

**ENHANCING FARMERS' INCOME THROUGH  
FLORICULTURE –  
A CASE STUDY ON CHRYSANTHEMUM IN  
RURAL KARNATAKA**



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## FOREWORD

Agriculture is the backbone of the Indian economy, providing food for over 1.40 billion people. However, our farmers face numerous challenges, and the need to supplement their income is more important than ever. As India has achieved food surplus due to Green Revolution, it is high time to double the farmers' income through crop diversity and commercialization of agriculture. Against this backdrop, the role of floriculture in enhancing income security of the farmers is not overemphasized. Cultivation of flowers and ornamental plants not only increases farmers' revenue but also contributes to better agricultural practices.

This report delves into various aspects of floriculture, from cultivation techniques to market dynamics, local markets to exports, and the challenges and constraints faced by farmers in flower cultivation in general, Chrysanthemum in particular. The study underscores the profound impact of cultivation of Chrysanthemum, its production, and incomes of the farming community in rural Karnataka. By cultivating this high-value crop, farmers in Mandya and Mysuru districts receive substantial economic benefits due to technological interventions of Green Grameen Services led