2.90)	32.45
Tamil Nadu	24.75 (19.23)	26.73 (18.56)	26.74 (16.64)	29.14 (17.50)	32 (17.49)	32 (16.76)	32.3 (12.74)	29 (12.47)	55 (21.57)	9.28
Uttar Pradesh	8.25 (6.41)	8.39 (5.82)	8.41 (5.23)	13.53 (8.12)	10.4 (5.69)	10.4 (5.45)	14.5 (5.72)	16 (6.88)	16.6 (6.51)	8.08
West Bengal	17.89 (13.90)	18.56 (12.89)	27.42 (17.06)	21.07 (12.65)	21.9 (11.97)	23.1 (12.10)	23.9 (9.42)	24 (10.32)	24.9 (9.76)	3.74
Nagaland	NA	NA	0.02 (0.01)	NA	NA	NA	NA	NA	NA	-
Others	22.06 (17.14)	21.87 (15.19)	23.40 (14.56)	25.44 (15.28)	33 (18.04)	39.10 (20.48)	47.1 (18.57)	53 (22.78)	59.9 (23.49)	11.74
Total	128.68 (100)	144.01 (100)	160.72 (100)	166.52 (100)	182.9 (100)	190.9 (100)	253.6 (100)	232.6 (100)	255 (100)	7.90

Source: Indian Horticulture Database and National Horticulture Board.

Note: Figures in parenthesis is percentage of the total.

NA – Not Available

However in State like Odisha the area under flower crops in 2005-06 was 0.59 thousand hectares comprising only 0.46% of the total area under flower has now increased to 7.4 thousand hectares (2.90%) in 2013-14 with a high compounded annual growth rate of 32.45%. Area under flower cultivation in Nagaland has been recorded only for the year 2007-08 with just 0.02 thousand hectares. Total area under floriculture in India during 2005-06 was 128.68 thousand hectares, increases to 253.6 in 2011-12 but falls to 232.6 thousand hectares in 2012-13. It however increases to 255 thousand hectares in 2013-14 indicating a growth rate of 7.90%. The table reveals that there is high variation among the States as well as within the States during the reference years.

2.1.1.2 State-wise Production of Loose Flowers in India

Floriculture industry in the domestic market of India mainly deals with loose flowers which are used for offerings in religious places, for making garland, to adorn the hair etc. Loose flowers are sold in Kilograms usually in open space which comprises of Marigold, Jasmine, Chrysanthemum, Crossandra, Tuberose etc. With increasing population and rising demand, increase in loose flower production has been witnessed over the years. From table 2.1.2, as per the Indian Horticulture Database and National Horticulture Board report, highest production of loose flowers from 2005-06 to 2010-11, 2012-13 and 2013-14 has been recorded in Tamil Nadu, except in 2011-12 where the production was highest in Andhra Pradesh. In 2013-14, Tamil Nadu, Karnataka, Gujarat and Andhra Pradesh were the top loose flowers producing states in the country. Production of loose flowers in 2005-06 was 202 thousand MT in Tamil Nadu, 156.2 thousand MT in Karnataka, 88.81 thousand MT in Andhra Pradesh and 42.18 thousand MT in Gujarat.

The compounded annual growth rates among the states in production of loose flower indicates that the production increased to 343.65 thousand MT in 2013-14 in Tamil Nadu recording a growth rate of 6.08%, 211.5 thousand MT in Karnataka with CGR at 3.42%, 163.6 thousand MT in Gujarat (16.25% CGR) and 136.3 thousand MT in Andhra Pradesh (4.90% CGR). However, in State like Odisha where the production was just 1.79 thousand MT in 2005-06 increased to 37.4 thousand MT in 2013-14, recording a manifold increase in its growth rate of 40.17%. Total loose flower production in the country in 2005-06 stands at 654.08 thousand MT, has increased its production to 1754 thousand MT in 2013-14 indicating a compounded annual growth rate of 11.58%.

2.1.1.3 State-wise Production of Cut Flowers in India

On the other hand, the global floriculture market mainly deals with cut flowers and Netherland is the largest producer and occupies the highest share in the international market. India has come a long way in producing cut flowers for commercial purpose since liberalization, though it is still negligible. Competition from the world market and the need to earn foreign exchange made it imperative to produce cut flowers under controlled conditions which faced many challenges. State wise production distribution of cut flowers in India is presented in table 2.1.3. Majority of the States are showing an increasing trend in cut flower production during the reference period. West Bengal recorded the highest cut flower production among all the States in the country during the reference period where its production was 9347.9 lakhs in 2005-06 increased to 25429.1 lakhs in 2012-13 and 145.2 thousand MT in 2013-14. In Nagaland cut flower production was 16.50 lakhs in 2007-08 which increased to 96.70 lakhs in 2012-13 and 0.4 thousand MT in 2013-14. From 2005-2013 Andhra Pradesh recorded the highest compounded annual growth rate of 78.49% followed by Odisha (61.64%). West Bengal (145.2 thousand MT), Karnataka (71.5 thousand MT), Odisha (57.4 thousand MT) and Uttar Pradesh (54.1 thousand MT) were the top cut flower producing states during 2013-14.

2.1.1.4 Major Export Centre of Floriculture from India

Growing flowers for social, religious and decorative purposes has been traditionally practiced by the people of India. Later Indian entrepreneurs have diverted their attention to grow different varieties of flowers for international trade (Narasimham and Kishor, 1997)[67]. This sector has been accorded 100% export oriented status to earn foreign exchange by the Government of India. Cut flowers, dried flowers, foliage, live plants, buds, seedlings, potted plants etc are traded in the world floriculture market. The export of these floriculture products to different parts of the world during 2010-11 to 2013-14 has been illustrated in table 2.1.4.

[67] Narasimham, N.V. and N. Kishor (1997), op.cit., p. 49.

Table 2.1.2:State-wise production distribution of loose flowers in India (Production in 000MT)

States	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	CGR
Andhra Pradesh	88.81	116.24	126.27	125	130.3	133.7	389	224.4	136.3	4.90
Gujarat	42.18	49.50	49.5	49.5	49.5	49.5	135.5	149.3	163.6	16.25
Karnataka	156.2	192.07	169.12	203.9	203.9	203.9	211.5	207.5	211.5	3.42
Maharashtra	56.08	88.9	69.45	89.4	91.1	91.1	104	119	122.7	9.09
Odisha	1.79	1.93	7	23.4	25.3	3.7	26.1	26.2	37.4	40.17
Tamil Nadu	202	218.06	214.38	233.7	247.3	247.3	332.81	312.97	343.65	6.08
Uttar Pradesh	12.18	12.34	12.36	24.3	17.6	17.6	27.05	31.49	32.16	11.39
West Bengal	42.29	43.68	48.45	52.01	55.2	59.2	63.91	65.14	66.5	5.16
Others	52.56	157.72	173.85	186.22	200.2	225.2	361.86	593.32	640.72	32.03
Total	654.08	880.43	870.37	987.4	1020.6	1031.3	1650.87	1728.4	1754	11.58

Source: Indian Horticulture Database and National Horticulture Board.

Table 2.1.3: State-wise production distribution of cut flowers in India (Production in Lakh Nos.) (2013-14 in '000 MT)

States	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	CGR	2013-14
Andhra Pradesh	67.07	65.87	67.82	3	6202	6202	7099.4	6909	78.49	30
Gujarat	4392	5063	5063	5063	5063	5063	0.0	0.0	2.40	0.0
Karnataka	5239	5660	5550	5867	5860	5860	10388	9441.8	7.64	71.5
Maharashtra	3410	4774	5728	5728	7914	7914	7914	7914	11.10	44
Odisha	129.64	NA	129.60	NA	5356	5911	6020	6040	61.64	57.4
Tamil Nadu	NA	NA	NA	NA	NA	NA	0.0	1168	-	12.9
Uttar Pradesh	3668	3746	3752	3467	2958	2958	4194	4908	3.71	54.1
West Bengal	9347.9	12966	19680	21232	22170	23919	25042.1	25429.1	13.33	145.2
Nagaland	NA	NA	16.50	17	17	17	15.40	96.70	24.74	0.4
Others	2949.81	4881.42	3430.54	6565	11131.3	11183	14393.3	14825.3	22.36	127.2
Total	29203.42	37156.29	43417.46	47942	66671.4	69027.4	75066	76731.9	12.83	543

Source: Indian Horticulture Database and National Horticulture Board.
Note: NA- Not Available

Figure 2.1.1:State-wise production distribution of loose flowers in India (2005-13)

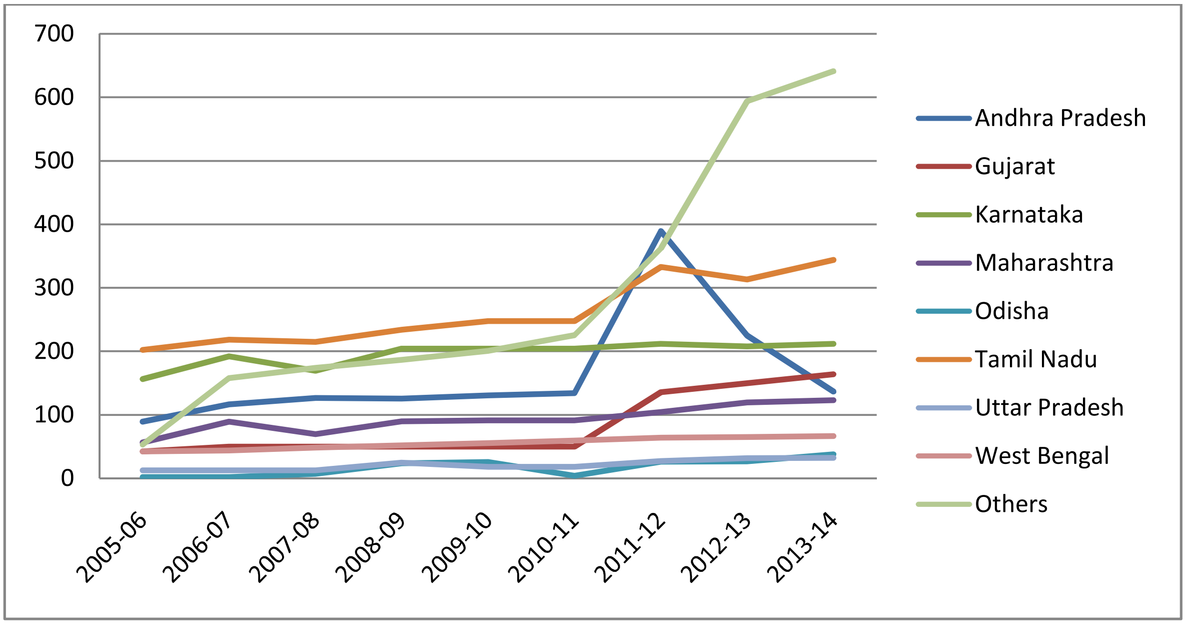
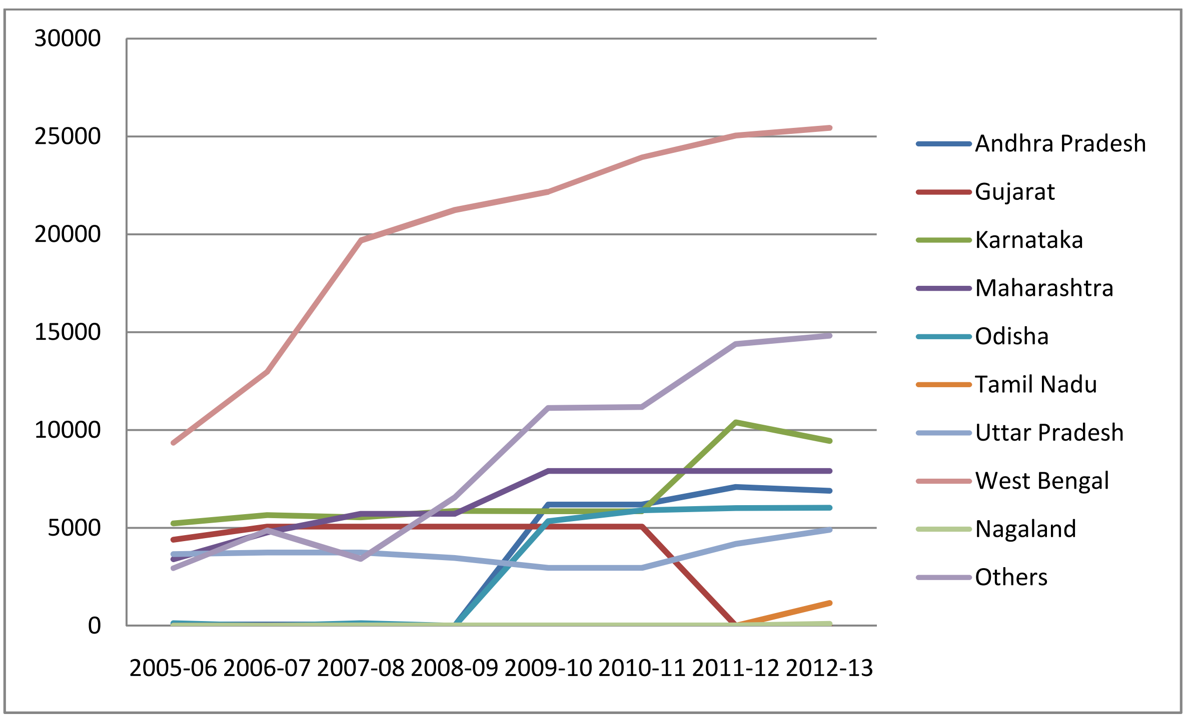


Figure 2.1.2:State-wise production distribution of cut flowers in India (2005-2013)



The main export destination of India's floriculture products both in terms of quantity and value since 2010-11 to 2013-14 has been the United States. In 2010-11, 7429.85 MT flowers worth Rs. 5799.35 lakhs has been exported to US and in 2013-14 export to the US decline to 5158.7 MT but its value increased to Rs. 8459.38 lakhs thus, showing a negative growth of -8.72% for quantity exported but a positive growth rate of value of 9.90%. Export to China People's Republic has witnessed a manifold increase during the year 2010-11 to 2013-14 with compounded annual growth rate of 59.01% for quantity exported and 75.39% in value. During the year 2010-11, India exported 28906.83 MT of flower products worth Rs.29604.01 lakhs. But in 2013-14, the quantity exported decline to 22485.2 MT indicating a negative growth rate of -6.09%. Values of export however increase to Rs. 45590.63 lakhs during the reference period with a compounded growth rate of 11.40%.

2.1.1.5 Major Import Centre of Floriculture to India

Apart from exporting floriculture products from India, the country also import flowers from different flower producing countries. Table 2.1.4 shows the Indian imports of floriculture products from different flower producing countries in the world. The total imports of floriculture products in 2010-11 in terms of quantity stands at 2589.42 MT which is worth Rs. 4548.27 lakhs. During this period import from Netherland accounts the major share with 1182.12 MT worth Rs. 2055.59 lakhs. Next to Netherland, Thailand also plays significant contribution to India's flower imports with 480.18 MT during the period 2010-11 worth of Rs. 680.27 lakhs. Similarly India also started to import from the neighbouring country of Bangladesh in the year 2012-13 with 121.23 MT flower worth Rs. 49.10 lakhs but did not make much progress and decline to 98 MT valuing Rs. 11.84 lakhs in 2013-14.

Increasing demand for flowers in India has led to considerable increase in its import during 2013-14. During the reference period import from Thailand accounts the major share of 1764.22 MT i.e. 40.94% of total import with its value of Rs. 3824.58 lakhs consisting of 34.09% of the total value imported. The compounded annual growth rate of import from Thailand grew at the rate of 38.45% and 53.98% of quantity and value respectively. During the reference period the highest CGR of quantity imported has been

Table 2.1.4: Export of flowers from India (Qty in MT; Value in Rs. Lakhs)

Country	2010-11		2011-12		2012-13		2013-14		CGR	
	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
United States	7429.85	5799.35	7559.21	7129.1	6696.6	8381	5158.7	8459.38	-8.72	9.90
Germany	4474.12	4332.26	5256.69	5752.49	3715.28	5675.43	2841.16	5928.94	-10.73	8.16
United Kingdom	4298.72	3529.6	3456.23	3856.02	3191.89	4568.17	2583.87	5512.57	-11.95	11.79
Netherland	3149.47	4527.06	3923.99	5412.74	3099.15	5970	1983.51	6615.28	-10.92	9.95
United Arab Emirates	822.69	995.59	816.85	1125.5	1029.36	1544.53	1026.05	1701.07	5.68	14.33
Canada	524.07	811.13	867.81	1202.83	985.89	1618.65	567.78	1365.31	2.02	13.90
Italy	1255.42	892.59	1267.02	1118.84	820.8	1350.13	682.75	1332.93	-14.12	10.54
Japan	639.75	1233.67	736.65	1472.24	801.35	1567.19	727.07	1621.35	3.25	7.07
China People's Republic	80.62	100.58	523.22	656.71	596.15	1059.75	515.43	951.67	59.01	75.39
Singapore	226.72	225.18	343.38	378.14	552.44	613.34	817.98	910.51	37.82	41.80
Others	6005.400	7157	6174.96	8427.47	5632.97	9996.43	5580.9	11191.62	-1.82	11.83
Total	28906.830	29604.01	30926.01	36532.08	27121.88	42344.62	22485.2	45590.63	-6.09	11.40

Source: APEDA Website, June 2014

Table 2.1.5: Distribution of floricultural imports to India (Qty in MT; Value in Rs. Lakhs)

Country	2010-11		2011-12		2012-13		2013-14		CGR	
	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
Netherland	1182.12	2055.59	1354.13	2625.49	1548.82	3324.64	1549.73	3710.29	7	15.91
Thailand	480.18	680.27	520.95	1047.92	1090.54	2182.88	1764.22	3824.58	38.45	53.98
China People's Republic	436.38	559.53	473.71	954.09	443.7	926.41	275.18	818.42	-10.89	9.97
Bangladesh	NA	NA	NA	NA	121.23	49.1	98	11.84	-10.09	-50.89
Vietnam Social Republic	36.98	24.16	8.78	18.2	80.46	112.64	10.34	24.3	-27.28	0.14
United Arab Emirates	131.46	430.57	39.55	187.98	64.64	386.16	41.92	314.29	-24.85	-7.57
Madagascar	9	10.32	45	63.16	54.5	84.45	42.3	75.93	47.24	64.70
Italy	17.32	49.88	28.74	114.08	36.24	177.97	82.85	320.13	47.89	59.17
Spain	19.63	81.99	15.84	72.33	29.81	124.19	50.36	287.7	26.56	36.87
United States	21.24	101.5	55.44	218.2	27.77	168.88	35.06	297.42	13.35	30.84
Others	255.11	554.46	522.21	1562.09	230.83	1028.62	358.84	1534.55	8.90	28.98
Total	2589.42	4548.27	3064.35	6863.54	3728.54	8566.94	4308.8	11219.45	13.58	25.32

Source: APEDA Website, June 2014
Note: NA- Not Available

witnessed in the case of Italy with 47.89% and highest CGR of import value has been in Madagascar with 64.70% growth rate. Import from countries like the United Arab Emirates and Bangladesh has witnessed negative growth rate in both quantity and value. However, this decrease in import in some of the countries has been diverted to increase in import from other flower producing countries. In 2013-14, import of flower increase to 4308.8 MT and its value increase to Rs. 11219.45 lakhs which is more than double of 2010-11. Thus the compounded annual growth rate of India's floriculture imports increased at the rate of 13.58% and 25.32% in quantity and value respectively.

SECTION II

2.2 FLORICULTURAL DEVELOPMENT IN NAGALAND

Floriculture especially cut flower being a highly specialized industry is a capital intensive enterprise demanding a considerable amount of capital investment on farm structure, implements and planting materials requiring the external support of sound, overhead structure and facilities (Thakur *et al.*, 2004)[68]. Nagaland being richly endowed with agro-climatic condition and fertile soil is able to produce good quality flowers. However the technology mission has brought about considerable changes in the flower industry through the introduction of high-tech method of cultivation and quality planting materials. Flower cultivation which has been in practice since time immemorial has now become one of the alternative sources of earning livelihood. Which was once confined only to small gardens in front or backyard of the house in open space is now cultivated in large area under high-tech. Commercialization of floriculture in the State was started to enable the growers to earn a subsistence living by taking advantage of the Government subsidies and the favorable agro-climatic condition suitable for the cultivation of varieties of cut flowers. Domestically produced fresh cut flowers in the State which is known as "Naga Fresh Flowers" has made its presence felt in the other states of the country as well as South East Asian countries in earlier years. Though some of the growers have been able to export their produce to neighbouring States and other parts of the country, flower

[68]Thakur, D.R., A.S. Saini and K.D. Sharma (2004), op.cit., p. 44.

production in Nagaland is mainly limited to the domestic market due to lack of cold storage facilities, absence of grading system and market information and most importantly due to poor transportation facilities.

2.2.1 Nagaland Floriculture Industry and HMNEH

As a result of the technology mission, the State Horticulture Department tied up with various flower growing companies namely, Florance Flora, North-Bengal Floritech, Vitro Biotech, Megha Star Pvt. Ltd. and Zopar Pvt. Ltd. to elevate floriculture industry in the state. These companies deals with different types of flowers and other infrastructural facilities required in this industry. The Department open up tender notice to these companies and whichever company agrees and accept the terms and conditions set by the Department make deals to supply the necessary equipments and planting materials required for setting up the unit. Accordingly for the year 2014-15 the Department tied up with Megha Star Pvt. Ltd. and Zopar Pvt. Ltd..

Depending on the suitability of different types of flowers to the State's climatic condition flowers are cultivated. At present six cut flowers were mainly focused for commercial cultivation namely Alstroemeria, Anthurium, Gerbera, Lilium, Orchid and Rose. These flowers are of high quality which is imported from different parts of the world through the above mentioned companies. For instance, Florance Flora deals with Gerbera, Lilium and Anthurium, North-Bengal Floritech with Gerbera and Orchids, Vitro Biotech with Alstroemeria and Lilium, Megha Star Pvt. Ltd. with Lilium and Gerbera and Zopar Pvt. Ltd. with Rose. Of the five companies Florance Flora and Vitro Biotech have Export-Import license and North-Bengal Floritech provides the best micro irrigation facilities which have tied up with Netafim, an irrigation company. These companies not only supply the required infrastructure and planting materials for growing flowers but also help in constructing the poly-houses, fitting drip irrigation and training the growers to take up flower cultivation in a more efficient way so as to produce high quality cut flowers for commercial purpose. These companies also help the growers to sell their produce by acting as a middleman or as a mediator between the growers and the retailers and wholesalers in the national market. Company like Zopar Pvt. Ltd. import flowers from its company located in different parts of India and sells it to the retailers in the domestic market when there is shortage in domestic production especially during wedding season, at the same time it also import those flowers which can't be produce locally but have demand in the local market.

The inception of HMNEH by the GOI has enabled the State Horticulture Department in Nagaland to develop its floriculture industry in modern line. The use of advanced techniques that were introduced though could not bring the flowers of Nagaland at the global market have up to some extent enable the growers to export their produce to some parts of the country either directly or through the various flower companies that are operating in different parts of Nagaland. At present North-Bengal Flori-tech is the only company that is continuing the buyback policy. There are certain rules of the companies to follow buyback policy i.e. the growers are suppose to offer their produce whole year round and not only for a particular season, cut flower size and stem length should be of international standard and depending on the type of cut flowers, it should be harvested at the budding stage so that its quality doesn't wore out when it reach the final consumer. Through the buyback policy, these companies help the growers, who have no ties with the outside market, in exporting their produce to other flower consuming states in the country. However the buyback policy was stopped by most of the companies because of the failure on the part of the growers to abide by the rules set by the companies.

The growers being able to sell their produce at a higher price in the domestic market during winter or the season of festivals prefer to sell them locally and are thus able to fetch high income instead of selling them to companies that offer much lower price whole year round. But during summer when the production is high and demand is low in the domestic market and there is excess supply the growers offer their produce to the company at the company's price. This was not acceptable by most of the flower companies as it becomes difficult for them to retain their business deal with the national market only in summer. This was one of the main reasons for most of the companies to discontinue buyback policy. The demand for cut flowers being low in Dimapur District compared to Kohima District due to hot and humid weather make some of the growers who have no or very less customer for their produce to sell off their produce to the flower companies at a lower price i.e. set by the company and this price prevails the whole year round. When the buyback policy was stopped the growers were made to search for their own market outside the state, in such situation some of the growers were not able to export their produce as they have no contact with the outside market and their knowledge about floriculture was limited to the domestic market. However, there were some growers who were able to export their produce outside Nagaland but later on this was also stopped by almost all the growers except few growers as they were not paid back on time and sometimes they also face difficulties in payments.

Apart from buyback policy there are companies like the Florance Flora that act as a mediator between the growers and the retailers or the wholesalers within and outside the state in selling the cut flowers. This process of selling cut flowers to other flower consuming states through flower companies is faced with various problems when the growers with improper knowledge of post harvest management fail to retain the quality of flowers or harvest the flowers at the wrong time and that when the flowers reach the market it loses its market quality. A group of flower growers have also come up with an association known as the Nagaland Flower Growers' Society who have been taking active part in developing flower industry in the State by providing trainings and seminars to the growers, organize flower shows cum sale and competition in collaboration with the State Horticulture Department of Nagaland.

The State Horticulture Department in collaboration with the above mentioned flower companies started supplying poly-houses and planting materials to the flower growers from the year 2004-05 where the poly-houses were of low bamboo structure covering an area of $100m^2$ each. From the year 2006-07 to 2009-10 poly-houses were of steel structure covering an area of $500m^2$ each and from 2010-11 till date the State horticulture department is supplying poly-houses measuring $200m^2$ each. This scheme is limited and benefits only those growers who fulfill the criteria laid down by the Horticulture Department. The criteria which the beneficiaries have to fulfill to avail this scheme is that a grower should have land measuring more than $200m^2$, the land should have good water source whole year round, should be easily accessible and the growers should have the ability to cultivate flowers. In the beginning, each beneficiary was allotted a unit which comprises of poly-house and planting materials free of cost but this benefit was misused by some of the growers as they were getting it free of cost they did not put much effort in effective utilization of the infrastructural facilities that was offered to them. Later on the department started charging Rs. 25000 from each beneficiary to make the scheme more effective and from 2014-15 onwards the amount has been increased to Rs. 30000. Depending on the budget of the department, poly-house, planting tools and the no. of planting materials are provided to the growers which keep on changing.

In addition, the State Horticulture Department has come up with packing boxes for cut flowers under the name “Naga Fresh” which is given to the growers at subsidized rate to transport their produce [69]. Flower growers have been entrusted with the beautification of Kohima town, all the government offices in the State capital, State programmes, Republic and Independence Day etc. ‘Floral Galleria’ a separate gallery was set up by the Department of Horticulture at Kisama, Naga heritage complex, Kohima which coincides with the Hornbill Festival every year to showcase the different varieties of flowers and other ornamental plants produced domestically and competitions are organized for various categories of flower arrangements with cash prize to the winners. Cold storage has been set up in Kohima, Dimapur and Mokokchung districts for highly perishable products especially cut flowers.

2.2.2 Protected Cultivation

Green revolution which happened in India in the 1960s made way to the production of high quality crops for which various works on research and development was carried out to meet the growing demand for food as well as to fulfill nutritional needs of the population. Poly-house or green house technology was used in India for the first time in the 1980s for carrying out research activities to increase food grain production. Similarly the initiation of globalization and liberalization policies in the 1990s which encouraged the use of protected cultivation to produce export oriented crops to earn foreign exchange. Since then there has been great increase in the demand for poly-house

[69] Annual Administrative Report (2009-10), State Horticulture Department, Government of Nagaland, p. 6.

or greenhouse to cultivate various high quality agricultural crops. In India, Maharashtra, Karnataka, Himachal Pradesh, Uttarakhand, Tamil Nadu, Punjab and North-Eastern States are the leading States adopting protected cultivation. Protected cultivation refers to that technique of cultivation where the microclimate surrounding the plant is partially or fully controlled as per the requirement of the plant species during their period of growth (Shweta *et al.* 2014)[70]. This method of cultivation creates an environment inside the greenhouse or poly-house wherein the atmosphere inside can be controlled both during cold and hot weather through the mechanism of advanced technology attached with it.

Greenhouse technology was first started by the Europeans and later during the Second World War new system of protected cultivation started with the use of polythene sheets known as ‘poly-house’. Poly-house is made up of UV stabilized thick transparent white polyethylene, usually semi-circular and elongated in shape which is supported by iron or aluminium frames. Poly-houses are structures that are utilized as microclimate environment, whose weather inside differs from the climate outside, for the cultivation of crops in an unfavourable environment or unfavourable climatic conditions and also for whole year round production. Poly-house farming involve the modification of the natural environment where air and root temperatures, light, water, humidity, plant nutrition and carbon dioxide is controlled to extend the growing season, grow off-season crops and to achieve maximum plant growth and economic returns (Dahiya *et al*.)[71].Cultivation under poly-houses enables the growers to produce good quality crops of high value and quantity of production is also much better than those grown in open field.

2.2.3 Classification of Poly-house or Greenhouse based on Cost of Installation and Suitability

i) Low Cost

Low cost poly-house or greenhouse is made up of simple structure with green shed net or polythene sheet and bamboo or timber frame. Simple techniques are applied to control the inside temperature and humidity and the light

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[70]Shweta, S.K. Bhatia and M. Malik (2014), “Protected Farming”, *Popular Kheti*, Vol. 2(1), p. 74.
[71]Dahiya, P., K. Singh and M. Mehta, “Poly house: An Alternative Farming”. Retrieved on 22/09/2015 from www.academia.edu

intensity is reduced by integrating shading material like black shed nets. During summer temperature is reduced by opening the side walls while in winter the side walls are closed to increase the temperature. This type of greenhouse is suitable for cold climatic zones.

ii) Medium Cost

Medium cost poly-house is constructed using Galvanized Iron (GI) pipe which is connected with screws. Exhaust fan are used to thermostatically control the temperature, while evaporative cooling pads and misting arrangements are made to maintain favourable humidity. Such greenhouse is suitable for dry and composite climatic zones.

iii) Hi-tech Poly-house

This type of poly-houses is dome or cone shaped whose frames are made up of iron or aluminium. It is highly durable and is 5-6 times costlier than medium-tech greenhouse. The technique used is more advanced where the temperature is automatically controlled.

2.2.4 Advantages of poly-house farming

1. Protects the plants from excess rainfall, wind, scorching sunlight and extreme cold conditions.
2. Flowers can be grown throughout the year.
3. Produce uniform quality flowers.
4. Protects the flowers from birds, animals and human activities.
5. Productivity is 8-9 times higher than those flowers grown in open space.
6. Management of insects, pests, diseases and weeds is easier.
7. These structures are ideally suited for small farmers and unemployed youth.
8. Require minimum labour, water and fertilizers.
9. Organic farming is easier.
10. Even those lands with low quality or unproductive soil can be used for setting up poly-house.

11. Accurate irrigation and fertilization is possible.
12. High quality flowers can be produce for international markets.

2.2.5 Disadvantages of poly-house farming

1. Greater management is required for poly-house during off-season months to ensure proper conditions are maintained.
2. Poly-houses are more drought resistant than open field gardens but can build up temperatures quickly because of confined spaces.
3. Setting up of poly-house is costly compared to open field cultivation.
4. Maintenance cost is high
5. There is less chance of diseases infecting flowers to enter poly-house from outside, but those already inside will not go out if proper care is not taken.

2.2.6 Cultivation of Selected Cut Flowers under Poly-house/Greenhouse

Cultivation under poly-house requires specific steps to be followed to yield good quality flowers. Type of location, temperature, management, harvesting etc should be followed accordingly.

i) Alstroemeria

Alstroemeria[72] is a perennial and rhizomatous plant which is commonly known as *Inca* and *Peruvian* lily and belongs to the family *Alstroemeriaceae*. Best planting time is July-November and it flowers best in the month of February to August depending upon the temperature, crop cycle, planting time and variety. The vase life of cut flower is 8 to 12 days at room temperature.

a) Location: Alstroemeria grows well in cool temperature, free from water logging and strong winds, does not prefer direct sunlight and requires cooling system in high temperature.
b) Soil: Alstroemeria favour sandy loam soil with soil pH of 5.5 to 7.0 and can also be grown in soils rich in organic matters (2-3%) having

[72] "Growing Alstroemeria in the Foot Hills of Himalaya". Retrieved on 22/09/2015 from www.ihbt.res.in/TIM/Alstroemeria.html

poriferous structure and drainage system. When using clay soil, sand and decomposed yard manure should be mix to make it absorb excess fluids.

c) Climate: Most favourable temperature for growing Alstroemeria lies between 18-22 ˚C day temperature and 12-16 ˚C night temperature. Shed net can be spread on the roof to lower the temperature. Relative humidity between 65-85% is the most suited for the success of this crop.

d) Irrigation: Sufficient water should be given to the plant depending on the climate as the soil has to be kept moist for good production.

e) Harvesting: It starts producing flowers after 3-4 months from the date of planting. Flower should be harvested depending on the distance of the flower market. It can produce 50-75 flowering shoots per plant per year.

f) Diseases and Pests: Alstroemeria is affected by fungal diseases and pests such as,

- Botrytis: here brown colour spots appear on the flower petals due to high humidity. It can be controlled through proper ventilation and keeping the soil dry during rainy season.

- Root rot: caused by fungus *Pythium*, this fungus loosens up the root parts when it is grown in heavy and compact soil. It can be controlled by sterilizing the soil before planting, better air circulation and reducing moist content of growing media.

- Foot rot: caused by *Rhizoctonia*, this disease causes the plant stem above the soil level to rot. This can be corrected by avoiding fluctuation in temperature and watering in mid-day during warm temperature.

- Pests such as aphids and green caterpillar are found in young leaves and flower buds. It can be avoided by spraying insecticides such as Endosulfa, Rogor or Malathian at 1.0-1.5 ml per liter of water.

ii) Anthurium

Anthurium [73] is derived from the Greek words '*Anthos*' and '*Oura*' meaning bloom and tail respectively. It belongs to the *Araceae* family. It reaches its peak in during October and November and slack season in March. Anthurium as cut flower last upto 20-30 days.

a) Location: Anthurium grows well in areas having high relative humidity and moderate temperature condition.

b) Medium: Anthurium is an epiphytic plant and thus is grown in media that are free from soil such as coconut husk, charcoal, tile pieces, sand etc. and proper drainage system should be maintain in the medium used. These media should be sterilized properly before planting.

c) Climate: The temperature required for growing Anthurium is above 35˚C with relative humidity of 60-80%. Shade nets of 70-75% can be used for shedding to reduce light intensity.

d) Irrigation: Anthurium has to be watered daily to retain its quality, requiring approximately 3 to 5 liters per m^2per day.

e) Harvesting: Anthurium flower can be harvested after 10-12 months from the date of planting. It yields 5-7 flowers per plant per year for the initial two years and 10-12 from third year onwards.

f) Pest and Diseases

- Spider mites: harms lower part of the leaves causing severe mottling and wilting of the affected leaves.
- Caterpillars: eats away the tender leaves.
- Thrips: damages the leaves and flowers leaving brown stripes on it.
- Snails: eat root tips and damages the flowers and buds.
- Bacterial blight: it is the most devastating disease which is found on leaves and flowers, it appears as soaked spots with brown centre and yellow outer edges. It can be controlled by removing the infected plant or spraying streptomycin at 1g per liter at every 8-10 days interval.

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[73] "Anthurium Cultivation under Naurally Ventilated Poly house for Cut Flower Production" (2013), ICAR Research Complex for Goa, Extension Folder No. 63.

- Root rot: when this disease occurs, leaves turn yellow at the edges and roots look brown. It can be controlled by soaking Aliette at 1.5g per liter two times in 12-15 interval days.

- Anthracnose: this fungal disease attacks the spadix[74] portion and harms the plant[75]. It can be avoided by controlling splashing of rain and movement of insects who usually spread the disease.

iii) Gerbera

Gerbera[76] is a genus of *Asteraceae* and belongs to daisy family. It is also commonly known as the African daisy, it was named after the German botanist and medical doctor Traugott Gerber (1710-1743). It flowers whole year round and has a vase life of 7-10 days.

a) Location: It grows well in warm humid conditions.
b) Soil: Soil should be porous and well-drained penetration of roots for better root growth. Soil with a pH level of 5.5-6.5 is suitable for its growth.
c) Climate: Temperature of 20-30°C and relative humidity of 70-75% is most suitable for Gerbera cultivation. Shade net of 50-70% can be used to reduce the sunlight.
d) Irrigation: Each Gerbera plant requires 700ml water per day.
e) Harvesting: It starts producing flowers after 3-4 months and yield 30-40 flowers per plant per year.
f) Pest and Diseases: When not taken care of properly Gerbera is infected by pest and diseases damaging the whole plant. Some of the pets are white fly, leaf miner, thrips, mites and leaf eating caterpillar. Diseases include (Pant and Baranwal, 2017)[77]:

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[74] Spadix is a spike inflorescence which is surrounded by leaf like curve bract.
[75] Spadix (Botany), Wikipedia. Retrieved on 15/02/2017 from https//:en.wikipedia.org/wiki/Spadix_(botany)
[76] "Gerbera Cut Flower Cultivation in Poly house" (2008), ICAR Research Complex for Goa, Extension Folder No.33.
[77] Pant, R.P. and V.K. Baranwal, (2017), "Diseases Management in Flower Crops", *Advances in Floriculture and Landscape Gardening*, Central Institute of Horticulture, Department of Agriculture, Co-

- Root and crown rot: in this case plant growth becomes stagnant, root skin is removed and finally dried up the plant. This can be avoided by sterilizing the soil, maintaining proper drainage system, spraying the soil with pre-heated water and avoiding over watering.
- Powdery mildew: this occurs in under warm and damp environment. This affects the leaves making it unhealthy and prevents the flower from blooming.
- *Alternaria* leaf spot.

iv) Lilium

Lilium[78] is a genus of herbaceous flowering plants growing from bulbs. The botanic name Lilium is derived from the greek word *leiron* which means true. The best time for planting is in the month of April-May.

a) Location: Lilium is suitable for growing in environment with cool and moderate climate.
b) Soil: Sandy loam soil with pH 6-7 is suitable for the cultivation of Lilium.
c) Climate: Lilium grows well under day temperature of 21-25°C and night temperature of 12-15°C. Relative humidity of 80-85% is suitable and shed net can be used to reduce 75% light in summer and 50% in winter.
d) Irrigation: regular watering is required especially during summer.
e) Harvesting: It should be harvested in the morning to reduce dehydration of the plant. It starts producing flowers after one and half to three months depending on the variety of flowers. It is harvested during the budding stage for marketing. Its vase life ranges from 7-10 days.
f) Pest and Diseases

   -Botrytis rot: a fungal disease affecting the leaves caused by excessive moisture and warm temperature. It can be cured by spraying carbendazim prior to flowering.

operation and Farmer's Welfare, Ministry of Agriculture and Farmer's Welfare, Government of India, Medziphema, Dimapur, Nagaland- 797106, p. 225.

[78]"Lilium". Retrieved on 22/09/2015 from www.kiran.nic.in/pdf/Agri-kaleidoscope/Horticulture.../Lilium.pdf

-Fusarium stem disease: it leads to premature yellowing of the leaf which later on turn brown and subsequently drops. It can be controlled by using appropriate fungicides.

- Basal rot: it is a fungal disease which enters the bulbs through the roots and basal plate. It can be prevented by avoiding excess watering during summer and maintaining proper drainage and also by dipping the bulbs in a fungicide solution of *benlate*.

v) Rose

Rose[79] is a woody perennial plant of the genus Rosa and belongs to the family of *Rosaceae*. It was cultivated since the ancient times for production of perfume. It can be grown throughout the year but the best planting time is between September and October in plains and October to November or February-March in hilly regions. It has a vase life of 4-7 days[80].

a) Location: Cool and moist environment is suitable for cultivating Rose.
b) Soil: Soil that is well-drained and rich in organic matter and oxygen is suitable for growing Rose. Soil with a pH of 6-6.5 is preferable and soil loosening should be carried out after every 4-6 months for efficient irrigation.
c) Climate: Day temperature of 20-25°C and night temperature of 15-18°C is suitable for cultivating high quality flower. Humidity can be maintained depending upon the requirement and evaporation can be slowed down.
d) Irrigation: watering the plant depends on the temperature, dry and windy climate require daily watering on the plant.
e) Harvesting: It starts producing flowers after 5-6 months of planting. For commercial purpose it should be harvested when it is still in budding stage. It is preferable to harvest in the morning to retain its freshness. It can yield about 80-90 stems per plant per year.
f) Pests and Disease

[79]"Rose". Retrieved on 22/09/2016 from https://en.m.wikipedia.org>wiki>Rose
[80]"Rose Cultivation in Greenhouse". Retrieved on 22/09/2015 from www.agrifarming.in>rose-cultivation

- Black spot: it appears during humid month. It can be controlled by spraying carbendozin and suitable fungicide.

- Powdery mildew: occurs on leaf when days are warm and nights are cold. It can be cured through prunning by removing all the infected leaves.

- Botrytis blight: a fungus that infect the petal. It can be managed by removing the infected flowers and ventilate to maintain low humidity. Fungicides such as chlorothalonil, dichloran, or iprodione can be used to protect the plant.

- Crown gall: it is a small white to cream coloured galls that are form on stems or roots. When this occurs remove the infected plants or apply agrobacterium radiobacter to protect the plant.

- Pests such as white ants, red scales, leaf hopper and red spider mite often infect the plant.

2.2.7 Area and Production of Cut Flowers under HMNEH in Nagaland

Since 2004-05, each year along with some old flower growers, new growers are provided the opportunity to carry out flower production in a more advanced way i.e., under protected conditions, by way of selection by the Horticulture Department of Nagaland under the HMNEH scheme. Flower cultivation under protected condition using green shed net was known and practiced by the flower growers of Nagaland prior to 2004-05. Under HMNEH protected cultivation was introduced using advanced technology where the growers were able to control the temperature inside the poly house and adopted improved methods of flower bed preparation, planting and watering. Adoption of flower cultivation for commercial purpose as a means of earning livelihood has been on the rise in Nagaland. However, the area under protected cultivation and its production in Nagaland keeps on fluctuating for one or the other reasons.

Total area under protected cut flower and its production from 2005-06 to 2013-14 in Nagaland is shown in table 2.2.1. Since commercialization of floriculture in Nagaland is a recent one, its area under cut flower and its production is low compared to other cut flower producing States in India. According to the annual reports of the Directorate of Horticulture, Nagaland, during 2005-06, area under cut flower production was 27600 m^2

and it has increased to 697000 m^2 in 2009-10 but showed a sharp decline in 2010-11 which then gradually increased to 92800 m^2 in 2012-13 but again it slightly decline to 90000 m^2 in 2013-14. Similarly, in case of production, it was 516000 stems in 2005-06 while in 2009-10 it was 18215760 stems, highest production till date. However in 2010-11, total cut flowers production witnessed a substantial fall to 7051200 stems which was mainly due to the discontinuation of dry flower production. Since then there has been a declining trend in production till the year 2012-13 when its production was 7682800 stems but it again decreases to 6243600 stems in 2013-14. The compounded annual growth rate indicates that during the reference period the area under cut flower increased at 14.02% and for production it was about 31.92% by adoption of high technological practices and other economic and market conditions in Nagaland.

Table 2.2.1: Distribution of area and production of cut flowers under protected cultivation in Nagaland

Year	Area (in m^2)	% Change	Production (stems)	% Change
2005-06	27600	-	516000	-
2006-07	180400	553.62	4354000	743.80
2007-08	271610	50.56	7718800	77.28
2008-09	464690	71.09	13537520	75.38
2009-10	697000	49.99	18215760	34.56
2010-11	75000	-89.24	7051200	-61.29
2011-12	85200	13.6	7010800	-0.57
2012-13	92800	8.92	7682800	9.58
2013-14	90000	-3.02	6243600	-23.05
CGR	**14.02**		**31.92**	

Source: Directorate of Horticulture, Kohima, Nagaland.

2.2.8 Area Distribution of Cut Flowers under HMNEH in Nagaland

Commercialization of floriculture in Nagaland started with the cultivation of Lilium, Anthurium and Dry flowers. As seen in table 2.2.2, the total area under protected cultivation in 2005-06 was 27600sq.m, out of which area under Lilium cultivation was

4100sq.m, Anthurium was 3500sq.m and area under dry flowers was 20000sq.m. In 2006-07 Rose was added for protected cultivation and an area measuring 7000sq.m was brought under its cultivation at the same time Carnation was also included covering an area of 500sq.m but it was discontinued in later years. Area under Lilium cultivation was increased to 6000sq.m, Anthurium was increased to 6900sq.m, dry flowers to 160000sq.m. In 2008-09 Alstroemeria was brought under protected cultivation covering an area of 1000sq.m. Other flowers such as Heliconia (23000sq.m) and Zantedeschia (700sq.m) were also brought under the scheme during the same year but it was cultivated in open field and Zantedeschia was discontinued later on.

During 2009-10, highest area under cut flower production was witnessed i.e. 697000sq.m and area under Rose and dry flowers production was also highest i.e. 21500sq.m and 614000sq.m respectively. Highest area under Anthurium production was witnessed in 2010-11 which was 30400sq.m and there was sharp reduction in area under dry flower production compared to previous years, it was reduced to 1800sq.m. Thus the total area under cut flower production declined to as low as 75000sq.m. In 2011-12, dry flower production was discontinued as it was fetching very low income and Gerbera, covering an area of 4400sqm was brought under protected cultivation for commercial purpose. Comparing to the other years, in 2013-14 Lilium and Alstroemeria witnessed the highest area under its production i.e. 26600sq.m and 30600sq.m respectively. Nevertheless, during this period the Department discontinued supplying Anthurium plant to the growers due to increasing sick units resulting from lack of technical knowledge on Anthurium cultivation, however, some of those units that were supplied earlier still exist. Thus, during 2013-14 the total area under cut flower production was 90000sq.m.

2.2.9 Distribution of Production and Productivity of Cut flowers in Nagaland under HMNEH

Protected cultivation has promoted production of off-season flowers whole year round at the same time improved production and productivity. The quality of flowers has been upgraded which is now equivalent to international standard. Table 2.2.3 shows the production of various cut flowers under protected cultivation in different years. It is perceptible from the table that the scheme under HMNEH was started with the production of Lilium, Anthurium and Dry flowers and their production during 2005-06 were 246000 stems, 70000 stems and 200000 stems respectively. In 2006-07 when Rose was brought under protected cultivation its production were 350000 stems contributing 8.04% of the total cut flower production. Similarly the contribution of dry flowers has highest share i.e. 3200000 stems and account to 73.49% of the total production during 2006-07.

When Alstroemeria was added to the scheme in 2008-09 it started with a low production which was 60000 stems contributing only 0.44% to the total cut flower production. In 2009-10, the total cut flower production was 18215760 stems which is the highest till date. In 2011-12 when Gerbera was brought under poly-house cultivation the production was 352000 stems contributing 5.02% of the total production. During 2012-13 though Anthurium production was highest among all the other flowers i.e. 35.92% of the total production it was discontinued in the next year. Whereas in 2013-14 the total production of cut flowers in Nagaland was 6243600 stems in which Lilium contribution was 22.56%, Rose 27.87%, Alstroemeria 34.31%, Gerbera 8.65% and others 3.61%. The data reveals that there is wide variation in production among the flowers during the reference years. It is interesting to note that some of the flower cultivation was discontinued due to lack of demand and other constraints related plant materials and technological bottlenecks.

Table 2.2.4 indicates the productivity of cut flowers. The data indicates that Lilium shows stagnant in productivity of 60 stems per sq. m for all the reference period. Whereas the productivity of Anthurium was 20 per sq. m. in 2005-06, it was increased to 80 in 2007-08 and it further increased to 100 from 2010-2-11 to 2012-13 with a compounded growth rate of 22.28%, which is highest among all the other cut flowers. Correspondingly, Alstroemeria's productivity was 60 stems per sq. m. in 2008-09 and it increased to 70 per sq. m. in 2010-11 whereas Gerbera's productivity was 80 stems in 2011-12 and it increased to 90 stems in 2012-13 and 2013-14 with a compounded growth rate of 4% during the study period.

Table 2.2.2: Area distribution of cut flowers under protected cultivation in Nagaland

Cut flowers	Area (in sq.m)									CGR
	2005-06	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	
Lilium	4100	6000	8600	10680	11300	17000	18800	20600	26600	23.09
Anthurium	3500	6900	19210	26090	25000	30400	29200	27600	NA	29.45
Rose	NA	7000	15800	20820	21500	17000	18200	21000	17400	12.06
Dry flowers	20000	160000	228000	382400	614000	1800	NA	NA	NA	-33.06
Alstroemeria	NA	NA	NA	1000	1800	7200	11200	13000	30600	76.86
Gerbera	NA	NA	NA	NA	NA	NA	4400	6400	6000	10.89
Others	NA	500	NA	23700	23400	1600	3400	4200	9400	44.3
Total	27600	180400	271610	464690	697000	75000	85200	92800	90000	

Source: Annual Administrative Reports, Department of Horticulture, Government of Nagaland, Kohima.

Table 2.2.3: Production Distribution of cut flower under protected cultivation in Nagaland

Cut flowers	Production (no. of stems)									CGR
	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	
Lilium*	246000 (47.67)	360000 (8.27)	516000 (6.68)	640800 (4.73)	680640 (3.74)	1020000 (14.46)	1128000 (16.09)	1236000 (16.09)	1596000 (22.56)	23.09
Anthurium•	70000 (13.56)	414000 (9.51)	1536800 (19.91)	2087120 (15.42)	2005680 (11.01)	3040000 (43.11)	2920000 (41.65)	2760000 (35.92)	NA	58.3
Rose˄	NA	350000 (8.04)	1106000 (14.33)	1665600 (12.30)	1723040 (9.46)	1700000 (24.11)	1820000 (25.96)	2100000 (27.33)	1740000 (27.87)	22.2
Dry flowers°	200000 (38.76)	3200000 (73.49)	4560000 (59.08)	7648000 (56.49)	12294400 (67.49)	768000 (10.89)	NA	NA	NA	25.14
Alstroemeria"	NA	NA	NA	60000 (0.44)	108000 (0.59)	504000 (7.15)	784000 (11.18)	910000 (11.84)	2142000 (34.31)	81.46
Gerbera**	NA	NA	NA	NA	NA	NA	352000 (5.02)	576000 (7.50)	540000 (8.65)	15.33
Others˅	NA	30000 (0.69)	NA	1436000 (10.61)	1404000 (7.71)	19200 (0.27)	6800 (0.10)	100800 (1.31)	225600 (3.61)	28.68
Total	516000	4354000	7718800	13537520	18215760	7051200	7010800	7682800	6243600	

Source: Annual Administrative Reports, Department of Horticulture, Government of Nagaland, Kohima.

Note: Figure in parenthesis are percentages of the total.

*Production of Lilium during the year 2005-06 to 2013-14; •Production of Anthurium during 2005-06 to 2012-13; ˄Production of Rose during 2006-07 to 2013-14; °Production of Dry flowers during 2005-06 to 2010-11; "Production of Alstroemeria during 2008-09 to 2013-14; **Production of Gerbera during 2011-12 to 2013-14; ˅Production of other cut flowers during 2008-09 to 20

Table 2.2.4: Productivity of cut flowers under protected cultivation in Nagaland

Cut flowers	Productivity (stems per sq. m)									CGR
	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	
Lilium	60	60	60	60	60	60	60	60	60	0
Anthurium	20	60	80	80	80	100	100	100	NA	22.28
Rose	NA	50	70	80	80	100	100	100	100	9.05
Dry flowers	10	20	20	20	20	20	NA	NA	NA	12.25
Alstroemeria	NA	NA	NA	60	60	70	70	70	70	2.60
Gerbera	NA	NA	NA	NA	NA	NA	80	90	90	4.00
Others	NA	60	NA	60.59	60	12	20	24	24	-10.82
Total	90	250	230	360.59	360	362	430	444	344	

Source: Annual Administrative Reports, Department of Horticulture, Government of Nagaland, Kohima.

SECTION III

2.3 SOCIO-ECONOMIC PROFILE OF CUT FLOWER GROWERS AND RETAILERS IN DIMAPUR AND KOHIMA DISTRICTS

Floriculture industry in Nagaland is mainly associated with women because of greater participation of men in service sector and other allied activities and also growing flower is regarded as a feminine activity (Pusa and Giribabu, 2016)[81]. To understand floriculture industry of Nagaland it is imperative to have a detail account of the socio-economic profile of the selected flower growers and retailers as it affects the organization, management, production and marketing (Sharma, 2014)[82]. Thus efforts have been made to gather information on the socio-economic profile of the respondents which includes their family size, age, educational qualification, occupation, marital status, size of land holdings and land distribution among different flowers.

2.3.1 Family Size and Work Force

Family size and the size of working population play an important role in determining the socio-economic condition of the respondents. Table 2.3.1 shows the average family size which is classified into male and female and the average working population classified into agricultural and non-agricultural workers of the flower growers in Dimapur and Kohima districts. It is apparent from the table that Dimapur has an average family size of 4.29 and in Kohima it is 4.69. In Dimapur, male constitute 49.42% and female 50.58% of the family whereas in Kohima male comprises of 47.55% and female 52.45% of the family.

Average working population of the flower growers in Dimapur is 2.72 out of which 37.87% is engage in agriculture and 62.13% is employed in non-agricultural sectors. On the other hand average working population in Kohima constitutes 2.85 with 39.65% agricultural workers and 60.35% non-agricultural workers. The average family size of the total respondent is 4.49, female constituting the major family size with 51.45%

[81] Pusa, K. and Giribabu M. (2016), op.cit., p. 43.
[82] Sharma, K.M. (2014), "Economic Analysis of Commercial Flower Cultivation in Sirmaur District of Himachal Pradesh", *Ph.D Thesis* submitted to Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishvavidhyalaya, Palampur, p. 52.

while male constitute 44.28% of the total family members. Whereas the average working population of the total respondent stood at 2.78, with 38.85% of the work force in agriculture sector and 61.15% in non-agriculture sector. The data reveals that on an average 61.91% in the family is employed either in agriculture or non-agriculture sector and the remaining 38.09% is dependent on the households or non working group in both the districts during the study period.

Table 2.3.1: Average family size and work force of the selected flower growers

Sl. No.	Particulars	Dimapur	Kohima	Total
1.	Family size	4.29 (100)	4.69 (100)	4.49 (100)
	a. Male	2.12 (49.42)	2.23 (47.55)	2.17 (44.28)
	b. Female	2.17 (50.58)	2.46 (52.45)	2.31 (51.45)
2.	Working population	2.72 (100)	2.85 (100)	2.78 (100)
	a. Agriculture	1.03 (37.87)	1.13 (39.65)	1.08 (38.85)
	b. Non-agriculture	1.69 (62.13)	1.72 (60.35)	1.70 (61.15)

Source: Field survey 2013-14
Note: Figures in parenthesis are percentages to the total.

2.3.2 Age-wise Distribution

Age of the growers enable us to make a study on the physical capability of the growers to carry out certain manual works in the field. When the growers are young they are capable of undertaking more physical works than those who have aged. However in some cases when the cultivator is employed in other activities besides growing flower they hire labour to work on the field.

Table 2.3.2: Age classification of the selected growers in Dimapur and Kohima districts

Sl. No.	Age	Dimapur	Kohima	Total
1.	21-30	02 (2.32)	05 (3.60)	07 (3.11)
2.	31-40	22 (25.58)	46 (33.09)	68 (30.22)
3.	41-50	43 (50.00)	57 (41.01)	100 (44.44)
4.	51-60	18 (20.93)	21 (15.11)	39 (17.33)
5.	61-70	01 (1.16)	07 (5.03)	08 (3.55)
6.	71-80	-	03 (2.16)	03 (1.33)
7.	Total	86 (100)	139 (100)	225 (100)

Source: Field survey 2013-14
Note: Figures in parenthesis are percentages to the total.

Table 2.3.2 shows the age distribution of the selected cut flower growers in Dimapur and Kohima districts. The data indicates that in Dimapur district majority of the flower growers i.e. 43(50%) are in the age group of 41-50, followed by 22 (25.58%) in the age group of 31-40, and only one (1.16%) in the age group of 61-70, none of the grower above 70 years is involved in floriculture in Dimapur district. On the other hand in Kohima district, 57 (41.01%) growers are in the age group of 41-50, followed by 46 (33.09%) in the age group of 31-40, 7 (5.03%) growers in the age group of 61-70 and 5 (3.60%) growers in the group of 21-30 years and three growers (2.16%) in the age group of 71-80. Out of the total 225 respondents of cut flower growers in the selected districts, 44.44% of the respondents belong to the age group of 41-50, followed by 31-40 years (30.22%). It is interesting to note that three flower growers in Kohima district are in the age group of above 70 years, whereas in Dimapur none of the growers in this age group is involved during the reference period. Since floriculture activity has been taken up by most of the growers as an alternative source of income it is apparent from this figure that most of the women take up floriculture when they are settled in life.

2.3.3 Educational Status

Educational status of the growers instigates a significant role in adopting modern technology, improve management, better understanding of market conditions and improve their efficiency. Higher educational status enables the growers to comprehend and understand the elaboration of scientific production of cut flowers and at the same time improve their management efficiency (Birajdar *et al*., 2014)[83].

Table 2.3.3 indicates the distribution of flower grower's educational qualification in the selected districts of Dimapur and Kohima. The data shows that, majority of the growers were educated at least up to the primary level and only two respondents were illiterate. In Dimapur district 27 growers i.e. 31.39% of the total respondents have finished undergraduate course, 23 growers have acquired intermediate course, only 5 have professional degree[84] and none of the respondents is illiterate. On the contrary to

[83]Birajdar, V.M., J.G. Angadi and A.A. Patil (2014), op.cit., p. 489.
[84]Professional degree here has been referred to growers attaining degree in medical doctors, engineers, lawyers or other special courses in designing etc.

that in Kohima about 33.81% of the respondents have acquired intermediate class, 30.21% growers have undergraduate degree and two respondents (1.44%) are illiterates. It is evident from the table that majority of the growers in Dimapur has attained higher education and professional qualifications than their counterpart growers in Kohima during the study period.

Table 2.3.3: Educational qualification of the selected growers in Dimapur and Kohima districts

Sl. No.	Educational qualification	Dimapur	Kohima	Total
1.	Illiterate	-	02 (1.44)	02 (0.89)
2.	Primary-Matriculate	23 (26.74)	35(25.18)	58 (25.78)
3.	Intermediate	19 (22.09)	47 (33.81)	66 (29.33)
4.	Under-graduate	27 (31.39)	42 (30.21)	69 (30.67)
5.	Post-graduate	12 (13.95)	09 (6.47)	21 (9.33)
6.	Professional	05 (5.81)	04 (2.88)	09 (4.00)
7.	Total	86 (100)	139 (100)	225 (100)

Source: Field survey 2013-14
Note: Figures in parenthesis are percentages to the total.

2.3.4 Marital Status

Majority of the growers are married in both the selected districts of Dimapur and Kohima. In Dimapur district about 86.05% and Kohima district about 84.17% of the respondents are married and only 12 (13.95%) in Dimapur and 22 (15.83%) in Kohima of the growers are single (unmarried) during the study period. Out of the total respondents, 191 growers i.e. 84.89% are married and only 34 growers (15.11%) are single. It reveals that married growers are more predominant in flower growing activities than unmarried growers in both the selected districts.

Table 2.3.4: Marital status of the selected growers in Dimapur and Kohima districts

Marital status	Dimapur	Kohima	Total
Single	12 (13.95)	22 (15.83)	34 (15.11)
Married	74 (86.05)	117 (84.17)	191 (84.89)
Total	86 (100)	139 (100)	225 (100)

Source: Field survey 2013-14
Note: Figure in parenthesis are percentages to the total.

2.3.5 Occupation-wise Distribution

Occupation of the growers determines whether the growers are fully dependent on floriculture for their livelihood or not? It was observed from the field survey that none of the unmarried growers were fully dependent on floriculture, while they are engaged in other activities for their better livelihood. In Dimapur 34.88% of the respondents who are housewives are fully engaged in floriculture, while 12.79% of the growers along with floricultural activities are involved in other business activities. Whereas, most of the flower growers i.e. 52.32% are engaged in service sector and at same time growing/farming floriculture as an alternative job to supplement their income.

Similarly in Kohima district about 39.57% of the selected growers are housewives who are solely depending on the production of flowers, while 14.39% are engaged in both floriculture and business and remaining respondents (46.04%) are engaged in service sector as well as in floriculture. From both the districts more than 45% of the growers are working in service sector as well as in cut flower production while about 37% are housewife and engaged only in floriculture and around 13.78% are engage in both business and flower production during the study period.

Table 2.3.5: Occupation of the selected growers in Dimapur and Kohima districts

Occupation	Dimapur	Kohima	Total
Housewife and flower grower	30 (34.88)	55 (39.57)	85 (37.78)
Business and flower grower	11 (12.79)	20 (14.39)	31 (13.78)
Government service and flower grower	45 (52.32)	64 (46.04)	99 (44.00)
Total	86 (100)	139 (100)	225 (100)

Source: Field survey 2013-14
Note: Figure in parenthesis is percentages to the total.

2.3.6 Land Holding

Table 2.3.6 shows the land holding particulars of the selected respondents in Dimapur and Kohima districts. Total land holding of the selected growers in Dimapur stands at 576.52 acres, out of which area under agriculture is 217.92 acres, major proportion of their land were used for non agricultural purposes especially setting up buildings for residential or business purposes, 18.58 acres were kept unused and only

11.06 acres of land is under floriculture. Total area of the selected growers in Dimapur under protected cut flower cultivation of selected flowers is 8.62 acres and under open space cultivation is 2.44 acres. Whereas in Kohima, total land holding of the selected growers is 901.76 acres of which land under agricultural production forms 34.14% (307.83 acres), land under non-agricultural activities comprises of 61.53% (554.90 acres), land under unused forms 2.51% (22.63 acres) and area under floriculture constitute 1.82% (16.40 acres) which is higher than Dimapur. In Kohima 10.65 acres of land are under protected cut flower cultivation of selected flowers and 5.75 acres of land is used for open space cultivation.

Total area under floriculture in both the selected districts in Nagaland stood at just 27.46 acres of the total holding i.e. 1.86% which is very meager for floriculture development. Area under poly house cultivation is 19.27 acres which needs further extension to produce high quality flowers of international standard to meet domestic demand as well as the demand of neighbouring States and rest of the country.

Table 2.3.6: Land holding particulars of the sample growers during 2013-14 (in acres)

Sl. No.	Particulars of land use	Dimapur	Kohima	Total
1.	Total landholding of flower growers	576.52 (100)	901.76 (100)	1478.28 (100)
2.	Area under agriculture	217.92 (37.80)	307.83 (34.14)	525.75 (35.56)
3.	Land for non-agricultural purpose	328.96 (57.06)	554.90 (61.53)	883.86 (59.79)
4.	Area under floriculture	11.06 (1.92)	16.40 (1.82)	27.46 (1.86)
	a) Poly-house	8.62	10.65	19.27
	b) Open area flower cultivation	2.44	5.75	8.19
5.	Area unused	18.58 (3.22)	22.63 (2.51)	41.21 (2.79)

Source: Field survey 2013-14
Note: Figures in parenthesis is percentages to the total.

2.3.7 Area Distribution under Selected Cut Flowers

Cut flower production under protected cultivation has been distributed to the growers in different districts according to the suitability of agro-climatic conditions of the districts to different cut flowers. Accordingly Anthurium and Gerbera were found suitable for the climate in Dimapur which is hot and humid, while Alstroemeria, Lilium and Rose could grow best in Kohima where the climate is cold and moderate.

Table 2.3.7: Area distribution of the selected cut flowers production under protected cultivation (in acres)

Flowers	Dimapur	Kohima	Total
Alstroemeria	-	3.06 (28.73)	3.06 (15.88)
Anthurium	5.41 (62.76)	-	5.41 (28.07)
Gerbera	2.27 (26.33)	-	2.27 (11.78)
Lilium	-	2.77 (26.01)	2.77 (14.37)
Rose	-	2.57 (24.13)	2.57 (13.34)
Other flowers under poly-house	0.94 (10.90)	2.25 (21.13)	3.19 (16.55)
Total	8.62 (100)	10.65 (100)	19.27 (100)

Source: Field survey 2013-14
Note: Figure in parenthesis is percentages to the total.

It is evident from table 2.3.7 that in Dimapur district, of the total area of the selected growers under poly house i.e. 8.62 acres, more than half of the area i.e. 62.76% has been diverted in the production of Anthurium and only 26.33% are under Gerbera cultivation. This is so because Anthurium production for cut flower market started in 2005-06 and it has a life span of 6 to 8 years whereas Gerbera was taken up for cut flower production lately in 2011-12. Other flowers apart from the selected cut flowers that are grown under poly house constitute 10.90% which is mostly varieties of Orchids.

On the other hand, in Kohima district, the total area of the selected cut flowers under protected cultivation stands at 10.65 acres, of which share of area under Alstroemeria production is 28.73%, Lilium is 26.01% and Rose is 24.13%. Area under other flower cultivation under poly house constitutes 21.13%, such flowers are Carnation, Chrysanthemum, Gladioli, Limonium, etc. Accordingly total area, both Dimapur and Kohima districts, under protected cultivation is 19.27 acres with area under Anthurium production forming the majority of 28.07% and the least is in the production of Gerbera with 11.78%. It is important to note that the selected cut flowers are taken on the basis of maximum area and production irrespective of location.

2.3.8 Growers Classification on the Basis of Selected Cut Flowers

Selected growers in the study area were divided on the basis of cut flowers grown by them. There is no uniformity in the selection of cut flowers in both the study districts because of variability in the geography, climate, location and other physical conditions. Table 2.3.8 shows the distribution of sample growers according to the flower cultivated in the study areas.

In Dimapur district 46 Anthurium and 40 Gerbera growers were selected whereas in Kohima district 52 Alstroemeria, 50 Lilium and 37 Rose growers were selected using purposive sampling for the study. It is apparent from the table that highest number of growers has been concentrated in the production of Alstroemeria i.e. 23.11% of the selected growers, followed by Lilium 22.22% and Anthurium 20.44% while Rose growers are only 16.44% of the total respondents in selected district of Kohima.

Table 2.3.8: Distribution of growers in terms of selected flowers grown in Dimapur and Kohima districts

Districts	Flowers	No. of growers
Dimapur	Anthurium	46 (20.44)
	Gerbera	40 (17.78)
Kohima	Alstroemeria	52 (23.11)
	Lilium	50 (22.22)
	Rose	37 (16.44)
Total		225 (100)

Source: Field survey 2013-14
Note: Figure in parenthesis is percentages to the total.

2.3.9 Grower's Experience in Cut Flower Marketing

Flower growing has been an integral part of beautifying the house in the Naga society since the ancient times and so Naga women had the knowledge of basic floriculture activities to be adopted. However, flower production under poly house is quite different from that of open field cultivation. Floriculture marketing was not very common to the people of the State until the inception of horticulture mission though some of the respondent growers have started selling cut flowers since 1998.

Table 2.3.9: Distribution of growers entering into cut-flower marketing in selected districts

Years	Dimapur	Kohima
1998-1999	-	4 (2.88)
2001-02	1 (1.16)	7 (5.03)
2004-05	6 (6.98)	22 (15.83)
2007-08	21 (24.42)	28 (20.14)
2010-11	34 (39.53)	40 (28.78)
2013-14	24 (27.91)	38 (27.34)
Total	86 (100)	139 (100)

Source: Field survey 2013-14
Note: Figure in parenthesis is percentages to the total.

It is apparent from table 2.3.9 that majority of the growers have entered into floriculture industry after 2004-05 when protected cultivation method was introduced in the State. One grower in Dimapur district has started selling cut flower since 2001-02 and in 2004-05 the number of growers entering cut flower marketing increased to 6. In 2013-14, 24 growers entered cut flower marketing. Whereas in Kohima district, growers have entered cut flower marketing since 1998-1999. Out of the total selected growers, 4 growers started marketing cut flowers during 1998-1999, in 2004-05, 22 growers entered floriculture industry and 38 growers entered in 2013-14 for marketing of flower products.

2.3.10 Socio-Economic Profile of Selected Retailers in Dimapur and Kohima Districts

Retailers play a significant role in the market who acts as the intermediator between the producer and the final consumer and at times between the wholesaler and the consumer depending upon marketing channel. All together 30 cut flower retailers were selected for the study from Dimapur and Kohima districts. Table 2.3.10 shows the socio-economic profile of the selected retailers in Dimapur and Kohima districts. The average family size of the respondent is 4.88 where male form 48.36% of the family and female form 51.64% of the family size. Out of the average working family size of 2.36 (48.36%), the working population in agriculture is about 13.56% and 86.44% are in non-agriculture.

Similarly, about 43.33% (13) of the retailers belong to the age group of 41-50 and only 10% i.e. 3 retailers comes under the age group of 21-30. Educational qualification of the selected florist in Dimapur and Kohima districts indicates that 46.67% have attained under-graduate course, 20% have finished intermediate and 16.67% have post graduate degree and primary level. This shows that none of the selected florist is illiterate but has attained at least the minimum level of educational qualification which makes them efficient to handle their business. Marital status of the florists shows that more than half i.e. 18 (60%) of them are unmarried which enables them to freely carry out the business and 12 of them are married.

Table 2.3.10: Profile of the Selected Cut Flower Retailers in Dimapur and Kohima Districts

Sl. No.	Particulars		Dimapur and Kohima
1.	Family size	Male	2.36 (48.36)
		Female	2.52 (51.64)
		Total	4.88 (100)
2.	Age	21-30	3 (10)
		31-40	10 (33.33)
		41-50	13 (43.33)
		51-60	4 (13.33)
		Total	30(100)
3.	Working population (Average size)	Agriculture	0.32 (13.56)
		Non-agriculture	2.04 (86.44)
		Total	2.36 (100)
4.	Educational qualification	Primary-Matriculate	5(16.67)
		Intermediate	6 (20)
		Under-graduate	14 (46.67)
		Post-graduate	5(16.67)
		Total	30 (100)
5.	Marital status	Single	18 (60)
		Married	12 (40)
		Total	30 (100)

Source: Field survey 2013-14
Note: Figure in parenthesis is percentages to the total.

Recapitulation

This chapter discusses on the development made in the floriculture industry of the country as well as Nagaland, socio-economic profile of the sample growers in the study areas, average family size, age, educational qualification, marital status, experience and their occupational activities. Development of floriculture industry to earn foreign exchange has been the prime focus of the policy makers since liberalization of trade and industry in India. Various schemes were introduced to produce quality flowers using advanced technology to meet international demand by providing trainings on various aspects of production and marketing. Besides this financial assistance and transport subsidies were also provided to the farmers. Area under floriculture has been continuously increasing in the country. In 2005-06 area under flower production was 128.68 thousand HA which increased to 255 thousand HA in 2013-14. Floriculture industry in Nagaland faced an overturn with the initiation of HMNEH in 2004-05 which introduced protected cultivation of flowers.

Chapter III

PRODUCTION AND MARKETING CONDITION OF FLORICULTURE IN NAGALAND

3. Introduction

Floriculture industry is mainly concerned with production and marketing of flowers and its products. Production of flowers has shifted from traditional to modern method of cultivation to yield high and good quality output. The age old practice of flower cultivation with traditional methods has now undergone a drastic change, though traditional and modern method of flower cultivation exists side by side. Floriculture industry in Nagaland is mainly concentrated on potted plants, foliage, dry flowers and cut flowers. Initiation of protected cultivation for cut flowers has reinvigorated both production and marketing of cut flowers in Nagaland. Besides being endowed with favourable agro climatic condition, cultivation of flowers under poly house has boost up the quality and quantity of cut flowers. Using modern and advanced techniques adopted from developed countries, the State Government under the Department of Horticulture has opened ways for the growers to the modern method of production to supplement their income. The benefit of cultivating flowers under poly houses is that it helps to produce flowers year round, though the quantity of production may be different in different seasons. The quality of flowers is high, some even of international standard. The vase life of flowers is longer and it incurs less cost for maintenance and less post harvest losses. This increase, both in quantity and quality has created a situation of export promotion and import substitution of cut flowers in Nagaland. Since 2004-05, with the subsidies provided by the State Horticulture Department to promote floriculture, many new and old flower growers were given the opportunity to produce cut flowers under controlled climatic condition for commercial purpose.

The aesthetic value of flowers, their use in every occasion, the satisfaction in working with them and the high income generated from it is influencing modern entrepreneurs to take up floriculture business. The increasing demand for flowers and ornamental plants for different occasions and festivals has been witnessed globally over the years (Sudhagar, 2013)[85]. Increasing demand can be attributed to rapid urbanization, increase in individual purchasing power among middle-income groups, on account of increase in GDP, increase in the number of corporate bodies, hotels, tourists, religious places and changing life-styles or social values among the people (NABARD, Occasional paper-49, 2009)[86]. Considering the fact that the market for cut flower is burgeoning as a result of increasing demand especially from local consumers more growers are entering this lucrative business and thus creating more employment opportunities. The income generation is also higher than other agricultural crops. Increasing floricultural activities has been recorded over the years and cut flowers have occupied a mainstay in it.

This chapter is divided into six sections. Section I deals with production and productivity, the quantity marketed by the sample growers and the price received from selling the selected cut flowers in the study areas; section II emphasize on the various cost of production of the producer; section III discusses on labour absorption among the selected cut flowers; section IV on the gross return and net margin of the sample growers; section V analyses the marketing channels involved in transferring the produce from the producer to the final consumer and the marketing cost, market margin and net return of the producer and the intermediaries; and the final section highlights the retailer's marketing aspects among the selected cut flowers in the study area.

SECTION I

3.1 PRODUCTION AND MARKETING

Production may be defined as the process whereby various inputs are used as raw materials to yield an output which can be used for final consumption or for further use as an input in other activities, while productivity is the amount of output received per unit of input used by the farmer. Commercial production of cut flowers have attracted the attention of the State Horticulture Department which have further boosted and

[85]Sudhagar, S. (2013), op.cit., p. 15.
[86]Occasional paper-49 (2009), "Hi-Tech Floriculture in Karnataka", Department of Economic Analysis and Research, National Bank for Agriculture and Rural Development, Mumbai , p. 15.

encouraged farmers and private entrepreneurs to play an important role in Nagaland. Depending on the climatic condition and its suitability to different types of flowers, planting materials are distributed to the growers in selected districts. The temperature of Kohima is favourable for cultivation of Alstroemeria, Lilium and Rose flowers, whereas, Anthurium and Gerbera flowers grow well in Dimapur. Since flowers are grown under controlled condition, production period is short compared to flowers grown in open space. This short gestation period enables the growers to yield quick output.

Table 3.1.1 shows the total area, production and productivity of selected cut flowers of the total respondents. The table indicates that the highest area under cut flower has been concentrated for Anthurium with 21893.16 m^2 followed by Alstroemeria with 12400 m^2. Whereas in production among the selected flowers, Alstroemeria has the highest number with 899962 stems, whereas Lilium is the lowest with 426040 stems which is less than half of Alstroemeria. On the contrary to that, Gerbera has the highest productivity at 76.59 per m^2 followed by Alstroemeria (72.58 per m^2) and Rose (62.30 per m^2). Both Lilium and Anthurium registered lower productivity compared to other cut flowers in selected districts during the study period.

Table 3.1.1: Total area (in m^2), production (in stems) and productivity (per m^2) of the selected growers under selected flowers

Districts	Flowers	Total area	Total production	Productivity
Dimapur	Anthurium	21893.16	812860	37.13
	Gerbera	9200	704600	76.59
Kohima	Alstroemeria	12400	899962	72.58
	Lilium	11200	426040	38.04
	Rose	10400	647980	62.30

Source: Field survey 2013-14

3.1.1 Average Production and Productivity

The average production and productivity of selected cut flowers under poly house cultivation measuring 200m^2 and more than 200m^2 have been calculated. Data in table 3.1.2 reveals that area has positive association with production among all the selected cut flowers. Gerbera and Alstroemeria yields higher productivity than the others. Gerbera yields an average of 15282.35 stems and 30833.33 stems under poly house measuring $200m^2$ and more than $200m^2$ respectively, while Alstroemeria yields an average of 14122.90 stems and 30680 stems for both sizes of poly house respectively. Similarly, in case of productivity of all selected cut flowers in both sizes of poly houses, Gerbera yields 76.41 stems and 77.08 stems per m^2 respectively. However, Anthurium production along with the inception of HMNEH could not yield impressive output for most of the growers due to lack of scientific training and knowledge among the cultivators and lack of trained labourers. In spite of having the largest area under protected cultivation, production of Anthurium has declined over the years and the number of sick units has also augmented. Thus production and productivity of Anthurium cut flower has remained low, with production of 7642.27 stems and productivity of 38.21 per m^2 for poly house measuring $200m^2$, and 17793.22 productions and 35.59 per m^2 productivity for poly house measuring more than $200m^2$.

Table 3.1.2: Average production and productivity of selected cut flowers in Dimapur and Kohima districts

Districts	Flowers	Production (in stems)		Productivity (per m^2)	
		$200m^2$	More than $200m^2$	$200m^2$	More than $200m^2$
Dimapur	Anthurium	7642.27	17793.22	38.21	35.59
	Gerbera	15282.35	30833.33	76.41	77.08
Kohima	Alstroemeria	14122.90	30680.00	70.61	76.70
	Lilium	7571.36	15483.33	37.86	35.73
	Rose	12314.17	27110.77	61.57	62.93

Source: Field survey 2013-14

Whereas in case of Lilium which is a seasonal crop, production is different from the other four selected flowers. Lilium is a bulbaceous plant and once the bulbs produces flowers new bulbs have to be planted or sometimes the same bulb can be replanted and thus production per plant or bulb and productivity is lower than the other four selected crops. Lilium flower produces 7571.36 stems and 15483.33 stems for $200m^2$ and more than $200m^2$ poly houses respectively. In case of Rose, the average production stands at 12314.17 and 27110.77 stems for $200m^2$ and more than $200m^2$ poly house respectively. The data reveals that there are wide variations in production and productivity among the selected flowers between the districts. It is shown that Gerbera predominates both in production and productivity in Dimapur while Alstroemeria gives highest production and productivity in Kohima as well as among the other selected cut flowers in both the districts. It indicates that there are many factors determining the different yield among the flowers in both the districts.

3.1.2 Seasonal Production of Selected Cut flowers

Though flower production under controlled condition enables the cultivators to produce flower throughout the year, quantity of production however differs in different seasons. Summer season yield more output than winter for all the selected cut flowers except in the production of Gerbera for poly-house measuring 200m^2 where winter yields higher than summer.

Table 3.1.3: Average production of selected cut flowers by farmers per month in different seasons for one poly-house measuring 200m^2

Districts	Flower	Production per month (in stems)		% Change
		Summer	Winter	
Dimapur	Anthurium	642.56	628.85	-2.18
	Gerbera	1220.78	1335.03	8.56
Kohima	Alstroemeria	1288.75	1061.53	-21.40
	Lilium	683.53	578.37	-18.18
	Rose	1076.33	973.56	-10.56

Source: Field survey 2013-14

It is evident from table 3.1.3 that average production of Alstroemeria per month during summer recorded the highest output with 1288.75 stems which falls to 1061.53 stems during winter showing negative growth of -21.40%. Similarly, the other flowers except Gerbera shows higher production during summer is higher than winter in both the districts during the study period. On the contrary, in case of Gerbera the production is higher during winter (1335.03 stems) than summer (1220.78 stems) which shows positive growth of 8.56%. Average production of Lilium is found to be lowest in winter with 578.37 stems with a negative percentage change of -18.18%.

Table 3.1.4: Average production of selected cut flowers by farmers per month in different seasons for one poly-house measuring more than 200m^2

Districts	Flower	Production per month (in stems)		% Change
		Summer	Winter	
Dimapur	Anthurium	1674.67	1374.80	-21.81
	Gerbera	2369.44	2769.44	14.44
Kohima	Alstroemeria	2734.95	2318.67	-17.95
	Lilium	1347.80	1232.76	-9.33
	Rose	2452.60	2043.31	-20.03

Source: Field survey 2013-14

Similarly, the flower production above 200m^2 poly house is shown in table 3.1.4. The data indicates that average production is higher during summer with respect to Alstroemeria while during winter Gerbera recorded higher production than the other selected flowers. The percentage change in production from summer to winter for Gerbera is 14.44%. On the contrary, the average production of Lilium tends to be lower in both the seasons with 1347.80 stems during summer and 1232.76 stems during winter. Whereas the percentage change in the average production of all flowers except Gerbera from summer to winter are also negative, the change for Lilium is the lowest (-9.33%), followed by Alstroemeria (-17.95%), Rose (-20.03%) and Anthurium (-21.81%).

3.1.3 Multiple Regression Analysis

The term multiple regression was first used by Pearson in 1908 to estimate the relationship between various independent variables and a dependent variable[87]. It is a statistical tool for estimating the relationship between the endogenous and exogenous variables. Change in the value of the dependent variable is determined by change in the independent variables. Multiple linear regression analysis is expressed as:

$$\ln Y = \sim_0 + {}_1 \ln x_1 + {}_2 \ln x_2 + {}_3 \ln x_3 + {}_4 \ln x_4 + {}_5 \ln x_5 + {}_6 \ln x_6 + {}_7 \ln x_7 + {}_8 \ln x_8 + {}_9 \ln x_9 + «_i$$

Where, Y = Revenue measured in Rs.,

[87] "How to Find Relationship Between Variables, Multiple Regression" Retrieved on 05/06/16 from www.statsoft.com/textbook/multiple-regression

x_1 = Age measured in years,

x_2 = Education measured as 1 - literate and 0 - otherwise,

x_3 =Experience measured in years,

x_4 = Designation measured as 1- pure flower growers and 0 - otherwise,

x_5= Land holding measured in acre,

x_6 = Capital cost measured in Rs. per poly house,

x_7 = Labour cost measured in Rs. per poly house,

x_8 = Productivity measured in stems per m^2,

x_9 = Average price measured in Rs. per stem,

u_i = Error term which include unknown factors affecting the revenue of farmers,

ln = Natural logarithm,

α = Constant.

3.1.3.1 Regression Analysis for Kohima District

Table 3.1.5 shows the regression analysis of selected cut-flowers in Kohima district. In the table all the variables are showing expected signs. It is evident from the table that in case of Alstroemeria, the coefficients of capital cost, productivity and average price is statistically significant at 1 percent level. This indicates that for every one percent increase in the spending on capital cost, income of the grower will increase by 0.46 times, whereas one percent increase in productivity and average price will increment grower's income by 1.02 times and 0.91 times respectively. While other explanatory variables such as age and landholding also have positive association but is statistically insignificant with the dependent variable. However, the coefficient of labour cost is positive and statistically significant at 5 percent, indicating that employing more labour leads to increase in the production and productivity resulting in increasing farmer's income. On the other hand, designation of the growers is negative and statistically significant at 10%. As growers engage themselves in other activities besides floriculture their farm income will reduce.

Similarly in case of Lilium flower, coefficient of capital cost, productivity and average price are statistically significant at 1 percent level, i.e., when capital cost, productivity and average price increases by one percent, grower's income is enhanced by 0.40, 0.86 and 1.33 times respectively. Simultaneously the investment on labour is positive and significant at 10 percent level. On the contrary, grower's education is associating negative relation with the dependent variable and significant at 10 percent level. As farmer-grower attains higher education they tend to focus more on other activities especially service sector for their livelihood.

Regression analysis in case of Rose cut flowers shows a more interesting result where the coefficient of capital cost, labour cost and productivity are positive and statistically significant at 1 percent level. Accordingly, when Rose growers increase their investment in capital and labour by one percent, income increases by 0.65 and 0.34 times respectively. At the same time one percent increase in productivity induces income by 0.59 times. Coefficient of education is showing negative and significant at 1 percent level, which indicates that when farmer attain more education they will give less priority on floriculture and focus in other service and business activities where they get higher returns or salaries. On the other hand, coefficients of farmer's age and landholding are negative and statistically significant at 10 percent level. It indicates that as growers become older, concentration will be reduced and yield and return will be affected negatively. On the contrary, coefficient of average price of flower is found to be positive and statistically significant at 5 percent level.

The overall regression analysis of the three selected cut flowers in Kohima district reveals that there is both positive and significant association with dependent variable, whereas in case of farmer's age, education and landholding coefficients are negative. The coefficients of capital cost, labour cost, productivity and average price are positive and statistically significant at 1 percent level, whereas farmer's education is negative and significant at 1 percent level. It is evident from the table that 0.69% change in farmer's income is the result of explanatory variables illustrated in the table.

Table 3.1.5: Factor Distribution for Selected Cut-flowers in Kohima: Regression Analysis

Sl. No.	Variables	Alstroemeria	Lilium	Rose	All
1	Constant	-0.158	0.353	0.068	0.372
2	Age	0.047 (0.23)	-0.161 (0.96)	-0.680 (1.86)***	-0.105 (0.79)
3	Education	-0.044 (0.58)	-0.129 (1.75)***	-0.565 (3.78)*	-0.143 (2.63)*
4	Experience	-0.005 (1.36)	0.0004 (0.17)	0.010 (1.54)	0.0007 (0.35)
5	Designation	-0.046 (1.93)***	0.012 (0.50)	0.038 (1.09)	0.022 (1.60)
6	Landholding	0.022 (0.50)	-0.007 (0.22)	-0.109 (1.93)***	-0.027 (1.07)
7	Capital cost	0.463 (5.08)*	0.400 (3.73)*	0.654 (4.50)*	0.397 (7.31)*
8	Labour cost	0.150 (2.40)**	0.107 (1.87)***	0.347 (3.63)*	0.179 (4.74)*
9	Productivity	1.022 (7.45)*	0.861 (5.19)*	0.599 (3.79)*	0.916 (10.68)*
10	Avg. Price	0.912 (3.65)*	1.331 (3.09)*	1.365 (2.35)**	0.964 (10.63)*
	R^2	0.831	0.692	0.797	0.690
	F change	23.04	10.01	11.84	31.94
	No. of observation	52	50	37	139

Note: Figures in parenthesis indicate 't' values
*, ** and *** indicates 1 percent, 5 percent and 10 percent significance

3.1.3.2 Regression Analysis for Dimapur District

Regression result of the two selected cut flowers in Dimapur district i.e., Anthurium and Gerbera has been depicted in table 3.1.6. The explanatory variables in case of Anthurium shows that the coefficients of labour cost, productivity and average price are positive and significant at 1 percent level, whereas the coefficient of the farmer's age is negative and statistically significant at 1 percent level. As farmers become older his or her efficiency in production is reduced and this leads to fall in their income. On the contrary to that, landholding is positively associated with the dependent variable and statistically significant at 5 percent level, indicating that production and productivity increases with increase in land size leading to a rise in their level of income.

Table 3.1.6: Factor Distribution for Selected Cut-flowers in Dimapur: Regression Analysis

Sl. No.	Variables	Anthurium	Gerbera	All
1	Constant	2.338	1.611	2.009
2	Age	-0.835 (2.75)*	-0.465 (2.51)*	-0.564 (3.48)*
3	Education	-0.077 (0.70)	-0.154 (2.02)**	-0.056 (0.88)
4	Experience	0.011 (1.35)	0.013 (1.87)***	0.009 (1.94)***
5	Designation	0.033 (0.93)	0.008 (0.34)	0.015 (0.77)
6	Landholding	0.182 (2.37)**	-0.004 (0.12)	0.084 (2.13)**
7	Capital cost	0.184 (1.46)	0.436 (4.44)*	0.299 (3.64)*
8	Labour cost	0.237 (2.65)*	0.171 (2.95)*	0.206 (3.96)*
9	Productivity	0.640 (3.35)*	0.658 (3.59)*	0.683 (6.85)*
10	Avg. Price	0.975 (3.12)*	0.561 (2.26)**	0.569 (4.72)*
	R^2	0.609	0.884	0.687
	F change	6.23	25.44	18.53
	No. of observation	46	40	86

Note: Figures in parenthesis indicate 't' values
*, ** and *** indicates 1 percent, 5 percent and 10 percent significance

In case of Gerbera, all the selected variables are showing expected signs and coefficients of grower's age, education, capital cost (technology), labour cost (labour utilization), productivity and prices are statistically significant. When growers invest more in technology and labour it leads to increase in production and productivity which will increase grower's income. On the contrary, farmer's age and education shows negative relation and are significant at 1 and 5 percent level respectively. As the growers become older their efficiency will be reduced and when the growers are highly educated they will focus on other activities which give more returns. R^2 shows the model is good fit at 61% and 88% of change in variation in the income of the selected flowers of Anthurium and Gerbera in the selected districts during the study period.

The overall regression analysis of the coefficients of all explanatory variables of both the selected cut flowers taken together indicates that the determinants of capital cost, labour cost, productivity and average price are positive and significant at 1 percent. Whereas the coefficient of farmer's age is negative and statistically significant at 1 percent level, coefficient of landholding is positive and statistically significant at 5 percent while coefficient of farmer's experience is also positive at 10 percent level of significance. It is also seen from the table that 68% change in farmer's income is affected by the explanatory variables expressed in the table. Thus the second hypothesis of the study have been proved where availability of land holdings with the farmers, expenditure in capital and labour and market prices are the major factors that determines production and productivity of cut flowers than education and experience of the farmers.

3.1.4 Marketed Quantity

Agricultural marketing is a process where a saleable farm commodity is produced, involving all elements of market structure, functional and institutional, based on technical and academic circumstances and includes pre and post harvest operations, assembling, grading, storage, transportation and distribution (Singh, 1990) [88] . Marketing of agricultural produce being a complex phenomenon includes all functions and processes involved in the movement of the produce from the producers to the final consumers. This function will vary from commodity to commodity, market to market, the level of economic development of the country and the form of final consumption (Acharya and Agarwal, 2011)[89].

This section analyzes the marketing of cut flowers within the selected districts as well as the neighbouring states. Consumer's demand for varieties of cut flowers for

[88]Singh. D.V. (1990), "Production and Marketing of Off-Season Vegetables" (First Edition), p. 132, New Delhi: Mittal Publications.
[89]Acharya, S.S. and N.L. Agarwal (2011), "Agricultural marketing in India" (Fifth Edition), p. 85, New Delhi: Oxford and IBH Publishing Company Pvt. Ltd.

personal consumption or for gifts and other social purposes determines the marketing condition. Domestic demand for cut flowers is seasonal where more is demanded during occasions such as weddings, birthdays, Valentine's Day, etc. and during the season of festivities such as Christmas and New Year. Over the years rising demand for fresh cut flowers has been witnessed with urbanization, increase in per capita income and improvement in the standard of living of the people of Nagaland. Demand for cut flowers for decorating Government/private offices, hotels, restaurants, tourism spots and churches has further increased domestic demand for cut flowers. Seasonality in production further influences the quantity and quality available for sale in the market. Due to warm or humid weather the duration of production tends to be shorter during summer with higher yield compared to longer production duration and lesser yield during winter. Thus more output is available for sale during summer than winter depending on the amount offered for sale by the domestic producers.

Table 3.1.7: Average marketed quantity of selected cut flowers by farmers per month in different seasons for poly-house measuring 200m^2

Districts	Flower	Marketed quantity per month (in stems)		% Gap
		Summer	Winter	
Dimapur	Anthurium	556.82	540.45	-3.03
	Gerbera	1136.47	1302.35	12.73
Kohima	Alstroemeria	1121.43	980.48	-14.37
	Lilium	607.73	558.18	-8.87
	Rose	968.75	914.58	-5.92

Source: Field survey 2013-14

In table 3.1.7, the data for poly house measuring 200m^2 shows that in both the seasons, average marketed quantity per month of Gerbera recorded the highest number among all the selected cut flowers sold i.e., 1136.47 stems during summer and 1302.35 stems during winter. On the contrary, Anthurium recorded the lowest number of cut flower stems sold per month i.e., only 556.82 stems during summer and 540.45 stems during winter. The data also indicates that Gerbera witnessed a positive percentage gap of 12.73% which illustrates that more quantity is sold by the producer in winter than summer. Whereas, Anthurium flower shows a negative percentage gap of -3.30% between the seasons indicating higher marketed quantity during summer than winter.

Moreover, Alstroemeria (14.37%), Lilium (8.87%) and Rose (5.92%), have variations between the two seasons in which the quantity marketed during summer is higher than winter during the study period. The data reveals that there is huge variation among the flowers in marketed quantity due to variations in production, productivity and price in both the selected districts.

Table 3.1.8: Average marketed quantity of selected cut flowers by farmers per month in different seasons for poly-house measuring more than 200m^2

Districts	Flower	Marketed quantity per month (in stems)		% Gap
		Summer	Winter	
Dimapur	Anthurium	1257.82	1210.84	-3.88
	Gerbera	1991.67	2183.33	8.77
Kohima	Alstroemeria	2278.00	2035.00	-11.94
	Lilium	1258.33	1191.67	-5.59
	Rose	2126.77	1738.60	-22.33

Source: Field survey 2013-14

Similarly, the marketed quantity of selected cut flowers in the poly house measuring more than 200m^2 is shown in table 3.1.8. The data indicates that marketed quantity of Gerbera predominates in the months of winter having positive growth of 8.77. On the contrary, the other four flowers shows higher marketed quantity during summer compared to winter having wide gap between the seasons. On the other hand, Anthurium and Lilium is showing almost equal importance in both the seasons giving a gap of 3.88% and 5.59% respectively between the two seasons. Production of Rose being slow in winter the percentage gap in marketed quantity between the two seasons shows 22.33% indicating a wider gap compared to the other four selected flowers.

Table 3.1.9 shows the marketed quantity, self consumption, gift and spoilage of selected cut flowers under 200m^2 poly house in Dimapur and Kohima district. It is evident from the table that in Dimapur, Anthurium[90] growers sell 86.15% of their produce while consuming 2.11% at the household level, giving away 5.60% as gifts to friends and family members or to churches as offerings and having a spoilage rate of 6.19% of the produce due to non-availability of market for their produce or excess

[90] Lack of scientific knowledge and training have resulted in low quality production for most of the Anthurium growers and this have even led to increasing sick units in Dimapur district.

production and also lack in quality to meet market standard. In case of Gerbera[91] growers, about 95.75% of the produce is marketed and only 0.92% is used for household consumption and 1.25% as gifts to friends and family and offering to churches respectively in Dimapur district.

Table 3.1.9: Marketed quantity, self consumption, gift and spoilage of selected cut flowers of the farmers in Dimapur and Kohima districts for growers having poly house measuring 200m^2 (in %)

Districts	Flowers	Marketed Qty.	Household consumption	Gift to friends, family and churches	Spoilage	Total
Dimapur	Anthurium	86.10	2.11	5.60	6.19	100
	Gerbera	95.75	0.92	1.25	2.08	100
Kohima	Alstroemeria	89.29	2.30	4.27	4.14	100
	Lilium	92.39	1.92	4.08	1.01	100
	Rose	91.76	1.39	3.04	3.90	100

Source: Field survey 2013-14

On the other hand, in Kohima district the growers of Alstroemeria sell about 89.29% of the flowers in the market, giving away 4.27% to their friends and churches and have a spoilage rate of 4.14%. Households consume about 2.30% of the total production in both the seasons. Whereas, in case of Lilium, it is very interesting to note that spoilage/wastage rate is very low[92] i.e., 1.01% and marketed quantity of about 92.39% which is highest among the selected cut flowers in Kohima district. Donating to the churches or giving gift to their family and friends from the total output is about 4% and household consumption is 1.92%. Similarly, in case of Rose, the growers sell about 92% of their total produce, giving about 3.04% to family, friends and churches and having a spoilage rate of 3.90%. It is interesting to note that, in both the districts, among all the selected flowers, Anthurium predominates in wastage or spoilage and Lilium has the lowest spoilage rate. Whereas Gerbera flower in Dimapur district predominates in marketed quantity followed by Lilium in Kohima district during the study period.

[91]North Bengal Flori-tech deals in buying back Gerbera flower from the growers provided they are willing to sell their produce at the company's price whole year round.

[92] Low rate of spoilage in case of Lilium is due to the high demand as well as longer shelf life.

Table 3.1.10: Marketed quantity, self consumption, gift and spoilage of selected cut flowers in Dimapur and Kohima districts for growers having poly house measuring more than 200m^2 (in %)

Districts	Flowers	Marketed Qty.	Household consumption	Gift to friends, family and churches	Spoilage	Total
Dimapur	Anthurium	81.11	3.68	7.24	7.97	100
	Gerbera	81.24	4.80	7.61	6.35	100
Kohima	Alstroemeria	84.35	2.02	5.58	4.87	100
	Lilium	94.94	2.75	3.29	0.86	100
	Rose	85.55	1.63	4.92	5.96	100

Source: Field survey 2013-14

Similarly, the percentage of marketed quantity and the surplus used for self-consumption, as gifts and spoilage rate of selected growers having poly house measuring more than 200m^2 have been listed in table 3.1.10. An interesting observation from the study reveals that as the growers are able to produce more, the percentage of their marketed quantity becomes smaller than those growers producing less while the rate of household consumption, gifts and spoilage rate increases in both the districts, one of the main reasons being lack of marketing facilities to sell their produce. The spoilage rate of Anthurium is highest among the other selected cut flowers at 7.97%, whereas Lilium has the lowest spoilage rate at 0.86% resulting in more marketed quantity of 94.94% while self-consumption of Gerbera is highest with 4.80%.

3.1.5 Marketed Price

When the output is brought to the market for sale, the farmers have to set a suitable price for their produce. The movement of each product from the farm to the final consumer plays an important role in determining the price of that product to the farmer (Singh, 1990)[93]. Floriculture industry in Nagaland being unorganized, no firm step has been taken so far to fix the prices of flowers and as such prices remain unregulated and keep on fluctuating. Instability in prices often results from a number of factors such as

[93]Singh. D.V. (1990), op.cit., p. 144.

climate, season, occasions, quality of flowers, etc (FABS, 2013)[94]. There is no grading system where cut flowers are rated according to their quality, size, colour and length. Farmers try to adopt uniform price for their produce by making agreement among them but their efforts go wasted as they do not only sell flowers to the retailers and the middleman but also directly to the consumers. Since there is no uniform price of the selected cut flowers, an average price is taken for the study purpose. Unregulated market enables the growers to charge differentiated price.

During summer when production of cut flower is higher and in excess of demand, as fewer occasions are held and since flowers are highly perishable in nature, growers as well as the retailers are compelled to sell cut flowers at a lower price to avoid wastage or spoilage. This is the time when the growers are faced with the problem of unwanted wastage of matured flowers in the field due to lack of demand from the market. At the same time, the retailer is faced with excess storage which results in spoilage due to lack of demand from the domestic consumers. However, during winter when production is lower and demand reaches its peak with the season of celebrations, huge demand of cut flowers for decorations and as gifts enables the growers to fetch higher prices. The season of festivities (winter months) gives an opportunity to both the growers and the retailers to take advantage from the rising demand to recover for their summer losses. Price of flower is also determined by the seasonality in production or its availability. The more abundant the availability of cut flowers lower will be its price and vice versa.

Data on average price per stem received by the farmers in different seasons has been shown in table 3.1.11. It is evident from the table that price of selected cut flowers varies with seasons. Seasonal variation in prices is attributed to the demand of the domestic consumers as well as the production and availability of cut flowers. In Dimapur, Anthurium whose price per stem stands at Rs. 15 during summer increases to Rs. 20.94 during winter. Whereas, Gerbera flower fetch an average price of Rs. 7.33 per stem to the farmer during summer and Rs. 9.55 per stem during winter.

[94]Food and Agri Business School (FABS), Chevella, Hyderabad (2013) “Demand Supply Assessment of the Cut Flowers in the Vicinity of Hyderabad”, p. 7.

Table 3.1.11: Average price received per stem by the farmers in different seasons and their percentage change (Rs. per stem)

Districts	Flowers	Price per stem		Average
		Summer	Winter	
Dimapur	Anthurium	15.00	20.94	17.97
	Gerbera	7.33	9.55	8.44
Kohima	Alstroemeria	7.42	10.97	9.19
	Lilium	13.85	20.38	17.11
	Rose	8.07	10.91	9.49

Source: Field survey 2013-14

Similarly, the average price per stem in case of Alstroemeria in Kohima is Rs. 7.42 during summer and Rs. 10.97 during winter. Whereas in case of Lilium the average price is Rs. 13.85 per stem during summer which increases to Rs. 20.38 per stem during winter. In case of Rose, summer price is Rs. 8.07 per stem with winter price at Rs. 10.91 per stem. Among the selected cut flowers Gerbera (Rs. 8.44) fetch the least average price per stem to the growers in both the seasons, while Anthurium (Rs. 17.97) growers receives the highest price in both the seasons.

SECTION II

3.2 COST OF PRODUCTION

Cut flower cultivation depends upon various input used in the process of production such as land, labour, irrigation, fertilizers, pesticides and fungicides, manure, transportation, packing, etc. which involve costs. The use of genetic engineering technology in floriculture not only removes obstacles in commercialization but also reduces cost of cultivation because unlike food crops, flowers are not consumed and do not have to undergo food safety check; and at the same time it reduces the use of chemicals to control diseases and insects (Chandler and Lu, 2005)[95]. Modern method of cut flower production under protected cultivation has reduced cost to a greater extent where the risk of poor quality, damages by outside environment and pests and diseases

[95]Chandler, S.F. and C. Lu (2005), op.cit., p. 591.

has been controlled partially. The various costs incurred in producing the selected cut flowers in both Dimapur and Kohima districts are provided in tables 3.2.1 to 3.2.5.

3.2.1 Alstroemeria

Table 3.2.1 shows the cost of cultivating Alstroemeria. It can be seen that total input cost calculated for both the poly houses measuring $200m^2$ and more than $200m^2$ stands at Rs. 13926.40 and Rs. 25182.00 respectively. Highest input cost has been incurred in transportation i.e. Rs. 4973.10 for poly house measuring $200m^2$, whereas for poly house measuring more than $200m^2$ it is in buying organic manure i.e. Rs. 10820. Cultivation under protected condition helps in controlling pests and diseases and as a result, usage of chemicals to maintain plant quality is reduced. Thus it is evident from the table that only Rs. 155.95 ($200m^2$) and Rs. 490 (more than $200m^2$) have been invested in buying fertilizers, pesticides and fungicides. For poly house measuring $200m^2$ no irrigation cost has been incurred because poly house and other subsidies are given to those growers who have land measuring $200m^2$ or more, land that have water for irrigation and is near to the market.

Nevertheless, growers having more than $200m^2$ area under flower cultivation have incurred some cost on irrigation (Rs. 220) as it becomes essential to buy water at times during dry season. Of the total labour cost, maximum cost has been incurred in hiring labour for ploughing or to till the land in order to prepare for cultivation i.e. Rs. 4623.04 and Rs. 6848.45 respectively for both $200m^2$ and more than $200m^2$. Lowest labour cost for both the poly houses has been in hiring labour for controlling pests and diseases, i.e., Rs. 20.00 ($200m^2$) and Rs. 167.02 (more than $200m^2$).

Estimation shows that, among the total cost of producing Alstroemeria for both the poly houses, labour cost forms greater share of the total cost. Growers spent more on paying labour wages in employing them for carrying out various activities for both the size of poly houses i.e., Rs. 14339.88 for area measuring $200m^2$ and Rs. 25572.90 for area measuring more than $200m^2$. Total cost from both input and labour computed together shows Rs. 28266.28 ($200m^2$) and Rs. 50754.90 (more than $200m^2$). It is interesting to note that in both the poly houses, growers are getting rhizomes (seeds) from the Horticulture Department at free of cost. It is also important to note that labour charges are higher than the other input costs in case of Alstroemeria.

Table 3.2.1: Average cost of production of Alstroemeria (in Rs.)

Sl. No.	Particulars	Poly-house measuring $200m^2$	Poly-house measuring more than $200m^2$
1.	i. Seed	*	*
	ii. Manure	4619.64	10820
	iii.Fertilizers, pesticides and fungicides	155.95	490
	iv. Irrigation	-	220
	v. Transport	4973.10	6050
	vi. Poly-house	1904.76	4000
	vii. Electricity	416.90	920
	viii. Packing	1300	1940
	ix. Others	556.05	742
	Total input cost	**13926.40**	**25182**
2.	Labour cost		
	a. Ploughing	4623.04	6848.45
	b. Preparation of flower bed	1596.14	3119.14
	c. Manuring and fertilizing	1319.18	2299.06
	d. Planting	565.94	1028.65
	e. Pest and disease control	20.00	167.02
	f. Watering	3632.62	6369.57
	g. Weeding and trimming	1141.27	2190.65
	h. Harvesting	541.18	1414.05
	i. Transport, loading and unloading	900.51	2136.31
	Total labour cost	**14339.88**	**25572.90**
3.	**Total cost (1+2)**	**28266.28**	**50754.90**

Source: Field survey 2013-14
Note: * seedlings is given free of cost by Horticulture Department of Nagaland.

3.2.2 Lilium

The cost of producing Lilium in poly house measuring $200m^2$ and more than $200m^2$ is shown in table 3.2.2. Unlike other selected cut flowers, Lilium is a onetime or seasonal plant and can be replanted for the second time at the most. So when the bulbs that are provided by the Government at subsidized rate produce flowers or attains maturity, the growers in order to continue with Lilium cultivation have to buy the bulbs from the market whose price ranges from Rs. 5 to Rs. 10 per bulb. Hence on an average an amount of Rs. 2127.27 (for poly house measuring $200m^2$) and Rs. 8833.33 (poly house measuring more than $200m^2$) has been paid out by the selected growers for buying Lilium bulbs.

Table 3.2.2: Average cost of production of Lilium (in Rs.)

Sl. No.	Particulars	Poly-house measuring $200m^2$	Poly-house measuring more than $200m^2$
1.	i. Seed	2127.27	8833.33
	ii. Manure	6563.75	9354.17
	iii.Fertilizers, pesticides and fungicides	121.59	600
	iv. Irrigation	59.09	533.33
	v. Transport	5220.91	3900
	vi. Poly-house	1868.18	3666.67
	vii. Electricity	268.18	858.33
	viii. Packing	1494.32	1666.67
	ix. Others	475.08	966.67
	Total input cost	**18198.37**	**30379.17**
2.	Labour cost		
	a. Ploughing	4575.44	6613.16
	b. Preparation of flower bed	1984.57	3576.40
	c. Manuring and fertilizing	1220.96	2669.82
	d. Planting	720.01	2077.04
	e. Pest and disease control	32.01	278.36
	f. Watering	3667.19	7431.27
	g. Weeding and trimming	983.02	2651.27
	h. Harvesting	509.60	1052.23
	i. Transport, loading and unloading	641.41	1220.71
	Total labour cost	**14334.21**	**27570.26**
3.	**Total cost (1+2)**	**32532.58**	**57949.43**

Source: Field survey 2013-14

Cost of manure forms the highest cost of production for growers under both the poly houses i.e., Rs. 6563.75 and Rs. 9354.17 for poly-house with $200m^2$ and more than $200m^2$ area respectively. Total input cost of Rs. 18198.37 for $200m^2$ poly house and Rs.

30379.17 for more than 200m^2 poly-house has been incurred by Lilium growers in Kohima which is higher than labour cost. Of the total labour cost of Rs. 14334.21 (for poly house measuring 200m^2) and Rs. 27570.26 (poly house measuring more than 200m^2), lowest amount has been spent in hiring labour for controlling pests and diseases i.e., Rs. 32.01 (200m^2) and Rs. 278.36 (more than 200m^2). Among the labour cost, wages paid for hiring labour for ploughing form the major cost for both the poly houses at Rs. 4575.44 and Rs. 6613.16 respectively. Total cost which consists of both input cost and labour cost for producing Lilium stands at Rs. 32532.58 (200m^2 area) and Rs.57949.43 (more than 200m^2 area) in the study area during the study period of 2013-14.

3.2.3 Rose

Cost associated with the cultivation of Rose per year is given in table 3.2.3. From the table it is clear that the lowest cost of production is in irrigation i.e. Rs. 366.67 (200m^2 poly house) and Rs. 246.15 (more than 200m^2 poly house)[96]. Like the other two selected flowers in Kohima, highest cost of producing Rose under 200m^2 poly house is in purchasing manure, i.e., Rs. 7168.75 whereas the cost for purchases of fertilizers, pesticides, insecticides and fungicides (Rs. 11353.85) forms the highest cost under poly house measuring more than 200m^2. Rose is usually infected by pests and diseases, and thus need special care by treating it with chemicals whenever required to yield high quality flowers.

In comparison with the other four selected cut flowers, Rose is covered by a special net while it is still in its flower bed during budding stage, to prevent it from blooming before reaching the final consumer or to make its vase life longer. This cost along with miscellaneous cost has been given under other costs as indicted in the table which is Rs. 2529.16 and Rs. 3094.61 for poly house measuring 200m^2 and more than 200m^2 respectively. Even in Rose cultivation input cost forms the major cost of production in both the poly houses during the study period.

[96]Though the units (poly house) is given to those growers whose land have excess to water availability, Kohima being hilly, situation arises when they are faced with water scarcity and have to resort to buying water for irrigation.

Table 3.2.3: Average cost of production of Rose (in Rs.)

Sl. No.	Particulars	Poly-house measuring $200m^2$	Poly-house measuring more than $200m^2$
1.	i. Seed	*	*
	ii. Manure	7168.75	11153.85
	iii.Fertilizers, pesticides and fungicides	6279.17	11353.85
	iv. Irrigation	366.67	246.15
	v. Transport	4702.50	6146.15
	vi. Poly-house	1750	2769.23
	vii. Electricity	416.67	1123.85
	viii. Packing	1966.67	2676.92
	ix. Others	2529.16	3094.61
	Total input cost	**25179.58**	**38564.62**
2.	Labour cost		
	a. Ploughing	4871.81	7135.05
	b. Preparation of flower bed	1576.70	3170.61
	c. Manuring and fertilizing	1509.13	2914.73
	d. Planting	561.18	1287.85
	e. Pest and disease control	430.33	902.69
	f. Watering	3398.41	8388.96
	g. Weeding and trimming	913.36	2337.46
	h. Harvesting	416.92	1663.56
	i. Transport, loading and unloading	744.62	1565.91
	Total labour cost	**14422.46**	**29366.82**
3.	**Total cost (1+2)**	**39602.04**	**67931.44**

Source: Field survey 2013-14
Note: * root stock of Rose is given free of cost by Horticulture Department of Nagaland.

Average labour cost of Rs. 14422.46 ($200m^2$ poly house) and Rs. 29366.82 (more than $200m^2$ poly house) has been incurred as indicated in the table. Among the expenditure or cost on hired labour in the different operations, the ploughing activity is more predominant at Rs, 4871 and Rs. 7135 respectively for both the poly houses, followed by watering, flower bed preparation, etc. The total cost for Rose production stands at Rs 39602.04 and Rs. 67931.44 for selected Rose growers with $200m^2$ and more than $200m^2$ poly house correspondingly. In Kohima, cost of producing Rose is found to be higher than Alstroemeria and Lilium because of the extra cost required on chemicals, packing and other cost such as net use for controlling Rose buds from blooming.

3.2.4 Anthurium

Availability of ground water for irrigation acts as an advantage for the growers to exempt themselves from buying water in Dimapur district and thus helps in reducing cost. Cultivation of Anthurium for commercial purpose under protected cultivation is uniquely different from the other four selected flowers. This is because instead of using soil or animal waste Anthurium uses coco husk[97], charcoal, bricks or thermo coal as manure for its production which last for 4 years. Cost of producing Anthurium, both input and labour cost, has been illustrated in table 3.2.4.

Growers have to be properly trained for Anthurium cultivation as it is more prone to diseases. In this process growers invest a good amount on fertilizers, pesticides and fungicides, i.e., Rs. 5581.82 (200m^2) and Rs. 14570.76 (more than 200m^2) which have to be sprayed on the plant every one or two months. Cost of manure also forms a major part of the total cost, ranging from Rs. 7361.36 for growers having poly house measuring 200m^2 and Rs. 13365.38 for poly house measuring more than 200m^2. Total input cost for poly house measuring 200m^2 is Rs. 22933.98 and Rs. 60620.77 for poly house measuring more than 200m^2.

On the other hand, of the total labour cost, labour hired for ploughing operation forms the highest cost for both the poly houses i.e. Rs. 3311.59 (200m^2) and Rs. 5854.27 (more than 200m^2) respectively. Unlike the selected flowers in Kohima where labour hired for ploughing is often the highest labour cost, Dimapur being located in plain area is faced with lower cost for this activity. Similarly, watering the plant which is a regular activity forms the second highest labour cost for the growers under both the poly houses with Rs. 3165.90 and Rs. 5537.86 respectively. Considering the cost of employing labour to undertake various labour activities in production, overall labour cost has been estimated to be Rs. 11644.83 and Rs. 22255.91 for poly house measuring 200m^2 and more than 200m^2 respectively. Growers incurred a total cost of Rs. 34578.81 (200m^2) and

[97] Coco husk is usually imported from neighbouring states of Assam loaded in trucks.

Rs. 82876.68 (more than 200m^2) for producing Anthurium under protected cultivation in Dimapur district during the study period of 2013-14.

Table 3.2.4: Average cost of production of Anthurium (in Rs.)

Sl. No.	Particulars	Poly-house measuring 200m^2	Poly-house measuring more than 200m^2
1.	i. Seed	277.27	4961.54
	ii. Manure	7361.36	13365.38
	iii.Fertilizers, pesticides and fungicides	5581.82	14570.76
	iv. Irrigation	*	*
	v. Transport	5165.68	8680.77
	vi. Poly-house	1690.90	12557.69
	vii. Electricity	867.27	1971.15
	viii. Packing	1616.82	3576.92
	ix. Others	372.84	936.54
	Total input cost	**22933.98**	**60620.77**
2.	Labour cost		
	a. Ploughing	3311.59	5854.27
	b. Preparation of flower bed	1429.44	2542.21
	c. Manuring and fertilizing	1502.96	2463.92
	d. Planting	397.69	970.77
	e. Pest and disease control	271.51	731.29
	f. Watering	3165.90	5537.86
	g. Weeding and trimming	705.74	1500.21
	h. Harvesting	277.21	944.63
	i. Transport, loading and unloading	582.79	1710.70
	Total labour cost	**11644.83**	**22255.91**
3.	**Total cost (1+2)**	**34578.81**	**82876.68**

Source: Field survey 2013-14

Note: * no irrigation cost since Government aided poly-house is given to those growers whose land have access to water.

3.2.5 Gerbera

The cost of production in case of Gerbera is shown in table 3.2.5 and it indicates that input cost is higher than labour cost in both the poly houses during the study period. Among the input cost, cost of manure predominates which is an important component in the production process constituting the maximum cost of Rs. 7941.18 and Rs. 12833.34 respectively for $200m^2$ and more than $200m^2$ poly houses.

Table 3.2.5: Average cost of production of Gerbera (in Rs.)

Sl. No.	Particulars	Poly-house measuring $200m^2$	Poly-house measuring more than $200m^2$
1.	i. Seed	426.47	1500
	ii. Manure	7941.18	12833.34
	iii.Fertilizers, pesticides and fungicides	2305.88	6416.66
	iv. Irrigation	*	*
	v. Transport	6600	5950
	vi. Poly-house	2000	4000
	vii. Electricity	852.94	1383.33
	viii. Packing	1291.19	2400
	ix. Others	587.54	1055
	Total input cost	**22005.20**	**35538.33**
2.	Labour cost		
	a. Ploughing	3160.02	5447.72
	b. Preparation of flower bed	1137.32	2841.75
	c. Manuring and fertilizing	979.32	2018.30
	d. Planting	429.36	967.06
	e. Pest and disease control	213.71	446.05
	f. Watering	3042.19	6142.48
	g. Weeding and trimming	811.70	1294.49
	h. Harvesting	376.04	919.82
	i. Transport, loading and unloading	753.52	1512.11
	Total labour cost	**10903.18**	**21589.78**
3.	**Total cost (1+2)**	**32908.38**	**57128.11**

Source: Field survey 2013-14

Note: * no irrigation cost since Government aided poly-house is given to those growers whose land have access to water.

On the other hand, the higher productivity of Gerbera makes it imperative for the selected growers to increase the transportation cost for moving the flowers to the market. The average transportation cost is Rs. 6600 and Rs. 5950 for poly house measuring $200m^2$ and more than $200m^2$ respectively. To lift the underground water for irrigation, electricity is used for which the grower spent on an average of Rs. 852.94 ($200m^2$) and Rs. 1383.33 (more than $200m^2$) during the study period.

Correspondingly, the total labour cost for one year in case of Gerbera is Rs. 10903.18 ($200m^2$) and Rs. 21589.78 (more than $200m^2$). Among the labour activities, the growers spent more on ploughing the land and watering. For ploughing activity the growers spent an average of Rs. 3160.02 for poly house measuring $200m^2$, while labour cost for watering the plants forms the highest at Rs. 6142.48 for poly house measuring more than $200m^2$. Labour hired for controlling pests and disease forms the least labour cost at Rs. 213.71 ($200m^2$) and Rs. 446.05 (more than $200m^2$). Total cost for Gerbera production on an average is Rs. 32908.38 for poly house measuring $200m^2$and Rs. 57128.11 for poly house measuring more than $200m^2$ in Dimapur district during the study period (2013-14).

SECTION III

3.3 LABOUR UTILIZATION

Liberalization of Indian economy during the early 1990's has created impetus to the Indian entrepreneurs for establishing and promoting export oriented floriculture unit under controlled climatic conditions. Ministry of Agriculture is playing the major role in developing this sector and is formulating and implementing policies and programmes to achieve rapid agricultural growth through optimum use of land, water soil and plant resources of the country (Mathur and Pachpande, 2013)[98]. The aesthetic value of flowers and ornamental plants and its use in social events, personal satisfaction gained from working with them and high income generated from it is attracting modern entrepreneurs

[98]Mathur, R. and P. Pachpande (2013), "Floriculture- Prospects and Opportunities", *ASM's International E-Journal of Ongoing Research in Management and IT*, p. 2.

to enter into floriculture industry (Sudhagar, 2013)[99]. Studies have proved that flower industry being labour intensive generate more employment than any other horticultural and food crops. Floriculture activity is highly labour intensive employing about 50 workers on an average per acre and women are actively involved as they are capable of noticing the slightest variations in the health of plants, water the plants at regular intervals and in right amount, apply specified quantities of chemicals, remove weeds and harvest the flowers (Panini, 1999)[100]. Therefore, floriculture industry is capable of generating more direct and indirect employment both in rural and in urban areas which is higher than other horticultural, food or commercial crops (Thippaiah, 2005)[101]. Women and unemployed youth can now get themselves employed throughout the year and live sustainably by engaging in commercial cut flower production which was once a mere hobby. Since the inception of commercial floriculture in Nagaland there has been increased participation of women and unemployed youth in the field of flower production and marketing.

Floriculture industry in Nagaland is mainly owned by women, with few male participation, where they actively engaged themselves in producing high quality flowers of international standard. Employment of women in cut flower industry has brought some improvement in terms of their income and in decision making in their family (Korovkin, 2003)[102]. With the help of the State Horticulture Department supplying poly houses and planting materials to the growers at subsidized rate, more women are entering into the flower business. At the same time increase in the demand for flowers in the domestic market is encouraging more women participation in commercial floriculture. These women open up nurseries and since it becomes difficult for them to take care of flowers alone, they hire labourers who help in all the works from ploughing to production and marketing. As a result unemployed labours are able to get employment. Since flower is fragile and easily perishable, it needs extensive care, so the labourers are trained by the owner to take up various tasks.

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[99]Sudhanagar, S. (2013), op.cit., p. 15.
[100] Panini, M. N.(1999), "Trends in cultural Globalization: from Agriculture to Agribusiness in Karnataka", *Economics and Political Weekly*, Vol. 34(31), p. 2171.
[101]Thippaiah, P. (2005), op.cit., p. 10.
[102]Korovkin, T. (2003), op.cit., p. 28.

3.3.1 Operation-wise Labour Absorption

The number of labour utilized both from the family and hired, for a particular endeavor shows the labour absorption at the existing technology (Giribabu, 2012)[103]. Production involve different amount of labour absorption to carry definite activities for different cut flowers. Daily activities of labour in flower farm include watering, weeding and pruning, harvesting, transportation, loading and unloading. The quantity of labour absorption will differ for different flowers and will also differ depending on the location of cultivation and the size of poly house.

The labour absorption for the selected cut flowers in both the districts is shown in table 3.3.1. The table reveals the labour absorption under different activities of production and marketing from the point of cultivators for all the five selected cut flowers under poly house measuring 200m^2 and more than 200m^2. Cultivation of selected cut flowers under poly house measuring 200m^2 is shown on the left side of table. Kohima being hilly area usually require more labour for cultivation. It can be seen from the table that the selected flowers in Kohima, i.e., Alstroemeria, Lilium and Rose absorb higher labour than the counterpart flower crops in plain area of Dimapur district for poly house measuring 200m^2. Lilium being seasonal plant require more labour in flower bed preparation and planting than other cut flowers. Rose is usually infected by pest and diseases compared to the other four selected cut flowers, therefore, it absorbs more labour for grafting, pesticides and fertilizer applications (Thippaiah, 2005)[104]. Thus a total of 1.90 and 6.92 man-days labour has been absorbed for controlling pest and disease and weeding and trimming activities respectively. Alstroemeria cultivation employs more labour for harvesting than other flowers with 6.35 man-days labour. Depending on the duration and the number of times cut flowers are transported to the market. Highest labour absorption for transportation, loading and unloading is in Gerbera flower with 10.40 man-days. Considering the overall labour absorption, Alstroemeria predominates with 75.35 man-days followed by Lilium (75.05), Rose (74.71), Anthurium (71.43) and Gerbera (69.76). An interesting observation made in the study is that Gerbera flower has

[103]M. Giribabu, (2012), “Labour Absorption and Technical Efficiency in Agriculture: Some Evidences”, International Journal of Development Research, Vol. 1(4), p. 4.
[104] Thippaiah, P., (2005), op.cit., p. 81.

Table 3.3.1: Operation-wise labour absorption during the first year of selected cut flower cultivation (in man-days)

Labour activities	Poly-house measuring 200m^2					Poly-house measuring more than 200m^2				
	Dimapur		Kohima			Dimapur		Kohima		
	Anthurium	Gerbera	Alstroemeria	Lilium	Rose	Anthurium	Gerbera	Alstroemeria	Lilium	Rose
Ploughing	11.56 (16.18)	11.08 (15.88)	13.66 (18.13)	13.04 (17.37)	14.00 (18.74)	19.65 (19.24)	18.33 (17.32)	17.71 (18.58)	17.16 (17.46)	18.42 (17.50)
Flower bed preparation	5.50 (7.70)	4.32 (6.19)	5.50 (7.30)	6.18 (8.23)	4.79 (6.36)	9.11 (8.92)	10.17 (9.61)	8.28 (8.69)	9.58 (9.75)	8.22 (7.81)
Manuring	6.96 (9.74)	4.85 (6.95)	5.27 (6.99)	6.37 (8.49)	5.71 (7.64)	9.69 (9.49)	9.16 (8.65)	7.42 (7.78)	8.51 (8.66)	8.53 (8.10)
Planting	3.93 (5.50)	3.67 (5.26)	3.97 (5.27)	7.60 (10.13)	4.16 (5.57)	6.08 (5.95)	6.83 (6.45)	5.71 (5.99)	12.13 (12.34)	6.07 (5.77)
Pest and disease control	1.00 (1.39)	0.74 (1.06)	0.12 (0.16)	0.14 (0.19)	1.90 (2.54)	2.59 (2.53)	1.68 (1.59)	0.42 (0.44)	0.70 (0.71)	2.44 (2.32)
Watering	24.80 (34.72)	22.60 (32.40)	22.83 (30.30)	22.15 (29.51)	23.49 (31.44)	28.64 (28.04)	34.26 (32.37)	25.68 (26.94)	25.68 (26.13)	29.63 (28.15)
Weeding and trimming	6.17 (8.64)	6.61 (9.47)	7.99 (10.60)	6.27 (8.35)	6.92 (9.26)	9.18 (8.99)	8.28 (7.82)	10.71 (11.24)	11.97 (12.18)	8.85 (8.41)
Harvesting	4.12 (5.77)	5.49 (7.87)	6.35 (8.43)	5.39 (7.18)	5.96 (7.80)	7.42 (7.26)	7.98 (7.54)	9.76 (10.24)	6.76 (6.89)	9.60 (9.12)
Transportation, loading and unloading	7.39 (10.34)	10.40 (14.91)	9.65 (12.81)	7.91 (10.54)	7.78 (10.41)	9.79 (9.58)	9.14 (8.64)	9.62 (10.09)	5.77 (5.87)	13.50 (12.82)
Total	71.43 (100)	69.76 (100)	75.35 (100)	75.05 (100)	74.71 (100)	102.15 (100)	105.83 (100)	95.31 (100)	98.26 (100)	105.26 (100)

Source: Field survey 2013-14

Note: Figures in parenthesis indicates percentage.

higher rate of production with more productivity and absorbs lower labour compared to other cut flower under poly house measuring $200m^2$ in both the districts during the study period.

On the right side of table 3.3.1 is the labour absorption of selected cut flowers under poly house measuring more than $200m^2$. Depending on the size of poly house or the area under cultivation, labour absorption under different activities will vary. It is quite contrasting that under poly house measuring more than $200m^2$, the Gerbera cut flower absorbs highest human labour which is the lowest under poly house measuring $200m^2$, i.e., it absorbs about 105.83 man-days followed by Rose (105.26) and Anthurium (102.15). However, Alstroemeria utilizes lowest man-days under poly house measuring more than $200m^2$ among the selected cut flowers. Among the operation wise labour utilization, irrigation or watering of the flower plants occupies major role absorbing more than 25 man-days in all selected flowers followed by ploughing activity, bed preparation, weeding, harvesting, etc. According to flower wise distribution the labour utilization on watering Gerbera absorb more than 34 man-days whereas Anthurium takes on an average of 19.65 man-days for ploughing. Similarly, transportation, weeding, harvesting, manuring, bed preparation and planting activities also play significant role in labour absorption in floriculture sector in selected cut flowers in both the districts. It is interesting to note that there is not much difference for total labour absorption among the flowers in both the selected districts during the study period.

3.3.2 Gender-wise Labour Utilization under Different Activities

Gender-wise labour absorption (both family and hired labour) under different farming activities for the selected cut flowers in the study areas for poly house measuring $200m^2$ has been illustrated in table 3.3.2. All the selected cut flowers have their own attributes in labour utilization in the production process. However, one common feature from the table indicated that in the cultivation of all the selected cut flowers, female labour plays predominant role than their male counterparts in both the districts. Whereas, male labourers are found to be mainly involved in ploughing activity where more physical efforts is needed.

The crop-based analysis reveals that production of Anthurium flower absorbed more male labour in ploughing (10.74 man-days), followed by flower bed preparation (4.82 man-days), manuring (4.73 man-days) and pest and disease control (0.84 man-days). On the other hand, female labour is predominant in watering (20.72 man-days), followed by weeding and trimming (5.51 man-days), planting (3.38 man-days), harvesting (3.28 man-days) and transportation, loading and unloading (3.74 man-days). The total labour absorption in Anthurium is about 71.43 consisting of 30.90 male and 40.53 female man-days labour. Whereas in Gerbera flower, about 24.92 male labour days and 44.84 female labour days are utilized. Similar to Anthurium crop, more male labour has been employed in ploughing (10.44 man-days) followed by transportation, loading and unloading (5.28 man-days), bed preparation (3.97 man-days), manuring (2.79 man-days) and pest and disease control (0.59 man-days) in Gerbera flower production. On the other hand, female labour is predominant in watering (22.22), followed by weeding (6.22), harvesting (5.06), etc. It is interesting to note that female labour in Gerbera cultivation is almost two times higher than their male counterparts in which more than fifty percent of total female labour is used only for watering plants frequently during the crop period.

Similarly in Kohima district, for Alstroemeria, a total of 27.04 man-days male labour and 47.94 man-days female labour have been absorbed. Male labour absorbed in ploughing the land forms the majority share of about 43.06% and only 0.18% of the total male labour has been absorbed in controlling pest and diseases. On the contrary to that majority of the female labour is employed in watering the plants (43.16%) while only 0.15% is engaged in pest and disease control. Whereas in case of Lilium flower, a total of 29.04 male labour days and 46.01 female labour days has been absorbed with male labour predominating in ploughing (11.77 man-days), followed by bed preparation (5.29 man-days) and pest and disease control (0.08 man-days). On the other hand, more female labour was absorbed in watering (18.62 man-days) followed by planting, weeding and trimming, manuring, etc. Similarly, the labour absorption for Rose flower shows that about 30.45 male labour days and 44.26 female labour days have been absorbed. Comparing to the other selected flowers, more than 40% of male labour is absorbed in tilling or ploughing the land and about 48% of female labour is utilized for watering the plants with respect to Rose flower in Kohima district.

Likewise, the gender-wise labour utilization for poly house measuring more than $200m^2$ is shown in table 3.3.3. It is apparent from the table that except for Gerbera, male labour predominates in production of the other four sample cut flowers. In the case of Anthurium, about 55.95 man-days male labour have been absorbed, of which 34.30% labour is engaged in ploughing, 15.46% in flower bed preparation, 13.96% in manuring, etc.; whereas 46.20 man-days female labour have been absorbed, in which 47.03% of labour is utilized for watering, 15.06% for weeding and trimming and 13.79% for harvesting. On the contrary, in case of Gerbera flower, female labourers are more dominant than their male counterparts absorbing more labour days. Among the activities, about 47% of female labourers are utilized only for water supply, 11% for weeding and trimming, 11% for harvesting and 9% for planting. On the other hand, male labourers are engaged more in ploughing (36.35%), bed preparation (18.80%), manuring or fertilizer application (13.48) and transportation, loading and unloading (11.91%). It is interesting to note that Gerbera is the only flower among all the five selected flowers which absorbs less male labour days than female labourers.

On the other hand, in case of Alstroemeria, both male and female labourers are equally absorbed in which male labourers dominate in ploughing activity, while female laburers are more utilized in watering the plants. Female participation is also significant in weeding and harvesting while male labourers are absorbed more in bed preparation

Table 3.3.2: Gender-wise labour absorption for different activities during the first year of cultivation for poly house measuring 200m^2 (in man-days)

Labour activities	Dimapur				Kohima					
	Anthurium		Gerbera		Alstroemeria		Lilium		Rose	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Ploughing	10.74 (34.76)	0.82 (2.02)	10.44 (41.89)	0.64 (1.43)	11.80 (43.06)	1.86 (3.88)	11.77 (40.53)	1.27 (2.76)	12.54 (41.18)	1.46 (3.30)
Flower bed preparation	4.82 (15.60)	0.68 (1.68)	3.97 (15.93)	0.35 (0.78)	4.14 (15.11)	1.36 (2.84)	5.29 (18.22)	0.89 (1.93)	4.13 (13.56)	0.66 (1.49)
Manuring	4.73 (15.31)	2.23 (5.50)	2.79 (11.19)	2.06 (4.59)	3.16 (11.53)	2.11 (4.40)	3.07 (10.57)	3.30 (7.17)	3.84 (12.61)	1.87 (4.22)
Planting	0.55 (1.78)	3.38 (8.34)	0.65 (2.61)	3.02 (6.73)	0.75 (2.74)	3.22 (6.72)	0.76 (2.62)	6.84 (14.87)	0.79 (2.59)	3.37 (7.61)
Pest and disease control	0.84 (2.72)	0.16 (0.39)	0.59 (2.37)	0.15 (0.33)	0.05 (0.18)	0.07 (0.15)	0.08 (0.27)	0.06 (0.13)	1.28 (4.20)	0.62 (1.40)
Watering	4.08 (13.20)	20.72 (51.12)	0.38 (1.52)	22.22 (49.55)	2.14 (7.81)	20.69 (43.16)	3.53 (12.15)	18.62 (40.67)	2.14 (7.03)	21.35 (48.24)
Weeding and trimming	0.66 (2.13)	5.51 (13.59)	0.39 (1.56)	6.22 (13.87)	0.90 (3.28)	7.09 (14.79)	0.85 (2.93)	5.42 (11.78)	0.21 (0.69)	6.71 (15.16)
Harvesting	0.84 (2.72)	3.28 (8.09)	0.43 (1.72)	5.06 (11.28)	0.24 (0.87)	6.11 (12.74)	0.47 (1.62)	4.92 (10.69)	1.54 (5.06)	4.42 (9.99)
Transportation, loading and unloading	3.64 (11.78)	3.75 (9.25)	5.28 (21.19)	5.12 (11.42)	4.22 (15.40)	5.43 (11.33)	3.22 (11.09)	4.69 (10.19)	3.98 (13.07)	3.80 (8.58)
Total	30.90 (100)	40.53 (100)	24.92 (100)	44.84 (100)	27.40 (100)	47.94 (100)	29.04 (100)	46.01 (100)	30.45 (100)	44.26 (100)

Source: Field survey 2013-14

Note: Figure in parenthesis are percentages to the total.

Table 3.3.3: Gender-wise labour absorption for different activities during the first year of cultivation for poly house measuring more than 200m^2 (in man-days)

Labour activities	Dimapur				Kohima					
	Anthurium		Gerbera		Alstroemeria		Lilium		Rose	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Ploughing	19.19 (34.30)	0.46 (0.99)	14.83 (36.35)	3.50 (5.38)	17.43 (36.34)	0.28 (0.59)	16.50 (33.49)	0.66 (1.35)	17.88 (30.51)	0.54 (1.16)
Flower bed preparation	8.65 (15.46)	0.46 (0.99)	7.67 (18.80)	2.50 (3.84)	7.99 (16.66)	0.29 (0.61)	9.16 (18.59)	0.42 (0.86)	8.07 (13.77)	0.15 (0.32)
Manuring	7.81 (13.96)	1.88 (4.07)	5.50 (13.48)	3.66 (5.63)	4.71 (9.82)	2.71 (5.72)	6.50 (13.19)	2.01 (4.10)	7.00 (11.94)	1.53 (3.29)
Planting	2.00 (3.57)	4.08 (8.83)	1.00 (2.45)	5.83 (8.96)	1.28 (2.67)	4.43 (9.35)	1.61 (3.27)	10.52 (21.47)	2.07 (3.53)	4.00 (8.61)
Pest and disease control	2.33 (4.16)	0.26 (0.56)	0.56 (1.37)	1.12 (1.72)	0.42 (0.87)	-	0.70 (1.42)	-	2.27 (3.87)	0.17 (0.36)
Watering	6.91 (12.35)	21.73 (47.03)	4.28 (10.49)	29.98 (46.10)	7.34 (15.30)	18.34 (38.73)	8.56 (17.37)	17.12 (34.94)	7.90 (13.48)	21.73 (46.77)
Weeding and trimming	2.22 (3.97)	6.96 (15.06)	1.14 (2.79)	7.14 (10.98)	1.47 (3.06)	9.24 (19.51)	1.72 (3.49)	10.25 (20.92)	3.28 (5.60)	5.57 (11.99)
Harvesting	1.05 (1.88)	6.37 (13.79)	0.96 (2.35)	7.02 (10.79)	1.95 (4.06)	7.81 (16.41)	0.86 (1.74)	5.90 (12.04)	2.49 (4.25)	7.11 (15.30)
Transportation, loading and unloading	5.79 (10.35)	4.00 (8.66)	4.86 (11.91)	4.28 (6.58)	5.37 (11.20)	4.25 (8.97)	3.66 (7.43)	2.11 (4.31)	7.64 (13.04)	5.86 (12.61)
Total	55.95 (100)	46.20 (100)	40.80 (100)	65.03 (100)	47.96 (100)	47.35 (100)	49.27 (100)	48.99 (100)	58.60 (100)	46.66 (100)

Source: Field survey 2013-14

Note: Figures in parenthesis is percentages to the total.

and watering etc. Similarly, in case of Lilium, both male and female labourers are absorbed equally in which female labourers are engaged more in watering the plants, planting, weeding and harvesting while more male labourers are absorbed in ploughing, bed preparation, watering and manure application. Correspondingly, in case of Rose flower, about 46.77% of female labour days are engaged in watering the plants, 15.30% in harvesting and 12 .61% in loading activity, while male labourers are demanded more for ploughing (30.51%) followed by bed preparation (13.77%), watering (13.48%) and loading activities (13.04%). It is interesting to note that higher labour days are absorbed for watering flower plants in all selected flowers for female while more male labourers are absorbed in ploughing and bed preparation during the study period. The study reveals that, except Gerbera flower, male labourers are demanded slightly higher than their female counterparts in all other selected cut flowers. The higher demand for female labourers in case of Gerbera flower reveals that the labour absorption for each cut flower is determined based on the nature of work and availability of labourers. The study also reveals the contradictory nature of labour utilization between both the poly houses where more female labourers are engaged under poly house measuring $200m^2$ whereas higher male labourers are employed poly house measuring more than $200m^2$.

3.3.3 Gender-wise Labour Absorption

Gender-wise labour absorption in the production of selected cut flowers has been illustrated in table 3.3.4. Female labour forms majority of the labour absorption for all the five cut flowers under poly house measuring $200m^2$. In Anthurium cultivation female forms 56.74% and male constitutes 43.26% of the total labour absorption of 71.43 man-days. Similarly, in Gerbera cultivation, 64.28% of the total labour absorption has been covered by female labours and only 35.72% by male labour. Whereas, in Alstroemeria, female labour constitutes 63.62% and male labour forms 36.36% out of the total labour absorption of 75.35 man-days. Similarly, the labour absorption in Lilium cultivation comprises 61.30% female and 38.69% male labour whereas that of Rose consists of 59.24% female labour and 40.76% male.

Table 3.3.4: Gender-wise labour absorption of selected flower in Dimapur and Kohima districts (Man-days/200m^2 and more than 200m^2)

Districts	Flowers	200m^2			More than 200m^2		
		Male	Female	Total	Male	Female	Total
Dimapur	Anthurium	30.90 (43.26)	40.53 (56.74)	71.43 (100)	55.95 (54.77)	46.20 (45.23)	102.15 (100)
	Gerbera	24.92 (35.72)	44.84 (64.28)	69.76 (100)	40.80 (38.55)	65.03 (61.45)	105.83 (100)
Kohima	Alstroemeria	27.40 (36.36)	47.94 (63.62)	75.35 (100)	47.96 (50.32)	47.35 (49.68)	95.31 (100)
	Lilium	29.04 (38.69)	46.01 (61.30)	75.05 (100)	49.27 (50.14)	48.99 (49.86)	98.26 (100)
	Rose	30.45 (40.76)	44.26 (59.24)	74.71 (100)	58.60 (55.67)	46.66 (44.33)	105.26 (100)

Source: Field survey 2013-14
Note: Figure in parenthesis is percentages to the total.

On the contrary, gender-wise labour absorption under poly house measuring more than 200m^2 indicates that male labourers are more predominant than the female labourers. The table shows that the male labourers attain more working days in Anthurium, Alstroemeria, Lilium and Rose flower cultivation, i.e., more than 50% in all except Gerbera flower where female labour attains more than 60% of total labour absorption. The study reveals that female-male gap is wider in poly house measuring 200m^2 with higher female labour absorption whereas the gap under poly house measuring more than 200m^2 is lesser with higher male labour days. The labour gap among selected flowers are different both within and between the districts which are however meager. It is imperative from the table that floriculture industry has better prospect for employment opportunities for the women in Nagaland.

Figure 3.3.1: Gender-wise labour absorption under poly house measuring 200m^2 (in man-days)

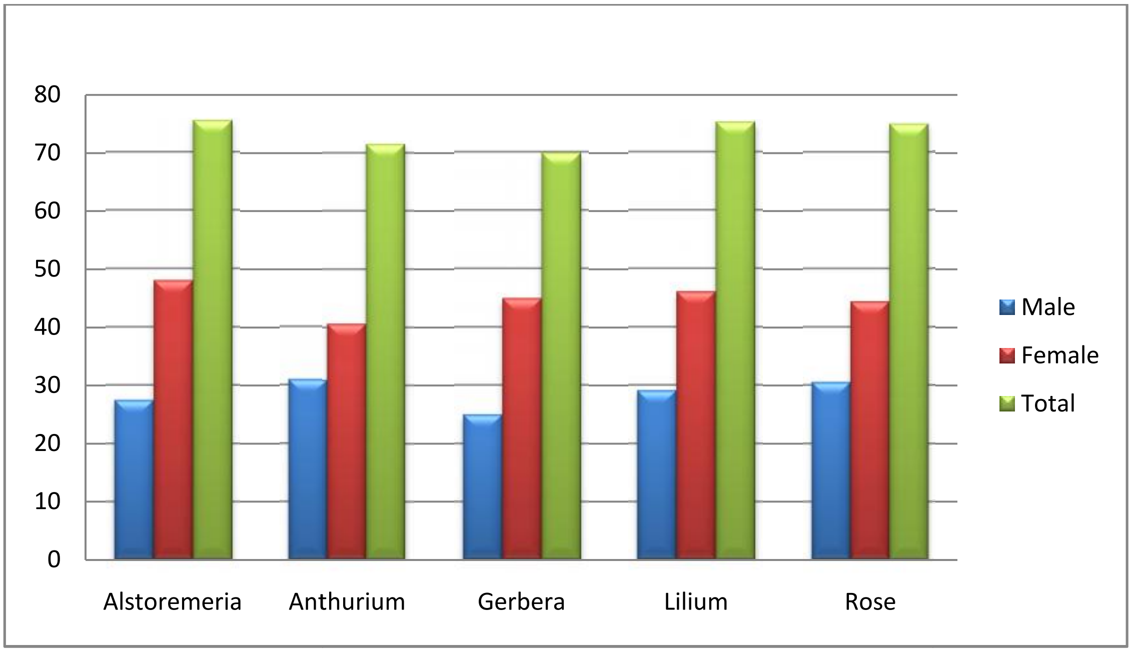
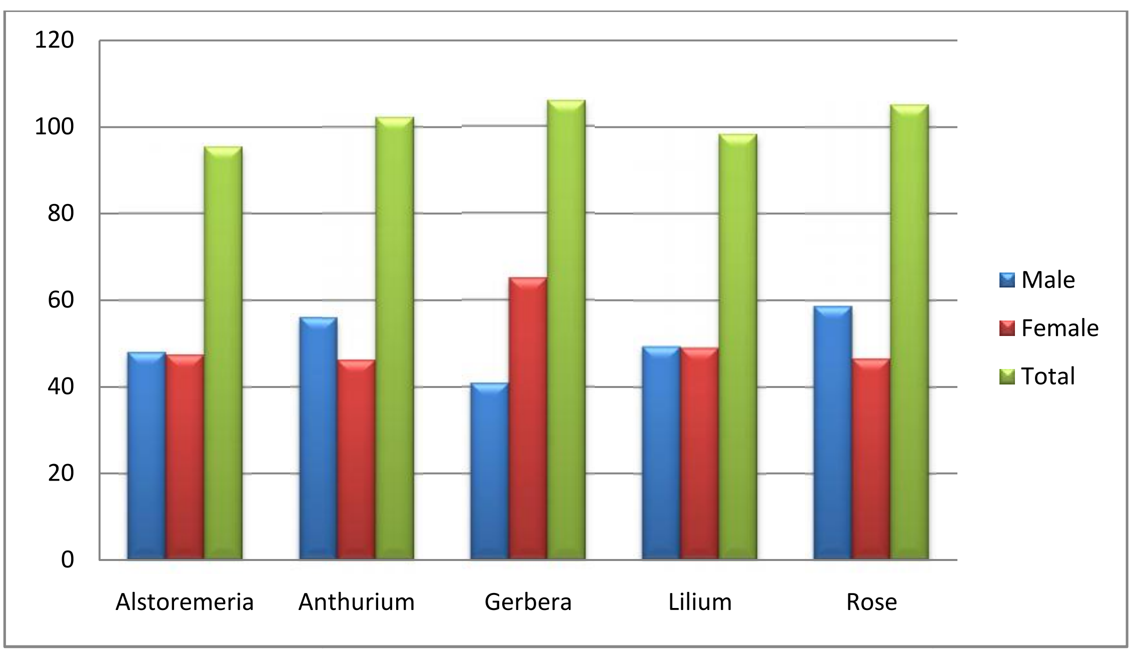


Figure 3.3.2: Gender-wise labour absorption under poly house measuring more than 200m^2 (in man-days)



3.3.4 Year-wise Labour Absorption in Alstroemeria Production

3.3.4.1 First Year of Cultivation

Labour absorption during the first year of Alstroemeria[105] cultivation for poly house measuring $200m^2$ and more than $200m^2$ is shown in table 3.3.5. The data indicates that from the hired labour with respect to poly house measuring $200m^2$, male labour absorption is more with 23.60 man-days than their female labour counterparts, i.e., 19.16 man-days. However, in family labour, female absorption is higher than male counterparts with higher utilization in most of the farm activities. Labour utilization among the farm activities, hired male labourers are more demanded for ploughing (11 man-days), followed by flower bed preparation (3.67 man-days), manuring (2.75 man-days), loading and unloading (2.32 man-days) activities. Whereas, female labourers are more demanded in watering, harvesting and weeding in both hired and family labourers in selected Alstroemeria crop during the first year of cultivation. The data also indicates that out of 75.35 man-days of total labour absorption, female labour and male labour accounts for 63% and 47% respectively.

On the other hand, in poly house measuring more than $200m^2$, both male and female labourers are equally distributed in total labour utilization. However, in hired labour utilization, male labourer predominates with 49.07% (46.77 man-days) of total labour whereas female labourers form 29.96% (28.56 man-days) of the total labour absorption. On the contrary, in family labour utilization, male labourers are very meager at only 1.25 % compared to that of female labour participation (19.71%) in the flower cultivation in selected district during the study period. Similar to poly house measuring $200m^2$, operation-wise labour utilization reveals that, more male labourers are engaged in ploughing activity with 17.43 man-days, followed by flower bed preparation 7.99 man-days and watering 7.34 man-days. Whereas, female labourers are more predominant in watering, weeding and harvesting activities in selected flower during the first year of cultivation.

[105]Gestation period of Alstroemeria is 3 to 4 months and have a life span of 3 to 5 years.

3.3.4.2 Second Year of Cultivation

During the second year in Alstroemeria cultivation, labour utilization for both the gender reveals that the labour demand is significantly lower than the first year as shown in table 3.3.6. The data indicates that the labour use for male is very low in case of poly house measuring 200m^2 i.e., 6.75 man-days under hired labour and 2.06 man-days under family labour. On the other hand, labour used for female is higher in both hired and family labour with 16.28 man-days and 23.95 man-days respectively, occupying a major share of 80% under poly house measuring 200m^2. Among the farm activities, both male and female labourers are predominant in watering (46.55%) followed by loading and unloading (19.68%) and weeding activities (16.29%).

Similarly, in case of poly house measuring more than 200m^2, about 30% of male and 70% of female labourers are distributed for labour utilization during the second year. However, the man-days in absolute number is quite low during the second year compared to first year. The data from table 3.3.5 and 3.3.6 reveals that about 26.31 of man-days are lower in case of 200m^2 poly house when compared to the labour use in first year of cultivation and 36.15 man-days lower in case of poly house measuring more than 200m^2 in case of Alstroemeria.

3.3.5 Year-wise Labour Absorption in Lilium Production

3.3.5.1 First Year of Cultivation

Operation-wise labour absorption in case of Lilium[106] cultivation under poly house measuring 200m^2 and more than 200m^2 is shown in table 3.3.7. The table indicates that the labour utilization from both hired (41.88 man-days) and family (33.17 man-days) labour among the gender under poly house measuring 200m^2 reveals that male labourers are predominant in hired labour (25.79 man-days) compared to family labour (3.25 man-

[106]Lilium is a seasonal plant having a gestation period of 2 to 3 months, which once produce flower have to be replaced or replanted with new bulb, sometimes the same bulb can be used for second production depending on the quality of the bulb. Thus planting takes place in the second and third season as well and so does manuring the soil where new manure is added to the old soil. Employment generation for planting Lilium has been taken for only one time, it can be planted more than once in a year depending on the ability or willingness of the growers.

days), whereas female family labour (29.92 man-days) is more dominant compared to hired labour (16.09 man-days). Among the operation-wise labour demand, male labourers are highly demanded for ploughing the land followed by bed preparation, watering and manuring, whereas more than 50% of labour absorption from female is in watering the plants followed by weeding activity. Out of the total labour utilization of 75.05 man-days, about 38.69% of male labour (29.04 man-days) and 61.31% of female labour (46.01 man-days) are absorbed for growing Lilium crop for the first year.

On the other hand, Lilium crop under poly house measuring more than $200m^2$ reveals that, both the labourers are equally absorbed in the first year of cultivation. However, the labour demanded for Lilium crop is dominated by hired labour (81.95 man-days) as compared to family labour (16.31 man-days) in which more than 83.40% of total labour absorption is from hired labour and only 16.59% of labour from family labour. Among the operation wise labour use, male labourers are predominant in ploughing activity, followed by bed preparation, watering the plants, manuring and other transportation activities, whereas for female labour, participation is higher in watering the plants, weeding and trimming and other plantation works. The total labour utilization for first year in poly house measuring more than $200m^2$ is 98.26 man-days of which 49.27 man-days (50.14%) are male and 48.99 man-days (49.86%) are female labourers for the first year of Lilium crop cultivation.

3.3.5.2 Second Year of Cultivation

Data for the second and consequent years of cultivation for poly house measuring $200m^2$ and more than $200m^2$ is shown in table 3.3.8. The data reveals that no labour is utilized for ploughing and flower bed preparation, however, the other activities continue and the total number of labour absorption is reduced. The number of labour absorbed in controlling pest and disease, watering, weeding, harvesting and transportation, loading and unloading remains the same. Labour absorption under poly house measuring $200m^2$ is reduced to 52.66 man-days of which 42.06% of labour is absorbed in watering, 15.02% in transportation, loading and unloading, 11.91% in weeding and trimming, 10.23% in harvesting, 12.78% in planting, 7.73% in manuring and only 0.26% in controlling pest and disease. There is more participation of female labourers in both family and hired labour with 51.14% and 29.62% of the total labour absorption respectively.

It is also shown in table 3.3.8 that in cultivation of Lilium during the second and consequent years, the number of labour absorption falls to 67.90 man-days labour for poly house measuring more than $200m^2$. Apart from manuring number of labour absorption in other activities such as planting, controlling pest and disease, watering, weeding, harvesting and transportation, loading and unloading remains the same. In the second year more female labour is hired comprising 49.47% of the total labour absorption. Male family labour participation can be seen only in manuring and transporting the flowers to the market with a total of only 0.64 man-days (0.94%). While female family labour participation is absent in controlling pest and disease and watering, their absorption in manuring, planting, weeding, harvesting and transportation activities constitute 20.56% (13.96 man-days) of the total labour absorption.

3.3.6 Year-wise Labour Absorption in Rose Production

3.3.6.1 First Year of Cultivation

Table 3.3.9 shows the operation wise labour demanded for producing Rose[107] cut flower for both the poly houses (i.e., $200m^2$ and more than $200m^2$). In the first year under $200m^2$ area, 74.71 man-days labour is absorbed. Like the other selected flowers, watering absorbed the highest number of labour with 23.49 man-days (31.44%) followed by ploughing the land with 14 man-days (18.74%) labour, and transportation, loading and unloading with 7.78 man-days (10.41%). Male hired labour has been employed in almost all the activities except in harvesting. Out of the total labour utilization, both male and female hired labour form 33.65% and 23.01% respectively. On the other hand, participation of male family labour is stunted comprising of only 7.11% whereas female family labour constitute 36.39% representing majority of the labour utilization. It is apparent from the table that female family labour is employed in all the activities from ploughing to post harvest management and transporting to the market for sale. However,

[107]Rose being a perennial plant has a life span of 5 to 6 years and a gestation period of 6 months.

male family labour is absent in watering and weeding and trimming activities in case of Rose flower.

Similarly, the labour absorption under poly house measuring more than $200m^2$ for Rose is almost double than that of $200m^2$ poly house where major labour absorption is from hired labour. In the selected district in general and Rose growers in particular, the growers who are financially stable and socially engaged in other activities tend to hire more labour instead of engaging themselves fully into floriculture, therefore, their participation rate is low. Like the other selected cut flowers, male hired labour formed the majority of the labour absorption in ploughing, followed by flower bed preparation, manuring and pest and disease control. No female labour has been hired in flower bed preparation and in controlling pest and disease. About 28.15% of the labour is absorb in watering with no participation of family labour, followed by 17.50 % in tilling the land and only 2.32% labour in controlling pest and disease which consist of male hired labour and female family labour. Female family labour predominates in harvesting and transporting the flowers to the market, and this makes it clear that the cultivators prefer to handle the harvest themselves. Out of the total labour utilization of 105.26 labour man-days, 51.58 man-days are male hired labour, 30.58 are female hired labour, 4.08 are male family labour and 13.75 are female family labour in the first year of Rose cultivation for poly house measuring more than $200m^2$.

3.3.6.2 Second Year of Cultivation

The data for Rose cultivation during the second and consequent years has been given in table 3.3.10. It can be seen from the table that the labour absorption decreases to 48.34 man-days for $200m^2$ poly house and Rose being a perennial plant, ploughing, flower bed preparation and planting is not repeated. Even in the second year female family member forms the majority share in labour absorption with 46.48% whereas male family labour forms only 8.23% of the total labour absorption. More female labour (31.40%) is hired during the second year than hired male (13.88%) to carry out those activities which require extensive care. Even in the second year labour absorbed in watering 48.59% (23.49 man-days) dominates the total labour absorption whereas the least is in controlling pest and disease i.e. 3.93% (1.90 man-days).

However, the labour absorption during the second and consequent years for poly house with more than $200m^2$ in area shows 67.26 labour man-days (table 3.3.10). Apart from ploughing, flower bed preparation and planting other activities are recurrent. Interestingly, the process of employing labour for manuring diminishes to 3.41 man-days indicating minimum usage or addition of manure during the second and consequent years. Female hired labour absorption is highest during the second year constituting 43.61%, followed by male hired labour (33.99%), female family labour (17.17%) and male family labour (5.23%). It is interesting to note that, demand for male labour is higher in bigger poly houses than in poly house measuring $200m^2$ in both first and second year, whereas equal priority is given to female labour in all the years for Rose cultivation.

3.3.7 Year-wise Labour Absorption in Anthurium Production

3.3.7.1 First Year of Cultivation

During the first year of Anthurium cultivation, male hired labour dominates labour absorption due to the involvement of heavy manual works. It is shown in table 3.3.11 that a total of 71.43 man-days labour has been employed under $200m^2$ poly house. Both male and female hired labour as well as female family labour has been employed in all the activities while male family labour can be seen in most of the activities except in controlling pest and disease and watering. Similar to other selected cut flowers in ploughing, flower bed preparation, manuring and pest and disease control, hired male labour dominates with 10.45, 4.57, 4.41 and 0.84 man-days respectively. Whereas, female family labour is noticeable in planting (2.16 man-days), watering the plants (11.67 man-days), weeding (3.35 man-days), harvesting (2.44 man-days) and transporting (3.48 man-days). It is interesting to note that though the absorption of male hired labour is at significant level, female labour predominates in total labour absorption for Anthurium crop during the first year of cultivation in poly house measuring $200m^2$ during the study period.

On the contrary, under poly house measuring more than $200m^2$ for the first year of cultivation, male hired labour predominates in the total labour absorption (102.15 labour man-days) than their female counterparts. Male hired labourers are involved mainly in ploughing, flower bed preparation, manuring and watering and other activities occupying more than half of the total labour, whereas female hired labour forms 26.41% followed by female family labour 18.81% and male family labour 2.11%. Participation of male family labour can be seen in weeding and trimming which is not visible in other selected cut flowers. Moreover, female family labour participation is present in all the activities but is very meager. More female labour is absorbed in watering the plants compared to other activities.

3.3.7.2 Second Year of Cultivation

Similar to the Rose production, in Anthurium cultivation, the ploughing, flower bed preparation and planting, manuring is also discontinued in the second year (see table 3.3.12). Labour utilization is thus reduced to 44.40 man-days and 58.76 man-days for poly house measuring $200m^2$ and more than $200m^2$ respectively which is lowest among all the other selected flowers during the second year and consequent years of labour absorption. Once the activities that involve large number of male hired labour are done, labour use in the second and consequent years is mainly focused on female labour as the activities of production require fragile hand to handle it.

It is perceptible from the table that female labour comprises more than 70% of the total labour absorption under $200m^2$ poly house and 60% under more than $200m^2$ poly house. Watering the plants continues to form the major labour absorption with 24.80 man-days ($200m^2$) and 28.64 man-days (more than $200m^2$). In poly house with $200m^2$ area more involvement of family labour can be seen than hired labour which is contrary to that under poly house measuring more than $200m^2$. The same amount of labour is employed for controlling pest and disease, watering, weeding and trimming, harvesting and transportation, loading and unloading even in the second and consequent years for both the poly houses in Anthurium cultivation as shown in table 3.3.12.

3.3.8 Year-wise Labour Absorption in Gerbera Production

3.3.8.1 First Year of Cultivation

It is imperative from table 3.3.13 that Gerbera cultivation during the first year employs 69.76 labour man-days taking into consideration labour utilization under different activities of production and marketing from the cultivator's side. Both male and female hired labour has been employed in all the activities. More participation of female labour than their male counterparts is evident in planting, weeding and trimming, harvesting and transporting, loading and unloading. Watering (22.60 man-days), ploughing (11.08 man-days), and transportation, loading and unloading (10.40 man-days) covers major part of labour use, while controlling pest and disease forms the lowest labour utilizing activity (0.74 man-days). The table shows that about 35.02% of the labour is covered by female family labour whereas male and female hired labourers formed 29.36% and 29.26% of the total labour respectively.

Similarly, the labour absorption in case of poly house measuring more than 200m^2 shows that about 105.83 labour man-days has been utilized, out of which watering the plants (32.37%) plays the major role followed by ploughing (17.32%) and flower bed preparation (9.61%). Male labour can be seen mainly in ploughing, manuring, planting, harvesting and transportation, loading and unloading, whose percentage share in the total labour absorption is around 35%, while female labour (65%) plays a dominant role in the total labour absorption during the first year of Gerbera flower cultivation.

3.3.8.2 Second Year of Cultivation

The second and other consequent years of growing Gerbera flower is quite similar to the other flower crops where labour absorption in ploughing, bed preparation, planting is totally absent. Therefore, total labour absorption is reduced to 47.79 labour man-days for poly house measuring 200m^2 as shown in table 3.3.14. It is interesting to note that the male labour utilization for poly house measuring 200m^2 is just 7.86 man-days (16.45%) while the female labourers occupy major role (83.55%) in other farm activities. It reveals that labour participation in Gerbera crop is totally dominated by female.

Table 3.3.5: Labour absorption in Alstroemeria cultivation for first year (in man-days)

Labour activities	Poly-house measuring $200m^2$					Poly-house measuring more than $200m^2$				
	Hired		Family		Total	Hired		Family		Total
	Male	Female	Male	Female		Male	Female	Male	Female	
Ploughing	11.00	0.58	0.80	1.28	13.66 (18.13)	17.00	-	0.43	0.28	17.71 (18.58)
Flower bed preparation	3.67	0.44	0.47	0.92	5.50 (7.30)	7.71	0.11	0.28	0.18	8.28 (8.69)
Manuring	2.75	0.83	0.41	1.28	5.27 (6.99)	4.71	1.57	-	1.14	7.42 (7.78)
Planting	0.53	1.36	0.22	1.86	3.97 (5.27)	1.28	2.00	-	2.43	5.71 (5.99)
Pest and disease control	0.05	-	-	0.07	0.12 (0.16)	0.42	-	-	-	0.42 (0.44)
Watering	2.14	11.06	-	9.63	22.83 (30.30)	7.34	14.67	-	3.67	25.68 (26.94)
Weeding and trimming	0.90	2.89	-	4.20	7.99 (10.60)	1.47	5.81	-	3.43	10.71 (11.24)
Harvesting	0.24	1.71	-	4.40	6.35 (8.43)	1.95	2.69	-	5.12	9.76 (10.24)
Transportation, loading and unloading	2.32	0.29	1.90	5.14	9.65 (12.81)	4.89	1.71	0.48	2.54	9.62 (10.09)
Total	23.60 (31.33)	19.16 (25.43)	3.80 (5.04)	28.78 (38.19)	75.35 (100)	46.77 (49.07)	28.56 (29.96)	1.19 (1.25)	18.79 (19.71)	95.31 (100)

Source: Field survey 2013-14

Note: Figure in parenthesis is percentages to the total.

Table 3.3.6: Labour absorption in Alstroemeria cultivation for second year and other consequent years (in man-days)

Labour activities	Poly-house measuring 200m^2					Poly-house measuring more than 200m^2				
	Hired		Family		Total	Hired		Family		Total
	Male	Female	Male	Female		Male	Female	Male	Female	
Ploughing	-	-	-	-	-	-	-	-	-	-
Flower bed preparation	-	-	-	-	-	-	-	-	-	-
Manuring	1.10	0.33	0.16	0.51	2.10 (4.28)	1.88	0.63	-	0.46	2.97 (5.02)
Planting	-	-	-	-	-	-	-	-	-	-
Pest and disease control	0.05	-	-	0.07	0.12 (0.24)	0.42	-	-	-	0.42 (0.71)
Watering	2.14	11.06	-	9.63	22.83 (46.55)	7.34	14.67	-	3.67	25.68 (43.41)
Weeding and trimming	0.90	2.89	-	4.20	7.99 (16.29)	1.47	5.81	-	3.43	10.71 (18.10)
Harvesting	0.24	1.71	-	4.40	6.35 (12.95)	1.95	2.69	-	5.12	9.76 (16.49)
Transportation, loading and unloading	2.32	0.29	1.90	5.14	9.65 (19.68)	4.89	1.71	0.48	2.54	9.62 (16.26)
Total	6.75 (13.76)	16.28 (33.19)	2.06 (4.20)	23.95 (48.84)	49.04 (100)	17.95 (30.34)	25.51 (43.12)	0.48 (0.81)	15.22 (25.73)	59.16 (100)

Source: Field survey 2013-14

Note: Figure in parenthesis is percentages to the total.

Table 3.3.7: Labour absorption in Lilium cultivation for first year (in man-days)

Sl. No.	Labour activities	Poly-house measuring 200m^2					Poly-house measuring more than 200m^2				
		Hired		Family		Total	Hired		Family		Total
		Male	Female	Male	Female		Male	Female	Male	Female	
1.	Ploughing	11.15	0.22	0.62	1.05	13.04 (17.37)	16.17	0.33	0.33	0.33	17.16 (17.46)
2.	Flower bed preparation	4.77	0.27	0.52	0.62	6.18 (8.23)	8.83	0.14	0.33	0.28	9.58 (9.75)
3.	Manuring	2.67	0.60	0.40	2.70	6.37 (8.49)	6.33	0.67	0.17	1.34	8.51 (8.66)
4.	Planting	0.62	1.80	0.14	5.04	7.60 (10.13)	1.61	5.34	-	5.18	12.13 (12.34)
5.	Pest and disease control	0.08	-	-	0.06	0.14 (0.19)	0.70	-	-	-	0.70 (0.71)
6.	Watering	3.53	9.31	-	9.31	22.15 (29.51)	8.56	17.12	-	-	25.68 (26.13)
7.	Weeding and trimming	0.85	2.39	-	3.03	6.27 (8.35)	1.72	7.11	-	3.14	11.97 (12.18)
8.	Harvesting	0.47	1.29	-	3.63	5.39 (7.18)	0.86	2.8	-	3.10	6.76 (6.89)
9.	Transportation, loading and unloading	1.65	0.21	1.57	4.48	7.91 (10.54)	3.10	0.56	0.56	1.55	5.77 (5.87)
10	Total	25.79 (34.36)	16.09 (21.44)	3.25 (4.33)	29.92 (39.87)	75.05 (100)	47.88 (48.73)	34.07 (34.67)	1.39 (1.41)	14.92 (15.18)	98.26 (100)

Source: Field survey 2013-14

Note: Figure in parenthesis is percentages to the total.

Table 3.3.8: Labour absorption in Lilium cultivation for second and other consequent years (in man-days)

Sl. No.	Labour activities	Poly-house measuring 200m^2					Poly-house measuring more than 200m^2				
		Hired		Family		Total	Hired		Family		Total
		Male	Female	Male	Female		Male	Female	Male	Female	
1.	Ploughing	-	-	-	-	-	-	-	-	-	-
2.	Flower bed preparation	-	-	-	-	-	-	-	-	-	-
3.	Manuring	1.33	1.20	0.20	1.34	4.07 (7.73)	3.16	0.66	0.08	0.99	4.89 (7.20)
4.	Planting	0.31	1.20	0.14	5.08	6.73 (12.78)	1.61	5.34	-	5.18	12.13 (17.86)
5.	Pest and disease control	0.08	-	-	0.06	0.14 (0.26)	0.70	-	-	-	0.70 (1.03)
6.	Watering	3.53	9.31	-	9.31	22.15 (42.06)	8.56	17.12	-	-	25.68 (37.82)
7.	Weeding and trimming	0.85	2.39	-	3.03	6.27 (11.91)	1.72	7.11	-	3.14	11.97 (17.63)
8.	Harvesting	0.47	1.29	-	3.63	5.39 (10.23)	0.86	2.80	-	3.10	6.76 (9.95)
9.	Transportation, loading and unloading	1.65	0.21	1.57	4.48	7.91 (15.02)	3.10	0.56	0.56	1.55	5.77 (8.49)
10	Total	8.22 (15.61)	15.60 (29.62)	1.91 (3.63)	26.93 (51.14)	52.66 (100)	19.71 (29.03)	33.59 (49.47)	0.64 (0.94)	13.96 (20.56)	67.90 (100)

Source: Field survey 2013-14

Note: Figure in parenthesis is percentages to the total.

Table 3.3.9: Labour absorption in Rose cultivation during the first year (in man-days)

Sl. No.	Labour activities	Poly-house measuring 200m^2					Poly-house measuring more than 200m^2				
		Hired		Family		Total	Hired		Family		Total
		Male	Female	Male	Female		Male	Female	Male	Female	
1.	Ploughing	11.92	0.17	0.62	1.29	14 (18.74)	17.54	0.23	0.34	0.31	18.42 (17.50)
2.	Flower bed preparation	3.92	0.04	0.21	0.62	4.79 (6.36)	7.92	-	0.15	0.15	8.22 (7.81)
3.	Manuring	3.42	0.58	0.42	1.29	5.71 (7.64)	6.77	0.92	0.23	0.61	8.53 (8.10)
4.	Planting	0.54	1.33	0.25	2.04	4.16 (5.57)	1.92	2.08	0.15	1.92	6.07 (5.77)
5.	Pest and disease control	1.00	0.10	0.28	0.52	1.90 (2.54)	2.27	-	-	0.17	2.44 (2.32)
6.	Watering	2.14	10.16	-	11.19	23.49 (31.44)	7.90	21.73	-	-	29.63 (28.15)
7.	Weeding and trimming	0.21	2.99	-	3.72	6.92 (9.26)	3.28	3.93	-	1.64	8.85 (8.41)
8.	Harvesting	-	1.56	1.54	2.86	5.96 (7.80)	2.49	2.90	-	4.21	9.60 (9.12)
9.	Transportation, loading and unloading	1.99	0.14	1.99	3.66	7.78 (10.41)	4.21	0.40	3.43	5.46	13.50 (12.82)
10	Total	25.14 (33.65)	17.07 (23.01)	5.31 (7.11)	27.19 (36.39)	74.71 (100)	54.30 (51.58)	32.19 (30.58)	4.30 (4.08)	14.47 (13.75)	105.26 (100)

Source: Field survey 2013-14

Note: Figure in parenthesis is percentages to the total.

Table 3.3.10: Labour absorption in Rose cultivation during the second and other consequent years (in man-days)

Sl. No.	Labour activities	Poly-house measuring $200m^2$					Poly-house measuring more than $200m^2$				
		Hired		Family		Total	Hired		Family		Total
		Male	Female	Male	Female		Male	Female	Male	Female	
1.	Ploughing	-	-	-	-	-	-	-	-	-	-
2.	Flower bed preparation	-	-	-	-	-	-	-	-	-	-
3.	Manuring	1.37	0.23	0.17	0.52	2.29 (4.74)	2.71	0.37	0.09	0.24	3.41 (5.07)
4.	Planting	-	-	-	-	-	-	-	-	-	-
5.	Pest and disease control	1.00	0.10	0.28	0.52	1.90 (3.93)	2.27	-	-	-	2.27 (3.37)
6.	Watering	2.14	10.16	-	11.19	23.49 (48.59)	7.90	21.73	-	-	29.63 (44.05)
7.	Weeding and trimming	0.21	2.99	-	3.72	6.92 (14.31)	3.28	3.93	-	1.64	8.85 (13.16)
8.	Harvesting	-	1.56	1.54	2.86	5.96 (12.33)	2.49	2.90	-	4.21	9.60 (14.27)
9.	Transportation, loading and unloading	1.99	0.14	1.99	3.66	7.78 (16.09)	4.21	0.40	3.43	5.46	13.50 (20.07)
10	Total	6.71 (13.88)	15.18 (31.40)	3.98 (8.23)	22.47 (46.48)	48.34 (100)	22.86 (33.99)	29.33 (43.61)	3.52 (5.23)	11.55 (17.17)	67.26 (100)

Source: Field survey 2013-14

Note: Figure in parenthesis is percentages to the total.

Table 3.3.11: Labour absorption in Anthurium cultivation during the first year (in man-days)

Sl. No.	Labour activities	Poly-house measuring 200m^2					Poly-house measuring more than 200m^2				
		Hired		Family		Total	Hired		Family		Total
		Male	Female	Male	Female		Male	Female	Male	Female	
1.	Ploughing	10.45	0.34	0.29	0.48	11.56 (16.18)	18.73	0.11	0.46	0.35	19.65 (19.24)
2.	Flower bed preparation	4.57	0.18	0.25	0.50	5.50 (7.70)	8.38	0.11	0.27	0.35	9.11 (8.92)
3.	Manuring	4.41	0.75	0.32	1.48	6.96 (9.74)	7.54	0.88	0.27	1.00	9.69 (9.49)
4.	Planting	0.39	1.22	0.16	2.16	3.93 (5.50)	1.73	2.08	0.27	2.00	6.08 (5.95)
5.	Pest and disease control	0.84	0.08	-	0.08	1.00 (1.39)	2.33	0.13	-	0.13	2.59 (2.53)
6.	Watering	4.08	9.05	-	11.67	24.80 (34.72)	6.91	15.80	-	5.93	28.64 (28.04)
7.	Weeding and trimming	0.66	2.16	0. 18	3.35	6.17 (8.64)	2.11	3.75	0.11	3.21	9.18 (8.99)
8.	Harvesting	0.30	0.84	0.54	2.44	4.12 (5.77)	1.05	2.75	-	3.62	7.42 (7.26)
9.	Transportation, loading and unloading	1.93	0.27	1.71	3.48	7.39 (10.34)	5.01	1.36	0.78	2.64	9.79 (9.58)
10	Total	27.63 (38.68)	14.89 (20.84)	3.27 (4.58)	25.64 (35.89)	71.43 (100)	53.79 (52.66)	26.97 (26.41)	2.16 (2.11)	19.23 (18.81)	102.15 (100)

Source: Field survey 2013-14

Note: Figure in parenthesis is percentages to the total.

Table 3.3.12: Labour absorption in Anthurium cultivation during the second and other consequent years (in man-days)

Labour activities	Poly-house measuring 200m^2					Poly-house measuring more than 200m^2				
	Hired		Family		Total	Hired		Family		Total
	Male	Female	Male	Female		Male	Female	Male	Female	
Ploughing	-	-	-	-	-	-	-	-	-	-
Flower bed preparation	-	-	-	-	-	-	-	-	-	-
Manuring	0.32	0.10	-	0.32	0.74 (1.67)	0.12	0.84	-	0.18	1.14 (1.94)
Planting	-	-	-	-	-	-	-	-	-	-
Pest and disease control	0.84	0.08	-	0.08	1.00 (2.25)	2.33	0.13	-	0.13	2.59 (4.41)
Watering	4.08	9.05	-	11.67	24.80 (55.85)	6.91	15.80	-	5.93	28.64 (49.74)
Weeding and trimming	0.66	2.16	0.18	3.35	6.35 (14.30)	2.11	3.75	0.11	3.21	9.18 (15.62)
Harvesting	0.30	0.84	0.24	2.74	4.12 (9.28)	1.05	2.75	-	3.62	7.42 (12.63)
Transportation, loading and unloading	1.93	0.27	1.71	3.48	7.39 (16.64)	5.01	1.36	0.78	2.64	9.79 (16.66)
Total	8.13 (18.31)	12.50 (28.15)	2.13 (4.80)	21.64 (48.74)	44.40 (100)	17.53 (29.83)	24.63 (41.92)	0.89 (1.51)	15.71 (26.73)	58.76 (100)

Source: Field survey 2013-14

Note: Figure in parenthesis is percentages to the total.

Table 3.3.13: Labour absorption in Gerbera cultivation during the first year (in man-days)

Sl. No.	Labour activities	Poly-house measuring 200m^2					Poly-house measuring more than 200m^2				
		Hired		Family		Total	Hired		Family		Total
		Male	Female	Male	Female		Male	Female	Male	Female	
1.	Ploughing	10.00	0.29	0.44	0.35	11.08 (15.88)	14.83	3.33	-	0.17	18.33 (17.32)
2.	Flower bed preparation	3.68	0.09	0.29	0.26	4.32 (6.19)	7.67	2.17	-	0.33	10.17 (9.61)
3.	Manuring	2.50	0.94	0.29	1.12	4.85 (6.95)	4.83	2.33	0.67	1.33	9.16 (8.65)
4.	Planting	0.47	1.26	0.18	1.76	3.67 (5.26)	0.67	3.33	0.33	2.50	6.83 (6.45)
5.	Pest and disease control	0.59	0.15	-	-	0.74 (1.06)	0.56	1.12	-	-	1.68 (1.59)
6.	Watering	0.38	12.78	-	9.44	22.60 (32.40)	4.28	21.42	-	8.56	34.26 (32.37)
7.	Weeding and trimming	0.39	2.91	-	3.31	6.61 (9.47)	1.14	4.00	-	3.14	8.28 (7.82)
8.	Harvesting	0.10	1.49	0.33	3.57	5.49 (7.87)	0.86	2.86	0.10	4.16	7.98 (7.54)
9.	Transportation, loading and unloading	2.37	0.50	2.91	4.62	10.40 (14.91)	4.00	1.72	0.86	2.56	9.14 (8.64)
10	Total	20.48 (29.36)	20.41 (29.26)	4.44 (6.36)	24.43 (35.02)	69.76 (100)	38.84 (36.70)	42.28 (39.95)	1.96 (1.85)	22.75 (21.50)	105.83 (100)

Source: Field survey 2013-14

Note: Figure in parenthesis is percentages to the total.

Table 3.3.14: Labour absorption in Gerbera cultivation during the second and other consequent years (in man-days)

Sl. No.	Labour activities	Poly-house measuring 200m^2					Poly-house measuring more than 200m^2				
		Hired		Family		Total	Hired		Family		Total
		Male	Female	Male	Female		Male	Female	Male	Female	
1.	Ploughing	-	-	-	-	-	-	-	-	-	-
2.	Flower bed preparation	-	-	-	-	-	-	-	-	-	-
3.	Manuring	1.00	0.38	0.12	0.45	1.95 (4.08)	1.93	0.93	0.27	0.53	3.66 (5.63)
4.	Planting	-	-	-	-	-	-	-	-	-	-
5.	Pest and disease control	0.59	0.15	-	-	0.74 (1.55)	0.56	1.12	-	-	1.68 (2.58)
6.	Watering	0.38	12.78	-	9.44	22.60 (47.29)	4.28	21.42	-	8.56	34.26 (52.69)
7.	Weeding and trimming	0.39	2.91	-	3.31	6.61 (13.83)	1.14	5.14	-	3.14	9.42 (14.49)
8.	Harvesting	0.10	1.49	-	3.90	5.49 (11.49)	0.86	2.30	-	4.56	7.72 (11.87)
9.	Transportation, loading and unloading	2.37	0.50	2.91	4.62	10.40 (21.76)	4.00	1.72	-	2.56	8.28 (12.73)
10	Total	4.83 (10.11)	18.21 (38.10)	3.03 (6.34)	21.72 (45.45)	47.79 (100)	12.77 (19.64)	32.63 (50.18)	0.27 (0.41)	19.35 (29.76)	65.02 (100)

Source: Field survey 2013-14

Note: Figure in parenthesis is percentages to the total.

Correspondingly, in the cultivation of Gerbera (see in table 3.3.14) for poly house measuring more than $200m^2$ the number of employment in manuring has been reduced to 3.66 man-days while the number of labour man-days in weeding and trimming has been increased to 9.42 indicating more labour requirement to clear the flower bed from weeds and other unwanted leaves and stems. It is also seen from the table that the number of labour absorption in harvesting and transportation, loading and unloading has also been reduced to 7.72 and 8.28 man-days respectively, showing the fall in productivity of Gerbera as years go on. Female hired labour constitutes 32.63 man-days forming half of the total labour absorption (50.18%) and female family labour (19.35 man-days) constitutes 29.76% of the total labour utilization. Thus there is more participation of female labour than male even in the second and consequent years of Gerbera cultivation.

3.3.9 Gender-wise Distribution of Wages

In Indian labour market, gender is regarded as the most important factor where wage discrimination against women labourers in terms of wage payments which is generally lesser than their male counterparts is a very common phenomenon (Javeed and Manuhaar, 2013)[108]. Wage discrimination is more prominent in the agriculture sector than the non-agriculture sector and it is also found more in the informal labour markets than in formal, the former being mostly neglected in spite of the fact that it is the main employment destination for the poor population (Agrawal and Vanneman, 2014)[109]. Laws have been passed by the Indian government to reduce wage disparity and provide equal opportunity to both male and female workers, such as the Equal Remuneration Act of 1976 which aims to provide equal payment to both male and female workers and prevent gender disparity at work (Agrawal and Vanneman, 2014)[110], at the same time Article 39 of the constitution also guarantees equal pay for equal work for both men and women

[108]Javeed, S. and A. Manuhaar (2013), "Women and Wage Discrimination in India: A Critical Analysis", *International Journal of Humanities and Social Science Invention*, Vol. 2(4), p. 7.

[109]Agrawal, T. and R. Vanneman (2014), "Gender-based Wage Differentials in India: Evidence Using a Matching Comparisons Method". Retrieved on 03/06/16 from http://pblabour.gov.in/pdf/acts_rules/equal_remuneration_act_ 1976.pdf, p. 2.

[110]Agrawal, T. and R. Vanneman (2014), Ibid., p. 12.

(Javeed and Manuhaar, 2013)[111]. However, despite the steps taken by the Indian government gender disparities in labour market is still perceptible.

According to the National Sample Survey (NSS) 2004, the daily wage rate of female in Indian agricultural sector was 70% that of the male labour. This difference in gender wage rate differs across states (Mahajan and Ramaswami, 2012)[112]. Researchers differ in their views with regard to wage differentials between men and women. Some opined it as the result of discrimination, while others, as differences in men and women's experience and education (Council of Economic Advisers Issue Brief, 2015)[113]. Wage differentials between men and women labour, with lower wage of women is due to various reasons, some of which are: most of the women work in light industries as they are unsuitable for heavy industries, women being physically weak than men are unable to work for longer hours, and male workers are usually trained by taking up job training and thus are more productive whereas women workers are linked with other priorities such as looking after their family and children and thus lack proper trainings (Javeed and Manuhaar, 2013)[114]. Further intra-occupational gender wage differentials has been attributed to labour market discrimination or differences in education, experience, efforts, working conditions and demand side of the market (Chakrabarti and Sarker, 2011)[115].

3.3.9.1 Gender-wise Wage Distribution in Kohima

Wage disparity between male and female labour is also prevalent in Nagaland where female labour is paid less than male labour. Table 3.3.15 shows the gender-wise distribution of wage in Kohima district under both sizes of poly house in carrying out various activities of flower cultivation. It can be seen that higher wage is paid to male labourers. Depending on the intensity of physical effort required to carry out various

[111]Javeed, S. and A. Manuhaar (2013),op.cit., p. 7.

[112]Mahajan, K and B. Ramaswami (2012), "Caste, Female Labour Supply and the Gender Wage Gap in India: Boserup Revisited". Retrieved on 03/06/16 from, www.iza.org/conference_files/worldb 2012/mahajan_k8185.pdf.p. 1.

[113]Council of Economic Advisers Issue Brief (2015), "Gender Pay Gap: Recent trends and Explanations". Retrieved on 03/06/16 from, https://www.whitehouse.gov/sites/default/files/docs/equal_pay_issue_brief_final.pdf, pg. 2.

[114]Javeed, S. and A. Manuhaar (2013),op.cit., p. 7.

[115] Chakrabarti, S. and D. Sarker (2011), "Gender Earning Differentials in Flower Trading Market in West Bengal: Capital Constraints on Women's Income", *Indian Journal of Agricultural Economics*, Vol. 66(2), p. 198.

activities, wages are paid to the labourers. For carrying out activities such as ploughing, flower bed preparation, manuring, etc., more wages is paid and lesser wage for planting, watering, harvesting etc. In activities that involves health risks such as pest and disease control, more wages is also paid to the labourers. Thus for poly-house measuring 200m^2, the average wage paid to male labour for ploughing the land is Rs. 404.42, Rs. 399.18 for flower bed preparation, Rs. 400.08 for pest and disease control, whereas it is Rs. 352.51 for watering, Rs. 350.72 for harvesting, etc. On the contrary, average wage paid to female labour in Kohima for ploughing is Rs. 300.73, Rs. 298.06 for flower bed preparation, Rs. 302.54 for controlling pest and disease, while lower wages are been paid for watering the plants (Rs. 260.24), harvesting (Rs. 267.26) and transporting, loading and unloading (Rs. 255.61).

In case of poly-house measuring more than 200m^2, male labourers are paid Rs. 402.85 for ploughing, Rs. 400.33 for flower bed preparation, Rs. 351.90 for watering, Rs.347.73 for transporting, loading and unloading, etc. Correspondingly, female labourers are paid Rs. 300.25 for ploughing, Rs. 296.33 for flower bed preparation, Rs. 258.12 for watering, Rs. 254.92 for transporting, loading and unloading, etc. Wage gap between male and female labourers indicates that it is more for those activities associated with higher degree of physical effort. It is seen from the table that, in case of 200m^2 poly house, Rs. 404.42 is paid to male workers for ploughing while only Rs. 300.73 is being paid to female workers showing the widest wage gap of Rs. 103.69 followed by manuring, bed preparation, transportation, loading and unloading, in which male labourers predominates and the gap in lowest in planting activity. Similarly, for poly house measuring more than 200m^2, highest wage gap is in bed preparation (Rs. 104) followed by ploughing, manuring, and lowest in weeding and trimming.

Table 3.3.15: Gender-wise wage distribution under different farm activities of flower cultivation in Kohima district (wages in Rs.)

Labour activities	Poly-house measuring 200m^2			Poly-house measuring more than 200m^2		
	Male	**Female**	**Wage gap**	**Male**	**Female**	**Wage gap**
Ploughing	404.42	300.73	103.69	402.85	300.25	102.60
Flower bed preparation	399.18	298.06	101.12	400.33	296.33	104.00
Manuring	391.97	290.67	101.30	390.90	291.67	99.23
Planting	356.25	277.30	78.95	370.35	277.30	93.05
Pest and disease control	400.08	302.54	97.54	397.66	300.71	96.95
Watering	352.51	260.24	92.27	351.90	258.12	93.78
Weeding and trimming	370.80	279.43	91.37	374.36	282.33	92.03
Harvesting	350.72	267.26	83.46	358.75	265.61	93.14
Transportation, loading and unloading	356.20	255.61	100.59	347.73	254.92	92.81
Average labour wage	375.79	281.31	94.48	377.20	280.80	96.40

Source: Field survey 2013-14

3.3.9.2 Gender-wise Wage Distribution in Dimapur

Wage distribution and gender wage differentials in Dimapur district is shown in table 3.3.16. Wage rate in Dimapur district is lower than Kohima district for both the gender which may be the result of availability of cheap labour as well as excess of labour supply over demand. Gender-wise wage distribution in Dimapur district is similar to that of Kohima district where more is paid for those activities involving higher degree of physical effort and lesser for those activities requiring fewer efforts.

Under poly house measuring 200m^2, wage paid to male workers for ploughing is Rs. 308.65 while it is Rs. 253.53 for female workers. Lowest wage is paid for watering to both the genders i.e., Rs. 265.45 (male labour) and Rs. 230.15 (female labour). Wage difference is found to be highest in ploughing (55.12) and lowest in harvesting (33.29). For the labourers working under more than 200m^2 poly house, male receive Rs. 311.09 and female Rs. 250.53 for ploughing showing a wage difference of Rs. 60.56. Male labourers are paid the lowest wage in watering which is Rs. 268.32 whereas, female labours are being paid the lowest wage in transportation, loading and unloading i.e., Rs.

230.67. The study reveals that the wage gap prevails in both the selected districts. However, the wage gap is wider in Kohima district compared to Dimapur district by differences in labour supply than demand.

Table 3.3.16: Gender-wise wage distribution under different farm activities of flower cultivation in Dimapur district (wages in Rs.)

Labour activities	Poly-house measuring 200m^2			Poly-house measuring more than 200m^2		
	Male	**Female**	**Wage gap**	**Male**	**Female**	**Wage gap**
Ploughing	308.65	253.53	55.12	311.09	250.53	60.56
Flower bed preparation	302.94	250.06	52.88	300.10	248.84	51.26
Manuring	298.75	247.29	51.46	297.71	249.08	48.63
Planting	277.35	237.31	40.04	279.62	234.15	45.47
Pest and disease control	299.88	245.18	54.70	300.01	248.26	51.84
Watering	265.45	230.15	35.30	268.32	233.15	35.17
Weeding and trimming	278.65	241.59	37.06	275.27	245.17	30.10
Harvesting	267.70	234.41	33.29	270.03	240.42	29.61
Transportation, loading and unloading	270.53	224.72	45.81	278.84	230.67	48.17
Average labour wage	285.54	240.47	45.07	286.78	242.25	44.53

Source: Field survey 2013-14

3.3.9.3 Gender and Operation-wise Wage Distribution in Alstroemeria Cultivation

As a consequence of wage differences between male and female labour and operation wise labour utilization, variation in labour cost has been witnessed. Table 3.3.17 illustrates gender and labour-wise labour cost for the two poly houses. It is evident from the table that under 200m^2 ploy house, ploughing incurs the highest male labour cost (Rs. 4448.62) and for female labour it is in watering the plants (Rs. 2878.25). The total labour cost is Rs. 14339.88, of which male labour cost constitute 64.15% (Rs. 9198.98) and female labour cost forms 35.85% (Rs. 5140.90).

Whereas, for poly-house measuring more than 200m^2, Rs. 6848.48 is invested on male labour for ploughing, constituting the highest male labour cost. No cost is incurred on female labour for ploughing and in controlling pest and disease while major female labour cost is in watering with Rs. 3786.62. Male and female labour cost comprises of 70.19% and 29.81% respectively of the total labour cost. The data reveals that female labour dominates in labour absorption while male labour receives higher wage distribution indicating wage gap prevailing at significant level between the genders.

3.3.9.4 Gender and Operation-wise Wage Distribution in Lilium Cultivation

Table 3.3.18 for Lilium cultivation under $200m^2$ poly house shows that male wages constitute more than 70% and female wages constitute 30% of the total labour cost (Rs. 14334.21). Among the operation wise distribution of wages shown in the table, it can be seen that Rs. 4509.28 is paid to male labour for ploughing activity forming the highest male labour cost, followed by bed preparation and watering.

Whereas for poly measuring more than $200m^2$, the highest wage cost for female labour is in watering the plants, followed by weeding and planting activity during the first year of cultivation. At the same time for controlling pest and disease, Rs. 32.01 was incurred on male labour but no wage was incurred on female labour for the same. The total labour cost is Rs. 27570.26, which consists of Rs. 18440.65 (66%) male wages and Rs. 9129.61 (33.11%) female wages. It is perceptible from the table that labour cost for ploughing forms majority of the male labour cost while watering the plant occupies greater part for female wage cost.

3.3.9.5 Gender and Operation-wise Wage Distribution in Rose Cultivation

It is evident from table 3.3.19 that under $200m^2$ poly house more labour cost is invested on male labour which is higher on activities involving more physical efforts. The distribution of expenditure on wages among the operations indicates that male predominates in ploughing, bed preparation and manuring activities. While female dominates in watering the plants, weeding and harvesting. Interestingly, male labourers are not involved in harvesting the Rose crops during the first year. The table indicates that male labourers attain more wage share (68.36%) than female (31.64%) in total wage cost in Rose cultivation during the first year of cultivation.

On the other hand, under more than 200m^2 poly house, male labour wage forms 71.04% and female labour wage 28.96% of the total wage (Rs. 29366.82). It can be observed from the table that more wages is paid to male labour for almost all the operation except watering. No wage has been incurred in flower bed preparation, pest and disease control for female labour due to non participation of female labour in these activities during the study period.

3.3.9.6 Gender and Operation-wise Wage Distribution in Anthurium Cultivation

Table 3.3.20 represents gender and operation-wise wage distribution among Anthurium labourers in Dimapur district. Similar to other selected crops, male labour is paid more wages in ploughing while female labour in watering the plants. Wages paid to male labour constitute about 70.05% and that of female labour is around 29.95% of the total labour cost for poly-house measuring 200m^2. Similarly, for poly house measuring more than 200m^2 wages paid to male labour is about 71.37% and female labour is 28.63% of the total wages of Rs. 22255.91. During the first year of cultivation more emphasis has been on employment of male labour which forms majority of the total labour cost.

3.3.9.7 Gender and Operation-wise Wage Distribution in Gerbera Cultivation

Table 3.3.21 shows the classification of both gender and operation-wise wage distribution in Gerbera flower. It is perceptible from the table that under 200m^2 poly house, Rs. 3086.50 has been paid to male labours for ploughing and Rs. 1114.82 for flower bed preparation. On the other hand, female wage distribution is predominant in watering which is Rs. 2941.32. Thus, male labour cost and female labour cost constitute 56.25% and 43.75% of the total labour cost respectively.

Correspondingly, under poly house measuring more than 200m^2, the respective male and female labour wages comprise 53.35% and 46.65% of the total labour cost. Though equal participation of male and female labour is prevalent in the flower crop, wage share for male labour is higher than that of female labour in ploughing, flower bed preparation, manuring and transport, loading and unloading activities. On the other hand,

Table 3.3.17: Gender-wise wages paid to the labourers for different operations in Alstroemeria cultivation (in Rs.)

Sl. No.	Labour activities	Poly-house measuring 200m^2			Poly-house measuring more than 200m^2		
		Hired		Total	Hired		Total
		Male	Female		Male	Female	
1.	Ploughing	4448.62	174.42	4623.04	6848.45	-	6848.45
2.	Flower bed preparation	1464.99	131.15	1596.14	3086.54	32.60	3119.14
3.	Manuring	1077.92	241.26	1319.18	1841.14	457.92	2299.06
4.	Planting	188.81	377.13	565.94	474.05	554.60	1028.65
5.	Pest and disease control	20.00	-	20.00	167.02	-	167.02
6.	Watering	754.37	2878.25	3632.62	2582.95	3786.62	6369.57
7.	Weeding and trimming	333.72	807.55	1141.27	550.31	1640.34	2190.65
8.	Harvesting	84.17	457.01	541.18	699.56	714.49	1414.05
9.	Transportation, loading and unloading	826.38	74.13	900.51	1700.40	435.91	2136.31
10	Total	9198.98 (64.15)	5140.90 (35.85)	14339.88 (100)	17950.42 (70.19)	7622.48 (29.81)	25572.90 (100)

Source: Field survey 2013-14

Note: Figures in parenthesis is percentage to the total.

Table 3.3.18: Gender-wise wages paid to the labourers for different operations in Lilium cultivation (in Rs.)

Sl. No.	Labour activities	Poly-house measuring 200m^2			Poly-house measuring more than 200m^2		
		Hired		Total	Hired		Total
		Male	Female		Male	Female	
1.	Ploughing	4509.28	66.16	4575.44	6514.08	99.08	6613.16
2.	Flower bed preparation	1904.09	80.48	1984.57	3534.91	41.49	3576.40
3.	Manuring	1046.56	174.40	1220.96	2474.40	195.42	2669.82
4.	Planting	220.87	499.14	720.01	596.26	1480.78	2077.04
5.	Pest and disease control	32.01		32.01	278.36	-	278.36
6.	Watering	1244.36	2422.83	3667.19	3012.26	4419.01	7431.27
7.	Weeding and trimming	315.18	667.84	983.02	643.90	2007.37	2651.27
8.	Harvesting	164.84	344.76	509.60	308.52	743.71	1052.23
9.	Transportation, loading and unloading	587.73	53.68	641.41	1077.96	142.75	1220.71
10	Total	10024.92 (69.94)	4309.29 (30.06)	14334.21 (100)	18440.65 (66.89)	9129.61 (33.11)	27570.26 (100)

Source: Field survey 2013-14

Note: Figures in parenthesis is percentage to the total.

Table 3.3.19: Gender-wise wages paid to the labourers for different operations in Rose cultivation (in Rs.)

Sl. No.	Labour activities	Poly-house measuring 200m^2			Poly-house measuring more than 200m^2		
		Hired		Total	Hired		Total
		Male	Female		Male	Female	
1.	Ploughing	4820.69	51.12	4871.81	7065.99	69.06	7135.05
2.	Flower bed preparation	1564.78	11.92	1576.70	3170.61	-	3170.61
3.	Manuring	1340.54	168.59	1509.13	2646.39	268.34	2914.73
4.	Planting	192.37	368.81	561.18	711.07	576.78	1287.85
5.	Pest and disease control	400.08	30.25	430.33	902.69	-	902.69
6.	Watering	754.37	2644.04	3398.41	2780.01	5608.95	8388.96
7.	Weeding and trimming	77.87	835.49	913.36	1227.90	1109.56	2337.46
8.	Harvesting	-	416.92	416.92	893.29	770.27	1663.56
9.	Transportation, loading and unloading	708.84	35.78	744.62	1463.94	101.97	1565.91
10	Total	9859.54 (68.36)	4562.92 (31.64)	14422.46 (100)	20861.89 (71.04)	8504.93 (28.96)	29366.82 (100)

Source: Field survey 2013-14

Note: Figures in parenthesis is percentage to the total.

Table 3.3.20: Gender-wise wages paid to the labourers for different operations in Anthurium cultivation (in Rs.)

Sl. No.	Labour activities	Poly-house measuring 200m^2			Poly-house measuring more than 200m^2		
		Hired		Total	Hired		Total
		Male	Female		Male	Female	
1.	Ploughing	3225.39	86.20	3311.59	5826.71	27.56	5854.27
2.	Flower bed preparation	1384.43	45.01	1429.44	2514.84	27.37	2542.21
3.	Manuring	1317.49	185.47	1502.96	2244.73	219.19	2463.92
4.	Planting	108.17	289.52	397.69	483.74	487.03	970.77
5.	Pest and disease control	251.90	19.61	271.51	699.02	32.27	731.29
6.	Watering	1083.04	2082.86	3165.90	1854.09	3683.77	5537.86
7.	Weeding and trimming	183.91	521.83	705.74	580.82	919.39	1500.21
8.	Harvesting	80.31	196.90	277.21	283.53	661.15	944.63
9.	Transportation, loading and unloading	522.12	60.67	582.79	1396.99	313.71	1710.70
10	Total	8156.76 (70.05)	3488.07 (29.95)	11644.83 (100)	15884.47 (71.37)	6371.84 (28.63)	22255.91 (100)

Source: Field survey 2013-14

Note: Figures in parenthesis is percentage to the total.

Table 3.3.21: Gender-wise wages paid to the labourers for different operations in Gerbera cultivation (in Rs.)

Sl. No.	Labour activities	Poly-house measuring 200m^2			Poly-house measuring more than 200m^2		
		Hired		Total	Hired		Total
		Male	Female		Male	Female	
1.	Ploughing	3086.50	73.52	3160.02	4613.46	834.26	5447.72
2.	Flower bed preparation	1114.82	22.50	1137.32	2301.77	539.98	2841.75
3.	Manuring	746.87	232.45	979.32	1437.94	580.36	2018.30
4.	Planting	130.35	299.01	429.36	187.34	779.72	967.06
5.	Pest and disease control	176.93	36.78	213.71	168.00	278.05	446.05
6.	Watering	100.87	2941.32	3042.19	1148.41	4994.07	6142.48
7.	Weeding and trimming	108.67	703.03	811.70	313.81	980.68	1294.49
8.	Harvesting	26.77	349.27	376.04	232.22	687.60	919.82
9.	Transportation, loading and unloading	641.16	112.36	753.52	1115.36	396.75	1512.11
10	Total	6132.94 (56.25)	4770.24 (43.75)	10903.18 (100)	11518.31 (53.35)	10071.47 (46.65)	21589.78 (100)

Source: Field survey 2013-14

Note: Figures in parenthesis is percentage to the total.

female wage share is more in planting, pest and disease control, watering, weeding and trimming and harvesting for Gerbera crop under poly house measuring more than $200m^2$ during the study period.

3.3.10 Stochastic Frontier Production Model-Half-Normal Case

Production function has been defined as a boundary or a frontier where it tries to obtain the maximum possible output from a given set of inputs which are assumed to be fully efficient. Any deviation from this frontier results in farm's technical inefficiency which may arise due to technical problems or market imperfections. Efficiency in production is described to be of two kinds, namely, technical and allocative efficiency, the former referring to producing the maximum level of output given the inputs or using the minimum level of inputs given the output, while the latter referring to the marginal rate of substitution between any of the input equal to the corresponding input price ratio (Mastromaro, 2008)[116]. A series of production functions were developed to test the efficiency of existing inputs to yield the maximum possible output such as the Cobb-Douglas production functions, CES production functions and translog production functions. Stochastic frontier model has been used widely in many studies of production, cost, revenue and profits. Stochastic production frontier was simultaneously developed by Aiger, Lovell, Schmidt and Meeusen and Van den Broeck in 1977[117]. Stochastic frontier production function can be advantageous in estimating farm's technical efficiency and inefficiencies, where the efficiency parameters are restricted to be zero. Null hypothesis indicate that there is no technological intensification in the production function which can be tested using log likelihood ratio (LR) (Giribabu, 2012)[118].

[116] Mastromaro, C. (2008), "Stochastic Frontier Models", retrieved on 18/8/16 from www.camillamastromaro.it/CIDE/STFR.pdf, p. 10.
[117] Wikipedia, retrieved on 18/8/16 from https://en.wikipedia.org/wiki/**Stochastic_frontier_**analysis
[118] M. Giribabu, (2012), op.cit., p. 4.

Thus, stochastic frontier Model of half-normal case has been expressed as:

$$\ln Out_i = \sim_0 + \quad_k \ln K_i + \quad_L \ln L_i + \frac{1}{2} \quad_{KK} (\ln K_i)^2 + \frac{1}{2} \quad_{LL} (\ln L_i)^2 + \quad_{KL} (\ln K_i)(\ln L_i) + v_i$$

Where,

ln = Natural logarithmic value

Out = Total Output

K = Capital expenditure on seeds, fertilizers, pesticides, packing and other expenditures excluding human labour in Rs.

L = Human labour expenditure (total man days × wage rate).

V_i = random error component represents stochastic effects.

Table 3.3.22: Production Function Estimates of Selected Flowers in Kohima (Translog Stochastic Frontier Model-Half-Normal Case) for 200m^2 poly house

Sl.No.	Variable	Co-Efficient	Alstroemeria	Lilium	Rose
1	Constant	$\sim_0$	29.35	2.88	42.31
2	Capital	$_K$	10.66 (2.81)*	8.73 (1.75)***	15.31 (3.53)*
3	Labour	$_L$	-1.81 (0.66)	3.68 (1.02)	-2.49 (0.65)
4	Labour×Labour	$_{LL}$	0.37 (1.32)	-0.41 (1.64)	0.20 (0.64)
5	Capital×Capital	$_{KK}$	1.52 (3.18)*	6.03 (2.30)**	1.69 (2.41)**
6	Capital ×Labour	$_{KL}$	-0.30 (0.46)	-2.82 (0.79)	0.22 (0.29)
7	$\pm^2 = \pm_v^2 + \pm_u^2$		0.017	0.01	0.013
8	Log- Likelihood		38.39	40.72	27.41
9	No. of observation		52	50	37

Note: The Model represents the production function estimates using half-Normal method and other models are estimated by employing Maximum Likelihood Estimation.
Figures in parenthesis indicate ‘t’ values.
*, ** and *** indicates 1 percent, 5 percent and 10 percent significance.

Production function estimates of flower-varying stochastic frontier production function for half normal case in case of Kohima district is illustrated in table 3.3.22. The results indicates that for all the selected flowers, capital plays an important role in the production process showing statistical significant at 1 and 10 percent level of significance while labour have expected sign with insignificance. The data reveals that the factor of capital is more significant than labour in the production process of all the selected cut flowers of Alstroemeria, Lilium and Rose in Kohima district. The coefficient of capital is positive to the extent of 10.66, 8.73 and 15.31 of all selected flowers and is statistically significant. However, though the labour factor is insignificant, it is an important input to accelerate the production and productivity of flower cultivation. Therefore, the data information reveals that both the factors are necessary to grow the selected flower crops in order to increase yield and output.

Table 3.3.23: Production Function Estimates of Selected Cut Flowers in Dimapur (Translog Stochastic Frontier Model-Half-Normal Case) for 200m^2 poly house

Sl. No.	Variable	Co-Efficient	Anthurium	Gerbera
1	Constant	$\sim_0$	63.43	17.39
2	Capital	$_K$	-14.61 (2.28)**	-1.60 (0.32)
3	Labour	$_L$	13.56 (3.39)*	4.96 (1.95)***
4	Labour×Labour	$_{LL}$	1.48 (2.31)**	0.46 (1.19)
5	Capital×Capital	$_{KK}$	1.54 (1.85)***	0.03 (0.05)
6	Capital ×Labour	$_{KL}$	0.37 (0.47)	0.37 (0.53)
7	$\pm^2 = \pm_v^2 + \pm_u^2$		0.01	0.009
8	Log- Likelihood Function		40.80	37.62
9	No. of observation		46	40

Note: The Model represents the production function estimates using half-Normal method and other models are estimated by employing Maximum Likelihood Estimation.
Figures in parenthesis indicate 't' values.
*, ** and *** indicates 1 percent, 5 percent and 10 percent significance.

On the contrary, the selected cut flowers of Anthurium and Gerbera crops in Dimapur district is shown in table 3.3.23. The estimated parameters of stochastic frontier production function with half normal case indicates that the significance of labour is more predominant than capital expenditure. The coefficient of capital is negative to the extent of 14.61 and statistically significant at 1 percent level in case of Anthurium while the labour is positive to the extent of 13.56 and 4.96 and statistically significant at 1 and 10 percent for Anthurium and Gerbera flowers respectively. The study reveals that the cut flowers growing in dry and plain areas in Nagaland absorb more of labour than capital expenditure due to the nature of flowers, farm activities involved and life span of flower plant.

SECTION IV

3.4 COSTS, RETURNS AND MARGIN

Commercialization of floriculture has enabled the women flower growers of Nagaland to earn an income to supplement their family's income. Flowers grown under controlled conditions or poly-houses also tend to fetch higher income than those grown in open space as it helps to produce seasonal flowers throughout the year by trapping heat inside the poly house and is thus able to produce high quality flowers. Sustainability in production creates a situation of sustainable development wherein the income earned by the growers are diverted towards more productive activities such as further development of their nurseries, increase production, fulfilling the needs of their family and children's education, etc. Demand for cut flower is increasing both domestically and internationally, therefore, it will be a profitable business for the farmers and all the intermediaries associated with this business as its yield is double the cost of production (Jahan, 2009)[119].Introduction of floriculture crops will enable the farmers to earn more income by exploiting the available natural resources more efficiently. Net profit against the investment is much higher from these crops compared to other horticultural and agricultural crops (Khan, 2005)[120].

[119]Jahan, H. (2009), op.cit., p. 13.
[120]Khan, M.A. (2005), op.cit., p. 30.

Productivity and income of the farmers differs partly due to the differences in quality and quantity of land, labour and capital and largely due to the difference in management factors (Birajdar, 2014)[121]. Income generated by the selected growers from the sale of its produce after deducting cost of production has been listed in tables 3.4.1 to 3.4.6). All the selected cut flowers yield different production and productivity, have varied marketed surplus, offer different price, incur different costs of production and generate differential net profit to the selected farmers.

3.4.1 Poly House Measuring 200m^2

Data depicting selected cut flower production, productivity, marketed quantity, price per stem, cost of production and the margin generated during peak season under poly-house measuring 200m^2 is shown in table 3.4.1. During peak season production of all the selected cut flowers is higher than the slack season. Peak season of the selected flowers occurs during the summer months except for Gerbera in which the production is lower during summer and more during the winter season when there is high domestic demand. Thus Gerbera growers are able to take advantage of their increased production when the price is high. With high production, farmers are able to sell more but due to excess supply and lower demand during summer the price received tends to be low which fetch them low return. From the table, in Dimapur district, production of Anthurium in peak season is 3855.36 stems of which marketed quantity is 3340.92 stems (86.10%) at Rs. 15 per stem. After deducting gross return of Rs. 50113.80 from production cost of Rs. 20185.27, farmer receives a net margin of Rs. 29928.53. Similarly, the marketed quantity of Gerbera is 7814.10 stems out of the total production of 8010.18 stems during the peak months. Price per stem is Rs. 9.55 and the gross return is Rs. 74624.65 and net margin is Rs. 52667.85.

Correspondingly, in case of Alstroemeria in Kohima district, total production is 7732.50 stems in the peak season and the marketed quantity is 6728.58 stems at Rs. 7.42 per stem earning total revenue of Rs. 49926.06. Producer incurs a total cost of Rs. 16556.49 and receives a margin of Rs. 33369.57. Similarly, the production and marketed quantity of Lilium is 4101.18 stems and 3646.38 stems respectively. Price per stem is Rs.

[121] Birajdar, V.M., et. al. (2014), op.cit., p. 489.

13.85 yielding a margin of Rs. 34236.07 in case of Lilium at the cost of Rs. 16266.29. Whereas the marketed quantity of Rose is 5812.50 stems at Rs. 8.07 per stem yielding revenue of Rs. 46906.87 and finally net margin of Rs. 23692.99. The table reveals that there is a wide variation in production, price and cost among the flowers depending on quantity and variety of flowers which, in turn, depends on demand and supply as well as market infrastructure and information of selected cut flowers in the region.

On the other hand, production and marketing condition during the slack (winter) season is shown in table 3.4.2. Production is low during this season, however, domestic demand being high and its supply being low during winter, price of cut flowers goes up. As a result farmers are able to supplement their income by taking advantage of the rising prices. As far as Gerbera flower is concerned, its slack season during summer fetch low price to the farmers. Hence, flowers being highly perishable, Gerbera growers are left with no other choice but to adhere to low prevailing price in the domestic market. Taking into account slack season production, marketed quantity, price per stem, revenue, cost and margin, it can be seen from the table that net margin from the selected cut flowers are Rs.53508.57 for Anthurium, Rs. 39030.43 for Gerbera, Rs. 52825.40 for Alstroemeria, Rs.51987.96 for Lilium and Rs. 43480.25 in case of Rose during the study period.

Table 3.4.3 shows the total income generated by the selected farmers producing cut flowers under poly-house measuring $200m^2$. Anthurium flower with a total production of 7642.27 stems and productivity of 38.21 per $200m^2$ yields total revenue of Rs. 118307.65; and after deducting total cost of Rs. 34578.81, total margin received stands at Rs. 83728.84. In comparison with the other selected cut flowers, Gerbera flower recorded the highest production of 15282.35 stems and productivity of 76.41, generating a total margin of Rs. 90593.46 to the farmer, which is the highest income among all the selected cut flowers. Similarly, the production of Alstroemeria shows more than Lilium and Rose. Alstroemeria with productivity of 70.61 per $200m^2$ enables the farmers to sell 12611.46 stems giving a return of Rs. 87633.04. Lilium flower, on the other hand, with a production of just 7571.36 stems and productivity of 37.86 is able to yield a margin of Rs. 87159.74 to the growers. However, in case of Rose with the total production of 12314.17 stems and productivity of 61.57 per m^2 is able to give a margin of Rs. 67634.77 which is the lowest of all the selected cut flowers.

3.4.2 Poly House Measuring more than $200m^2$

Farmers having poly house measuring more than $200m^2$ tend to have larger production and thus more marketable surplus. But at the same time spoilage rate and unsold quantity is more compared to farmers cultivating under area measuring $200m^2$. Price per stem of selected cut flower remaining the same, change in production, productivity, marketed surplus, gross return, total cost and net profit have been illustrated from tables 3.4.4 to 3.4.6. Like the poly house measuring $200m^2$, more production takes place during the peak season and less during the slack season. However, farmers are able to generate more income during the slack season in spite of low production when demand is high by raising the price of cut flowers thereby covering up their summer loses.

Table 3.4.4 illustrates peak season production, marketed quantity, price per stem, revenue, cost and margin of sample growers producing selected cut flowers under area measuring more than $200m^2$. Production of Anthurium is estimated to be 10048.02 stems of which the marketed quantity is 7603.86 stems. Net margin of Rs. 65672.92 has been received by the growers after deducting the production cost of Rs. 48384.98 from gross revenue of Rs. 114057.90. Whereas in case of Gerbera, gross revenue is Rs. 125104.81 and with production cost of Rs. 35124.69 growers received a margin of Rs. 89980.12, which is the highest among the selected cut flowers. Subsequently, in Kohima, Alstroemeria growers incur production cost of Rs. 29747.27 and received a margin of Rs. 71669.29. Lilium and Rose growers received net margin of Rs. 75592.51 and Rs. 56474.13 respectively during the study period of 2013-14.

Similarly, the production, marketing condition and net margin during slack season has been given in table 3.4.5. While growers of Anthurium, Alstroemeria, Lilium and Rose enjoy higher margin during slack season, margin of Gerbera growers remain lower than its peak season. As shown in the table the highest margin has been received by Anthurium growers which is Rs. 117629.44, whereas Gerbera growers received the lowest margin, i.e., Rs. 65590.30. This is mainly due to the difference in the quantity marketed as well as the huge price gap, i.e., while price per stem of Anthurium is Rs. 20.94 that of Gerbera is Rs. 7.33.

Table 3.4.1: Production, marketed quantity, price per stem, revenue, cost and margin of selected cut flowers during peak season from an area measuring 200m^2

Districts	Flower	Production (stems)	Marketed quantity	Price/stem	Total revenue (Rs.)	Total cost (Rs.)	Margin (R-C)
Dimapur	Anthurium	3855.36	3340.92	15.00	50113.80	20185.27	29928.53
	Gerbera*	8010.18	7814.10	9.55	74624.65	21956.80	52667.85
Kohima	Alstroemeria	7732.50	6728.58	7.42	49926.06	16556.49	33369.57
	Lilium	4101.18	3646.38	13.85	50502.36	16266.29	34236.07
	Rose	6457.98	5812.50	8.07	46906.87	23213.88	23692.99

Source: Field survey 2013-14
Note: * Peak season of Gerbera is during the winter season.

Table 3.4.2: Production, marketed quantity, price per stem, revenue, cost and margin of selected cut flowers during slack season from an area measuring 200m^2

Districts	Flower	Production (stems)	Marketed quantity	Price/stem	Total revenue (Rs.)	Total cost (Rs.)	Margin (R-C)
Dimapur	Anthurium	3773.10	3242.70	20.94	67902.14	14393.57	53508.57
	Gerbera**	7324.68	6818.82	7.33	49981.95	10951.52	39030.43
Kohima	Alstroemeria	6369.18	5882.88	10.97	64535.19	11709.79	52825.40
	Lilium	3470.22	3349.08	20.38	68254.25	16266.29	51987.96
	Rose	5841.36	5487.48	10.91	59868.41	16388.16	43480.25

Source: Field survey 2013-14
Note: ** Slack season of Gerbera is during the summer season.

Table 3.4.3: Production, marketed quantity, price per stem, revenue, cost and margin of selected cut flowers from an area measuring 200m^2

Districts	Flower	Total Production (stems)	Productivity	Marketed quantity	Price/ stem	Total revenue (Rs.)	Total cost (Rs.)	Margin (R-C)
Dimapur	Anthurium	7642.27	38.21	6583.62	17.97	118307.65	34578.81	83728.84
	Gerbera	15282.35	76.41	14632.92	8.44	123501.84	32908.38	90593.46
Kohima	Alstroemeria	14122.90	70.61	12611.46	9.19	115899.32	28266.28	87633.04
	Lilium	7571.36	37.86	6995.46	17.11	119692.32	32532.58	87159.74
	Rose	12314.17	61.57	11299.98	9.49	107236.81	39602.04	67634.77

Source: Field survey 2013-14

Table 3.4.4: Production, marketed quantity, price per stem, revenue, cost and margin of selected cut flowers during peak season from an area measuring more than 200m^2

Districts	Flower	Production (stems)	Marketed quantity	Price/stem	Total revenue (Rs.)	Total cost (Rs.)	Margin (R-C)
Dimapur	Anthurium	10048.02	7603.86	15.00	114057.90	48384.98	65672.92
	Gerbera*	16616.64	13099.98	9.55	125104.81	35124.69	89980.12
Kohima	Alstroemeria	16409.70	13668	7.42	101416.56	29747.27	71669.29
	Lilium	8086.80	7549.98	13.85	104567.22	28974.71	75592.51
	Rose	14715.60	11930.88	8.07	96282.20	39808.07	56474.13

Source: Field survey 2013-14

Note: * Peak season of Gerbera is during the winter season.

Table 3.4.5: Production, marketed quantity, price per stem, revenue, cost and margin of selected cut flowers during slack season from an area measuring more than 200m^2

Districts	Flower	Production (stems)	Marketed quantity	Price/stem	Total revenue (Rs.)	Total cost (Rs.)	Margin (R-C)
Dimapur	Anthurium	8248.80	7264.62	20.94	152121.14	34491.70	117629.44
	Gerbera**	14216.64	11950.02	7.33	87593.65	22003.35	65590.30
Kohima	Alstroemeria	13912.02	12210	10.97	133943.70	21007.63	112936.07
	Lilium	7396.56	7150.02	20.38	145717.41	28974.71	116742.70
	Rose	12259.86	10440.76	10.91	113908.69	28123.37	85785.32

Source: Field survey 2013-14

Note: ** Slack season of Gerbera is during the summer season.

Table 3.4.6: Production, marketed quantity, price per stem, revenue, cost and margin of selected cut flowers from an area measuring more than 200m^2

Districts	Flower	Total Production (stems)	Productivity	Marketed quantity	Price/stem	Total revenue (Rs.)	Total cost (Rs.)	Margin (R-C)
Dimapur	Anthurium	17793.22	35.59	14811.94	17.97	266170.56	82876.68	183293.88
	Gerbera	30833.33	77.08	25050.00	8.44	211422.00	57128.11	154293.89
Kohima	Alstroemeria	30680.00	76.70	25878.00	9.19	237818.82	50754.90	187063.92
	Lilium	15483.33	38.71	14700.00	17.11	251517.00	57949.43	193567.57
	Rose	27110.77	62.93	23192.28	9.49	220094.74	67931.44	152163.30

Source: Field survey 2013-14

Table 3.4.6 shows that Gerbera lead both in production and productivity, i.e., 30833.33 stems and 77.08 respectively while Alstroemeria farmers are able to sell more of their produce, i.e., 25878 stems in the market. As far as gross return, total cost of production and net margin is concerned, Anthurium yield highest gross return (Rs 266170.56) with production cost of Rs. 82876.68 whereas Lilium shows more profitability with net margin of Rs. 193567.57. The data reveals that supply and demand play vital role in income generation of the flower growers, i.e., during the peak season, the supply exceeds demand with lower price while demand exceeds supply during the slack season with higher price which make changes in income of all selected growers. Thus development of floriculture has enabled the farmers to improve their income which proves the first hypothesis.

SECTION V

3.5 MARKETING CHANNELS

Marketing channel has been defined as the chain of intermediaries through which the produced good passes from the producers to consumers. The length of marketing channel varies from commodity to commodity depending on the quantity, consumer demand and the amount of regional specialization in production (Acharya and Agarwal, 2011)[122]. Agricultural marketing involves series of steps before the produce reach the ultimate consumers. It involves transferring agricultural products, be it farm, horticultural or other allied products from the producer to the consumer. Besides the producer and consumer, there are other intermediaries such as the wholesaler, trader or middleman and retailers in the marketing system (Vadivelu and Kiran, 2013)[123].

Floriculture industry in Nagaland followed three marketing channels for transferring the produce from the farmer to the ultimate consumer i.e.,

Channel I: Producer - Consumer

Channel II: Producer – Retailer – Consumer

Channel III: Producer – Wholesaler – Retailer - Consumer

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[122]Acharya, S.S. and N.L. Agarwal (2011),op.cit., p. 211.
[123] Vadivelu, A. and B.R. Kiran (2013), op.cit., p. 109.

3.5. a Alstroemeria

Marketing channel of Alstroemeria flower shows that two marketing channels i.e. I and II were adopted to transfer the produce from farmer to the final consumer. In channel I, farmer sells the produce directly to the final consumer without the interference of any intermediaries. Whereas in channel II, retailer acts as the intermediary between the producer and consumer. Marketed quantity under both the poly houses for the two marketing channels has been depicted in table 3.5.1. Keeping in mind the higher production under poly house measuring more than $200m^2$ compared to poly house measuring $200m^2$, more marketed quantity has been observed in the case of the former for both the channels. From table 3.5.1, a total of 38489.46 Alstroemeria stems were marketed through various marketing channels. In channel I a total of 8141.02 stems have been sold directly to the consumer whereas in channel II marketed quantity is 30348.44 stems constituting 78.85% of the total marketed quantity. This makes it clear that more than 70% of the marketed quantity passes through channel II i.e. from producers to retailers and ultimately to the consumers.

Table 3.5.1: Marketing channels and marketed quantity of Alstroemeria (quantity in stems)

Marketing channels	Channel No.	$200m^2$	More than $200m^2$	Total marketed qty.
		Marketed Qty.	Marketed Qty.	
Producer - Consumer	I	2349.52 (18.63)	5791.50 (22.38)	8141.02 (21.15)
Producer – Retailer - Consumer	II	10261.94 (81.37)	20086.50 (77.62)	30348.44 (78.85)
Total		12611.46 (100)	25878.00 (100)	38489.46 (100)

Source: Field survey 2013-14
Note: Figures in parenthesis is percentage to the total.

3.5.b Lilium

In the case of Lilium, marketing process involves three channels, the most common one being channel II for both the poly houses. It is evident from table 3.5.2 that there are only two marketing channels involved in case of poly house measuring $200m^2$. However, three marketing channels were adopted to dispose of Lilium for poly house measuring more than 200m^2. Out of the total marketed quantity of 21695.46 stems, 4002.96 stems i.e. 18.45% were marketed through channel I, 16992.78 stems were marketed through channel II, constituting 78.32% of the total marketed quantity, and only 699.72 stems were marketed through channel III forming only 3.22%. Prevalence of channel III[124] is not common with Lilium growers as they give more preference to channel I and II in the study area in which most of the growers act as wholesalers for selected cut flowers.

Table 3.5.2: Marketing channels and marketed quantity of Lilium (quantity in stems)

Marketing channels	Channel No.	200m^2	More than 200m^2	Total marketed qty.
		Marketed Qty.	Marketed Qty.	
Producer - Consumer	I	1055.61 (15.09)	2947.35 (20.05)	4002.96 (18.45)
Producer – Retailer - Consumer	II	5939.85 (84.91)	11052.93 (75.19)	16992.78 (78.32)
Producer - Wholesaler – Retailer - Consumer	III	-	699.72 (4.76)	699.72 (3.22)
Total		6995.46 (100)	14700 (100)	21695.46 (100)

Source: Field survey 2013-14
Note: Figures in parenthesis is percentage to the total.

3.5.c Rose

In case of Rose flower, all the three marketing channels were adopted by growers under both the poly houses to sell off their produce (see in table 3.5.3). Like Alstroemeria and Lilium, channel II is frequently adopted by the sample growers to sell of their produce where more than 60% of the total marketed quantity is sold through this channel. While marketed quantity in channel I is 10179.21 stems (29.51%), majority of the produce is sold through channel II with marketed quantity of 20857.07 stems (60.47%) and only 3455.98 (10.02%) stems through channel III.

[124] In channel III for Lilium and Rose crops, wholesalers are actually the producers or farmers, they collect flowers from their fellow growers at wholesale rate to meet the quantity demanded by the retailers.

Table 3.5.3: Marketed channels and marketed quantity of Rose (quantity in stems)

Marketing channels	Channel No.	$200m^2$	More than $200m^2$	Total marketed qty.
		Marketed Qty.	Marketed Qty.	
Producer - Consumer	I	2340.22 (20.71)	7838.99 (33.80)	10179.21 (29.51)
Producer – Retailer - Consumer	II	7512.23 (66.48)	13344.84 (57.54)	20857.07 (60.47)
Producer – Wholesaler - Retailer - Consumer	III	1447.53 (12.81)	2008.45 (8.66)	3455.98 (10.02)
Total		11299.98 (100)	23192.28 (100)	34492.25 (100)

Source: Field survey 2013-14
Note: Figures in parenthesis is percentage to the total.

3.5.d Anthurium

Table 3.5.4 shows the marketed channels adopted and the marketed quantity of Anthurium in Dimapur district. Growers cultivating under $200m^2$ poly house sell majority of their produce in channel II comprising of 56.48% of the total marketed quantity, 34.32% in channel III and only 9.20% in channel I. On the contrary, the growers cultivating under more than $200m^2$ poly house market about 56.42% of their produce through channel III, 28.91% through channel II and 14.67% through channel I. It is evident from the table that the growers under $200m^2$ poly house give more importance to channel II to dispose of their produce while growers under more than $200m^2$ poly house is more focused on channel III to sell their produce in which the quantity is at higher level to dispose in the market. Total marketed quantity of all the three channels under both the poly houses shows that a total of 21395.56 stems were disposed off for sale; from which 2778.60 stems were sold through channel I, 8000.56 stems through channel II and 10616.40 stems through channel III. The most prominent channel of marketing was through channel III constituting 49.62% of the total marketed quantity.

Table 3.5.4: Marketed channels and marketed quantity of Anthurium (quantity in stems)

Marketing channels	Channel No.	$200m^2$	More than $200m^2$	Total marketed qty.
		Marketed Qty.	Marketed Qty.	
Producer - Consumer	I	605.69 (9.20)	2172.91 (14.67)	2778.60 (12.99)
Producer – Retailer - Consumer	II	3718.43 (56.48)	4282.13 (28.91)	8000.56 (37.39)
Producer – Wholesaler - Retailer - Consumer	III	2259.50 (34.32)	8356.90 (56.42)	10616.40 (49.62)
Total		6583.62 (100)	14811.94 (100)	21395.56 (100)

Source: Field survey 2013-14
Note: Figures in parenthesis is percentage to the total.

3.5.e Gerbera

From the table 3.5.5, growers cultivating Gerbera under $200m^2$ poly house disposed majority of their produce through channel III i.e. 43.26%, while those cultivating under more than $200m^2$ poly house sold about 50.16%, of their marketable surplus through channel II. Total marketed quantity of both the poly houses indicates that 17677.82 stems (44.55%) were marketed in channel II, 14443.89 stems (36.40%) in channel III and only 7561.20 stems (19.05%) were disposed through channel I.

Table 3.5.5: Marketed channels and marketed quantity of Gerbera (quantity in stems)

Marketing channels	Channel No.	$200m^2$	More than $200m^2$	Total marketed qty.
		Marketed Qty.	Marketed Qty.	
Producer – Consumer	I	3189.98 (21.8)	4371.22 (17.45)	7561.20 (19.05)
Producer – Retailer – Consumer	II	5112.74 (34.94)	12565.08 (50.16)	17677.82 (44.55)
Producer – Wholesaler – Retailer – Consumer	III	6330.20 (43.26)	8113.69 (32.39)	14443.89 (36.40)
Total		14632.91 (100)	25049.99 (100)	39682.90 (100)

Source: Field survey 2013-14
Note: Figures in parenthesis is percentage to the total.

3.5.1 Market Cost, Market Margin and Price Spread

Market margin or price spread is a statistical measure to determine how consumer's expenditure is spread or divided among the market participants in different levels of marketing channels. It is influenced by various factors such as demand and supply, marketing cost, seasonality, technological changes, quantity sold, etc. (Toure and Wang, 2013)[125]. It has also been defined as an equilibrium entity which is expressed as the difference between equilibrium retail price and equilibrium farm price (Wohlgenant, 2001)[126]. Marketing process involves a series of marketing channels that begins with the producer and followed by other intermediaries in transferring the output to the consumers. The more the number of intermediation in the marketing channel the more will be the marketing cost as each transaction incurs expenses and generate profits. Therefore, the producer's price will be lesser and consumers will pay the highest price due to more involvement of mediators in the entire distribution process (Vadivelu and Kiran, 2013)[127].

A) Alstroemeria

Marketing cost, market margin and price spread of Alstroemeria during different seasons[128] have been explained in tables 3.5.6 and 3.5.7. Price per stem differs in different seasons depending on its availability and demand. Seasonal differences in marketed quantity are also observed in both channel I and II.

A.1) Channel I

Seasonal changes in cost, margin and price spread in channel I, as shown in table 3.5.6 indicate that during summer producer receive sale price of Rs. 36969.95 from marketed quantity of 4313.88 stems at Rs. 8.57 per stem. However, during winter producer receive sale price of Rs. 45039.55 from the sale of 3826.64 stems due to higher price at Rs. 11.77 per stem. Producer incurs marketing cost, consisting of transportation, packing and labour cost, of Rs. 828.89 and Rs. 669.26 during summer and winter

[125] Toure, M. and J. Wang (2013), "Marketing Margin Analysis of Tomato in the District of Banako, Republic of Mali", *Journal of Agricultural Economics and Development*, Vol. 2(3), p. 085.
[126] Wohlgenant, M. K. (2001), "Marketing Margins: Empirical Analysis", *Handbook of Agricultural Economics* (Ed.), Vol. 1, p. 936.
[127] Vadivelu, A. and B.R. Kiran (2013), op.cit., p. 109.
[128] Two season i.e. summer and winter months has been considered, where six months each for both the seasons were taken into account to study marketing conditions.

respectively. Since more quantity is marketed during summer its marketing cost is higher than winter, showing more share in consumer's rupee of 2.24% in summer and lesser in winter i.e., 1.48%. Net price received by the producer during summer is Rs. 36141.06 and winter is Rs. 44370.29 with its share in consumer's rupee of 97.76% and 98.51% respectively. Higher share of producer in consumer's rupee during winter is attributed to higher price and low marketing cost.

Table 3.5.6: Marketing cost, marketing margin and producer's share in Alstroemeria during summer and winter in Channel – I (Rs. per quantity sold)

Particulars	Summer	Producer's share in consumer's rupee (%)	Winter	Producer's share in consumer's rupee (%)
Producer's level				
Sale price	36969.95	100	45039.55	100
Marketing cost				
Transportation cost	615.78	16.66	499.76	1.11
Packing cost	137.20	0.37	109.03	0.24
Labour cost	75.91	0.20	60.47	0.13
Total marketing cost	828.89	2.24	669.26	1.48
Net price of producer	36141.06	97.76	44370.29	98.51
Consumer's price	36969.95	100	45039.55	100

Source: Field survey 2013-14

Note: Producer's sale price to consumer in summer, 4313.88 (stem) ×8.57 (Rs./stem)= Rs. 36969.95

Producer's sale price to consumer in winter, 3826.64 (stem) ×11.77 (Rs./stem) = Rs. 45039.55

In channel I (see in table 3.5.7), as the producer sell the produce directly to the consumer, its share in consumer's rupee is 98.19%. Marketed quantity of 8141.02 stems being sold at Rs. 10.17, producer received a sale price of Rs. 82794.17. Its total marketing cost stands at Rs. 1498.17 giving a net return of Rs. 81296. In this channel producer incurs transportation cost, packing and labour cost as the produce has to be transported to the final destination on demand by the consumer.

Table 3.5.7: Marketing cost, marketing margin and producer's share in Alstroemeria in Channel – I (Rs. per quantity sold)

Particulars	Alstroemeria	Producer's share in consumer's rupee (%)
Producer's level		
Sale price	82794.17	100
Marketing cost		
Transportation cost	1115.54	1.35
Packing cost	246.24	0.30
Labour cost	136.39	0.16
Total marketing cost	1498.17	1.81
Net price of producer	81296	98.19
Consumer's price	82794.17	100

Source: Field survey 2013-14

Note: Producer's sale price to consumer, 8141.02 (stem) ×10.17 (Rs./stem)= Rs. 82794.17

A.2) Channel II

In channel II there is an intermediary called the retailer who transfers the produce from the grower/producer to the final consumer. Here the producer offer the produce to the retailer at a lower rate who later sell it to the consumer at a higher price after taking the marketing cost into consideration. Seasonal variation in marketing cost, market margin and price spread in channel II have been illustrated in table 3.5.8. With more marketed quantity, cost of marketing of producer increases. While total marketing cost of producer during summer is higher at Rs. 7888.17 with 4.78% share in consumer's rupee, it is Rs. 6997.97 during winter with a share in consumer's rupee of 3.46%. Total marketing cost of retailer during summer is Rs. 10649.38 and Rs. 7817.15 during winter. It can be seen from the table that shop rent and market fee are same in both the seasons, this is due to the fact that the retailers have to pay shop rent and market fee irrespective of marketed quantity.

Table 3.5.8: Marketing cost, marketing margin and price spread of Alstroemeria during summer and winter in Channel – II (Rs. per quantity sold)

Particulars	Summer	Producer's share in consumer's rupee (%)	Winter	Producer's share in consumer's rupee (%)
Producer's level				
Sale price	100999.36	61.21	145087.56	71.77
Marketing cost				
Transportation cost	5250.02	3.18	4657.54	2.30
Packing cost	1586.39	0.96	1407.37	0.70
Labour cost	1051.76	0.64	933.06	0.46
A. Total marketing cost of producer	7888.17	4.78	6997.97	3.46
Net price of producer	93111.19	56.43	138089.59	68.31
Retailer's level				
Purchase price	100999.36	61.21	145087.56	71.77
Marketing cost				
1. Labour cost	250.19	0.15	221.95	0.11
2. Transportation cost	930.51	0.56	825.50	0.41
3. Electricity	399.12	0.24	450.08	0.22
4. Shop rent	3676.50	2.23	3676.50	1.82
5. Packing	567.88	0.34	503.80	0.25
6. Market fee	193.30	0.12	193.30	0.09
7. Spoilage	4458.12	2.70	1791.87	0.89
8. Miscellaneous	173.76	0.10	154.15	0.08
B. Total marketing cost of retailer	10649.38	6.45	7817.15	3.87
Retailer's net margin	53359.76	32.34	49247.77	24.36
Total marketing cost (A+B)	18537.55	11.23	14815.12	7.33
Consumer's price	165008.50	100	202152.48	100
Price spread	64009.14	38.79	57064.92	28.23

Source: Field survey 2013-14

Note: Producer's sale price in summer, 16082.70 (stem) ×6.28 (Rs./stem)= Rs. 100999.36

Producer's sale price in winter, 14266.23 (stem) ×10.17 (Rs./stem) = Rs. 145087.56

Retailer's sale price to consumer in summer, 16082.70 (stem) ×10.26 (Rs./stem) = Rs. 165008.50

Retailer's sale price to consumer in winter, 14266.23 (stem) ×14.17 (Rs./stem) = Rs. 202152.48

As a result of higher marketed quantity during summer months, labour cost, transportation cost, packing and other miscellaneous cost are higher. At the same time it is to be noted that due to low demand and warm weather during summer spoilage rate also rises. However, retailers pay more electricity bill during winter due to the use of heater and other electrical appliances to avoid extreme cold in the shops in Kohima. The overall cost of marketing during summer is Rs. 18537.55 which consists of 42.55% of producer and 57.45% of retailer shares. On the other hand, during winter season, the share of producer and retailer's cost on marketing constitute 47.23% and 52.76% of the total cost i.e., Rs. 14815.12. Producer and retailer's share in consumer's rupee during summer are 56.43% and 32.34% respectively and 68.31% and 24.36% respectively during winter. Thus it is evident from the table that producer's share in consumer's rupee is more during winter while retailers are able to enjoy more consumer's rupee during summer. Price spread, i.e., difference between price paid by the consumer and price received by the producer, during summer is Rs. 64009.14 and Rs. 57064.92 during winter.

Different price per stem is charged by both the producer and retailer[129]. In table 3.5.9, producer receives a sale price of Rs. 249464.18 in channel II. After incurring marketing cost of Rs. 14886.14, producer receives a net income of Rs. 234578.04. Retailer incurs a cost of Rs. 18466.55 on marketing constituting about 55% of the total marketing cost of Rs. 33352.69. Consumer's price and price spread has been estimated to be Rs. 370554.45 and Rs. 121090.27 respectively. It is clear from the table that producer's share in consumer's rupee is 63.30% and retailer's share in consumer's rupee is Rs. 27.69%. Similarly, share of producer marketing cost in consumer's rupee is 4.02% while that of retailer's is 4.98% indicating higher cost incurred by the retailer than producer in case of Alstroemeria in channel II.

[129] Producer sell a stem of Alstroemeria to retailer at Rs. 8.22 per stem and consequently retailer sell it at Rs. 12.21 per stem to consumer.

Table 3.5.9: Marketing cost, marketing margin and price spread of Alstroemeria in Channel – II (Rs. per quantity sold)

Particulars	Alstroemeria	Producer's share in consumer's rupee (%)
Producer's level		
Sale price	249464.18	67.32
Marketing cost		
Transportation cost	9907.56	2.67
Packing cost	2993.76	0.81
Labour cost	1984.82	0.53
A. Total marketing cost of producer	14886.14	4.02
Net price of producer	234578.04	63.30
Retailer's level		
Purchase price	249464.18	67.32
Marketing cost		
1. Labour cost	472.14	0.13
2. Transportation cost	1756.02	0.47
3. Electricity	849.20	0.23
4. Shop rent	7353.00	1.98
5. Packing	1071.68	0.29
6. Market fee	386.60	0.10
7. Spoilage	6250.10	1.69
8. Miscellaneous	327.91	0.09
B. Total marketing cost of retailer	18466.55	4.98
Retailer's net margin	102623.72	27.69
Total marketing cost (A+B)	33352.69	9.00
Consumer's price	370554.45	100
Price spread	121090.27	32.68

Source: Field survey 2013-14
Note: Producer's sale price to retailer, 30348.44 (stem) ×8.22 (Rs./stem)= Rs. 249464.18
Retailer's sale price to consumer, 30348.44 × 12.21 = Rs. 370554.45

B) Lilium

B.1) Channel I

Marketing cost, market margin and price spread in case of Lilium in channel I in different seasons have been illustrated in table 3.5.10. Producer sells a stem of Lilium at Rs. 17.04 during summer and Rs. 23.73 during winter to the consumer, incurring a total marketing cost of Rs. 173.23 (0.49%) and Rs. 133.31 (0.29%) during summer and winter respectively. It is evident from the table that marketing cost during both the seasons includes only labour and packing cost. Net price received by the producer is Rs. 35026.81 during summer and Rs. 45930.45 during winter. Since the producer sell directly to the consumer its share during consumer's rupee is 99.51% during summer and 99.71% in winter indicating equal share in both seasons.

Table 3.5.10: Marketing cost, marketing margin and producer's share in Lilium during summer and winter in Channel – I (Rs. per quantity sold)

Particulars	Summer	Producer's share in consumer's rupee (%)	Winter	Producer's share in consumer's rupee (%)
Producer's level				
Sale price	35200.04	100	46063.76	100
Marketing cost				
Packing cost	73.24	0.21	56.36	0.12
Labour cost	99.99	0.28	76.95	0.17
Total marketing cost	173.23	0.49	133.31	0.29
Net price of producer	35026.81	99.51	45930.45	99.71
Consumer's price	35200.04	100	46063.76	100

Source: Field survey 2013-14

Note: Producer's sale price to consumer in summer, 2065.73 (stem) ×17.04 (Rs./stem)= Rs. 35200.04

Producer's sale price to consumer in winter, 1937.08 (stem) ×23.78 (Rs./stem) = Rs. 46063.76

Table 3.5.11: Marketing cost, marketing margin and producer's share in Lilium in Channel – I (Rs. per quantity sold)

Particulars	Lilium	Producer's share in consumer's rupee (%)
Producer's level		
Sale price	81700.41	100
Marketing cost		
Packing cost	129.60	0.16
Labour cost	176.94	0.22
Total marketing cost	306.54	0.37
Net price of producer	81393.87	99.62
Consumer's price	81700.41	100

Source: Field survey 2013-14

Note: Producer's sale price to consumer, 4002.96 (stem) ×20.41 (Rs./stem)= Rs. 81700.41

Table 3.5.11 shows that the total quantity of 4002.96 stems has been marketed directly to the consumer through channel I at the rate of Rs.20.41 per stem, receiving sale price of Rs. 81700.41 to the producer. Marketing cost of Rs. 306.54 has been incurred on the producer in packing the flower and hiring labour for sorting and transportation. Net price received by the producer is Rs. 81393.87 making its share in consumer's rupee to be 99.62%.

B.2) Channel II

Table 3.5.12 exemplifies marketing cost, market margin and price spread of Lilium in channel II during summer and winter months. During summer, producer is able to sell 8768.99 stems whereas during winter it is 8222.89 stems through channel II. Accordingly producer is able to obtain Rs. 111394.06 during summer and Rs. 158479.28 in winter by selling the marketed quantity at Rs. 13.56 per stem in summer and Rs. 20.13 per stem in winter to the retailers. Producer's share in consumer's rupee during winter is 68.51% which has been estimated to be more than that during summer i.e., 62.98%. Whereas, the producer's share of marketing cost in consumer's rupee was found to be more during summer (4.25%) than winter (3.05%). Similarly, share of retailer's marketing cost (Rs. 11200.83 in summer and Rs. 6790.37 in winter) in consumer's rupee is also more during summer (6.33%) than winter (2.93%). The difference of both producer and retailer shares in consumer rupee is mainly to the higher spoilage rate during summer than winter. Total marketing cost in this channel is Rs. 18714.27 (10.58%) and Rs. 13837.86 (5.98%) during summer and winter respectively. After obtaining the cut flowers from the producers, the retailers sell it at the rate of Rs. 20.17 per stem during summer and Rs. 28.13 per stem during winter to the final consumers. Consequently, the final price paid by the consumer during summer is Rs. 176870.53 and Rs. 231309.89 during winter and the price spread is Rs. 57963.03 and Rs. 65783.12 respectively in case of Lilium crop during the study period of 2013-14.

Table 3.5.12: Marketing cost, marketing margin and price spread of Lilium during summer and winter in Channel – II (Rs. per quantity sold)

Particulars	Summer	Producer's share in consumer's rupee (%)	Winter	Producer's share in consumer's rupee (%)
Producer's level				
Sale price	118907.50	67.23	165526.77	71.56
Marketing cost				
Transportation cost	4706.39	2.66	4414.52	1.91
Packing cost	1507.76	0.85	1414.26	0.61
Labour cost	1299.29	0.73	1218.71	0.53
A. Total marketing cost of producer	7513.44	4.25	7047.49	3.05
Net price of producer	111394.06	62.98	158479.28	68.51
Retailer's level				
Purchase price	118907.50	67.23	165526.77	71.56
Marketing cost				
1. Labour cost	136.41	0.08	127.95	0.05
2. Transportation cost	507.26	0.29	475.80	0.20
3. Electricity	245.35	0.14	230.13	0.10
4. Shop rent	2058.55	1.16	2058.55	0.89
5. Packing	309.63	0.17	290.43	0.12
6. Market fee	108.23	0.06	108.23	0.05
7. Spoilage	7742.68	4.38	3412.31	1.47
8. Miscellaneous	92.72	0.05	86.97	0.04
B. Total marketing cost of retailer	11200.83	6.33	6790.37	2.93
Retailer's net margin	46762.20	26.44	58992.75	25.50
Total marketing cost (A+B)	18714.27	10.58	13837.86	5.98
Consumer's price	176870.53	100	231309.89	100
Price spread	57963.03	32.77	65783.12	28.44

Source: Field survey 2013-14
Note: Producer's sale price in summer, 8768.99 (stem) ×13.56 (Rs./stem)= Rs. 118907.50
Producer's sale price in winter, 8222.89 (stem) ×20.13 (Rs./stem) = Rs. 165526.77
Retailer's sale price to consumer in summer, 8768.99 (stem) ×20.17 (Rs./stem) = Rs. 176870.53
Retailer's sale price to consumer in winter, 8222.89 (stem) ×28.13 (Rs./stem) = Rs. 231309.89

Table 3.5.13 indicates that the marketed cost incurred by the producer (Rs. 14560.93) forms 3.55% of consumer's rupee and 44.73% of the total marketed cost of Rs. 32552.15. Likewise, retailer's marketing cost (Rs. 17991.22) constitutes 4.38% of consumer's rupee and 55.27% of the total marketing cost which indicates that retailers incur more marketing cost as well as its share in consumer's rupee is higher than that of producer due to the fact that it has to bear other costs besides transportation, packing and labour costs. Thus, retailer's share in consumer's rupee is 25.88% whereas that of producer is 66.18% of consumer's price at Rs. 410375.64 and price spread at Rs. 124217.23 in an average of both summer and winter seasons of Lilium crop during the study period in Kohima district.

Table 3.5.13: Marketing cost, marketing margin and price spread of Lilium in Channel – II (Rs. per quantity sold)

Particulars	Lilium	Producer's share in consumer's rupee (%)
Producer's level		
Sale price	286158.41	69.73
Marketing cost		
Transportation cost	9120.91	2.22
Packing cost	2922.02	0.71
Labour cost	2518.00	0.61
A. Total marketing cost of producer	14560.93	3.55
Net price of producer	271597.48	66.18
Retailer's level		
Purchase price	286158.41	69.73
Marketing cost		
1. Labour cost	264.36	0.06
2. Transportation cost	983.06	0.24
3. Electricity	475.48	0.11
4. Shop rent	4117.11	1.00
5. Packing	600.06	0.15
6. Market fee	216.46	0.05
7. Spoilage	11155.07	2.72
8. Miscellaneous	179.69	0.04
B. Total marketing cost of retailer	17991.22	4.38
Retailer's net margin	106226.01	25.88
Total marketing cost (A+B)	32552.15	7.93
Consumer's price	410375.64	100
Price spread	124217.23	30.27

Source: Field survey 2013-14

Note: Producer's sale price, 16992.78 (stem) ×16.84 (Rs./stem)= Rs. 286158.41; Retailer's sale price to consumer, 16992.78 (stem) ×24.15 (Rs./stem) = Rs. 410375.64

B.3) Channel III

Table 3.5.14 shows seasonal differences in marketed cost, market margin and price spread of Lilium in channel III. In this channel there are two intermediaries i.e., wholesaler and retailer in transferring the produce from the producer to the final consumer. The producer sells some part of the produce to the wholesaler at a rate lower rate than that sold to the retailer or consumer. Depending on the quantity marketed, total marketing cost is borne by all the three players i.e. producer, wholesaler and retailer. The total marketing cost during summer is Rs. 1148.83 of which producer’s marketed cost constitute 8.62%, that of wholesaler is 47.11% and retailer is 44.27%. Marketing cost accruing to the producer is packing and labour cost and no transportation cost been borne by the producer as the wholesaler directly goes to the field and collect the flowers from the producer. The wholesaler on the other hand bears the cost of transportation, labour cost and the cost of wastage or spoilage at the time of transportation. Marketing cost of retailers consists of labour cost, transportation cost, electricity bill, shop rent, packing etc. Producer receive a net margin of Rs. 3852.30 after selling 360.52 stems to the wholesaler at the rate of Rs. 10.96 per stem; wholesaler at the same time sell it at the rate of Rs. 14.12 per stem to the retailer and receive a margin of Rs. 697.01 and finally retailer sell it at the rate of Rs. 20.42 to the consumer and receive a margin of Rs. 1762.68. Subsequently, highest share of market margin in consumer’s rupee is that of the producer with 52.33% followed by retailer 23.94% and wholesaler 9.47%. The difference between price received by the producer and the price paid by the consumer is Rs. 3410.52 during the summer season.

Correspondingly, during the winter months, cost of marketing is lower due to small size in the quantity marketed. Share of producer’s marketing cost is only 0.95%, while that of wholesaler’s is 4.26% and retailer’s is 2.55%. Producer’s share in consumer’s rupee is 58.35%, wholesaler’s share is 12.33% and retailer’s is 21.55%. This makes it clear that producer is able to enjoy more profit than the other two intermediaries in channel III. Ultimately consumer pays Rs. 9817.55 to the retailer for purchasing 338.07 stems of Lilium during winter season during the study period.

Table 3.5.14: Marketing cost, marketing margin and price spread of Lilium during summer and winter in Channel – III (Rs. per quantity sold)

Particulars	Summer	Producer's share in consumer's rupee (%)	Winter	Producer's share in consumer's rupee (%)
Producer's level				
Sale price	3951.30	53.67	5821.56	59.30
Marketing cost				
Packing cost	56.35	0.76	53.02	0.54
Labour cost	42.65	0.58	40.13	0.41
A. Total marketing cost of producer	99.00	1.34	93.15	0.95
Net price of producer	3852.30	52.33	5728.41	58.35
Wholesaler's level				
Purchase price	3951.30	53.67	5821.56	59.30
Marketing cost				
Transportation cost	293.00	3.98	275.71	2.81
Labour cost	97.13	1.32	91.40	0.93
Spoilage	151.10	2.05	51.39	0.52
B. Total marketing cost of wholesaler	541.23	7.35	418.50	4.26
Wholesaler's net margin	697.01	9.47	1211.00	12.33
Retailer's level				
Purchase price	5090.54	69.15	7451.06	75.89
Marketing cost				
1. Labour cost	5.60	0.08	5.27	0.05
2. Transportation cost	20.89	0.28	19.65	0.20
3. Electricity	10.10	0.14	9.51	0.10
4. Shop rent	84.88	1.15	84.88	0.86
5. Packing	12.71	0.17	11.96	0.12
6. Market fee	4.46	0.06	4.46	0.04
7. Spoilage	369.96	5.02	115.04	1.17
8. Miscellaneous	-	-	-	-
C. Total marketing cost of retailer	508.60	6.91	250.77	2.55
Retailer's net margin	1762.68	23.94	2115.72	21.55
Total marketing cost (A+B+C)	1148.83	15.60	762.42	7.76
Consumer's price	7361.82	100	9817.55	100
Price spread	3410.52	46.33	3995.99	40.70

Source: Field survey 2013-14
Note: Producer's sale price in summer, 360.52 (stem) ×10.96 (Rs./stem)= Rs. 3951.30
Producer's sale price in winter, 338.07 (stem) ×17.22 (Rs./stem) = Rs. 5821.56
Wholesaler's sale price in summer, 360.52(stem) ×14.12 (Rs./stem)= Rs. 5090.54
Wholesaler's sale price in winter, 338.07(stem) ×22.04 (Rs./stem)= Rs. 7451.06
Retailer's sale price to consumer in summer, 360.52 (stem) ×20.42 (Rs./stem) = Rs. 114221.10
Retailer's sale price to consumer in winter, 338.07 (stem) ×29.04 (Rs./stem) = Rs. 9817.55

Table 3.5.15: Marketing cost, marketing margin and price spread of Lilium in Channel – III (Rs. per quantity sold)

Particulars	Lilium	Producer's share in consumer's rupee (%)
Producer's level		
Sale price	9852.06	58.30
Marketing cost		
Packing cost	109.37	0.65
Labour cost	82.78	0.49
A. Total marketing cost of producer	192.15	1.14
Net price of producer	9659.91	57.16
Wholesaler's level		
Purchase price	9852.06	58.30
Marketing cost		
Transportation cost	568.72	3.36
Packing cost	-	
Labour cost	188.53	1.11
Spoilage	202.50	1.20
B. Total marketing cost of wholesaler	959.75	5.68
Wholesaler's net margin	2031.28	12.02
Retailer's level		
Purchase price	12650.94	74.86
Marketing cost		
1. Labour cost	10.87	0.06
2. Transportation cost	40.54	0.24
3. Electricity	19.61	0.12
4. Shop rent	169.76	1.00
5. Packing	24.68	0.15
6. Market fee	8.93	0.05
7. Spoilage	485.00	2.87
8. Miscellaneous	-	
C. Total marketing cost of retailer	759.39	4.49
Retailer's net margin	3487.91	20.64
Total marketing cost (A+B+C)	1911.29	11.31
Consumer's price	16898.24	100
Price spread	7046.18	41.70

Source: Field survey 2013-14

Note: Producer's sale price, 699.72 ×14.08 (Rs./stem)= Rs. 9852.06; Wholesale's price, 699.72 ×18.08 = Rs. 12650.94; Retailer's sale price, 699.72 × 24.15 = Rs.16898.24

From the table 3.5.15, showing the overall marketing cost, market margin and price spread of Lilium in channel III, producer's marketing cost forms 10.05%, wholesaler's forms 50.21% and retailer 39.73% of the total marketing cost. Producer incur a cost of Rs. 192.15 in the process of marketing 699.72 Lilium stems to the wholesaler. By selling it at the rate of Rs. 14.08 per stem to the wholesaler, producer receives a net price of Rs. 9659.91 constituting 57.16% share in consumer's rupee. Wholesaler sells the same quantity at Rs. 18.08 per stem to the retailer and receives a margin of Rs. 2031.28 after deducting marketing cost of Rs. 959.75 from the sale price. Similarly, retailer sells it at the rate of Rs. 24.15 per stem to the consumer and receives Rs. 16898.24. Thus retailer's margin is Rs.3487.91 and its share in consumer's rupee is 20.64%. Finally, price spread of Rs.7046.18 constitutes 41.70% in consumer's rupee. Thus the study reveals that if the number of intermediaries increases the producer share in consumer rupee declines in the selected flowers.

C) Rose

C.1) Channel I

The seasonal difference in marketing cost, market margin and price spread of Rose flower in channel I has been depicted in table 3.5.16.

Table 3.5.16: Marketing cost, marketing margin and producer's share in Rose during summer and winter in Channel – I (Rs. per quantity sold)

Particulars	Summer	Producer's share in consumer's rupee (%)	Winter	Producer's share in consumer's rupee (%)
Producer's level				
Sale price	53603.59	100	64969.60	100
Marketing cost				
Transportation cost	1868.68	3.49	1332.76	2.05
Packing cost	1458.96	2.72	1040.54	1.60
Labour cost	397.99	0.74	283.85	0.44
Total marketing cost	3725.63	6.95	2657.15	4.09
Net price of producer	49877.96	93.05	62312.45	95.91
Consumer's price	53603.59	100	64969.60	100

Source: Field survey 2013-14

Note: Producer's sale price to consumer in summer, 5480.94 (stem) ×9.78 (Rs./stem)= Rs. 53603.59

Producer's sale price to consumer in winter, 4697.73 (stem) ×13.83 (Rs./stem) = Rs. 64969.60

In this channel producer incurs marketing cost of Rs. 3725.63 during summer and Rs. 62312.45 during winter with their share in consumer's rupee at 6.95% and 4.09% respectively. Marketed quantity of 5480.94 stems is sold during summer to the consumer at Rs. 9.78 per stem accruing consumer price of Rs. 53603.59 and net price received is Rs. 49877.96 (93.05%). Whereas during winter 4697.73 stems is sold at Rs. 13.83 per stem to the consumer, receiving consumer price of Rs. 64969.60 and net price of Rs. 62312.45 (95.91%). This clearly shows that though marketed quantity is less during winter, producer is able to earn more shares in consumer's rupee as a result of the high price paid by the consumer.

Table 3.5.17: Marketing cost, marketing margin and producer's share in Rose in Channel – I (Rs. per quantity sold)

Particulars	Rose	Producer's share in consumer's rupee (%)
Producer's level		
Sale price	120114.68	100
Marketing cost		
Transportation cost	3201.44	2.66
Packing cost	2499.50	2.08
Labour cost	681.84	0.57
Total marketing cost	6382.78	5.31
Net price of producer	113785.90	94.73
Consumer's price	120114.68	100

Source: Field survey 2013-14
Note: Producer's sale price in summer, 10179.21 (stem) ×11.80 (Rs./stem)= Rs. 120114.68

The information regarding the total marketing cost, market margin and price spread of Rose in channel I is shown in table 3.5.17 and it illustrates that producer in selling the produce to the consumer incurs marketing cost of Rs. 6382.78 having a share of 5.31% in consumer's rupee. Here producer receives a net price of Rs. 113785.90 (94.73%) and consumer's price of Rs. 120114.68.

C.2) Channel II

Season wise distribution of marketing cost, marketing margin and price spread of Rose flower in channel II is depicted in table 3.5.18.

Table 3.5.18: Marketing cost, marketing margin and price spread of Rose during summer and winter in Channel – II (Rs. per quantity sold)

Particulars	Summer	Producer's share in consumer's rupee (%)	Winter	Producer's share in consumer's rupee (%)
Producer's level				
Sale price	90860.25	79.55	97514.22	67.71
Marketing cost				
Transportation cost	4118.02	3.60	3529.19	2.45
Packing cost	2758.09	2.41	2363.71	1.64
Labour cost	742.69	0.65	654.49	0.45
A. Total marketing cost of producer	7618.80	6.67	6547.39	4.55
Net price of producer	83241.45	71.88	90966.83	63.17
Retailer's level				
Purchase price	90860.25	79.55	97514.22	67.71
Marketing cost				
1. Labour cost	174.70	0.15	149.72	0.10
2. Transportation cost	649.64	0.57	556.75	0.39
3. Electricity	314.22	0.27	269.29	0.19
4. Shop rent	2527.23	2.21	2527.23	1.75
5. Packing	396.54	0.35	339.84	0.23
6. Market fee	132.82	0.12	132.82	0.09
7. Spoilage	4684.50	4.10	2065.50	1.43
8. Miscellaneous	118.74	0.10	101.76	0.07
B. Total marketing cost of retailer	8998.39	7.88	6142.91	4.26
Retailer's net margin	14362.46	12.57	40352.02	28.02
Total marketing cost (A+B)	16617.19	14.55	12690.30	8.81
Consumer's price	114221.10	100	144009.15	100
Price spread	23360.85	20.45	46494.93	32.29

Source: Field survey 2013-14
Note: Producer's sale price in summer, 11231.18 (stem) ×8.09 (Rs./stem)= Rs. 90860.25
Producer's sale price in winter, 9626.28 (stem) ×10.13 (Rs./stem) = Rs. 97514.22
Retailer's sale price to consumer in summer, 11231.18 (stem) ×10.17 (Rs./stem) = Rs. 114221.10
Retailer's sale price to consumer in winter, 9626.28 (stem) ×14.96 (Rs./stem) = Rs. 144009.15

The data shows that during the summer months total marketing cost is Rs. 16617.19, of which marketing costs of producer and retailer constitute Rs. 7618.80 (45.85%) and Rs. 8998.39 (54.15%) respectively. Whereas during the winter, total marketing cost is Rs. 12690.30 and majority of the cost is covered by the producer comprising 51.59%. Producer's share of net margin in consumer's rupee is higher during summer (71.88%) than winter (63.17%). In spite of the lower marketed quantity during winter, both the producer and retailer are able to obtain higher market margin and at the same time retailer's share of net margin in consumer's rupee is also higher during winter (28.02%) than summer (12.57%). It is evident from the table that producer's sale price during winter is Rs. 97514.22 which is slightly higher than summer i.e. Rs. 90860.25. It indicates that the consumer's price is more during winter than that of summer as a result of higher price per stem during the winter season. Price spread during summer shows Rs. 23360.85 and Rs. 46494.93 during winter indicating wider gap between price received by the producer and price paid by the consumer during winter.

Similarly, the overall marketing cost, market margin and price spread of Rose in channel II as shown in table 3.5.19 illustrates that total marketing cost is Rs. 29307.52, from which producer and retailer incur marketing costs of Rs. 14166.20 and Rs. 15141.32 respectively. Producer is able to sell 20857.07 stems to the retailer at the rate of Rs. 9.11 per stem and receives a net margin of Rs. 173547.43 whose share in consumer's rupee is 66.25%. Subsequently, retailer sells the marketed quantity at Rs. 12.56 per stem to the consumer and receives consumer price of Rs. 261964.80. Retailer's net margin is Rs. 56815.57 with a share in consumer's rupee of 21.69%. It can be concluded that producer is able to generate more share in consumer's rupee than the retailer. Finally, price spread is Rs. 71956.89 with 27.47% share in consumer's rupee in channel II for marketing Rose in Kohima district.

Table 3.5.19: Marketing cost, marketing margin and price spread of Rose in Channel – II (Rs. per quantity sold)

Particulars	Rose	Producer's share in consumer's rupee (%)
Producer's level		
Sale price	190007.91	75.53
Marketing cost		
Transportation cost	7647.21	2.92
Packing cost	5121.81	1.95
Labour cost	1397.18	0.53
A. Total marketing cost of producer	14166.20	5.41
Net price of producer	173547.43	66.25
Retailer's level		
Purchase price	190007.91	75.53
Marketing cost		
1. Labour cost	324.42	0.12
2. Transportation cost	1206.39	0.46
3. Electricity	583.51	0.22
4. Shop rent	5054.47	1.93
5. Packing	736.38	0.28
6. Market fee	265.64	0.10
7. Spoilage	6750	2.58
8. Miscellaneous	220.51	0.08
B. Total marketing cost of retailer	15141.32	5.78
Retailer's net margin	56815.57	21.69
Total marketing cost (A+B)	29307.52	11.19
Consumer's price	261964.80	100
Price spread	71956.89	27.47

Source: Field survey 2013-14

Note: Producer's sale price, 20857.07(stem) ×9.11 (Rs./stem)= Rs.190007.91 ; Retailer's sale price to consumer, 20857.07 ×12.56 (Rs./stem) = Rs. 261964.80

C.3) Channel III

Channel III is not commonly practiced in Kohima, in which marketed quantity is lower than that in channel I and channel II. Table 3.5.20 shows the marketing cost, market margin and price spread of Rose flower during summer and winter in channel III.

Table 3.5.20: Marketing cost, marketing margin and price spread of Rose during summer and winter in Channel – III (Rs. per quantity sold)

Particulars	Summer	Producer's share in consumer's rupee (%)	Winter	Producer's share in consumer's rupee (%)
Producer's level				
Sale price	11817.54	52.78	14004.89	57.16
Marketing cost				
Packing cost	456.93	2.04	391.75	1.60
Labour cost	119.27	0.53	112.24	0.46
A. Total marketing cost of producer	576.20	2.57	503.99	2.06
Net price of producer	11241.34	50.21	13500.90	55.10
Wholesaler's level				
Purchase price	11817.54	52.78	14004.89	57.16
Marketing cost				
Transportation cost	682.23	3.05	584.91	2.39
Labour cost	126.38	0.56	108.35	0.44
Spoilage	468.46	2.09	178.94	0.73
B. Total marketing cost of wholesaler	1277.07	5.70	872.20	3.56
Wholesaler's net margin	2905.78	12.98	3179.33	12.98
Retailer's level				
Purchase price	16600.39	74.15	18056.42	73.70
Marketing cost				
1. Labour cost	28.95	0.13	24.82	0.10
2. Transportation cost	107.67	0.48	92.31	0.38
3. Electricity	52.08	0.23	44.65	0.18
4. Shop rent	418.94	1.87	418.94	1.71
5. Packing	65.72	0.29	56.35	0.23
6. Market fee	22.02	0.10	22.02	0.09
7. Spoilage	904.50	4.04	345.50	1.41
8. Miscellaneous	19.68	0.09	16.87	0.07
C. Total marketing cost of retailer	1619.56	7.23	1021.46	4.17
Retailer's net margin	4168.24	18.62	5422.70	22.13
Total marketing cost (A+B+C)	3472.83	15.51	2397.65	9.79
Consumer's price	22388.19	100	24500.58	100
Price spread	10570.65	47.21	10495.69	42.84

Source: Field survey 2013-14

Note: Producer's sale price in summer, 1861.03 (stem) ×6.35 (Rs./stem)= Rs. 11817.54

Producer's sale price in winter, 1595.09 (stem) ×8.78 (Rs./stem) = Rs. 14004.89

Wholesaler's sale price in summer, 1861.03 (stem) ×8.92 (Rs./stem)= Rs. 16600.39

Wholesaler's sale price in winter, 1595.09 (stem) ×11.32 (Rs./stem)= Rs. 18056.42

Retailer's sale price to consumer in summer, 1861.03 (stem) ×12.03 (Rs./stem) = Rs. 22388.19

Retailer's sale price to consumer in winter, 1595.09 (stem) ×15.36 (Rs./stem) = Rs. 24500.58

The table indicates that the total marketing cost in transferring the produce from the producer to the final consumer during summer is Rs. 3472.83, of which retailer's share in marketing cost (46.63%) is higher than that of producer (16.59%) and wholesaler (36.77%). Total marketed quantity is 1861.03 stems sold at Rs. 6.35 per stem at producer's level, Rs. 8.92 per stem at wholesaler's level and Rs. 12.03 per stem at retailer's level. Net margin received by the producer after selling the produce to the wholesaler is Rs. 11241.34, wholesaler's net margin is Rs. 2905.78 and retailer's net margin is Rs. 4168.24. Net margin share in consumer's rupee is highest for producer (50.21%), followed by retailer (18.62%) and wholesaler (12.98%) during summer, whereas, price spread is Rs. 10570.65 with 47.21% share in consumer's rupee.

During winter, total marketing cost of producer, wholesaler and retailer is Rs. 2397.65. Marketed quantity in winter is estimated to be 1595.09 stems and the marketing price of producer, wholesaler and retailer are Rs. 8.78, Rs. 11.32 and Rs. 15.36 per stem respectively. After selling the marketed quantity at each stage, the net margin of producer, wholesaler and retailer are at Rs. 13500.90 (55.10%), Rs. 3179.33 (12.98%) and Rs. 5422.70 (22.13%) respectively. The final price paid by the consumer in purchasing the marketed quantity is Rs. 24500.58 and the price spread is Rs.10495.69.

From the table 3.5.21 it can be understood that marketing cost of producer comprising of packing and labour cost is Rs. 1080.20 and its share in consumer's rupee is 2.49%. At wholesaler's level marketing cost is Rs. 2149.28 with a share in consumer's rupee of 4.95% while marketing cost of retailer is Rs. 2641.05 and its share in consumer's rupee is 6.08%. Total marketing cost of all three levels is Rs. 5870.53 with 13.52% share in consumer's rupee. Thus among the three levels in the marketing channel, marketing cost of retailer is higher than that of producer and wholesaler. Net margin received by the producer is Rs. 26775.00 and its share in consumer's rupee (61.68%) is more than that of wholesaler and retailer whose share in consumer's rupee is just 11.45% and 13.34% respectively. Similarly, consumer's price and price spread is Rs. 43407.11 and Rs. 15551.91 respectively.

Table 3.5.21: Marketing cost, marketing margin and price spread of Rose in Channel – III (Rs. per quantity sold)

Particulars	Rose	Producer's share in consumer's rupee (%)
Producer's level		
Sale price	27855.20	64.17
Marketing cost		
Packing cost	848.69	1.95
Labour cost	231.51	0.53
A. Total marketing cost of producer	1080.20	2.49
Net price of producer	26775.00	61.68
Wholesaler's level		
Purchase price	27855.20	64.17
Marketing cost		
Transportation cost	1267.14	2.92
Labour cost	234.73	0.54
Spoilage	647.41	1.49
B. Total marketing cost of wholesaler	2149.28	4.95
Wholesaler's net margin	4970.04	11.45
Retailer's level		
Purchase price	34974.52	80.57
Marketing cost		
1. Labour cost	53.78	0.12
2. Transportation cost	199.99	0.46
3. Electricity	96.73	0.22
4. Shop rent	837.89	1.93
5. Packing	122.07	0.28
6. Market fee	44.04	0.10
7. Spoilage	1250.08	2.88
8. Miscellaneous	36.55	0.08
C. Total marketing cost of retailer	2641.05	6.08
Retailer's net margin	5791.54	13.34
Total marketing cost (A+B+C)	5870.53	13.52
Consumer's price	43407.11	100
Price spread	15551.91	35.83

Source: Field survey 2013-14

Note: Producer's sale price, 3455.98 (stem) × 8.06 (Rs./stem)= Rs. 27855.20; Wholesale's price, 3455.98×10.12 = Rs. 34974.52; Retailer's sale price to consumer, 3455.98 ×12.56 = Rs. 43407.11

D) Anthurium

D.1) Channel I

Table 3.5.22 exemplifies marketing cost, market margin and price spread of Anthurium[130] in different seasons in channel I. In channel I, packing and labour cost are the only cost incurred by the producer in selling the marketed quantity. No transportation cost is incurred by the producer as the consumers themselves go to the place of production to buy it directly from the producer. Thus producer's marketing cost during summer and winter is Rs. 498.09 and Rs. 474.50 respectively. Producer's net margin after selling 1414.33 stems during summer at Rs. 19.96 per stem and 1364.95 stems in winter at the rate of Rs. 24.61 per stem is Rs. 27731.94 (98.23%) and Rs. 33116.92 (98.59%) respectively. Consumer's price during summer is Rs. 28230.03 and Rs. 33591.42 during winter.

Table 3.5.22: Marketing cost, marketing margin and producer's share in Anthurium during summer and winter in Channel-I (Rs. per quantity sold)

Particulars	Summer	Producer's share in consumer's rupee (%)	Winter	Producer's share in consumer's rupee (%)
Producer's level				
Sale price	28230.03	100	33591.42	100
Marketing cost				
Packing cost	343.41	1.22	331.26	0.99
Labour cost	154.68	0.55	143.24	0.43
Total marketing cost	498.09	1.76	474.50	1.41
Net price of producer	27731.94	98.23	33116.92	98.59
Consumer's price	28230.03	100	33591.42	100

Source: Field survey 2013-14

Note: Producer's sale price to consumer in summer, 1414.33 (stem) ×19.96 (Rs./stem) = Rs. 28230.03

Producer's sale price to consumer in winter, 1364.95 (stem) ×24.61 (Rs./stem) = Rs. 33591.42

Similarly taking both the seasons together under channel I as depicted in table 3.5.23, the data reveals that the total marketing cost of Rs. 972.59 is incurred by the

[130] Seasonal difference in marketed quantity of Anthurium is very meager in all the three channels compared to the other four selected cut flowers. The main reason is the little difference in seasonal production and the other is the quantity demanded.

producer in selling the marketed quantity of 2778.60 stems of Anthurium at the price of Rs. 22.28 per stem. Producer's net price is Rs. 49794.62 and its share in consumer's rupee is 98.08%. The price paid by the consumer in purchasing the marketed quantity is Rs. 50767.21.

Table 3.5.23: Marketing cost, marketing margin and producer's share in Anthurium in Channel-I (Rs. per quantity sold)

Particulars	Anthurium	Producer's share in consumer's rupee (%)
Producer's level		
Sale price	50767.21	100
Marketing cost		
Packing cost	674.67	1.33
Labour cost	297.92	0.59
Total marketing cost	972.59	1.91
Net price of producer	49794.62	98.08
Consumer's price	50767.21	100

Source: Field survey 2013-14
Note: Producer's sale price to consumer, 2778.60 (stem) ×22.28 (Rs./stem) = Rs. 50767.21

D.2) Channel II

The marketing cost, market margin and price spread of Anthurium flower during summer and winter in channel II is shown in table 3.5.24. The data indicates that the total marketing cost is Rs.12501.29 during summer, of which the marketing cost of retailer (Rs. 8544.65) is higher than that of producer (Rs. 3956.64). During summer season spoilage rate or market loss is more than winter, and total marketed quantity of 4070.96 stems is sold at Rs. 14.65 per stem to the retailer and the same quantity is sold to the consumer by the retailer at Rs. 20.17 per stem. As the quantity passes on from the producer to the retailer and final consumer, price of flower keeps on changing taking into account the marketing cost as well as the profit margin earned by the retailer. Simultaneously, net margin of the producer is Rs. 55682.92 having 70.41% share in consumer's rupee and net margin of the retailer is Rs. 10903.34 with 13.79% share in consumer's rupee. Price spread during summer is Rs. 19447.99 and its percentage share in consumer's rupee is 24.59%.

Table 3.5.24: Marketing cost, marketing margin and price spread of Anthurium during summer and winter in Channel-II (Rs. per quantity sold)

Particulars	Summer	Producer's share in consumer's rupee (%)	Winter	Producer's share in consumer's rupee (%)
Producer's level				
Sale price	59639.56	75.41	82111.26	74.30
Marketing cost				
Transportation cost	2531.71	3.20	2444.13	2.21
Packing cost	988.45	1.25	953.49	0.86
Labour cost	436.48	0.55	421.05	0.38
A. Total marketing cost of producer	3956.64	5.00	3818.67	3.45
Net price of producer	55682.92	70.41	78292.59	70.84
Retailer's level				
Purchase price	59639.56	75.41	82111.26	74.30
Marketing cost				
1. Labour cost	63.31	0.08	61.12	0.05
2. Transportation cost	235.44	0.30	227.30	0.20
3. Electricity	116.12	0.15	107.70	0.10
4. Shop rent	969.00	1.22	969.00	0.88
5. Packing	148.66	0.19	133.80	0.12
6. Market fee	50.94	0.06	50.94	0.05
7. Spoilage	6916.12	8.74	1904.34	1.72
8. Miscellaneous	45.06	0.06	39.51	0.03
B. Total marketing cost of retailer	8544.65	10.80	3493.71	3.16
Retailer's net margin	10903.34	13.79	24913.30	22.54
Total marketing cost (A+B)	12501.29	15.81	7312.38	6.62
Consumer's price	79087.55	100	110518.27	100
Price spread	19447.99	24.59	28407.01	25.70

Source: Field survey 2013-14

Note: Producer's sale price in summer, 4070.96 (stem) ×14.65 (Rs./stem) = Rs. 59639.56

Producer's sale price in winter, 3928.84 (stem) ×20.13 (Rs./stem) = Rs. 79087.55

Retailer's sale price to consumer in summer, 4070.96 (stem) ×20.17 (Rs./stem) = Rs. 82111.26

Retailer's sale price to consumer in winter, 3928.84 (stem) ×28.13 (Rs./stem) = Rs. 110518.27

Similarly, total marketing cost of Anthurium during winter in channel II is Rs. 7312.38 and producer's marketing cost constitutes more than 52% while retailer's marketing cost is 47.78% of the total cost. Producer's net price is Rs. 78292.59 (70.84%) and that of the retailer is Rs. 24913.30 (22.54%) which indicates that producer is able to enjoy more net return during winter compared to summer in channel II. Marketed quantity of 3928.84 stems sold by the producer to the retailer at Rs. 20.13 per stem gives the producer sale price of Rs. 82111.26 and consumer's price becomes Rs. 110518.27, and the difference between the price received by the producer and the final price paid by the consumer is Rs. 28407.01.

Table 3.5.25: Marketing cost, marketing margin and price spread of Anthurium in Channel-II (Rs. per quantity sold)

Particulars	Anthurium	Producer's share in consumer's rupee (%)
Producer's level		
Sale price	139129.74	72.01
Marketing cost		
Transportation cost	4975.84	2.57
Packing cost	1941.94	1.00
Labour cost	857.53	0.44
A. Total marketing cost of producer	7775.31	4.02
Net price of producer	131354.43	67.98
Retailer's level		
Purchase price	139129.74	72.01
Marketing cost		
1. Labour cost	124.44	0.06
2. Transportation cost	462.74	0.24
3. Electricity	223.82	0.11
4. Shop rent	1938.00	1.00
5. Packing	282.46	0.15
6. Market fee	101.89	0.05
7. Spoilage	8820.46	4.56
8. Miscellaneous	84.58	0.04
B. Total marketing cost of retailer	12038.39	6.23
Retailer's net margin	42045.39	21.76
Total marketing cost (A+B)	19813.70	10.26
Consumer's price	193213.52	100
Price spread	54083.78	27.99

Source: Field survey 2013-14

Note: Producer's sale price, 8000.56×17.39 (Rs./stem)= Rs. 139129.74 ; Retailer's sale price to consumer, 8000.56×24.15 = Rs. 193213.52

Similarly, the overall market cost, margin and price spread of Anthurium is shown in table 3.5.25. The data indicates that the total marketing cost for both the producer and retailer is estimated at Rs. 19813.70 out of which 60% of the cost is incurred by the retailer, with market loss or spoilage of flower covering the highest cost i.e. Rs. 8820.46. Total marketed quantity is 8000.56 stems with producer's price at Rs. 17.39 per stem and retailer's price at Rs. 24.15 per stem. Net margin received by the producer is Rs. 131354.43 with a share in consumer's rupee of 67.98%, and net margin of the retailer is Rs. 42045.39 with 21.76% share in consumer's rupee. Price paid by the consumer to purchase the marketed quantity amounts to Rs. 193213.52 at Rs. 24.15 per stem and the price spread in this channel is Rs. 54083.78 with 27.99% share in consumer's rupee.

D.3) Channel III

In channel III the producer sells his produce to the wholesaler outside the State in such a situation where no information on the marketing condition of the wholesaler is available. Thus marketing condition of Anthurium in channel III ends with the wholesaler's purchase price. Therefore, only producer's marketing cost and market margin have been shown as provided in table 3.5.26.

Table 3.5.26: Marketing cost and market margin of Anthurium during summer and winter in Channel-III (Rs. per quantity sold)

Particulars	Summer	Winter	Total
Producer's level			
Sale price	76932.31	74246.36	151177.54
Marketing cost			
Transportation cost	4514.25	4356.36	8870.61
Packing cost	1311.50	1265.63	2577.13
Labour cost	579.14	558.89	1138.03
A. Total marketing cost of producer	6404.89	6180.88	12585.77
Net price of producer	70527.42	68065.48	138591.77
Wholesaler's level			
Purchase price	76932.31	74246.36	151177.54

Source: Field survey 2013-14
Note: Producer's sale price to wholesaler in summer, 5402.55×14.24 (Rs./stem)= Rs. 76932.31
Producer's sale price to wholesaler in winter, 5213.93 ×14.24 (Rs./stem)= Rs.74246.36
Producer's sale price to wholesaler, 10616.40×14.24 (Rs./stem)= Rs. 151177.54

Total marketed quantity is 10616.40 stems out of which producer sells a quantity of 5402.55 stems during summer and 5213.93 stems during winter at Rs. 14.24[131] per stem and receives a sale price of Rs. 76932.31 and Rs. 74246.36 during summer and winter respectively. Total marketing cost incurred by the producer is Rs. 12585.77 that is Rs. 6404.89 during summer and Rs. 6180.88 during winter comprising of transportation, packing and labour cost. Due to higher marketed quantity during summer, net price received by the producer is higher during the season i.e., Rs. 70527.42, and that of winter is Rs. 68065.48. Consequently, total net price received by the producer is Rs. 138591.77.

E) Gerbera

E.1) Channel I

Table 3.5.27 shows marketing cost, market margin and price spread of Gerbera during summer and winter in channel I. In this channel without time lag the produce is transferred to the consumer on demand and accordingly the producer incurs less marketing cost.

Table 3.5.27: Marketing cost, market margin and producer's share in Gerbera during summer and winter in Channel-I (Rs. per quantity sold)

Particulars	Summer	Producer's share in consumer's rupee (%)	Winter	Producer's share in consumer's rupee (%)
Producer's level				
Sale price	32322.16	100	52152.26	100
Marketing cost				
Transportation cost	572.74	1.77	688.53	1.32
Packing cost	156.66	0.48	214.30	0.41
Labour cost	175.49	0.54	256.11	0.49
Total marketing cost	904.89	2.80	1158.94	2.22
Net price of producer	31417.27	97.20	50993.32	97.78
Consumer's price	32322.16	100	52152.26	100

Source: Field survey 2013-14

Note: Producer's sale price to consumer in summer, 3575.46 (stem) ×9.04 (Rs./stem) = Rs. 32322.16

Producer's sale price to consumer in winter, 3984.13 (stem) ×13.09 (Rs./stem) = Rs. 52152.26

[131] Price per stem of Anthurium is same in both the season as the producer and wholesaler follow certain rules where they come in agreement and fixed the price as well as the quantity to be marketed whole year round.

Marketed cost, quantity and price difference is found to be prevalent in different seasons. Since production is more during winter, more quantity is marketed during these months of the season and more marketing cost is borne by the producer. Marketing cost of Rs. 904.89 is incurred by the producer during summer which increases to Rs. 1158.94 during winter. During summer 3575.46 stems were sold at Rs. 9.04 per stem to the consumer which increases to 3984.13 stems at Rs.13.09 per stem during winter. Accordingly the price paid by the consumer during summer is Rs. 32322.16 and during winter it is Rs. 52152.26. Net margin of the producer stands at Rs. 31417.27 during summer and Rs. 50993.32 during winter showing more share in consumer's rupee during winter.

Similarly, the total marketing cost, market margin and price spread of Gerbera in channel I is illustrated in table 3.5.28. Producer's sale price is Rs.83626.87 which is incurred from selling the marketed quantity of 7561.20 stems at Rs. 11.06 per stem. Marketing cost consisting of transportation, packing and labour cost is Rs. 2063.83 and its share in consumer's rupee is 2.47%. Producer receives a net price of Rs. 81563.04 making its share in consumer's rupee 97.53% and the price paid by the consumer is Rs. 83626.87.

Table 3.5.28: Marketing cost, market margin and producer's share in Gerbera in Channel-I (Rs. per quantity sold)

Particulars	Gerbera	Producer's share in consumer's rupee (%)
Producer's level		
Sale price	83626.87	100
Marketing cost		
Transportation cost	1261.27	1.51
Packing cost	370.96	0.44
Labour cost	431.60	0.52
Total marketing cost	2063.83	2.47
Net price of producer	81563.04	97.53
Consumer's price	83626.87	100

Source: Field survey 2013-14

Note: Producer's sale price to consumer, 7561.20 (stem) × 11.06 (Rs./stem)= Rs.83626.87

E.2) Channel II

Table 3.5.29 gives an illustration of differences in marketing cost, market margin and price spread of Gerbera during summer and winter months. During the summer months, producer receives sale price of Rs. 58865.10 whereas, during winter it increases to Rs. 89911.17. Since more quantity is marketed during winter, producer's marketing cost is higher (Rs. 5274.42) compared to summer (Rs. 4732.07). However, retailer's marketing cost is more during summer (Rs. 10872.31) due to higher rate of spoilage (Rs. 7363.26) as compared to winter (Rs. 2167.23). The total marketing cost during summer is estimated at Rs. 15577.13 and retailer's marketing cost constitutes more than 69% whereas producer's marketing cost constitutes only about 30%. Net margin obtained by the producer and retailer is Rs. 54133.03 and Rs. 17473.24 respectively and their respective share in consumer's rupee is 62.07% and 20.03%. Final price paid by the consumer in purchasing Gerbera is Rs. 87210.65 and price spread is Rs. 28345.55.

On the other hand, during winter season the total marketing cost is Rs. 11071.07, with producer and retailer's marketing cost constituting 47.64% and 52.36% of the total cost respectively. Increase marketed quantity and higher price per stem during winter enables the producer as well as other intermediaries to earn higher return during the season. Thus producer receive a net margin of Rs. 84636.75 and retailer's net margin is Rs. 43706.04. Accordingly, consumer pays a higher price of Rs. 139385.61 during winter and the price spread is about Rs. 49474.44.

Table 3.5.29: Marketing cost, marketing margin and price spread of Gerbera during summer and winter in Channel-II (Rs. per quantity sold)

Particulars	Summer	Producer's share in consumer's rupee (%)	Winter	Producer's share in consumer's rupee (%)
Producer's level				
Sale price	58865.10	67.50	89911.17	64.50
Marketing cost				
Transportation cost	3178.13	3.64	3542.39	2.54
Packing cost	934.75	1.07	1041.88	0.75
Labour cost	619.19	0.71	690.15	0.49
A. Total marketing cost of producer	4732.07	5.43	5274.42	3.78
Net price of producer	54133.03	62.07	84636.75	60.72
Retailer's level				
Purchase price	58865.10	67.50	89911.17	64.50
Marketing cost				
1. Labour cost	130.03	0.15	144.93	0.10
2. Transportation cost	483.52	0.55	538.94	0.39
3. Electricity	258.35	0.30	236.19	0.17
4. Shop rent	2141.06	2.45	2141.06	1.54
5. Packing	295.14	0.34	328.97	0.24
6. Market fee	112.57	0.13	112.57	0.08
7. Spoilage	7363.26	8.44	2167.23	1.55
8. Miscellaneous	88.38	0.10	98.51	0.07
B. Total marketing cost of retailer	10872.31	12.47	5768.40	4.14
Retailer's net margin	17473.24	20.03	43706.04	31.36
Total marketing cost (A+B)	15577.13	17.89	11071.07	7.92
Consumer's price	87210.65	100	139385.61	100
Price spread	28345.55	32.50	49474.44	35.49

Source: Field survey 2013-14

Note: Producer's sale price in summer, 8361.52 (stem) ×7.04 (Rs./stem) = Rs. 58865.10

Producer's sale price in winter, 9317.22 (stem) ×9.65 (Rs./stem) = Rs. 89911.17

Retailer's sale price to consumer in summer, 8361.52 (stem) ×10.43 (Rs./stem) = Rs. 87210.65

Retailer's sale price to consumer in winter, 9317.22 (stem) ×14.96 (Rs./stem) = Rs. 139385.61

Table 3.5.30: Marketing cost, marketing margin and price spread of Gerbera in Channel-II (Rs. per quantity sold)

Particulars	Gerbera	Producer's share in consumer's rupee (%)
Producer's level		
Sale price	147433.02	65.72
Marketing cost		
Transportation cost	6720.52	2.99
Packing cost	1976.63	0.88
Labour cost	1309.34	0.58
A. Total marketing cost of producer	10006.49	4.46
Net price of producer	137426.53	61.26
Retailer's level		
Purchase price	147433.02	65.72
Marketing cost		
1. Labour cost	274.96	0.12
2. Transportation cost	1022.46	0.45
3. Electricity	494.54	0.22
4. Shop rent	4282.12	1.91
5. Packing	624.11	0.28
6. Market fee	225.14	0.10
7. Spoilage	9530.50	4.25
8. Miscellaneous	186.89	0.08
B. Total marketing cost of retailer	16640.72	7.42
Retailer's net margin	60257.79	26.86
Total marketing cost (A+B)	26647.21	11.88
Consumer's price	224331.53	100
Price spread	76898.51	34.28

Source: Field survey 2013-14

Note: Producer's sale price, 17677.82×8.34 (Rs./stem)= Rs. 147433.02; Retailer's sale price to consumer, 17677.82×12.69 = Rs. 224331.53

Similarly, in channel II as shown in table 3.5.30, the total marketed quantity of 17677.82 stems has been sold at Rs. 8.34 per stem by the producer to the retailer and the same quantity is sold by the retailer to the final consumer at Rs. 12.69 per stem. Consequently, the sale price received by the producer is Rs. 147433.02 and the consumer price is Rs. 224331.53. Out of the total marketing cost of Rs. 26647.21, the share of producer's cost is 38% (Rs. 10006.49) while that of retailer is 62% (Rs. 16640.72). Differences in the price received by the producer and the price paid by the consumer are Rs. 76898.51 and its share in consumer's rupee is 34.28%.

E.3) Channel III

Quite contrary to that of other crops in selected districts in channel III, producer as well as some of the retailers act as wholesaler in the marketing process of Gerbera. Marketing process in channel III of Gerbera ends with retailer's purchasing price in the study area as it is exported outside the State. Seasonal differences as well as the total marketed quantity, cost and margin have been given in table 3.5.31.

Table 3.5.31: Marketing cost, marketing margin and price spread of Gerbera during summer and winter in Channel-III (Rs. per quantity sold)

Particulars	Summer	Winter	Total
Producer's level			
Sale price	40376.29	44991.17	85363.39
Marketing cost			
Transportation cost	2160.76	2407.44	4568.20
Packing cost	635.52	708.07	1343.59
Labour cost	248.18	276.51	524.69
A. Total marketing cost of producer	3044.46	3392.02	6436.48
Net price of producer	37331.83	41599.15	78930.98
Wholesaler's level			
Purchase price	40376.29	44991.17	85363.39
Marketing cost			
Transportation cost	4372.64	5102.36	9475
Labour cost	194.55	266.72	461.27
Spoilage	676.43	309.81	986.24
B. Total marketing cost of wholesaler	5243.62	5678.89	10922.51
Wholesaler's net margin	20239.22	22716.56	42953.20
Retailer's level			
Purchase price	65859.13	73386.62	139239.10

Source: Field survey 2013-14
Note: Producer's sale price to wholesaler in summer, 6831.86×5.91 (Rs./stem)= Rs. 40376.29
Producer's sale price to wholesaler in winter, 7612.72×5.91 (Rs./stem)= Rs. 44991.17
Wholesaler's sale price to retailer in summer, 6831.86×9.64 (Rs./stem)= Rs. 65859.13
Wholesaler's sale price to retailer in winter, 7612.72×9.64 (Rs./stem)= Rs.73386.62
Producer's sale price to wholesaler, 14443.89 ×5.91 (Rs./stem)= Rs. 85363.39
Wholesaler's sale price to retailer, 14443.89 ×9.64 (Rs./stem)= Rs. 139239.10

A total of 14444.58 stems have been marketed during both the seasons (6831.86 stems during summer and 7612.72 stems during winter). Producer's and wholesaler's price during both the seasons are same i.e., Rs. 5.91 per stem at producer's level and Rs. 9.64 per stem at wholesaler's level. Due to the difference in marketed quantity, marketing cost is different for both the seasons. Total marketing cost of producer is Rs. 6436.48, out of which marketing cost during summer is Rs. 3044.46 and Rs. 3392.02 during winter. Total net margin incurred by the producer is Rs. 78930.98 i.e., Rs. 37331.83 during summer and Rs. 41599.15 during winter. Marketing cost of wholesaler which comprises of transportation, labour cost and spoilage is about Rs. 10922.51, where winter cost (Rs. 5678.89) is slightly higher than that of summer (Rs. 5243.62). Wholesaler's total net margin is Rs. 42953.20 which is the sum of wholesaler's summer net margin of Rs. 20239.22 and winter net margin of Rs. 22716.56.

SECTION VI

3.6 RETAILERS

Retailers play an important role as a mediator between the wholesaler and the consumer or between the farmer and the consumer in supplying cut flowers to meet consumer demand. With modernization use of artificial flowers as gifts to express one's emotion or for decoration purposes has been regarded less valuable and thus fresh cut flowers were given more inclination. Increased living standards have led to an increase in household consumption for cut flowers for decoration in modern homes and in all important events. Expanding hotels and restaurants have further added a new magnitude toward cut flower consumption (FABS, 2013)[132]. Increasing domestic demand for cut flowers has given an opportunity for the unemployed youth as well as housewives to open up retail outlet as an addition to the existing ones to meet ever increasing local demand. One can even see cut flowers being sold not only by the florists but also by those engaged in other businesses. This is done by putting one or two varieties of cut flower in a bucket in front of their shops. They may not sell it year-round but occasionally and these are usually from the little produce from their kitchen garden.

[132]Food and Agri Business School (FABS), Chevella, Hyderabad (2013), op.cit. p. 3.

Fluctuations in consumer demand hampers the smooth functioning of marketing system in the State. There is consumer demand for cut flowers year-round due to its increased use in every occasion. However, the demand reaches its peak during the wedding seasons which usually happens during the months of October to March. Domestic production being lower during winter, the high domestic demand during the season compels the retailers to import cut flowers from the neighbouring states as well as from other flower producing states of the country to meet the demand in the State. Apart from meeting the domestic demand in terms of quantity, the retailers also have to confirm to the quality of cut flowers to satisfy the consumers in respect of their preferences for different types these flowers.

Different flowers represent different meaning and soothe different emotions and hence retailers need to have knowledge on the uses of different flowers in different occasions. Market segmentation on the basis of demographic and physiographic characteristics of the consumers such as age, income, purpose of purchase, no. of purchases, package importance, colour preference etc. will enable floral managers or supermarket managers to target specific market segments and develop effective market strategies to accurately meet the demand of the consumers (Behe *et al*., 1992)[133].

3.6.1 Marketed Quantity of the Retailers

Apart from domestic supply of selected cut flowers, retailers import them to meet peak winter demand or wedding season. Table 3.6.1 shows the average monthly sales of cut flowers of the selected retailers in different seasons in the study areas (Dimapur and Kohima districts). Varieties of cut flowers in different sizes, colours, shapes, etc. are brought to the market to satisfy consumer's demand. Marketed quantity depends not only on domestic demand but also on the availability of cut flowers in the domestic market. It is perceptible from the table that marketed quantity of cut flowers is more during winter than summer.

[133] Behe, B.K., T.A. Prince and H. K. Tayama (1992), op.cit., p. 459.

Table 3.6.1: Average monthly sales of cut flowers by retailers in different seasons (in stems)

Sl. No.	Flowers	Seasons		% gap
		Summer	Winter	
1.	Alstroemeria	2680.45	2972.12	9.81
2.	Anthurium	678.49	654.81	-3.61
3.	Gerbera	1393.59	1552.87	10.26
4.	Lilium	1521.58	1854.88	17.97
5.	Rose	2182.03	2431.30	10.25

Source: Field survey 2013-14

As indicated in table 3.6.1, the average monthly sales of selected cut flowers in the selected districts shows significant difference between summer and winter, indicating higher sale during winter compared to summer. Monthly marketed quantity of Alstroemeria signifies the maximum marketed quantity in both the seasons with 2680.45 and 2972.12 stems in summer and winter respectively. Whereas least marketed quantity can be seen in Anthurium where 678.49 stems per month were sold during summer and only 654.81 stems per month during winter. Highest percentage gap in average marketed quantity is seen in case of Lilium with 17.97% and a negative gap of -3.61% in Anthurium.

Table 3.6.2: Average annual marketed quantity of cut flowers by retailers (in stems)

Sl. No.	Flowers	Marketed Quantity
1.	Alstroemeria	33915.42 (31.54)
2.	Anthurium	8000.56 (7.44)
3.	Gerbera	17677.82 (16.44)
4.	Lilium	20258.79 (18.84)
5.	Rose	27680.01 (25.74)
	Total	107532.60 (100)

Source: Field survey 2013-14

Note: Figure in parenthesis are percentage of the total.

On the other hand, table 3.6.2 shows the average annual marketed quantity[134] of sample cut flower retailers in the study areas with the percentage share of various cut flowers in the total marketed quantity. Alstroemeria shows the majority share with 31.54% of the total marketed quantity, followed by Rose with 25.74%, Lilium 18.84%, Gerbera 16.44% and Anthurium 7.44%. Though marketed quantity largely depends on availability of cut flowers in the market, it is also determined by consumer preferences.

3.6.2 Average Retailer's Price

Retailers buy varieties of cut flowers from the producer or wholesalers under great risk since they stock the produce with them for a certain period in their floral shop to meet diverse consumer's demand. They buy in bulk to meet demand of domestic consumers for various occasions. The average price paid by the retailers to the farmer and the wholesalers of selected cut flowers in different seasons is listed in table 3.6.3.

Average retailer's price of Alstroemeria during summer is Rs. 6.28 per stem which increased to Rs. 10.17 per stem in winter, whereas the cut flower of Anthurium's price during summer is Rs. 14.65 per stem and Rs. 20.13 per stem during winter. Gerbera flower is Rs. 7.04 per stem and Rs. 9.65 per stem during summer and winter respectively. Accordingly, the price of Lilium is Rs. 13.84 per stem during summer and Rs. 21.08 per stem during winter while that of Rose is Rs. 8.50 per stem and Rs.10.72 per stem during summer and winter respectively.

Table 3.6.3: Average retailer price of cut flowers in different seasons and their percentage change (Rs. per stem)

Sl. No.	Flowers	Seasons		Average
		Summer	Winter	
1.	Alstroemeria	6.28	10.17	8.22
2.	Anthurium	14.65	20.13	17.39
3.	Gerbera	7.04	9.65	8.34
4.	Lilium	13.84	21.08	17.46
5.	Rose	8.50	10.72	9.61

Source: Field survey 2013-14

[134] Marketed quantity of the retailers consist of not only domestic produce but also those imported from neighbouring States and other flower producing States of the country.

3.6.3 Average Consumer Price

Consumer price of cut flowers determines the profit of the farmer and the other intermediaries associated with it. Depending on the marketing channel and the floral shop located, consumer price will vary since both the price and market is unregulated and unorganized in Nagaland. Consumers are charged different price in different areas within the selected districts during the same season. Though the retailers try to maintain uniform price for smooth functioning of the market, price differences tend to occur due to lack of market information and infrastructure. Thus, similar to the retailer's price of cut flowers, consumer's price also keeps on fluctuating.

Table 3.6.4 shows the average consumer price for selected cut flowers paid by the consumers in different seasons in the selected districts. As the produce reach the final consumer the price of the produce increases. Consumer price of Alstroemeria is Rs. 10.26 per stem during summer and Rs. 14.17 per stem during winter. Similarly, the consumer price of Anthurium further increases to Rs. 20.17 per stem and Rs. 28.13 per stem during summer and winter respectively. Whereas, the consumer price of Gerbera per stem is Rs. 10.43 during summer which increases to Rs. 14.96 during winter. Consumer price per stem of Lilium reaches Rs. 20.29 during summer and further increases to Rs. 28.58 during winter, while consumer price per stem of Rose is Rs. 11.10 during summer and Rs. 15.16 during winter. Similarly, average price of both the seasons for the selected flowers are given in the table.

Table 3.6.4: Average consumer price of cut flowers in different seasons and their percentage change (Rs. per stem)

Sl. No.	Flowers	Seasons		Average
		Summer	Winter	
1.	Alstroemeria	10.26	14.17	12.21
2.	Anthurium	20.17	28.13	24.15
3.	Gerbera	10.43	14.96	12.69
4.	Lilium	20.29	28.58	24.43
5.	Rose	11.10	15.16	13.13

Source: Field survey 2013-14

3.6.4 Gross Revenue

Gross revenue (GR) is the total marketed quantity multiplied by per unit price of cut flowers, i.e.,

GR= marketed quantity × per unit price

Table 3.6.5: Gross revenue generated by the selected retailers from the sale of cut flowers in different seasons in Dimapur and Kohima districts (Rs. per month)

Sl. No.	Flowers	Seasons	
		Summer	**Winter**
1.	Alstroemeria	27501.42	42114.94
2.	Anthurium	13685.14	18419.80
3.	Gerbera	14535.14	23230.93
4.	Lilium	30872.86	53012.47
5.	Rose	24220.53	36858.51
Total		**110815.10**	**173636.70**

Source: Field survey 2013-14.

Seasonal discrepancy in marketed quantity and seasonal price makes the retailers to earn varied income in different seasons (see in table 3.6.5). As seen in the table total gross return from the sale of cut flowers is more during winter season, i.e., Rs. 173636.70 compared to summer with gross revenue of Rs. 110815.10. The revenue generated per month from Lilium is highest in both the seasons i.e. Rs. 30872.86 and Rs. 53012.47 in summer and winter respectively.

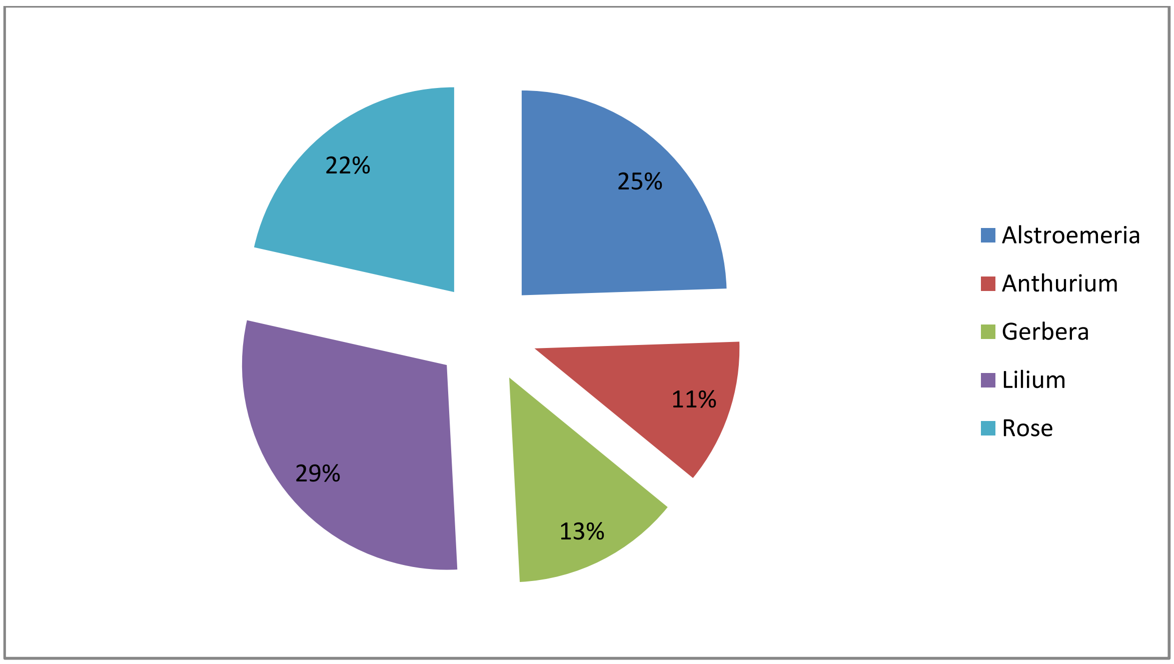
Analysis of yearly gross revenue of the selected cut flowers of the sample retailers is provided in table 3.6.6. Gross revenue generated from Lilium is higher than other selected cut flowers reaching an amount of Rs. 495935.18 forming a major portion of the total revenue i.e. 29.33%. This higher revenue from Lilium is mainly due to its high price and higher demand. Alstroemeria is another important flower contributing about 24.49% of the gross revenue. On the other hand gross revenue from Anthurium shows the lowest return of Rs. 193213.52 i.e. 11.42% of the total revenue. This low return is attributed to low production, fewer domestic demand and hence lower marketed quantity during the study period in selected districts.

Table 3.6.6: Gross revenue generated by the selected retailers from the sale of selected cut flowers in Dimapur and Kohima districts

Sl. No.	Flowers	Rs.
1.	Alstroemeria	414107.28 (24.49)
2.	Anthurium	193213.52 (11.42)
3.	Gerbera	224331.53 (13.27)
4.	Lilium	495935.18 (29.33)
5.	Rose	363438.53 (21.49)
Total		**1691026.04 (100)**

Source: Field survey 2013-14

Figure 3.6.1: Gross revenue generated by the sample retailers from the sale of selected cut flowers in Dimapur and Kohima districts



3.6.5 Cost and Return of Retailers

A retailer in cut flower business is faced with varieties of cost which is significant in its own way. This involve cost of hiring labour, cost of transportation, electricity, payment of shop rent, cost of papers, plastics, or boxes for packing, market fee in the form of tax to municipal council and factions, market losses or spoilage and other miscellaneous. The ever increasing demand for cut flowers has made floriculture of predominant importance for carrying out economic evaluation and marketing investigation. The economic return per rupee spent by the retailers for various types of flowers was found to be Rs. 1.38 in Lahore, Punjab (Manzoor *et al*., 2001)[135]. The influx of female entrepreneur into floriculture industry clearly indicates the higher return that is attracting them into this business.

Marketing cost, purchasing price, selling price and net return of selected retailers in Dimapur and Kohima districts has been presented in table 3.6.7. From the table, it can be seen that the total marketing cost of retailer in Alstroemeria is Rs. 18466.55. Purchase price of retailers from domestic producer, middleman and import from other flower producing states of the country stands at Rs. 278784.75, while gross income received by the retailer by selling 33915.42 stems at Rs. 12.21 per stem is Rs. 414107.28 and the net income is Rs. 116855.98. Similarly, in Lilium, total marketing cost incurred by the retailer is Rs. 18750.68 and cost of spoilage form majority of the cost (Rs.11640.07). Gross revenue received from selling 20258.79 stems at Rs. 24.15 per stem is Rs. 495935.18. Net income received by the retailer is Rs. 123466.03. Whereas, in case of Rose, total marketing cost is Rs. 17782.37 and purchase price of 27680.01 stems at Rs. 9.61 per stem is Rs. 266004.90. Gross revenue and net income incurred by the retailer is Rs. 363438.53 and Rs. 79651.26 respectively in case of Rose.

In the same way in case of Anthurium and Gerbera, the marketing cost is Rs. 12038.39 and Rs.16640.72 respectively. Gross income received by the retailer is Rs. 193213.52 in case of Anthurium and Rs. 224331.53 for Gerbera. The net income received by the retailer for Anthurium is Rs. 42045.39, whereas in case of Gerbera, it is Rs. 60257.79. The study reveals that the highest marketing cost incurred by the sample retailers has been in Lilium whereas the highest marketed quantity and highest net income have been generated in Alstroemeria flower during the study period in selected districts.

[135]Manzoor, R., S.A. Shahid and M. Baluch (2001), op.cit., p. 100.

Table 3.6.7: Marketing Cost, Selling Price and Net income of the selected retailers in Dimapur and Kohima districts (in Rs.)

Particulars	Alstroemeria	Lilium	Rose	Anthurium	Gerbera
Marketing cost					
1. Labour cost	472.14	275.23	378.20	124.44	274.96
2. Transportation cost	1756.02	1023.60	1406.38	462.74	1022.46
3. Electricity	849.20	495.09	680.24	223.82	494.54
4. Shop rent	7353.00	4288.87	5892.36	1938.00	4282.12
5. Packing	1071.68	624.74	858.45	282.46	624.11
6. Market fee	386.60	225.39	309.68	101.89	225.14
7. Spoilage	6250.10	11640.07	8000.08	8820.46	9530.50
8. Miscellaneous	327.91	179.69	257.06	84.58	186.89
Total cost	18466.55	18750.68	17782.37	12038.39	16640.72
Gross Income	414107.28	495935.18	363438.53	193213.52	224331.53
Purchase price	278784.75	353718.47	266004.90	139129.74	147433.02
Net Income	116855.98	123466.03	79651.26	42045.39	60257.79

Source: Field survey 2013-14.

Note: Alstroemeria- Retailer's purchase price, 33915.42×8.22 per stem= 278784.75; Consumer's purchase price, 33915.42×12.21 per stem= 414107.28

Lilium- Retailer's purchase price, 20258.79×17.46 per stem= 353718.47; Consumer's purchase price, 20258.79×24.48 stem=495935.18

Rose- Retailer's purchase price, 27680.01×9.61 stem= 266004.90; Consumer's purchase price, 27680.01×13.13 per stem= 363438.53

Anthurium-Retailer's purchase price, 8000.56×17.39 per stem=139129.74; Consumer's purchase price, 8000.56×24.15 per stem= 193213.52

Gerbera- Retailer's purchase price, 17677.82×8.34 per stem=147433.02; Consumer's purchase price, 17677.82×12.69per stem= 224331.53

Recapitulation

Production and marketing of selected cut flowers under poly house measuring 200m^2 and more than 200m^2 have been analyzed in this chapter. Production is found to be more in summer in case of Alstroemeria, Anthurium, Lilium and Rose while that of Gerbera was found to be more in winter. Regression analysis of selected cut flowers in Kohima district shows that cost on capital and labour, productivity and average price are positive and statistically significant at 1 per cent level, education is negative and statistically significant at 1 per cent level for all the three cut flowers while grower's age and landholding are negative and are statistically insignificant. On the other hand, in

Dimapur district age of the growers is negative and statistically significant at 1 per cent level whereas education is negative and statistically insignificant. Production being more in summer, more quantity of selected cut flowers is marketed whereas price of selected cut flowers is found to be higher during winter due to high demand and low production during the season.

Cost of production i.e. both input and labour cost of Rose under poly house measuring $200m^2$ is found to be highest with Rs. 39602.04 and in case of poly house measuring more than $200m^2$, cost of production of Anthurium i.e., Rs. 82876.68 is highest among the selected cut flowers. Flower being a fragile entity is labour intensive and thus require human labour to carry out production and marketing processes from ploughing the land to harvesting, transporting, loading and unloading. Analysis of labour utilization from the selected cut flowers shows that more labour is absorbed in watering the flowers followed by ploughing, bed preparation, whereas, labour use is lowest in controlling pests and diseases among the flower crops. The study also found that more labour is absorbed in Alstroemeria (75.35 man-days labour) among all selected flowers under poly house measuring $200m^2$ while Gerbera predominates under poly house measuring more than $200m^2$ with 105.83 man-days labour utilization. Estimates of Stochastic Frontier Model shows that in Kohima district, coefficient of capital is negative and significant at 1 per cent level for Alstroemeria and Rose, whereas in Dimapur coefficient of labour is negative and significant at 1 per cent level.

Three types of marketing channels exist in the floriculture industry in the study area. In channel I the producer sells the produce directly to the consumer, whereas in channel II the producer sell the produce to the retailer and retailer sell to the consumer and in channel III from the producer to the wholesaler and wholesaler to retailer in transferring the produce to the final consumer. Cost of marketing in each channel determines the market margin of the producer as well as the wholesaler and retailer. Producer receives more market margin in channel I whereas retailer receives higher market margin in channel II. Consumer on the other hand spends less when they buy directly from the producer in channel I.

CHAPTER IV

PROBLEMS AND PROSPECTS

4. Introduction

Growing demand for cut flowers along with relatively higher return per unit of land compared to other agricultural crops has encouraged farmers to take up floriculture. Increasing demand can be attributed to rapid urbanization, increase in individual purchasing power among middle income groups, on account of increase in GDP, increase in the number of corporate bodies, hotels, tourists, churches and changing lifestyles or social values among the people (Gowda, 2009)[136]. As a result rapid changes in floriculture industry in Nagaland have been witnessed within a span of few years. Development made in the floriculture sector through the introduction of advanced technology has overhauled this industry in Nagaland. Protected cultivation under poly-house has become lucrative in nature attracting more women, unemployed youth and farmers to take up cut flower production and marketing. However, this industry being at its nascent stage in Nagaland is faced with many shortcomings and difficulties. Lack of infrastructural facilities, inefficient market information, irregular demand and price fluctuations were the major problems confronting both the producers and the retailers in the study areas.

This chapter is divided into four sections. Section I discusses on the problems faced by the growers of selected cut flowers; section II illustrates on the suggestions recommended by the sample growers; section III brings out the problems and suggestions of the selected retailers in the study areas; and section IV discusses on the future prospects and policy implications of floriculture industry in the State.

[136]Gowda, M.V.S., (2009), "Hi-Tech Floriculture in Karnataka", Department of Economic Analysis and Research, National Bank for Agriculture and Rural Development, Mumbai, Occasional Paper-49, P. 15.

SECTION I

4.1 PROBLEMS FACED BY THE GROWERS

Cut flowers growers in Nagaland especially in the study areas have to deal with series of problems starting from planting to harvesting and marketing. In spite of the support from the Ministry of Agriculture and State Horticulture Department through HMNEH in providing the growers with planting materials at subsidized rates and organizing trainings, exposure tour and flower shows, the flower growers are not free from problems and constraints. Major problems faced by the selected growers have been discussed as under:-

i. High price of fertilizers and insecticides

Fertilizers serve as an important input which has to be added into the soil to fulfill nutrients requirements to yield maximum output in the production of cut flowers (Usman *et al*., 2014)[137]. Most of the product that has high importance comes with a high price tag. Growers are usually caught up with the high price of fertilizers and insecticides in the production process towards improving the quality of their produce for commercial purpose.

ii. Increase in cost of production

Cost of production under controlled and scientific method of flower cultivation incurs huge cost when compared to traditional or open cultivation. Cost of production involves investment in both capital and labour. Cultivation under controlled condition for commercial purpose involves good capital investment. Increase in the price of fertilizers and other chemical substances of insects and disease repellants further push the cost of production upward. Investment in human labour is another important cost in the cultivation of cut flowers as human resource is required in all the production and marketing activities.

[137] Usman, M., M. Ashfaq, S. Taj and M. Abid (2014), op.cit., p. 654.

iii. Seasonal change in production

Though cut flowers are produced under controlled condition which enables the farmers to produce flowers throughout the year, farmers are faced with the problem of seasonal change in production. Production of cut flowers is more during summer than winter. During winter when there is high domestic demand, production is slowed down and thus quantity yield decreases failing to meet huge demand. This seasonal change in production compels the retailers to import flowers during winter at a higher cost.

iv. Attack by pest and disease

Like other agricultural and horticultural crops, cut flowers are also infected by pests and diseases. Botrytis, root and foot rot, aphids and green caterpillar are the fungal diseases and pests that affect Alstroemeria; botrytis rot, fusarium, basal rot etc affects Lilium; black spot, powdery mildew, crown gall, red spider, etc affects Rose; spider mites, thrips, bacterial blight etc affects Anthurium; while white fly, leaf miner, thrips, mites, root rot, crown rot, powdery mildew affects Gerbera.

v. Lack of scientific knowledge and training

Modern cultivation under poly houses requires scientific knowledge and training to carry out production and marketing process. Increase competition makes it imperative for both the producer and the retailers to have scientific and technical knowledge in handling the flowers to maintain its quality and retain its vase life. Scientific knowledge in the form of testing the soil for its fertility, right time of watering, applying proper dosage of chemical fertilizers and pesticides, right time and method of harvesting etc needs to be adopted by the growers. Trainings in the form of seminar and demonstration have been provided to the growers by trained and specialized persons. However, these trainings seem insufficient for an industry which has just started. Lack of technical know-how, training facilities on pre and post harvest handling and lack of strong support from the State Government is discouraging some beneficiaries resulting in increasing sick units, especially Anthurium growers in Dimapur district and Rose growers in Kohima district. Moreover quality of cut flower produced is below the standard of marketing and the plant is usually infected by pests, diseases and fungi due to their limited knowledge on commercial floriculture production.

vi. Lack of quality seeds

Apart from the genetically modified seeds, bulbs or root stock that is being provided by the Government to the growers at subsidized rate, it is difficult to get good quality tissue culture plants in the local market. Even if available, the price is usually very high which when cultivated, the produce could not be sold at the prevailing domestic market rate.

vii. Lack of cold storage

Lack of cold storage is another problem for the growers especially in Dimapur district where the climate is hot and humid and demand is usually lower than Kohima district. After harvesting, cut flowers are required to be kept under cold temperature for a certain time to remove the farm heat before packing and transporting it to the market (Mou, 2012)[138]. Cold storage that has been set up in the study area cannot be accessed by all the growers due to the distance between the field and the cold storage and also because of the high rate charged for storing the flowers. Cold storage is also absent at the airport and railway station in the State which is required by the exporters.

viii. Inexperience labour

Producers are confronted with labourers who have no or little knowledge on flower production. These labourers are mostly petty wage earners or earlier agricultural workers who enter floriculture industry not because of their experience but they fit in wherever there is job opportunity. They have to be trained by the producers in a step by step manner, starting from basic production techniques to planting, watering, trimming, harvesting, etc.

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[138] Mou, N. H. (2012), op.cit., p. 90.

ix. Underdeveloped transportation and communication

Flowers being highly perishable, its success on marketing depends on efficient transportation system from the place of production to the market (Kargbo *et al*., 2010)[139]. There is absence of refrigerated van for transporting the cut flowers from the field to the domestic market. Transportation of cut flowers to the neighbouring States is done by trains and buses which have no cold storage or special cabin for highly perishable goods. Inefficient and improper transportation method often hampers timely delivery, damages the flowers and reduces its quality. Lack of communication between the producers and retailers also leads to market glut and at times shortage of supply in the market.

x. Lack of adequate market facilities

Unlike other floriculture industry within and outside the country, flower industry in Nagaland lacks certain market facilities such as common auction centre, wholesale market, grading system, standardization, proper packing facilities, store houses, refrigerated vans etc. There is no marketing intelligence who can act as a mediator between the producers and retailers and search market for the producers; they search their own market for their produce which is a big obstacle for a product which is highly perishable in nature.

xi. Low market price

Competition among the local flower growers to sell their highly perishable produce within a time period especially during summer compels them to charge lower prices. Low price usually affects those growers who do not depend on the subsidies but buy the planting material at the market price. Low market price prevails due to the absence of authority to control and regulate the price of cut flowers.

xii. Lack of market information

Nagaland Flower Grower's Society in collaboration with State Horticulture Department advertises various flower shows and competition in local newspaper to attract participants as well as customers. However, no news bulletin, magazine or any sort

[139] Kargbo, A., J. Mao and C. Wang (2010), op.cit., p. 7404.

of advertising aid exclusively on floriculture has been developed so far to provide the growers and other intermediaries associated with cut flower industry about the marketing condition in Nagaland. Except one or two retailers, no grower has advertised in any local newspapers or radio to attract customers. Growers and retailers get the information by visiting the market or through contact with their fellow friends. This sort of getting information is inconvenient because the information they get may be misleading sometimes.

xiii. Price fluctuation

There is no authority to fix the prices of cut flowers in Nagaland. It is done by the growers themselves which is not uniform and keeps on fluctuating in different seasons. Fluctuation in prices of cut flowers occurs depending on the availability and the changes in domestic demand. Due to lack of uniformity or unregulated price structure sometimes the growers are left at the mercy of the retailers and consumers where they sell their produce at a low price in order to get rid of their produce before they get matured in the field.

xiv. Irregular demand

With expanding flower industry, there is increase in production, excess supply over demand and consumer's demand becomes unpredictable as they demand quality products with varieties of colour, good texture, suitable with interior environment, long vase life and sweet fragrance (Kargbo *et al*., 2010)[140]. Like price fluctuation, domestic demand for cut flowers which is unpredictable also keeps on changing. Demand is low during summer but reaches its peak during winter when most of the occasions are held. However, in comparison between the two study areas, demand for fresh cut flowers is usually high in Kohima district than Dimapur district in all the seasons. Irregular demand has been a matter of concern for the growers and retailers because flowers keep on producing and their production cannot be hold back even when demand is low. This creates a wide gap between supply and demand in the market.

[140] Kargbo, A., J. Mao and C. Wang, (2010), op.cit., p. 7407.

xv. Spoilage

Cut flowers being highly perishable in nature has a high rate of spoilage if not marketed at the right time. Spoilage rate is higher during summer than winter. Highest spoilage rate is faced by the retailers as they buy in bulk from the growers and this ultimately results in high spoilage rate when domestic demand is low which further aggravates their problem.

4.1.2 Alstroemeria

Alstroemeria flower is an easy growing plant which does not require extra effort on the part of the growers for production unlike the other selected cut flowers. However the growers are faced with certain production and marketing problems which have been discussed in table 4.1.1 and ranked according to their nature of intensity on the growers.

Table 4.1.1: Problems faced by Alstroemeria growers in production and marketing in Kohima district

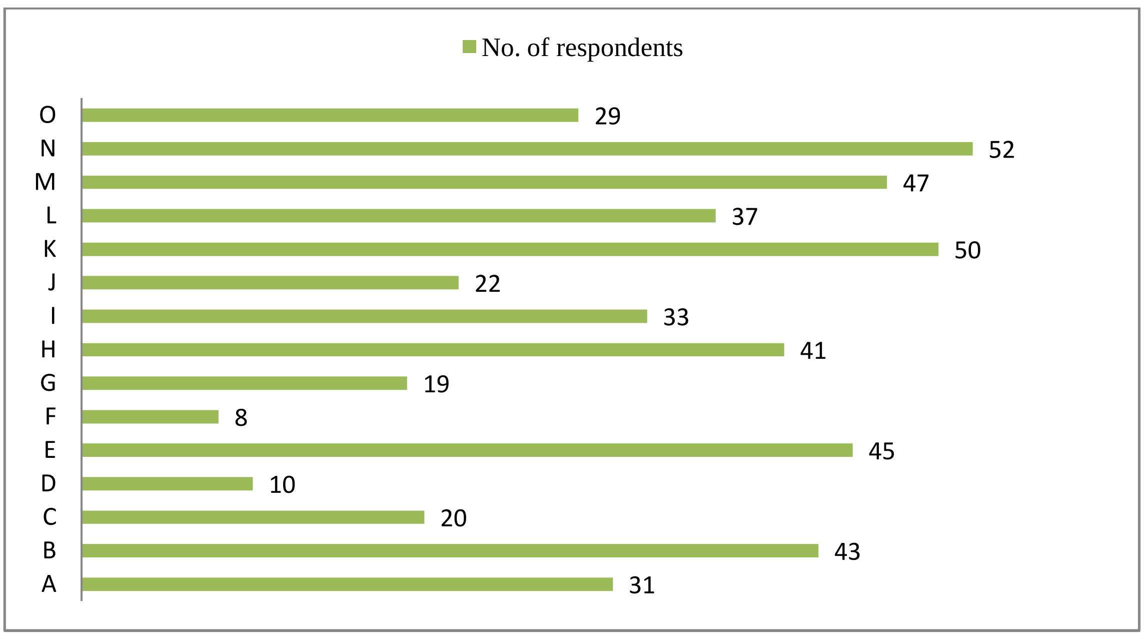
Problems	No. of respondents (%)	Rank
High price of fertilizers and insecticides	31 (59.16)	ix
Increase in cost of production	43 (82.69)	v
Seasonal change in production	20 (38.46)	xii
Attack by pest and diseases	10 (19.23)	xiv
Lack of scientific knowledge and training	45 (86.54)	iv
Lack of quality seeds	8 (15.34)	xv
Lack of cold storage	19 (36.54)	xiii
Inexperience labour	41 (78.85)	vi
Underdeveloped transportation and communication	33 (63.46)	viii
Lack of adequate market facilities	22 (42.31)	xi
Low market price	50 (96.15)	ii
Price fluctuation	37 (71.15)	vii
Lack of market information	47 (90.34)	iii
Irregular demand	52 (100)	i
Spoilage	29 (55.77)	x
Total no. of respondents	52	

Source: Field survey 2013-14

Note: Figures in parenthesis are percentages of the respondents.

One of the major constraints faced by the growers was irregular demand which keeps on fluctuating depending on the month of festivities and occasions. All the selected respondents have reported on irregular demand. About 96.15% of the total respondent has expressed on the problem of low price they receive from the sale of their produce, which ranges from Rs. 7.64 to Rs.10.14 per stem. Lack of information on marketing condition forms another major problem facing the respondents constituting 90.34% of the growers. It is also seen from the table that 86.54% of the growers have reported the problem of cultivating the flower due to lack of proper scientific knowledge and training. Lack of cold storages, attack by pest and diseases and lack of quality seeds were found to be the other problems at 36.54%, 19.23% and 15.34% respectively. Since the climate of Kohima is moderate the need for cold storage to keep cut flowers after harvest does not necessarily arise.

Figure 4.1.1: Problems faced by the selected Alstroemeria growers in Kohima district



Note: A- High price of fertilizers and insecticides; B- Increase in cost of production; C- Seasonal change in production; D- Attack by pest and diseases; E- Lack of scientific knowledge and training; F- Lack of quality seeds; G- Lack of cold storage; H- Inexperience labour; I- Underdeveloped transportation and communication; J- Lack of adequate market facilities; K- Low market price; L- Price fluctuation; M- Lack of market information; N- Irregular demand; O- Spoilage.

4.1.2 Lilium

Lilium flower comes in varied colours and is highly demanded in the market. Being a seasonal flower it can produce good quality flower for two seasons at the most, after which it has to be replanted with new bulbs. Problems confronting Lilium growers are listed in table 4.1.2 indicating that the number and percentage of respondents expressing it as well as their ranking according to their intensity on the growers. Out of the total 50 respondents, 47 growers i.e. 94% have reported the problem relating to inefficient information on marketing condition especially in respect of price and demand.

Table 4.1.2: Problems faced by Lilium growers in production and marketing in Kohima district

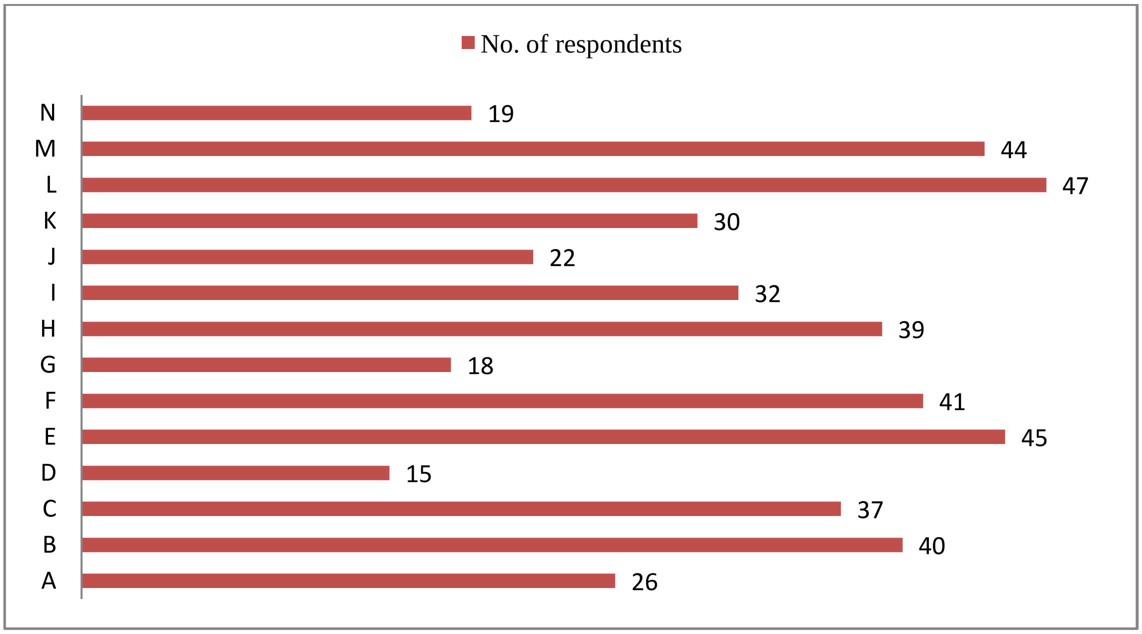
Problems	No. of respondents (%)	Rank
High price of fertilizers and insecticides	26 (52.00)	x
Increase in cost of production and low market price	40 (80.00)	v
Seasonal change in production	37 (74.00)	vii
Attack by pest and disease	15 (30.00)	xiv
Lack of scientific knowledge and training	45 (90.00)	ii
Lack of quality seeds	41 (82.00)	iv
Lack of cold storage	18 (36.00)	xiii
Inexperience labour	39 (78.00)	vi
Underdeveloped transportation and communication	32 (64.00)	viii
Lack of adequate market facilities	22 (44.00)	xi
Price fluctuation	30 (60.00)	ix
Lack of market information	47 (94.00)	i
Irregular demand	44 (88.00)	iii
Spoilage	19 (38.00)	xii
Total no. of respondents	50	

Source: Field survey 2013-14

Note: Figures in parenthesis are percentages of the respondents.

About 45 growers (90%) of the total respondent expressed their problem on lack of scientific knowledge and training required in production, pre and post harvest handling. 88% of the respondents have reported problem of irregular demand for their produce. Being a one time plant, lack of quality seed in the market has also been recorded as a major problem by 82% of the growers. On the other hand, attack by pest and diseases (30%), lack of cold storage (36%) and spoilage (38%) were found to be faced by few Lilium growers in Kohima district during the study period of 2013-14.

Figure 4.1.2: Problems faced by the selected Lilium growers in Kohima district



Note: A- High price of fertilizers and insecticides; B- Increase in cost of production and low market price; C- Seasonal change in production; D- Attack by pest and diseases; E- Lack of scientific knowledge and training; F- Lack of quality seeds; G- Lack of cold storage; H- Inexperience labour; I- Underdeveloped transportation and communication; J- Lack of adequate market facilities; K- Price fluctuation; L- Lack of market information; M- Irregular demand; N- Spoilage.

4.1.3 Rose

Rose flower which is in high demand and used in every occasion grows well with the climatic condition in Kohima. However, various steps are involved in its production which needs to be considered for better yield. Respondents associated with Rose flowers suffer from the constraints indicated in table 4.1.3. All the respondents, i.e. 37 Rose growers, have reported the high price of fertilizers and insecticides and attack by pest and diseases as the major constraint. About 94.59% have reported the problem of price fluctuation which keeps on changing with every season, and about 89.19% have problem relating to low market price of their produce as a result of which they receive low return.

Only 8 respondents have reported on problem confronting to lack of quality seeds, 16 growers reported on low yield of output and 19 growers have expressed on problem of spoilage.

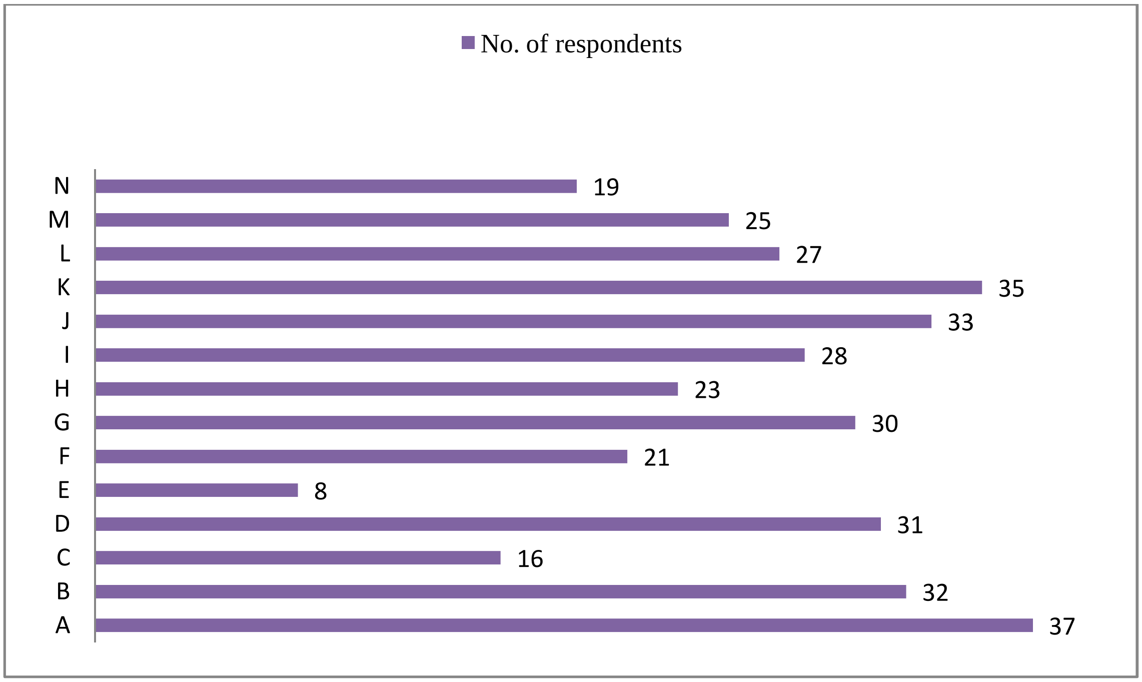
Table 4.1.3: Problems faced by Rose growers in production and marketing in Kohima district

Problems	No. of respondents (%)	Rank
High price of fertilizers and insecticides and attack by pest and diseases	37 (100)	i
Increase in cost of production	32 (86.49)	iv
Seasonal change in production	16 (43.24)	xiii
Lack of scientific knowledge and training	31 (83.78)	v
Lack of quality seeds	8 (21.62)	xiv
Lack of cold storage	21 (56.76)	xi
Inexperience labour	30 (81.08)	vi
Underdeveloped transportation and communication	23 (62.16)	x
Lack of adequate market facilities	28 (75.67)	vii
Low market price	33 (89.19)	iii
Price fluctuation	35 (94.59)	ii
Lack of market information	27 (72.97)	viii
Irregular demand	25 (67.58)	ix
Spoilage	19 (59.46)	xii
Total no. of respondents	37	

Source: Field survey 2013-14

Note: Figures in parenthesis are percentages of the respondents.

Figure 4.1.3: Problems faced by the selected Rose growers in Kohima district



Note: A- High price of fertilizers and insecticides and attack by pest and diseases ; B- Increase in cost of production and low market price; C- Seasonal change in production; D- Lack of scientific knowledge and training; E- Lack of quality seeds; F- Lack of cold storage; G- Inexperience labour; H- Underdeveloped transportation and communication; I- Lack of adequate market facilities; J- Low market price; K- Price fluctuation; L- Lack of market information; M- Irregular demand; N- Spoilage.

4.1.4 Anthurium

The major problems confronting the Anthurium growers have been that of high price of fertilizers and insecticides, increase in cost of production and irregular demand. As shown in the table 4.1.4, all the respondents have reported on high price of fertilizers and insecticides and increase cost of production. Increase use of fertilizers and other chemicals and the use of coco husk, charcoal and bricks as manure to maintain the quality of flowers have incurred higher cost of production on the growers. More than 95% of the respondents have expressed on irregular demand. Demand being unstable and irregular is usually faced with the dilemma in selling their produce. Growers have also expressed lack of cold storage (91.30%) to be a major problem. Due to hot and humid climatic condition in Dimapur, post harvest management especially in storing the harvest in cold storage is important to retain its quality and vase life.

About 89% have reported on lack of experience labour and 86.96% have expressed the problem of attack by pest and diseases, while 82.61% of the sample respondent have reported their problem on lack of scientific knowledge and training. Being grown for commercial purpose, quality of cut flowers forms the most important concern for the farmers and thus proper training and knowledge on handling the flowers from production to marketing becomes imperative. However, it is understood from the table that respondents are contended with the available seeds as more than 50% of the total respondents have no problem with the availability of seeds or seedlings. At the same time comparatively spoilage rate was also found to be one of the problems in Anthurium crop in Dimapur district during the study period.

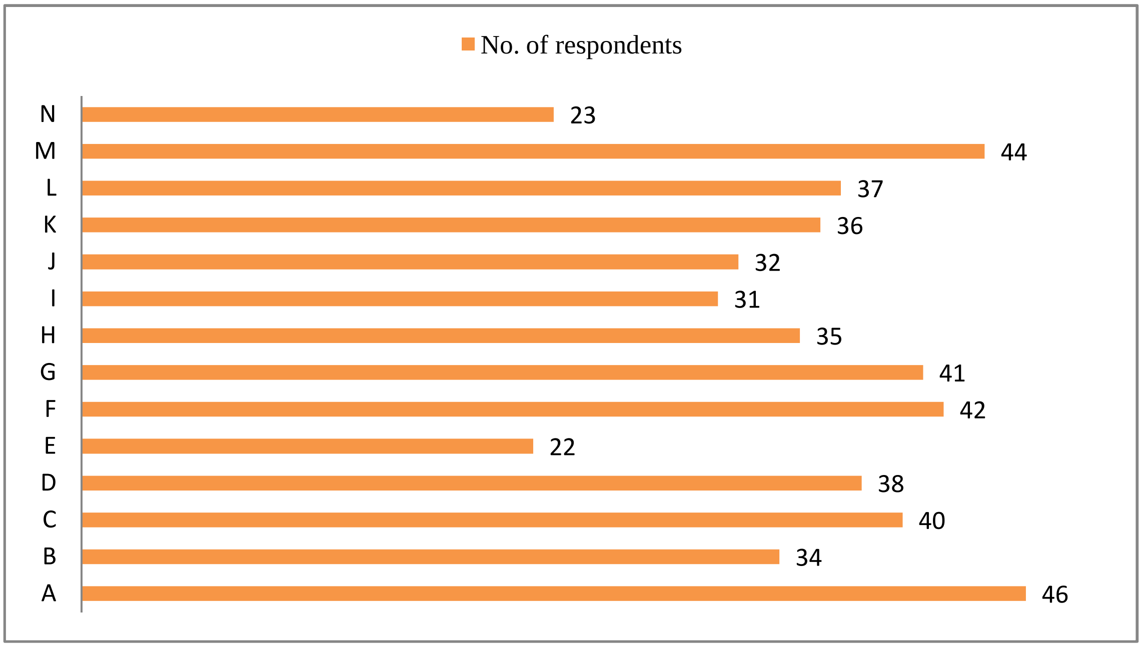
Table 4.1.4: Problems faced by Anthurium growers in production and marketing in Dimapur district

Problems	No. of respondents (%)	Rank
High price of fertilizers and insecticides and increase in cost of production	46 (100)	i
Seasonal change in production	34 (85.00)	x
Attack by pest and disease	40 (86.96)	v
Lack of scientific knowledge and training	38 (82.61)	vi
Lack of quality seeds	22 (47.83)	xiv
Lack of cold storage	42 (91.30)	iii
Inexperience labour	41 (89.13)	iv
Underdeveloped transportation and communication	35 (80.43)	ix
Lack of adequate market facilities	31 (67.39)	xii
Low market price	32 (69.56)	xi
Price fluctuation	36 (78.26)	viii
Lack of market information	37 (80.43)	vii
Irregular demand	44 (95.65)	ii
Spoilage	23 (50.00)	xiii
Total no. of respomdemts	46	

Source: Field survey 2013-14

Note: Figures in parenthesis are percentages of the respondents.

Figure 4.1.4: Problems faced by the selected Anthurium growers in Dimapur district



Note: A- High price of fertilizers and insecticides and increase in cost of production; B- Seasonal change in production; C- Attack by pest and diseases; D- Lack of scientific knowledge and training; E- Lack of quality seeds; F- Lack of cold storage; G- Inexperience labour; H- Underdeveloped transportation and communication; I- Lack of adequate market facilities; J- Low market price; K- Price fluctuation; L- Lack of market information; M- Irregular demand; N- Spoilage.

4.1.5 Gerbera

The major problem of Gerbera growers is found to be low price of their produce. The price of Gerbera cut flower ranges from Rs. 6.33 to Rs.8.46 which is lowest compared to the other four selected cut flowers. All the respondents i.e. 40 growers (table 4.1.5) have expressed their view on low market price for their produce. Irregular demand (97.50%) and lack of cold storage (95%) were some other major problems confronting Gerbera growers. only 25% of the respondents have expressed on lack of quality seeds and 30% on seasonal change in production. Since seeds are imported from other parts of the country and distributed to the growers, majority of the selected growers are satisfied with its quality of production and productivity.

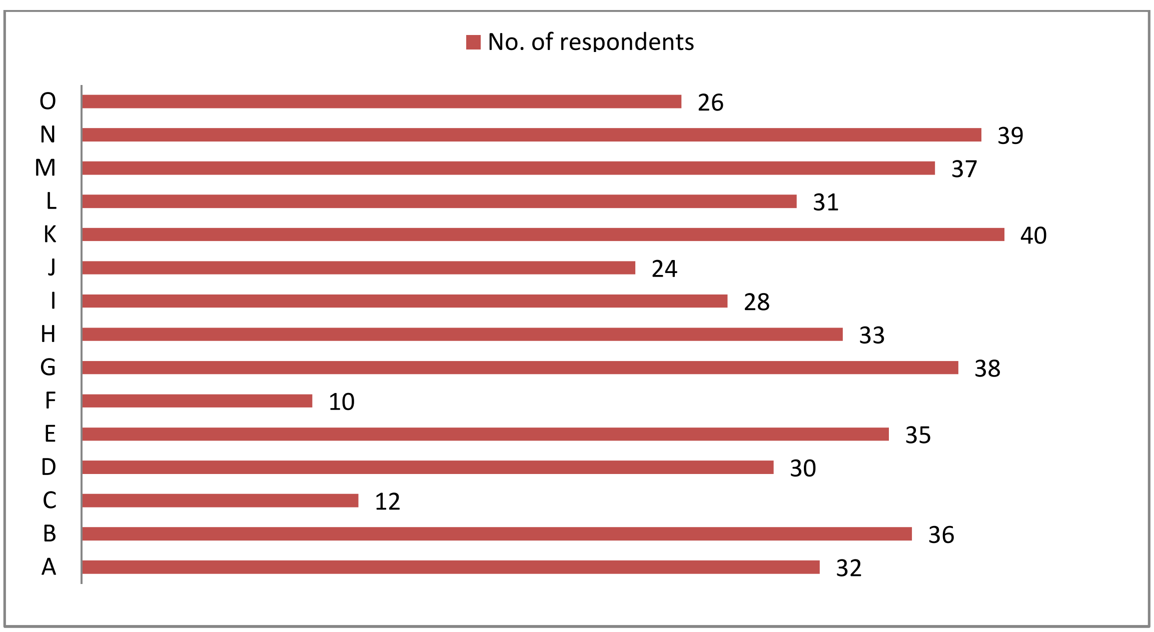
Table 4.1.5: Problems faced by Gerbera growers in production and marketing in Dimapur district

Problems	No. of respondents (%)	Rank
High price of fertilizers and insecticides	32 (80.00)	viii
Increase in cost of production	36 (90.00)	v
Seasonal change in production	12 (30.00)	xiv
Attack by pest and disease	30 (75.00)	x
Lack of scientific knowledge and training	35 (87.50)	vi
Lack of quality seeds	10 (25.00)	xv
Lack of cold storage	38 (95.00)	iii
Inexperience labour	33 (82.50)	vii
Underdeveloped transportation and communication	28 (70.00)	x i
Lack of adequate market facilities	24 (60.00)	xiii
Low market price	40 (100)	i
Price fluctuation	31 (75.00)	ix
Lack of market information	37 (92.50)	iv
Irregular demand	39 (97.50)	ii
Spoilage	26 (65.00)	xii
Total no. of respondents	40	

Source: Field survey 2013-14

Note: Figures in parenthesis are percentages of the respondents.

Figure 4.1.5: Problems faced by the selected Gerbera growers in Dimapur district



Note: A- High price of fertilizers and insecticides; B- Increase in cost of production; C- Seasonal change in production; D- Attack by pest and diseases; E- Lack of scientific knowledge and training; F- Lack of quality seeds; G- Lack of cold storage; H- Inexperience labour; I- Underdeveloped transportation and communication; J- Lack of adequate market facilities; K- Low market price; L- Price fluctuation; M- Lack of market information; N- Irregular demand; O- Spoilage.

SECTION II

4.2 SUGGESTIONS OF THE PRODUCERS

Suggestion of the growers and the retailers are indispensable because they are the real players and have first hand information of the situation prevailing in the floriculture industry. Their suggestions will be of pivotal importance for further development of floriculture industry by alleviating flower production and improve marketing efficiency.

4.2.1 Alstroemeria

Suggestion of selected growers of Alstroemeria flower is presented in table 4.2.1.

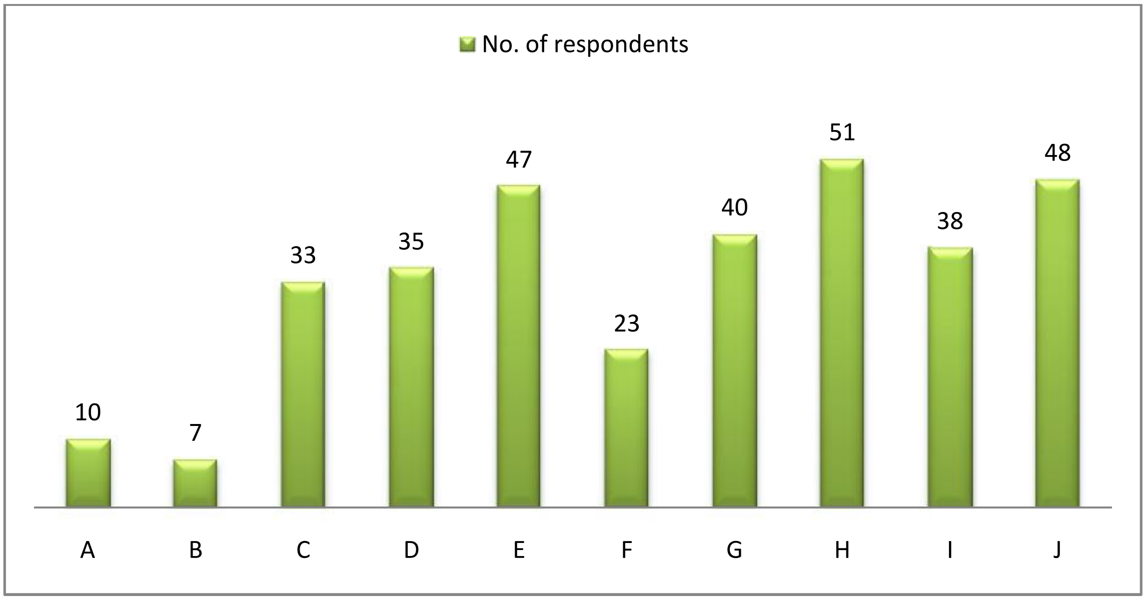
Table 4.2.1: Distribution of Alstroemeria farmer's suggestions to promote production and market efficiency in Kohima district

Suggestions	No. of Respondents (%)	Rank
Subsidies on inputs	10 (19.23)	ix
Fair and efficient distribution of poly house units	7 (13.46)	x
Quick and efficient means of transport	33 (63.46)	vii
State Government intervention by fixing reasonable prices	35 (67.31)	vi
Organizing intensive training related to pre and post harvest handling of the producers	47 (90.38)	iii
Establishment of adequate cold storage facilities	23 (44.23)	viii
Provision of adequate facilities in market	40 (76.92)	iv
Improvement of market information delivery system	51 (98.08)	i
Effective market regulation	38 (73.08)	v
Create awareness on the use of cut flowers	48 (92.31)	ii
Total no. of respondents	52	

Source: Field survey 2013-14.
Note: Figures in parenthesis are percentages of the respondents.

Improvement on market information delivery mechanism has been given the top priority by more than 98% of the respondents, followed by creating awareness on the use of cut flowers among the local people (92.31%), organizing training for better management of pre and post harvest handling (90.38%), provision of adequate facilities in the market (76.92%), etc. Only 13.46% of the respondents have expressed their view on fair and efficient distribution of poly house units. At the same time about 19.23% of the respondents have suggested on provision for more subsidies on inputs to promote floriculture.

Figure 4.2.1: Alstroemeria farmer's suggestions to promote production and market efficiency in Kohima district



Note: A- Subsidies on inputs; B- Fair and efficient distribution of poly house units; C- Quick and efficient means of transport; D- State Government intervention by fixing reasonable prices; E- Organizing intensive training related to pre and post harvest handling of the producers; F- Establishment of adequate cold storage facilities; G- Provision of adequate facilities in market; H- Improvement of market information delivery system; I- Effective market regulation; J- Create awareness on the use of cut flowers

4.2.2 Lilium

In the case of Lilium, the farmers were more concerned about improving the market information delivery system. It can be seen from table 4.2.2 that all the respondents have reported on providing the producers with better and well-organized information on marketing structure to check on demand condition and be familiar with the prevailing market price. About 92% of the producers have reported on organizing intensive training related to pre and post harvest handling of cut flowers. 82% of the total respondents have suggested on creating effective market regulation to avoid biasness and follow a standard marketing system. Fair and efficient distribution of poly house units and establishment of adequate cold storage facilities were given less priorities by the respondents.

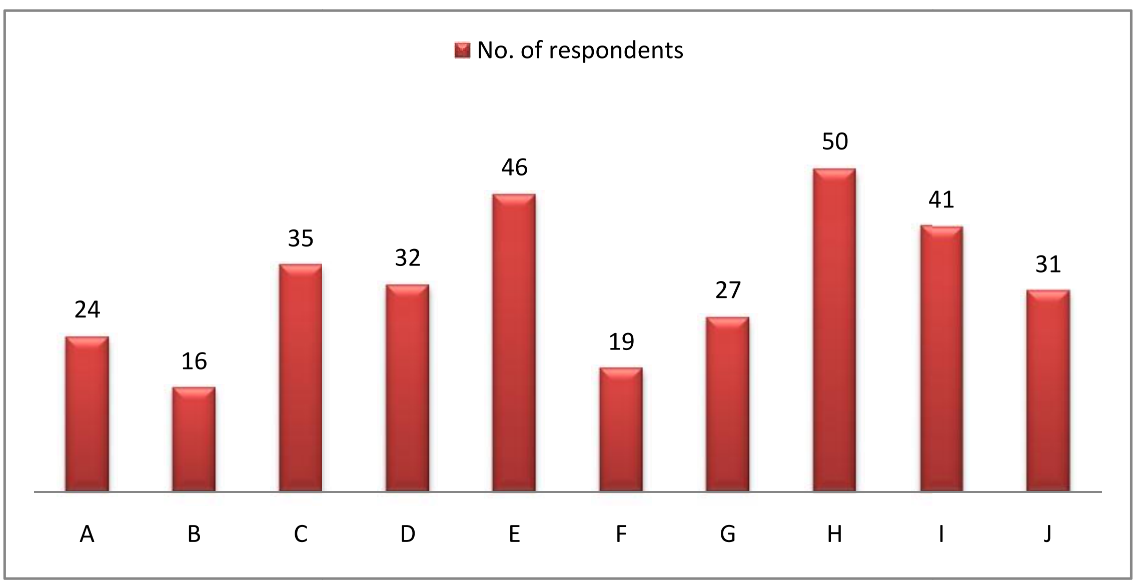
Table 4.2.2: Distribution of Lilium farmer's suggestions to promote production and market efficiency in Kohima district

Suggestions	No. of Respondents (%)	Rank
Subsidies on inputs	24(48.00)	viii
Fair and efficient distribution of poly house units	16 (32.00)	x
Quick and efficient means of transport	35 (70.00)	iv
State Government intervention by fixing reasonable prices	32 (64.00)	v
Organizing intensive training related to pre and post harvest handling of the produce	46 (92.00)	ii
Establishment of adequate cold storage facilities	19 (38.00)	ix
Provision of adequate facilities in market	27 (54.00)	vii
Improvement of market information delivery system	50 (100)	i
Effective market regulation	41 (82.00)	iii
Create awareness on the use of cut flowers	31 (62.00)	vi
Total no. of respondents	50	

Source: Field survey 2013-14

Note: Figures in parenthesis are percentages of the respondents.

Figure 4.2.2: Lilium farmer's suggestions to promote production and market efficiency in Kohima district



Note: A- Subsidies on inputs; B- Fair and efficient distribution of poly house units; C- Quick and efficient means of transport; D- State Government intervention by fixing reasonable prices; E- Organizing intensive training related to pre and post harvest handling of the producers; F- Establishment of adequate cold storage facilities; G- Provision of adequate facilities in market; H- Improvement of market information delivery system; I- Effective market regulation; J- Create awareness on the use of cut flowers.

4.2.3 Rose

Correspondingly, better and more efficient production and marketing condition of cut flower industry in Nagaland was the main priority of the Rose growers. It can be seen from table 4.2.3 that out of the total respondents, about 94.59% of them have expressed their view in organizing better method for improving market information delivery system. Creating awareness on the use of fresh cut flowers have also been given due importance by 86.49% of the total respondents, followed by organizing intensive training on pre and post harvest handling of the produce (78.38%), maintaining adequate market facilities (75.67%), quick and efficient means of transporting the flowers to the market (70.27%), setting up effective market regulation (70.27), State Government's intervention by fixing reasonable prices (67.58%) etc are some of the implications needed for promotion of floriculture sector in the State.

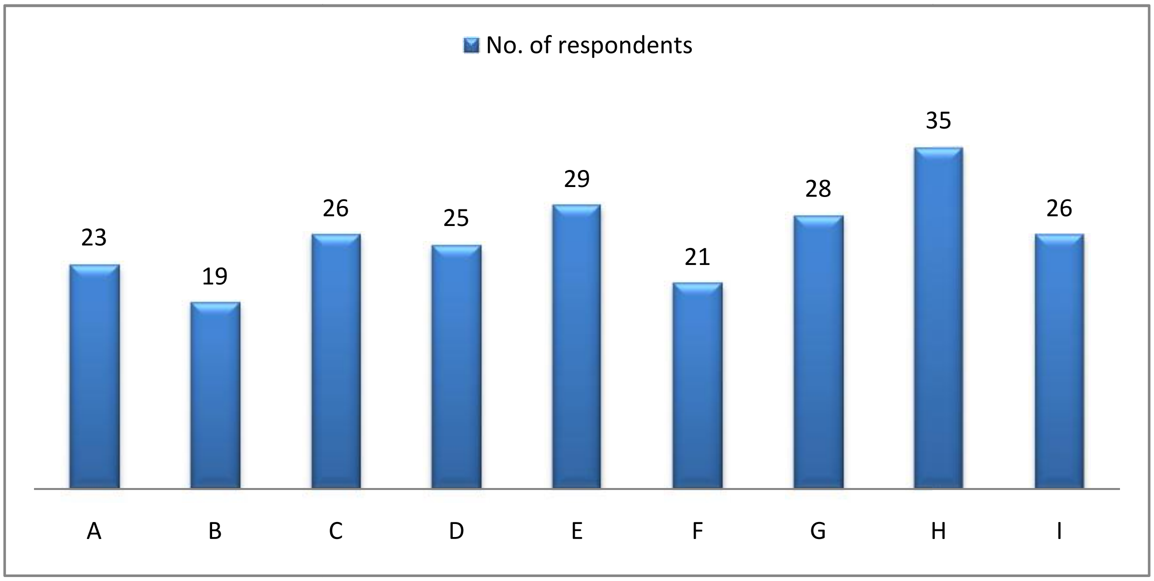
Table 4.2.3: Distribution of Rose farmer's suggestions to promote production and market efficiency in Kohima district

Suggestions	No. of Respondents (%)	Rank
Subsidies on inputs	23 (62.16)	vii
Fair and efficient distribution of poly house units	19 (59.46)	ix
Quick and efficient means of transport and effective market regulation	26 (70.27)	v
State Government intervention by fixing reasonable prices	25 (67.58)	vi
Organizing intensive training related to pre and post harvest handling of the produce	29 (78.38)	iii
Establishment of adequate cold storage facilities	21 (56.76)	viii
Provision of adequate facilities in market	28 (75.67)	iv
Improvement of market information delivery system	35 (94.59)	i
Create awareness on the use of cut flowers	32 (86.49)	ii
Total no. of respondents	37	

Source: Field survey 2013-14

Note: Figures in parenthesis are percentages of the respondents.

Figure 4.2.3: Rose farmer's suggestions to promote production and market efficiency in Kohima district



Note: A- Subsidies on inputs; B- Fair and efficient distribution of poly house units; C- Quick and efficient means of transport and effective market regulation; D- State Government intervention by fixing reasonable prices; E- Organizing intensive training related to pre and post harvest handling of the producers; F- Establishment of adequate cold storage facilities; G- Provision of adequate facilities in market; H- Improvement of market information delivery system; I- Create awareness on the use of cut flowers.

4.2.4 Anthurium

The respondents of Anthurium growers are more concerned about the need for intensive training to the growers in order to be familiarized with the scientific way of handling the produce so as to maintain the quality of cut flowers. Thus all the sample Anthurium growers have responded to it. Most of the trainings offered by the Horticulture Department have been mainly on production than training on handling the flowers for marketing. About 95.65% of the selected growers have proposed in developing the market information delivery system and 91.30% of the respondent have suggested on creating awareness on the importance of the use of cut flowers. Less attention has been given to fair and efficient distribution of poly house units (26.09%) indicating they are contended with the distribution policy of the State Government.

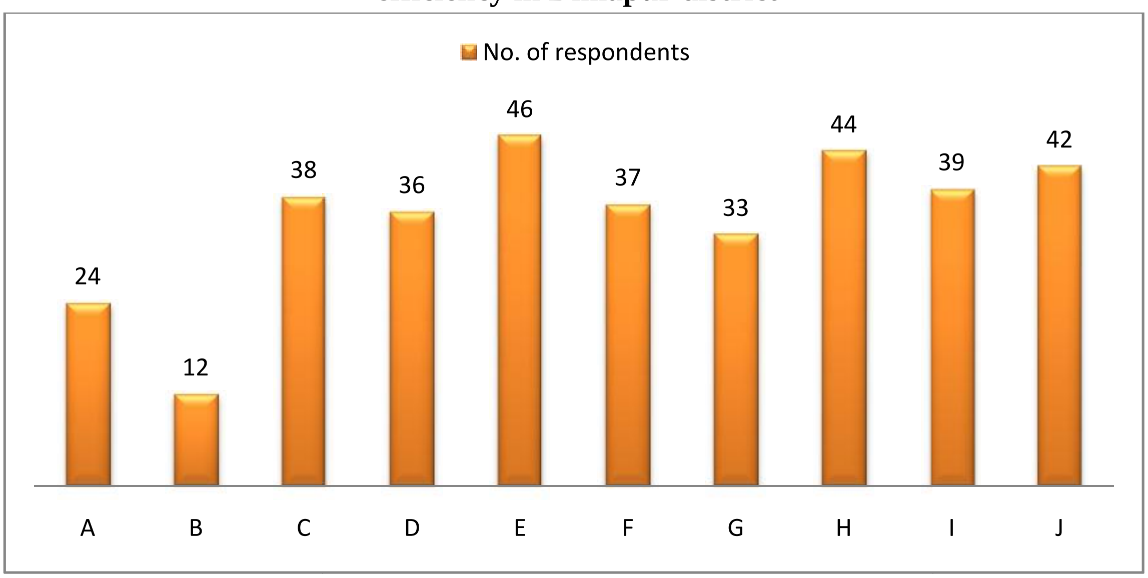
Table 4.2.4: Distribution of Anthurium farmer's suggestions to promote production and market efficiency in Dimapur district

Suggestions	No. of Respondents (%)	Rank
Subsidies on inputs	24 (52.17)	ix
Fair and efficient distribution of poly house units	12 (26.09)	x
Quick and efficient means of transport	38 (82.61)	v
State Government intervention by fixing reasonable prices	36 (97.83)	vii
Organizing intensive training related to pre and post harvest handling of the produce	46 (100)	i
Establishment of adequate cold storage facilities	37 (80.43)	vi
Provision of adequate facilities in market	33 (71.74)	viii
Improvement of market information delivery system	44 (95.65)	ii
Effective market regulation	39 (84.78)	iv
Create awareness on the use of cut flowers	42 (91.30)	iii
Total no. of respondents	46	

Source: Field survey 2013-14

Note: Figures in parenthesis are percentages of the respondents.

Figure 4.2.4: Anthurium farmer's suggestions to promote production and market efficiency in Dimapur district



Note: A- Subsidies on inputs; B- Fair and efficient distribution of poly house units; C- Quick and efficient means of transport; D- State Government intervention by fixing reasonable prices; E- Organizing intensive training related to pre and post harvest handling of the producers; F- Establishment of adequate cold storage facilities; G- Provision of adequate facilities in market; H- Improvement of market information delivery system; I- Effective market regulation; J- Create awareness on the use of cut flowers

4.2.5 Gerbera

Selected growers of Gerbera flower in Dimapur district have given their suggestions for betterment of floriculture industry in the State which is shown in table 4.2.5. Creating more awareness on the use of cut flowers among the people to increase demand is one of the major concerns for all the growers. About 97% of the respondents have expressed on Government's intervention for fixing reasonable price for their produce. Price fluctuation, low prevailing price and price differentiation prevailing in the market hampers the smooth flow of flower business. Respondents have suggested the need for State Government intervention to set a remunerative price to improve grower's condition as the price received by the Gerbera growers is lowest among the selected flowers, which ranges from Rs. 7.33 to Rs. 9.55. About 95% of the respondents have expressed the need for establishing more cold storage facilities in the study area. Only 22.50% of the total respondents have proposed on giving more subsidies on inputs in the form of planting materials.

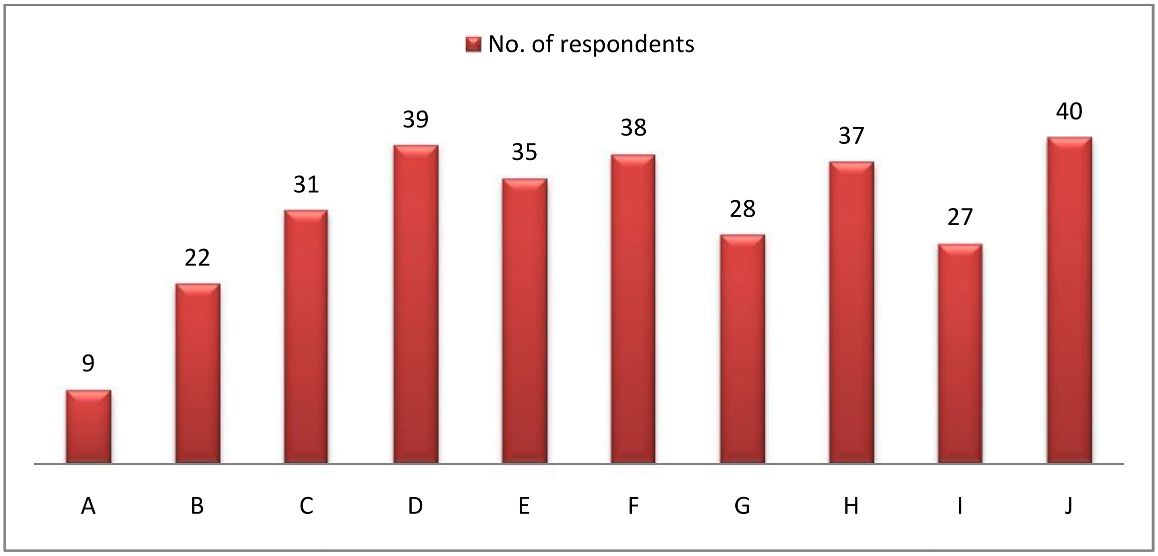
Table 4.2.5: Distribution of Gerbera farmer's suggestions to promote production and market efficiency in Dimapur district

Suggestions	No. of Respondents (%)	Rank
Subsidies on inputs	9 (22.50)	x
Fair and efficient distribution of poly house units	22 (55.00)	ix
Quick and efficient means of transport	31 (77.50)	vi
State Government intervention by fixing reasonable prices	39 (97.50)	ii
Organizing intensive training related to pre and post harvest handling of the produce	35 (87.50)	v
Establishment of adequate cold storage facilities	38 (95.00)	iii
Provision of adequate facilities in market	28 (70.00)	vii
Improvement of market information delivery system	37 (92.50)	iv
Effective market regulation	27 (67.50)	viii
Create awareness on the use of cut flowers	40 (100)	i
Total no. of respondents	40	

Source: Field survey 2013-14

Note: Figures in parenthesis are percentages of the respondents.

Figure 4.2.5: Gerbera farmer's suggestions to promote production and market efficiency in Dimapur district



Note: A- Subsidies on inputs; B- Fair and efficient distribution of poly house units; C- Quick and efficient means of transport; D- State Government intervention by fixing reasonable prices; E- Organizing intensive training related to pre and post harvest handling of the producers; F- Establishment of adequate cold storage facilities; G- Provision of adequate facilities in market; H- Improvement of market information delivery system; I- Effective market regulation; J- Create awareness on the use of cut flowers.

SECTION III

4.3.1 PROBLEMS FACED BY THE RETAILERS

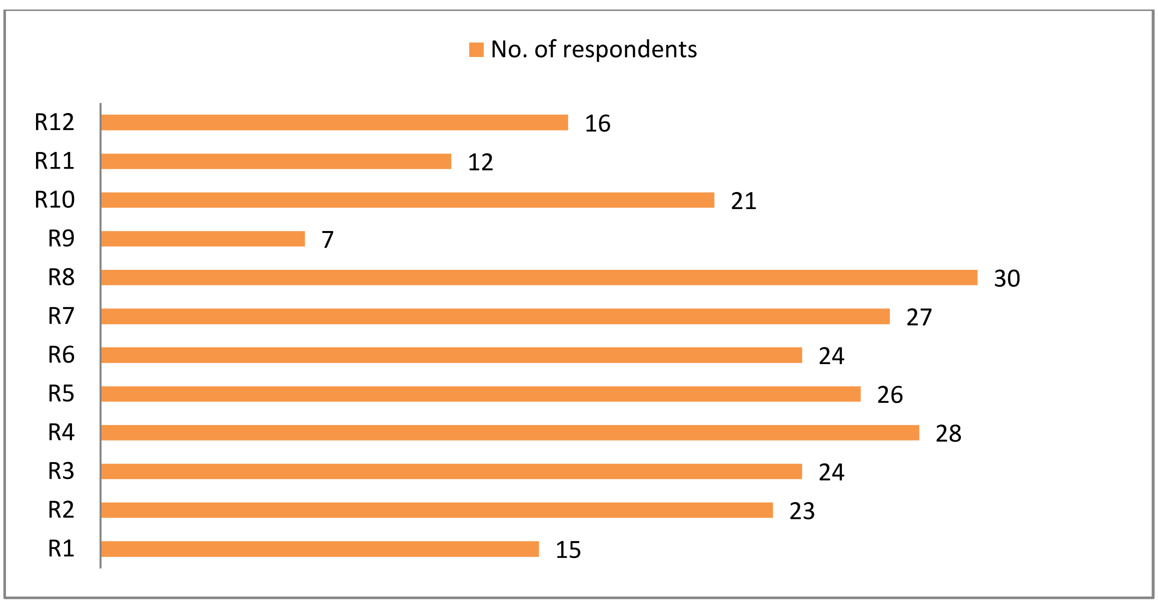
Data showing the classification of problems and constraints facing the selected retailers in the study areas has been depicted in table 4.3.1. It is evident from the table that 100% of the respondents have expressed their problem on highly perishable nature of cut flowers followed by irregular demand (93.33%). Irregular demand is usually witnessed during the summer months when fewer occasions are held which are a great hindrance for the success of floriculture industry which ultimately increases the rate of spoilage. Shortage of domestic supply during the peak (festive) season of winter is another major problem faced by the retailers (86.67%). About 80% of the sample retailers have expressed upon lack of storage facilities for the unsold cut flowers and inadequate information on marketing conditions. Only 23.33% have reported on poor quality of the domestic cut flowers and 40% have reported on poor transportation facilities in the cut flower industry in the study areas.

Table 4.3.1: Problems and constraints faced by retailers in selected districts

Problems	No. of Respondents (%)	Rank
Insufficient profit	15 (50.00)	ix
Price instability	23 (76.67)	vi
Lack of adequate market information	24 (80.00)	v
Irregular demand	28 (93.33)	ii
Shortage of supply during peak demand season	26 (86.67)	iv
Lack of storage facilities	24 (80.00)	v
Spoilage	27 (90.00)	iii
Highly perishable	30 (100)	i
Poor quality of the product	7 (23.33)	xi
Lack of management experience	21 (70.00)	vii
Poor transport facilities	12 (40.00)	x
Blockade/strikes	16 (53.33)	viii

Source: Field survey 2013-14.
Note: Figures in parenthesis are percentages of the respondents.

Figure 4.3.1: Problems and constraints faced by sample retailers in selected districts



Note: R1- Insufficient profit; R2- Price instability; R3- Lack of adequate market information; R4- Irregular demand; R5- Shortage of supply during peak demand season; R6- Lack of storage facilities; R7- Spoilage; R8- Highly perishable; R9- Poor quality of the product; R10- Lack of management experience; R11- Poor transport facilities; R12- Blockade/strikes.

4.3.2 SUGGESTIONS OF THE RETAILERS

Distribution of sample retailers' suggestions to develop market efficiency in cut flower industry in the study areas has been shown in table 4.3.2. All the 30 respondents have expressed concern on promoting advertisement to create awareness on the use of cut flowers among the people of Nagaland and thereby increase domestic consumption. About 96.67% of the respondents have expressed on organizing intensive trainings on flower arrangement, 93.33% on creation of effective market regulations, 90% on adequate cold storage facilities and 86.67% on the need for improvement in the market information delivery system. It is clearly construed in the table that about 56.67% of the sample retailers have expressed the need for exposure to international flower market to get better information and implication on floriculture industry in the State of Nagaland.

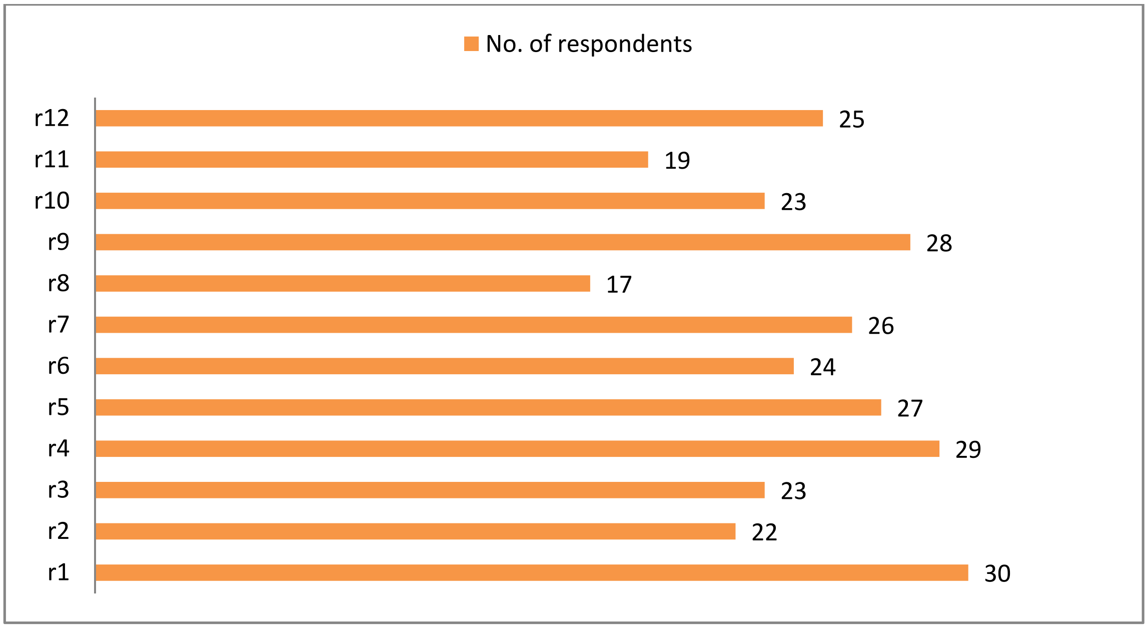
Table 4.3.2: Distribution of retailers' suggestions to promote market efficiency in cut flowers in selected districts

Suggestions	No. of Respondents (%)	Rank
Good advertising programmer	30 (100.00)	i
Quick and efficient means of transport	22 (73.33)	ix
State Government intervention by fixing reasonable prices	23 (76.67)	viii
Organizing intensive trainings on flower arrangement	29 (96.67)	ii
Establishment of adequate cold storage facilities	27 (90.00)	iv
Provision of adequate facilities in market	24 (80.00)	vii
Improvement of market information delivery system	26 (86.67)	v
Exposure to international markets	17 (56.67)	xii
Effective market regulations	28 (93.33)	iii
Market credit should be made easily available	23 (76.67)	viii
Tax less entry into the market	19 (63.33)	x
Punishment for those taking unauthorized fee	25 (83.33)	vi
Total no. of respondents	30	

Source: Field survey 2013-14.
Note: Figures in parenthesis are percentages of the respondents.

More than 63% of the respondents suggested tax less entry into the market without any barriers while 37% of the respondents are contented with the prevailing tax system in the market. At the same time 73.33% of the sample retailers suggested on developing quick and efficient means of transportation so that the consumers are provided with fresh and good quality cut flowers within a short span of time.

Figure 4.3.2: Distribution of retailers' suggestions to promote market efficiency in cut flowers in selected districts



Note: r1- Good advertising programmer; r2- Quick and efficient means of transport; r3- State Government intervention by fixing reasonable prices; r4- Organizing intensive trainings on flower arrangement ; r5- Establishment of adequate cold storage facilities; r6- Provision of adequate facilities in market; r7- Improvement of market information delivery system; r8- Exposure to international markets ; r9- Effective market regulations; r10- Market credit should be made easily available; r11- Tax less entry into the market; r12- Punishment for those taking unauthorized fee.

SECTION IV

4.4.1 PROSPECTS OF FLORICULTURE INDUSTRY IN NAGALAND

Over the years there has been shift in the production of commercial flowers from developed to developing countries. One of the main reasons has been the low cost of production in developing countries especially due to lower labour cost. The high return obtained by the growers and retailers as a result of increasing demand arising from improved standard of living and rising per capita income has created new avenues to earn a living. When countries like the Netherlands, Germany and USA are in the top position in production and marketing of flowers and developed its production techniques sophistically, India has very little share in the international market and State like

Nagaland has just started making its way into the industry. However, the State being situated in the North-Eastern part of India has various advantageous aspects from its geographical location to its land fertility, climatic condition and quick western influence. The rise in the domestic consumption of cut flowers itself has a brighter prospect for cut flower industry in Nagaland.

After deliberately considering the various advantages, future prospects of cut flower industry in the State have been illustrated in point wise below:

i. Availability of land

Availability of land is the first requirement for any developmental activity. Similarly, production process cannot take place without the availability of land. Availability of huge cultivable waste land of about 68422 hectare and fallow land of about 149342 hectare keeps the State in a favourable position of bringing more land under commercial cultivation of flower. Since the State production of commercial cut flowers is mainly cultivated under controlled climatic condition the requirement of land is lesser when compared to open field cultivation. Thus available land can be brought under cut flower production more scientifically.

ii. Favourable and varied agro-climatic conditions

Nagaland being endowed with favourable and varied climatic conditions has the advantage of producing varieties of cut flowers depending on its suitability. There are varieties of flowers that are suitable for the agro climatic condition of Nagaland. Cut flowers that require cold and moderate temperature can be cultivated in parts of Kohima, Mokokchung, and Wokha disricts whereas cut flowers requiring warm temperature can be diverted towards Dimapur district. In this way the State can produce varieties of cut flowers whole year and meet the domestic demand as well as export it to other parts of India.

iii. Abundance of good water source

The State is also blessed with good water source, be it rain water, stream or ground water. Water being the most essential requirement for plant growth is available in plenty. Copious availability of water in almost all the production site, except for a few growers during dry season, makes it advantageous for the growers by cutting down its cost on buying water for irrigation. Introduction of drip irrigation system further reduces expenditure on water.

iv. Lesser use of chemical fertilizers

Growers in the floriculture industry of Nagaland use organic manure in the form of animal waste, vermicompost, saw dust, coco husk and humus. These organic manures which are rich in organic matter are mixed with the top soil to improve the fertility of the soil, maintain soil moisture and temperature and further prevent the use of chemical fertilizers. However, pesticides are sprayed on the plants whenever required but keeping in mind its harmful effects on the environment, the growers are advised by the State Horticulture Department to minimize its use (Pusa and Giribabu, 2016)[141]. Use of fewer chemicals in the production process has greater prospects for the State floriculture industry when the world is looking towards organic production.

v. Increasing domestic demand

Modernization, changing living standard, increased per capita income and realization of the use of fresh cut flowers are the key factors to rising domestic demand for cut flowers. Demand for cut flowers especially in Kohima and Dimapur districts have sore up so much that even the State's production is not sufficient when the demand reaches its peak in winter months. Focus should be on increasing winter production and curtail its import. This increasing domestic demand has a brighter prospect for floriculture industry in Nagaland.

vi. Production of high quality flowers

Since commercialization of floriculture in 2004-05 in the State, cultivation of cut flowers under protected cultivation has enabled the growers to produce high quality

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[141] Pusa, K. and Giribabu M., (2016), "Women's Participation towards Sustainable Development through Floriculture in Nagaland", *Livelihood Promotions in North East India* (Ed.), p. 221.

flowers of international standard. Commercial cut flower cultivation has been concentrated mainly on planting materials imported from global market resulting in production of good quality flowers having longer vase life. The quality of cut flowers produced satisfies the international standard requirement in stem length, quality, colour etc. to a large extent which can be further improved and make it to the international market.

vii. Short gestation period

Unlike other agriculture crops, gestation period of flower from production to harvesting is shorter. Taking the case of selected cut flowers, crops like Lilium have a gestation period from two and a half to three months, Alstroemeria and Gerbera have a gestation period of three to four months, Rose six months and Anthurium almost a year. This short gestation period enables the growers to earn an income within a span of three to six months or longer.

viii. Support from the State and Indian Government

Floriculture industry in Nagaland has been fully backed by the State Horticulture Department as far as setting up floriculture unit is concerned, in collaboration with the Ministry of Agriculture, Government of India through the HMNEH scheme. Through this scheme many growers have been benefitted and at the same time have attracted more growers to take up floriculture business. Subsidies given to the growers in the form of poly houses and planting materials, which is the base of any floriculture industry, trainings imparted to the growers before every planting session and timely check on the poly houses boost floriculture industry. Support from the Government further encourages the growers to continue to promote this industry.

4.4.2 POLICY IMPLICATIONS

a) Though the Central Government has initiated various developmental programmes for promotion of floriculture, only few of them are applicable in Nagaland. Financial assistance, subsidies on airfreight rates and export promotion programmes are yet to be adopted in the State. State Government should introduce such developmental programmes and make it familiar to the growers so that they can access financial assistance to expand their business and export their produce to other parts of the country and abroad.

b) Investment in Human Resource Development by way of imparting training facility to farmers, especially in the field of floriculture will enable the farmers to upgrade their skills in adopting modern technologies and thus gear them up to be effective players in the world trade (Karthikeyan and Lekshmi, 2006)[142]. Training on scientific production of cut flowers should be promoted to improve human resource capabilities in order to increase production and productivity, promote off season production and improve flower quality (Mathur and Pachpande, 2013)[143]. Training enables the growers to update themselves with scientific method of cultivation and pre and post harvest handling. They will be more equipped and confident with modern method of cultivation and thus will be able to compete with technically well-stabled flower producing countries.

c) Effort should be made to open Research and Development Centre to propagate and genetically modify flowers to introduce new cultivar. Introducing new varieties of flowers at regular interval will attract more customers and increase sales (Kelly, 1961)[144]. Setting up of tissue culture lab with genetic engineering technology especially for floriculture will reduce grower's dependency on outside market for genetically modified planting materials. To produce flowers whole year round especially to increase production during winter when the demand soars up very high should be one of the main motive of floriculture industry in the State.

d) Development of floriculture industry also requires standardization and grading of cut flowers. Standardization refers to the finding of quality standards to be

[142] Karthikeyan, C. and P.S.S. Lekshmi (2006), op.cit., p. 89
[143] Mathur, R. and P. Pachpande, (2013), "Floriculture- Prospects and Opportunities", *ASM's International E-Journal of Ongoing Research and Management and IT*, p. 6.
[144] Kelly, R.A., (1961), op.cit., p. 22.

constituted for different commodities and methods of producing and handling and selling of goods and services. It is characterized by size weight, colour, texture, moisture content, length, appearance etc. while grading is used in a narrower sense which is the sorting out of the unlike goods produce into different lots according to the quality specification laid down (Acharya and Agarwal, 2011)[145].

e) Like the common flower market or the wholesale market such as the mandis of flower producing cities of Bangalore, Delhi, Mumbai, etc, attempt should be made in creating a common whole sale market. Such market will enable the growers to sell their produce efficiently without making much delay. The growers will no longer have to worry to search for market for their produce.

f) Fair and efficient distribution of subsidies to the growers based on their efficiency and capability will promote floriculture faster than concentrating on those growers who have connections with higher authority. The main aim of providing any kind of subsidies is to encourage those farmers who lack financial power but have the potentiality to carry out the activity. Biased distribution will only focus on few elite groups who already have enough. Emphasis should be based entirely on those growers who are capable and has experience in flower cultivation for smooth development of flower industry.

g) Strong support from the Government not only in providing subsidies but also in creating adequate market facilities is the need of the hour. Though production is increasing considerably compared to demand, growers are facing problem to dispose off their produce especially during summer. Proper marketing facilities has to be adopted in matters relating to transporting the produce, grading, packaging, cold storage, etc.

h) Efforts should be made to come up with news bulletin or monthly magazines on present floriculture scenario in the State as well as in India and the global market.

[145] Acharya, S.S. and Agarwal (2011), op.cit., p. 100-101.

Good advertising aid need to be adopted to depict the price structure of different cut flowers, importance of their usage, flowers resembling different meaning, availability, etc. Some of the growers have opened up a page on facebook as 'Naga flower lover's page'. Through this page they upload pictures of flowers with their price and address for sale and they make deals online. Improvement in information technology through sale of cut flowers online can also attribute towards widening the scope of floriculture industry in the State.

i) Fixing reasonable price of each cut flower will protect the growers, retailers and consumers from price differentiation. Setting up of auction centre can be advantageous for the growers to sell their produce at a reasonable rate. Appointment of marketing intelligence to check on demand, supply and price fluctuation can add up to the development of flower industry.

j) Improving the roads linking the farms with the local market is considered necessary for smooth and timely transportation of the produce. Transportation facilities to other flower consuming states in the country should be developed by setting up cold storage at various rail stations and airports and provide transport subsidy.

k) State Government should open up avenues for the growers by creating new market for their produce outside the State. Few growers have been able to export their produce to neighbouring States on their own, however, some of them have faced with problems of delay and default payment. Due to weak transportation system, flowers sometimes lose their quality when it reached the market as a result they receive very less price for their produce. At the same time ignorance about the outside market compels them to sell their produce at a lower price. Thus there is a need for the Government to step in and support the growers in finding market for their produce and make the presence of Naga flowers felt in the national and international markets.

l) One of the important contributions of floriculture industry to the economy is the creation of employment opportunities. Modern floriculture industry can provide versatile employment opportunities such as farm manager, plantation expert, supervisor, project coordinator, floral designer, landscape designer [146], retail florists, etc. This industry is a fragile industry which needs careful attention and care which cannot be done by technologies alone but need human labour. All the activities from planting, watering, harvesting, packing and transportation require human labour. Growers are given an opportunity to be self-employed and self-dependent.

m) Apart from producing flower to use it as gifts or for decoration purposes, efforts should be made to train the farmers and researcher to extract oils, medicines and colours to be used in perfumes, pharmaceuticals and dye industries. Above all, development of floriculture industry will enhance State's revenue. Many studies have reported that floriculture industry can generate more revenue than any other horticultural and agricultural crops. Promotion of this sector will add to the State's economy.

Commercialization of floriculture has boosted this industry not only in production and marketing but increased local consumption. Lately local women have also started planting potted plants and flowers for commercial purpose on a large scale. Studies have found that cut flower production uses the highest amount of chemicals to protect it from pests and diseases, increase output, improve quality and increase its vase life. Most of the floriculture industry in the world use huge amount of pesticides, herbicides, fertilizers and preservative to be marketed in the global market so when it reaches the final consumer it is fully polluted with chemicals. Nagaland being endowed with fertile soil and organic manure enables flower cultivation organically and thus reduces the use of fertilizers, pesticides and other growth augmenting chemicals. This activity in the State can be compared to a fashion industry where every grower is keen in trying out new flower or cultivar. They go even to the extent of buying new varieties of flowers costing

[146] "Floriculture", Retrieved on 18/8/16 from agriculture.indiabizclub.com/info/agriculture_types/floriculture

thousands of rupees. New cultivars are introduced every now and then which are usually imported from Bangkok and these are mainly tissue cultured plants. Of late succulents and cactus have started dominating potted plants. The State being situated in the North-eastern part of India has the advantage of geographical location in exporting the produce to neighbouring countries.

One of the main weaknesses of floriculture industry in Nagaland is the lack of infrastructure. Only few growers in the State have access to national and global floriculture industry, while the knowledge of some growers are limited to the domestic market where they retrieve market information from friends, retailers or family. Weak transportation is another hindrance for floriculture development in the State. Flowers are transported to the local market by regular car, at the same time transportation to outside market is carried out through buses or train. This is a big obstacle for marketing cut flowers which are highly perishable if not taken proper care in transportation. Thus, better transportation facilities and investment in technology will enhance the market potentiality in the state, which proves the third hypothesis of the study. Absence of tissue culture lab to propagate and genetically modify the existing cultivar act as a hindrance to compete with the other floriculture industry of the country as well as the global market.

Recapitulation

Floriculture industry in Nagaland being at its nascent stage has various shortcomings and drawbacks. Each producer is faced with different problems, some of which are high price of fertilizers and insecticides, irregular demand, low price of the produce, lack of market information, price fluctuation, lack of scientific knowledge, etc. Accordingly suggestions were also recommended by the sample growers which include improving market information, organizing intensive trainings, creating awareness among the locals on the use of fresh cut flowers, etc. Besides, problems and suggestions of the retailers were also analyzed. Despite these problems, Nagaland being endowed with favourable climate and fertile soil has brighter prospects for floriculture industry which can be further extended to the rest of the country.

CHAPTER V

SUMMARY AND CONCLUSION

5.1 Background

Flower has been use as a sign of beautification and adornment since the ancient times. During the 19th century flower was commercialized and since then various development and improvements in the form of genetic engineering technologies were introduced to produce high quality flowers. Setting up of tissue culture lab, cold storage, refrigerated vans, drip irrigation, control cultivation, standardization, packaging, auction centre etc were some of the improvements made in the floriculture industry after commercialization. In modern time floriculture is a diversified entity where the global trade on floriculture is on potted plants, cut flowers, buds, dry flowers, foliage, bedding plants and other ornamental plants. Among these dry flowers and cut flowers form the major items of the global market. Using modern technology and high quality planting materials, Indian farmers are producing good quality flowers some of which are being exported to the global market. According to Associated Chambers of Commerce and Industry of India (ASSOCHAM), India's share in the world floriculture trade in 2014 was only 0.61% which increased to 0.89% in 2015 showing an annual compounded growth rate of 30% (Kalmegh and Sing, 2016)[147]. Floriculture industry which has been regarded highly as a growth engine for earning foreign exchange has contributed not only towards income generation but also providing ample employment opportunities to other allied sectors, such as advanced transport services, pots, nursery bags, planting tools, plant protection equipments, packaging materials etc (Malhotra, 2017)[148].

Globalization, improvement in the standard of living, rising per capita income and demonstration effect have emanate floriculture sector to become an important income generating factor. Income generated by the global flower market encouraged the Indian entrepreneurs and the Indian Government to focus on promoting floriculture sector in the country. Lucrative nature of floriculture industry has been recognized as a growth engine

[147] Kalmegh, S. and N. Sing (2016), "Challenges and Obstacles in Indian Floriculture Industry", *International Journal of Innovative Research and Development,* Vol. 5(7), p. 22.
[148] Malhotra, S.K. (2017), op.cit, p. 32.

to push the economy towards development. Keeping this in mind series of development programmes were initiated not only to increase production and earn foreign exchange but also to create employment opportunities. Focus was mainly on those areas with fertile soil and favourable climatic conditions. Research and Development activities on floriculture and landscape gardening are underway in various agricultural institutions across the country and efforts have been taken by the Indian Government to promote introduction of new cultivar and improvement of the existing ones to developed floriculture industry. In this process efforts have been made to reach out to the North-Eastern and Himalayan States under the Horticulture Mission for North-East and Himalayan States (HMNEH) scheme to produce high quality cut flowers under protected environment.

Nagaland being endowed with fertile soil and varied agro climatic condition is suitable for the cultivation of varieties of flowers. With the initiation of HMNEH in 2004-05 in the State, floriculture industry has been overhauled using advanced method of cultivation bringing more areas under protected cultivation. Under this scheme flower growers were provided with poly house, planting tools and materials, drip and other irrigation materials. Rising demand for fresh cut flowers to be use in every occasion in the form of bouquets as gifts or for other decorative purposes has been increasing participation of growers to glean the profit. Though the State Horticulture Department has recorded the area under protected cultivation as well as its production and productivity, no data has been maintain on the marketed quantity, price of selected cut flowers, cost of production, market efficiency, income generation and problems faced by the flower growers and retailers. The present study brings to light the quantity that is actually marketed and retain for self consumption or other purposes. The various cost involved in producing the selected cut flowers and the margin obtain from selling the produce can be ascertain through this study. The industry being at a nascent stage is faced with various drawbacks and shortcomings, to grab a better idea of the problems facing the flower growers and retailers the study has made an indebt analysis on the problems confronting the growers and retailers and their suggestions which can be important for future development of floriculture industry in the State.

Against the backdrop the study is carried out based on the following objectives: to analyze the trends in area, production and yield of floricultural crops in selected districts and Nagaland, to study the infrastructural facilities available for floriculture development in selected districts in Nagaland, to examine the problems and prospects associated with flower producers/growers in selected districts in Nagaland, to assess the trends in domestic flower markets and marketing problems connected with flower retailers in selected districts and to suggest policy measures for producers and retailers of cut flowers in Nagaland.

Consistent with the above objectives three major hypotheses have been formulated. The first one is to development of floriculture sector will improve the income levels of growers and retailers in Nagaland. The second hypothesis is that the availability of land holdings, capital, labour and market prices are the major factors that determine the production and productivity of cut flowers than education and experience of flower growers. The third hypothesis is that the transportation and investment on technology enhances the market potentiality in the state of Nagaland.

Accordingly the study has been carried out in the Districts of Dimapur and Kohima where the production and marketing is more predominant. The study comprises of both primary and secondary data. Secondary data comprises of data collected from both published and unpublished sources of various administrative reports. Whereas primary data on the other hand has been collected using well prepared and pre-tested questionnaire. Using the prepared questionnaire, primary data were personally collected from 255 respondents from the study areas. These respondents were divided into flower growers and retailers of which 225 are flower growers and 30 are retailers. Proportionate purposive random sampling method has been applied for selection of districts, flowers and respondents. Though this study is a comparative study, the selected cut flowers are taken on the basis of concentration of flowers in two different climatic conditions i.e. Dimapur (hot and plain) and Kohima (hill and cold). The sample flower growers were further divided on the basis of the selected cut flowers that they are producing. From Dimapur, 46 are Anthurium growers and 40 are Gerbera growers whereas in Kohima 52 are Alstroemeria growers, 50 Lilium and 37 Rose growers respectively. The study employs statistical and econometric tools and techniques for analyzing data. These include multiple regression and Stochastic Frontier production models.

5.2 Key Findings:

5.2.1 Floriculture in India

Liberalization and industrial trade policy paved the way for cultivation of flowers on modern line. One of the key factors for introducing modern technology in the cultivation of flowers is to produce high quality flowers which can be exported to earn foreign exchange. Subsequently, development programmes such as the APEDA, NHB, NHM, HMNEH and later on MIDH were initiated to promote and developed those agricultural and horticultural crops that has a comparative advantage. Export promotion, market development, infrastructural improvement, financial assistance, establishment of processing units, increasing production, creation of employment opportunities, technological advancement, organic farming, post harvest management, encourage skill development etc were some of the aims of these schemes. Farmers are now equipped with better method of production using modern technology, they are now able to increase their production and productivity and hence improved quality of the produce, they have been provided with financial assistance to cater their financial needs and most importantly more employment opportunities has been created.

Development made in the floriculture industry can be attributed from the burgeoning size of area under flower cultivation over the years. Total land area under flower production in the country in 2005-06 was 128.68 thousand ha which rose to 144.01 thousand ha in 2006-07, it rose further to 253.60 thousand ha in 2011-12 and 255 thousand ha in 2013-14 showing 7.90% compounded growth rate. Accordingly production of cut flower increased manifold over the years. In 2005-06 the overall production of cut flowers in the country was 29203.42 lakhs which increased to 66671.40 lakhs in 2009-10 and in 2013-14 it was 543000 lakhs with a compounded annual growth rate of 38.37%.

5.2.2 Floriculture in Nagaland

Flower cultivation in Nagaland was simple until the technology mission (HMNEH). Since 2004-05 protected cultivation under poly houses was started using bamboo structure. Under this mission modern technology in form of poly houses, drip irrigation and planting material were imported from Israel and Holland in collaboration with flower companies such as Florence Flora, North-Bengal Floritech, Vitro Biotech, Megha Star Pvt. Ltd. and Zopar Pvt. Ltd. Through these companies planting materials and other techniques of production are supplied to the selected beneficiaries. In addition to this, trainings, seminars and demonstration on planting, pre and post harvest management, flower arrangement etc are also rendered to the growers by these companies. Apart from this, flower growers in Nagaland have also formed an association called “Naga Flower Growers Society” to promote floriculture in the state. This group of growers organizes trainings, seminars and flower arrangement cum sale and at times they also help the growers in selling their produce by acting as the mediator between the grower and the buyer.

Depending on the fund provided by the Government of India, the State Horticulture Department arranges its budget and accordingly supplies poly house and other planting materials to the growers. Area under modern method of cultivation from 2005-06 to 2013-14 shows a compounded growth rate of 14.02% and its production at 31.92% during the same year. There has been a discontinuous trend in the area under protected cultivation where it was 27600 sq.m in 2005-06 it increases considerably to 697000 sq. m in 2009-10 but in 2010-11 falls to 75000 sq.m and then increases to 90000 sq. m in 2013-14. Cut flowers that come under the preview of protected cultivation in the State are Lilium, Anthurium, Rose, Alstroemeria, Gerbera, Orchid, Carnation and Heliconia. Till the year 2010-11 dry flower cultivation was also adopted but was discontinued later on. Alstroemeria shows the highest compounded annual growth rate of 81.46% and Gerbera showing the least growth rate of 15.33%.

Floriculture industry in Nagaland has been fully commercialized since the inception of the technology mission and with this large areas were brought under modern method of cultivation under poly houses.

5.2.3 Production and Productivity

The study shows that area under Anthurium cultivation of the sample growers is higher than the other four selected cut flowers i.e. 21893.16 m^2. However due to the increasing sick units resulting to low production of 812860 stems, its productivity is lowest with 37.13 per m^2. Whereas in case of Alstroemeria with a total area of 12400 m^2 has the highest production of 899962 stems, and on the other hand, Gerbera with a total area and production of 9200 m^2 and 704600 stems respectively has the highest productivity with 76.59 per m^2.

Average production and productivity shows that in comparison with the other selected cut flowers, Gerbera in Dimapur district has the highest production as well as productivity for both the poly houses i.e. 15282.35 stems production and 70.61 per m^2 productivity for 200m^2 poly house and 30833.33 stems production and 77.08 per m^2 productivity for more than 200m^2 poly houses. Seasonal differences in production have been witnessed where production is more for Alstroemeria during summer and Gerbera has higher production in winter. In Dimapur production and productivity of Gerbera is higher than Anthurium for both the poly houses. Whereas in Kohima Alstroemeria have higher production and productivity than Lilium and Rose in both the poly houses,

Regression analysis of the three selected cut flowers in Kohima district indicates that capital cost, labour cost, productivity and average price are positive and statistically significant. In case of Alstroemeria and Lilium, capital cost, productivity and average price are positive and statistically significant at 1 per cent. On the other hand, capital expenditure, labour cost and productivity are positive and significant at 1 per cent level and education is significant but negative at 1 per cent level for Rose. Thus the overall regression analysis of three cut flowers shows that coefficient of education is negative and statistically significant at 1 per cent level, while capital cost, labour cost, productivity and average price are positive and significant at 1 per cent level. Whereas, in the case of Gerbera flower in Dimapur district, capital cost, labour cost and productivity is showing positive sign and statistically significant at 1 per cent level, while, age is negative and significant at 1 per cent level. The overall regression analysis of the two cut flowers in Dimapur district shows that capital cost, labour cost, productivity and average price is positive and age of the sample farmers is negative and statistically significant at 1 per cent level while landholding is positive and significant at 5 per cent level. This proves the second hypothesis of the study where availability of land holdings, capital, labour and market prices are the major factors determining production and productivity of cut flowers rather than education and experience of flower growers.

5.2.4 Marketed Quantity

Marketed quantity not only depends on demand from the consumer but also on availability in different seasons. The study reveals that sample farmers are able to market more quantity of cut flowers in summer than winter, except Gerbera farmers whose marketed quantity is more in winter than summer. In case of poly house measuring 200m^2 marketed quantities per month of Gerbera is higher in both the seasons with 1136.47 stems and 1302.35 stems in summer and winter respectively. However, for growers with poly house measuring more than 200m^2, marketed quantity per month of Alstroemeria is higher is summer with 2278 stems while in winter marketed quantity per month of Gerbera is higher with 2183.33 stems.

5.2.5 Marketed Price

Seasonal differences in the price of the selected cut flowers has been observed during the study period where price per stem is lower in summer when production is high and demand is low, similarly, during winter when demand reaches its peak and there is less production, it leads to higher prices. This price fluctuation in one of the major drawbacks in the floriculture industry in the State but at the same time enable the flower growers as well as retailers to take advantage of their summer losses during the winter months. In Dimapur the average price per stem of Anthurium is Rs. 15 in summer which increases to Rs. 20.94 in winter, while, the price of Gerbera starts from Rs. 7.33 in summer to Rs. 9.55 per stem in winter. Similarly in Kohima price per stem of Alstroemeria is Rs. 7.42 in summer and it increases to Rs. 10.97 in winter, while in the case of Lilium it increases from Rs. 13.85 in summer to Rs. 20.38 in winter and price per stem for Rose increases from Rs. 8.07 to Rs. 10.91 during summer and winter months.

5.2.6 Cost of Production

Cost of production for both the poly houses of the sample growers involving both input cost and labour cost indicates that highest input and labour cost for poly house measuring $200m^2$ is in the production of Rose with a total cost of Rs. 39602.04, whereas for poly house measuring more than $200m^2$ Anthurium recorded the highest production cost of Rs. 82876.68. Total cost of Alstroemeria production for poly house measuring $200m^2$ stands at Rs. 28266.28 of which input cost contributes about 49.27% and labour cost 50.73% to the total cost while for poly house measuring more than $200m^2$ total cost is Rs. 50754.90 of which input and labour cost comprises of 49.61% and 50.38% respectively. In case of Lilium, more than 55% is covered by input cost and labour cost constitute 44.06% of the total cost of Rs. 32532.58 for $200m^2$ poly house, whereas for more than $200m^2$ poly house, total cost of production is Rs. 57949.43 (input cost 52.42% and labour cost 47.58%). On the other hand, in case of Anthurium, total cost for $200m^2$ poly house is Rs. 34578.81 with input cost at 66.32% and labour cost at 33.68% of the total cost, and for poly house measuring more than $200m^2$ total cost is Rs.82876.68 of which more than 73% comprises of input cost and only about 26% labour cost. Similarly total cost of producing Gerbera is Rs. 22005.20 ($200m^2$ poly house) and Rs. 57128.11 (for more than $200m^2$ poly house).

In comparison with the selected cut flowers in the two districts cost of manure and cost of electricity for three selected cut flowers in Kohima district is less than that of the two selected cut flowers in Dimapur district. Lower cost of manure and electricity is attributed to low price of manure and less use of electricity for irrigation and other purposes in Kohima. On the other hand sample growers in Kohima district incur higher irrigation cost and cost of hiring labour than Dimapur district because none of the sample growers bought water for irrigation and labour wage is lower in Dimapur than Kohima district.

5.2.7 Labour Absorption

Floriculture industry has provided avenues for women and unemployed youth towards self employment and also in creating employment opportunities for local and non-local labourers. Floriculture activity is a step by step process wherein production starts with ploughing the land, flower bed preparation and preparing it for planting, followed by planting, watering, protecting the plant from pest and diseases, weeding, harvesting etc. Accordingly labour absorption differs for different flowers. The study reveals that for poly house measuring 200m^2, Alstroemeria has the highest labour absorption with 74.35 man-days while Gerbera have the lowest labour absorption of 69.76 man-days. In case of Lilium absorbed about 75 man-days followed by Rose (74.71 man-days) and Anthurium (71.43 man-days). On the contrary to that labour absorption under poly house measuring more than 200m^2, Gerbera growers employ the highest number of labour (105.83 man-days) followed by Rose (105.26 man-days), Anthurium (102.15 man-days), Lilium (98.26 man-days) and lowest is in Alstroemeria with only 95.31 labour man-days labour. Labour employed for watering constitutes the highest employment for all the selected flowers in both the districts, followed by ploughing the land while labour employed for controlling pests and disease constitute the least labour absorption for both the poly houses.

The study reveals that among the selected cut flowers for poly house measuring 200m^2, Anthurium absorbed the highest labour for watering with 24.80 man-days followed by Rose (23.49 man-days). More labour is absorbed in ploughing the land for all the selected cut flowers in Kohima district than in Dimapur district which can be attributed to the hilly terrain in the former resulting in employing more labour man-days for the same. Since planting of Lilium bulb is done more than once in a year, about 7.60 man-days labour is absorbed. Rose flower being usually infected by pest and disease absorbed the higher labour for controlling the same with 1.90 man-days. Whereas for poly house measuring more than 200m^2, in watering Gerbera absorbed the highest labour with 34.26 man-days. While more labour is employed for ploughing under Anthurium (19.65 man-days) reflecting larger size of area under it compared to the other selected cut flowers, similarly for controlling pest and disease more labour has been imputed in Anthurium cultivation.

Both male and female participation are equally important to carry out floriculture activities. In case of poly house measuring 200m^2 female labour is more prominent than the male counterpart for all the sample cut flowers. While for more than 200m^2 poly house, except Gerbera, in other four cut flowers (Alstroemeria, Anthurium, Lilium and Rose) male labour absorption is more prominent than the female counterparts. It can be concluded from the study that as the size of the poly house increases more preference is given to male than female labour to carry out the production activities.

5.2.8 Marketing Cost, Returns and Margin

Every economic activity involves production, cost and return which cannot be avoided. Similarly floriculture industry is concern with producing the product, gathering it for marketing which involves cost and receiving a net profit after it is being sold out in the market. The sample cut flowers in both the districts differs in quantities of production with varying marketed quantity fetching different price and subsequently offers varied return to the farmers. In Dimapur for 200m^2 poly house, Gerbera offers highest production with a productivity of 76.41% offers the farmer a net return of Rs. 90593.46 after deducting total cost of Rs. 32908.38, whereas, Anthurium with a productivity of only 38.21% offers a net return of Rs. 83728.84. On the other hand, in Kohima Alstroemeria yield higher production than Lilium and Rose with a productivity of 70.61%. The margin from Alstroemeria is Rs. 87633.04, followed by Lilium (Rs. 87159.74) and Rose (Rs. 67634.77) after deducting its total costs respectively.

Simultaneously, for poly house measuring more than 200m^2, in Dimapur district in case of Gerbera, the production (30833.33 stems) and productivity (77.08 per m^2) is higher than Anthurium with the margin of Rs. 154293.89 after deducting total cost of Rs. 57128.11. On the other hand in Kohima distirct, Alstroemeria flower yields higher production (30680 stems) and productivity (76.70 per m^2) than the other two selected cut flowers with lower cost of Rs. 50754.90 and a margin of Rs. 187063.92. An interesting observation has been made in case of Lilium flower in Kohima district i.e. though the production and productivity is lower than Rose and Alstroemeria, it attains higher margin, i.e. Rs. 193567.57, to the farmer due to its high price per stem in the market.

5.2.9 Marketing Channels, Market Cost, Market Margin and Price Spread

The study reveals that three marketing channels are operating in the floriculture sector of Nagaland in transferring the produce to the final consumers which are as follows:

Channel I: Producer - Consumer

Channel II: Producer – Retailer – Consumer

Channel III: Producer – Wholesaler – Retailer – Consumer

These marketing channels help the producer in selling their produce to the consumers. In Dimapur all the three channels are functioning in both the selected flowers of Anthurium and Gerbera. Channels III being the most prominent for Anthurium cut flower where 49.62% of the total marketed quantity is marketed through this channel, whereas, in case of Gerbera flower, majority of the produce is marketed through channel II (44.55%). On the contrary to that in Kohima district, only channel I and channel II is prevelent in Alstroemeria, whereas, in case of Lilium and Rose all the three channels are functioning for marketing the flowers. For Alstroemeria channel II is more prominent than channel I where more than 78% is marketed through channel II. Channel II is widely used in transferring their produce to the consumer by Lilium (78.32%) and Rose (60.47%) growers as well.

Marketing through channel I indicate that the producer’s share in consumer’s rupee in case of Anthurium in Dimapur district is 98.08%, while in case of Gerbera it is 97.53%. Marketing cost is determined by the quantity sold and the distance of the market from production centre and thus in channel I it is fully born by the producer. Whereas, in channel II when the retailer enters the market to feed the produce as an intermediary between the producer and ultimate consumer, producer’s share is consumer’s rupee is reduced resulting in less market efficiency. Producer’s share in consumer’s rupee for Anthurium is 67.98% while retailer’s share in consumer’s rupee is 21.76% and price spread is Rs. 6.76 in which producer incurs 39.24% and retailer 60.76% of the total marketing cost. Similarly, in case of Gerbera, producer’s share in consumer’s rupee is about 61.26% and retailer’s share is 26.86% having a price spread of Rs. 4.35 which is lower than Anthurium. Share of producer and retailer's marketing cost for Gerbera flower in channel II is 37.55% and 62.45% respectively.

On the other hand in Kohima district, producer's share in consumer's rupee in channel I is highest in case of Lilium with 99.62% followed by Alstroemeria (98.19%) and Rose (94.73%). Whereas, in channel II, the percentage share of retailer's marketing cost to the total cost is more than that of producer marketing cost for all the three cut flowers. In channel II, Rose has the highest producer's share in consumer's rupee with 66.25% however retailer's share in consumer's rupee is only 21.69% and price spread is only Rs. 3.45. Similarly, in case of Lilium it is 66.18% and price spread is Rs. 7.31. Whereas for Alstroemeria, producer's share in consumer's rupee is 63.30% and price spread is Rs. 3.99. It is quite contrary to that in case of channel III, Lilium and Rose growers market their produce through channel III which is in small quantity, with wholesaler's share in consumer's rupee being the lowest with only 12.02% for Lilium and 11.45% for Rose. Marketing cost of Lilium producer is only 10.05%, while wholesaler's share is 50.21% and retailer's is 39.73% in the total marketing cost. In case of Rose marketing cost of producer, wholesaler and retailer is 18.40%, 36.61% and 44.99% respectively. Price spread of Lilium is Rs. 10.07 and Rose is Rs. 4.50 respectively.

5.2.10 Marketed Quantity, Marketing Cost and Margin of Retailers

Retailers have an important role to play in a market which is unorganized and where there is lack of direct link between the producer and consumer. Retailer does not deal in a particular flower but varieties of flowers to meet varied and changing demand of the consumers. Marketing condition of the five selected cut flowers from the retailer point of view in the study areas has been analyzed. The study reveals that among the selected cut flowers highest marketed quantity is that of Alstroemeria with 33915.42 stems per year while the least quantity sold is Anthurium flower with 8000.56 stems per year. Similarly, marketed quantity per year of Gerbera is 17677.82 stems, Lilium 20258.79 stems and Rose 27680.01 stems. Average consumer price received by the retailer is highest in the case of Lilium with Rs. 24.43 per stem and the least is from the sale of Alstroemeria at the rate of Rs. 12.21 per stem, whereas that of Anthurium is Rs. 24.15, Gerbera Rs. 12.69 and Rose Rs. 13.13.

Marketing cost of the selected cut flowers is determine by the cost of labour, transportation cost, electricity bill, shop rent, packing charges, market fee, spoilage rate, quantity marketed, type of flower and its variety etc. The study reveals that Lilium generates the highest marketing cost of Rs. 18750.68 and Anthurium the lowest marketing cost of Rs. 12038.39. Lilium generates the highest margin to the retailers with Rs. 123466.03 per annum and the least is from Anthurium with Rs. 42045.39. At the same time the net return from Alstroemeria, Rose and Gerbera is Rs. 116855.98, Rs. 79651.26 and Rs. 60257.79 respectively.

5.2.11 Problems Faced by the Farmers

Nagaland flower industry is marked by a series of drawbacks and shortcomings which can be rightly attributed to its nascent stage. Farmers in the State are faced with various problems in carrying out production and marketing activities. In Dimapur Anthurium growers is mainly face with the problem of increasing cost of production as well as high price of fertilizers and insecticides while Gerbera growers is mainly faced with low market price and irregular domestic demand. Whereas in Kohima major problem confronting Alstroemeria growers is irregular demand, Lilium growers are mainly faced with lack of market information and Rose growers have to deal with constant attack by pest and diseases and the increasing price of fertilizers, insecticides and other chemicals required for the growth process.

5.2.12 Suggestions of the Farmers

It is imperative to examine the suggestions of the farmers for improvements and further development of floriculture industry. Anthurium growers have mainly reported to organizing intensive training to the growers on pre and post harvest handling as their main suggestions. Gerbera growers responded more on creating awareness on the use of cut flowers so as to increase domestic demand. Similarly, the growers in Kohima district gave more emphasize on improving the market information delivery system, create awareness on the use of fresh cut flowers and organizing intensive training on pre and post harvest handling to the producers.

5.2.13 Constraints and Suggestions of the Retailers

Major problem confronting the retailers in the study areas is the highly perishablility nature of cut flowers and irregular consumer demand. Retailers are at ease with poor quality of cut flowers available in the market and poor transportation facilities as only 23.33% and 40% respectively of the sample retailers have reported on it.

All the sample retailers have responded on coming up with good advertising aid to create awareness on the use of fresh cut flowers and the benefits of using them to express one's emotion. Organizing trainings on flower arrangement have also been considered important by most of the retailers as it is an important measure to capture the attention of consumers.

5.3 Concluding Remarks

It is evident from the above discussions that cut flower industry has gain momentum with the introduction of modern method of cultivation. Developmental programmes to promote cut flower industry were also extended to North Eastern States of the country. Accordingly Nagaland was also concentrated for protected method of cut flower cultivation using poly and green houses both low-cost and high-cost for commercial purpose. This has open up new avenues for women and unemployed youths to earn an alternative source of living. Flower industry in Nagaland is mainly occupied by women because of the greater participation of men in service sector and other allied activities and also because growing flower is regarded as a feminine activity. However local male growers have also started trying out their hands in this industry recently. Increase participation in floriculture industry has been witnessed in the State resulting to increase area under its cultivation, increase production and productivity and employment generation. Due to lack of storage facilities, total quantity that is produce is not sold in the market, but a part of it is consumed, given as gifts and some of it is spoiled. Cut flowers being highly perishable in nature results in spoilage if proper post harvest facility is not adopted. The study observed the existence of price fluctuations in the market in different seasons where cut flower prices are low in summer and higher in winter. Marketing channel II has been considered the most prominent by all the four cut flowers except Anthurium where channel III is mainly adopted. For the retailers the highest net return has been from the selling Lilium flowers followed by Alstroemeria.

5.4 Policy Implications

Being a new industry, flower produced in Nagaland is mainly confined to domestic market where the demand is continuously increasing. However this industry is faced with many challenges such as unregulated price, lack of post-harvest facilities, absence of refrigerated van, lack of market information, lack of grading system, etc. Due to its increase use in every occasion further development of this sector has brighter prospects to generate more employment opportunities, improve socio economic conditions of the growers and at the same time improve the economy of Nagaland.

The analysis of the study calls for an effective policy implications with proper set guidelines. There is a need to introduce proper cold storage facilities to the growers in order to maintain the quality of flowers before marketing, price of flowers should be regulated by fixing reasonable price of each cut flower to protect the growers, retailers and consumers from price differentiation, financial assistance, subsidies on airfreight rates and export promotion programmes needs to be introduce to promote export and creating a page on the local dailies or magazines concerning the flower industry will provide a clear picture of Nagaland's flower industry. Investment in Human Resource Development by way of imparting training facility to farmers with modern technology, introduction of Research and Development Centre to propagate and genetically modify flowers to introduce new cultivar and strong support from the Government not only in providing subsidies but also in creating adequate market facilities will enhance the flower industry in the State in general and districts in particular.

5.5 Scope for Future Research

The present study has made reasonable contribution to flower industry of Nagaland with respect to cut flower production and marketing. However, there is still a vast scope for further research in continuation of the present study. This study was limited to two districts i.e. Kohima and Dimapur, for cut flowers production under protected condition. Efforts may be made to carry out extensive research on open field cut flower cultivation, potted plants, dry flowers, green plants etc. To broaden our knowledge on floriculture scenario of the State an attempt may be made to carry out research on the remaining districts of the State. The present study has made an attempt to analyze the problems and suggestions of both the growers and retailers but the perspectives of the consumers remain unattended, studies may be made on this regard. Impact of commercializing floriculture on the producers, retailers and consumers in the State may also be studied. Research can also be carried out on propagating and modifying the existing commercial flowers so as to reduce dependency on outside market for planting materials.

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ANNEXURE I

Nagaland University
Department of Economics

"FLORICULTURE IN NAGALAND: A COMPARATIVE STUDY OF DIMAPUR AND KOHIMA DISTRICTS"

Name of the research investigator: **Khriemenuo Pusa** Date of Interview:

Name of the supervisor: **Dr. Giri Babu. M** Place:

Name of the farmer:

I. HOUSEHOLD INFORMATION

Sl. No.	Name of the Head and Dependents	Male/ Female	Relationship	Age	Educational Qualification	Designation	Occupation		Income from (Rs.)		Total Income	Remarks
							Main	Subsidiary	Main	Subsidiary		

II. LAND PARTICULARS (in acres)

Land holding (No. of pieces)	Operational holding	Irrigated land	Leased in land	Leased out land	Area under floriculture	Area under green house flower cultivation	Area under open area flower cultivation	Area unused	Remarks

III. FLOWER PRODUCTION AND PRICE DISTRIBUTION

Flowers	Area under Flower	Source of irrigation	Total Production	Productivity	Marketed quantity		Price per stem/piece		Total Returns after deducting cost	Remarks
					Season	Off season	Season	Off season		
Alstromeria										
Anthurium										
Gerbera										
Lilium										
Rose										
Others (specify)										

IV. COST OF FLOWER PRODUCTION (per 200m^2 or more than 200m^2)

Sl. No.	Particulars	Alstroemeria	Anthurium	Gerbera	Lilium	Rose	Others
1	Seed (per year)						
2	Manure (per year)						
3	Fertilizers (per year)						
4	Pesticides (per year)						
5	Irrigation (per month)						
6	Labour charge (per month)						
7	Transportation (per month)						
8	Green House (per 1unit)						
9	Electricity (per month)						
10	Packing (per month)						
11	Others (specify)						

V. Labour Absorption

a. Hired labour

Sl. No.	Labour activities	Human labour utilization									
		Hired Male					Hired Female				
		No. of workers	Work Hrs. per day	Work days per Month	Work days per season	Wages per day	No. of workers	Work Hrs. per day	Work days per Month	Work days per season	Wages per day
1	Ploughing										
2	Preparation of flower bed										
3	Manuring and fertilizer										
4	Planting										
5	Pest and disease control										
6	Watering										
7	Weeding and trimming										
8	Harvesting										
9	Transporting, loading and unloading										
10.	Total										

b. Family labour

Sl. No.	Labour activities	Human labour utilization							
		Family Male				Family Female			
		No. of workers	Work Hrs. per day	Work days per Month	Work days per season	No. of workers	Work Hrs. per day	Work days per Month	Work days per season
1	Ploughing								
2	Preparation of flower bed								
3	Manuring and fertilizer								
4	Planting								
5	Pest and disease control								
6	Watering								
7	Weeding and trimming								
8	Harvesting								
9	Transporting, loading and unloading								
10.	Total								

General Information:

1. Which type of flowers do you grow?

   (a) Cut flowers ☐ (b) Potted plant ☐

   (c) Dry flowers ☐ (d) Foliage ☐

2. How many varieties of flowers do you grow?

   ……………………………………………………………………………………

3. Which are those flowers?

   ……………………………………………………………………………………

   ……………………………………………………………………………………

4. Where do you plant your flowers?

   (a) Open space ☐ (b) Green house ☐ (c) Both a and b ☐

5. If under green house, what type of green house is being used?

   (a) Polyethylene plastic ☐ (b) Fiber glass ☐ (c) Glass House ☐

   (d) Others ……………………………………………………………………

6. How many green houses do you have at present? …………………………………

7. What is the size of each green house?

   ……………………………………………………………………………………

8. What kind of fertilizers do you use?

   (a) Organic ☐ (b) Inorganic ☐

9. No. of labours employed?

   (a) 1-2 ☐ (b) 2-3 ☐ (c) 3-4 ☐ (d)More than 4 ☐

   (e) None ☐

10. Are the members of your family engaged in the production of flowers?

(a) Yes ☐ (b) No ☐

If yes, how many of them? ……………………………………………………

11. Do you pay tax?

(a) Yes ☐ (b) No ☐

If yes, to whom do you pay the tax?

(a) Central Government ☐ (b) State Government ☐

(c) Underground Factions ☐ (d) Associations ☐

12. How do you pay it?

(a) Weekly ☐ (b) Monthly ☐

(b) Half yearly ☐ (d) Yearly ☐

13. How much do you pay? ………………………………….

Production and Demand Conditions (You can tick more than one)

1. During which month production is highest?

(a) Jan- Feb ☐ (b) March-April ☐ (c) May-June ☐

(d) July-Aug ☐ (e) Sept-Oct ☐ (f) Nov-Dec ☐

2. During which month production is lowest?

(a) Jan- Feb ☐ (b) March-April ☐ (c) May-June ☐

(d) July-Aug ☐ (e) Sept-Oct ☐ (f) Nov-Dec ☐

3. During which month do you receive the highest demand for flower?

(a) Jan- Feb ☐ (b) March-April ☐ (c) May-June ☐

(d) July-Aug ☐ (e) Sept-Oct ☐ (f) Nov-Dec ☐

4. During which month do you receive the lowest demand for flower?

(a) Jan- Feb ☐ (b) March-April ☐ (c) May-June ☐

(d) July-Aug ☐ (e) Sept-Oct ☐ (f) Nov-Dec ☐

5. Which flower is highly demanded compared to other flowers?

………………………...

6. Which flower is least demanded?

……………………………………………………………………………………...

7. Price received for selling flower to different people (per stem)

(a) Retailers ………..………………………………………………………

(b) Agents ………..…………………………………………………………

(c) Consumers ……..………………………………………………………..

(d) Others (specify) ……………………………………………………….

8. Why you've chosen Flower Cultivation as a source of income (motivating factors)?

(a)

(b)

(c)

(d)

(e)

Supply Condition

1. Where do you sell the flowers?

(a) Domestic market ☐ (b) National market ☐ (c) Both a and b ☐

2. Do you export your produce?

(a) Yes ☐ (b) No ☐

If yes, where do you export it?

……………………………………………………………

3. Which means of transportation do you use in exporting your produce?

(a) Roadways ☐ (b) Railways ☐ (c) Airways ☐ (d) Waterways ☐

4. From which market do you earn more profit?

(a) Domestic market ☐ (b) National market ☐ (c) Both a and b ☐

5. To whom do you sell the flowers?

(a) Retailers ☐ (c) Middlemen (commission agents) ☐

(b) Consumers ☐ (d) Others (specify) …………………………...

Infrastructure (You can tick more than one)

1. Please tick the infrastructure facilities that are available to you in producing flowers?

(a) Store house ☐ (b) Generator room ☐

(c) Refrigerated van ☐ (d) Labour quarter ☐

(e) Packing and grading house ☐ (f) Cold storage ☐

(g) Green house ☐

(h) Others (specify)

………………………………………………………………………

2. Which type of vehicle do you use in transporting flowers to the domestic market?

(a) Refrigerated van ☐ (b) Truck ☐

(c) Own van ☐ (d) Hired van ☐

3. What are the various planting materials you use in producing flowers?

(a) (b)

(c) (d)

(e) (f)

4. Do you use any advertising aid to increase sale?

(a) Yes ☐ (b) No ☐

If yes, which of the following advertising aid do you use?

(a) Newspaper ☐ (b) Magazine ☐

(c) TV or radio ad ☐ (d) Banners and pamphlet ☐

5. Do you have access to market information?

(a) Yes ☐ (b) No ☐

If yes, from where do you get the information?

(a) Newspaper ☐ (b) Magazine ☐ (c) TV or radio ☐

(d) Monthly bulletin ☐ (e) Association of which you are a member ☐

6. Post harvest losses during (% out of total quantity)

(a) Harvesting …...

(b) Handling and packaging …………………………………………………….

(c) Storage and transportation ……………………………………………………..

(d) Marketing ……………………………………………………………………...

(e) Total (for each flower type) ……………………………………………………

Training and Government Assistance

1. Have you participated in any kind of training or workshop for flower production?

(a) Yes ☐ (b) No ☐

If yes, how many training or workshop have you participated till now?

(a) 1 ☐ (b) 2 ☐ (c) 3 ☐ (d) 4 ☐ (e) more than 5 ☐

2. Who organize the trainings and workshops?

(a) Central Government ☐ (b) State Government ☐

(c) State Horticulture Department ☐ (d) Private group or individuals ☐

3. What kind of methods or tools is used for imparting knowledge and training on cultivating flowers?

(a) Demonstration ☐ (b) Practicing through coaching ☐

(c) Audio-visual aid ☐ (d) Others ……………………………

4. What are the various methods you use to improve the quality of flowers?

(a) (b)

(c) (d)

(e) (f)

5. What are the safety measures that you use to avoid wastage of flowers?

(a) (b)

(c) (d)

(e) (f)

6. Are you member of any of the flower growing association?

(a) Yes ☐ (b) No ☐

If yes, which association?

…………………………………………………………………

7. How does the association help you in promoting production of flowers?

(a) Exposure to foreign land ☐

(b) Providing subsidies ☐

(c) Imparting training on producing higher quality flowers ☐

(d) Providing domestic and international market information ☐

(e) Others (specify) ……………………………………………………………….

8. Do you get any subsidies from the Government?

(a) Yes ☐ (b) No ☐

If yes, in which of the following ways are the subsidies provided? (You can tick more than one)

(a) Flower seeds ☐ (b) Fertilizers ☐ (c) Green house ☐

(d) Planting materials ☐ (e) Financial assistance at low rate of interest. ☐

9. How are the subsidies allotted?

(a) Monthly ☐ (b) Half yearly ☐

(c) Yearly ☐ (d) After every two years ☐

10. What are the criteria to avail the subsidies?

……………………………………………………………………………………………

……………………………………………………………………………………………

11. Road and transportation condition from production to selling point

(a) Very good ☐ (b) Good ☐ (c) Average ☐

(d) Poor ☐ (e) Very poor ☐

12. What are the various development programmes initiated by the State Government or State Horticulture Department to developed floriculture in Nagaland?

(a)

(b)

(c)

(d)

Problems

Which of the following problem or problems do you face in producing flowers?

a. High price of fertilizers and insecticides ☐

b. Increase in cost of production ☐

c. Seasonal change in production ☐

d. Attack by pest and disease ☐

e. Lack of scientific knowledge and training ☐

f. Lack of quality seeds ☐

g. Lack of cold storage ☐

h. Inexperience labour ☐

i. Underdeveloped transportation and communication ☐

j. Lack of adequate market facilities ☐

k. Low market price ☐

l. Lack of market information ☐

m. Price fluctuation ☐

n. Irregular demand ☐

o. Spoilage ☐

p. Any other (specify)

…………………………………………………………………………..................

……………………………………………………………………………………

Suggestions of farmer for increasing the production and marketing efficiency:

a. Subsidies on inputs ☐

b. Fair and efficient distribution of poly house units ☐

c. Quick and efficient means of transport ☐

d. State Government intervention by fixing reasonable prices ☐

e. Organizing intensive training related to post harvest handling of the producers ☐

f. Establishment of adequate cold storage facilities ☐

g. Provision of adequate facilities in market ☐

h. Improvement of market information delivery system ☐

i. Effective market regulation ☐

j. Create awareness on the use of cut flowers ☐

k. Any others (specify)
………………………………………………………………………………………

………………………………………………………………………………………

Suggestions, if any:

………………………………………………………………………………………………..

…………………………………………………………………………………………………

…………………………………………………………………………………………………

ANNEXURE II

Nagaland University
Department of Economics

"FLORICULTURE IN NAGALAND: A COMPARATIVE STUDY OF DIMAPUR AND KOHIMA DISTRICTS"

Name of the research investigator: **Khriemenuo** Date of Interview:

Name of the supervisor: **Dr. Giri Babu. M** Place:

Name of the retailer:

I. HOUSEHOLD INFORMATION

Sl. No.	Name of the Head and Dependents	Male/ Female	Relation ship	Age	Educat ional Qualifi cation	Designati on	Occupation		Income from (Rs)		Total Income	Remarks
							Main	Subsidiary	Main	Subsidiary		

II. MARKETING COST (Input) (specify monthly/weekly/daily)

Particulars	Quantity Units	Price	Value	Remarks
Labour charge				
Transportation				
Electricity				
Shop rent				
Packing				
Market fee				
Spoilage				
Others (specify)				
Total marketing cost				

III. MARKET MARGIN (Output)

Flowers	Producer/Wholesale price per stem		Retailer price per stem		Consumer price per stem		Variation of producer price to consumer	Remarks
	On season	Off season	On season	Off season	On season	Off season		
Alstromeria								
Anthurium								
Gerbera								
Lilium								
Rose								
Others (specify)								

IV. OUTPUT SELLING

Flowers	Weekly sales		Price per stem		Total sales per month	Total cost per month	% of spoilage/ wastage		Revenue (C+W-S)	Remarks
	On season	Off season	On season	Off season			On season	Off season		
Alstromeria										
Anthurium										
Gerbera										
Lilium										
Rose										
Others (specify)										

General Information:

1. No. of labours employed?

   (a) 1-2 ☐ (b) 2-3 ☐ (c) 3-4 ☐ (c) 4-5 ☐ (d) none ☐

2. Are the members of your family engaged in your flower business?

   (a) Yes ☐ (b) No ☐

   If yes, how many of them?

   (a) 1-2 ☐ (b) 2-3 ☐ (c) 3-4 ☐ (d) 4-5 ☐

3. Do you pay tax?

   (a) Yes ☐ (b) No ☐

   If yes, to whom do you pay the tax?

   (a) Central Government ☐ (b) State Government ☐

   (c) Underground Factions ☐ (d) Associations ☐

   (e) Others (specify) ……………………………………………………………….

4. How do you pay it?

   (a) Weekly ☐ (b) Monthly ☐

   (b) Half yearly ☐ (d) Yearly ☐

   How much do you pay? ……………………………………………………………

5. Motivating factors to enter flower market

   (a) Good income/ better return ☐

   (b) Source of employment ☐

   (c) Personal interest ☐

   (d) High demand ☐

   (e) Less market fee ☐

(f) Easy credit ☐

(g) Any others (specify) ………………………………………………………

Demand condition

1. During which month do you receive the highest demand for flower?

   (a) Jan- Feb ☐ (b) March-April ☐ (c) May-June ☐

   (d) July-Aug ☐ (e) Sept-Oct ☐ (f) Nov-Dec ☐

2. During which month do you receive lowest demand for flower?

   (a) Jan- Feb ☐ (b) March-April ☐ (c) May-June ☐

   (d) July-Aug ☐ (e) Sept-Oct ☐ (f) Nov-Dec ☐

3. Which flower is highly demanded compared to other flowers? …………………...

   …………………………………………………………………………………

4. Which flower is least demanded? ....……………………………………………

5. Who are the most frequent buyers?

   (a) Households ☐ (b) Churches ☐ (c) Offices ☐

   (c) Others (specify) ……………………………………………………………….

6. Which group of people demands more flowers?

   (a) Youths ☐ (b) Married man ☐

   (c) Educated mothers ☐ (d) Old couples ☐

   (e) Others (specify) ……………………………………………………………...

7. Do you think you are able to meet the demand of the buyers in terms of supply?

   (a) Yes ☐ (b) Partially yes ☐ (c) May be ☐ (d) No ☐

8. Mark the rate along each factor base on your agreement:

	Strongly agree	Agree	Disagree	Strongly disagree	No opinion
a. Consumers prefer higher quality flowers. b. Consumers prefer cheap priced flowers. c. Consumers prefer to buy from those floral shops that offer wide range of flower varieties. d. Consumer's choice of buying flower depends on flower colour.					

Supply condition

1. Who supplies the flowers in the domestic market?

   (a) Farmers ☐ (b) Wholesalers ☐ (c) Auction market ☐

2. Do you import flowers?

   (a) Yes ☐ (b) No ☐

   If yes, from where do you import it and which are those flowers?

   …………………………………………………………………………………

   …………………………………………………………………………………

3. Which means of transportation do you use to import flowers?

   (a) Roads ☐ (b) Railways ☐ (c) Airways ☐ (d) Waterways ☐

4. Why do you import flowers?

   (a) Shortage of supply within the state ☐

   (b) Profit from imported flower is more than that from domestic flower ☐

   (c) Higher quality of imported flower ☐

   (d) Any other reasons? ………………………………………………………………….

Problems (You can tick more than one)

Which of the following factors can be the cause of flower business failure?

a. Insufficient profits ☐
b. Price instability ☐
c. Lack of adequate market information ☐
d. Irregular demand ☐
e. Shortage of supply during peak season ☐
f. Lack of storage facilities ☐
g. Spoilage ☐
h. Highly perishable ☐
i. Poor quality of the product ☐
j. Lack of management experience ☐
k. Poor transport facilities ☐
l. Blockade/strikes ☐
m. Others (specify) ☐

   ……………………………………………………………………………………………

   ……………………………………………………………………………………………

Suggestions of retailers for increasing the marketing efficiency:

a. Subsidies on inputs
b. Good advertising programmer
c. Quick and efficient means of transport
d. State Government intervention by fixing reasonable prices
e. Organizing intensive training related to post harvest handling of the producers
f. Establishment of adequate cold storage facilities
g. Provision of adequate facilities in market
h. Improvement of market information delivery system
i. Exposure to international markets
j. Effective market regulation
k. Tax less entry into the market
l. Punishment for those taking and demanding unauthorized fee
m. Market credit should be made easily available
n. Any others (specify)
..…………………………………………………………………

…………………………………………………………………………………

Suggestions, if any:

…………………………………………………………………………………………

…………………………………………………………………………………………

…………………………………………………………………………………………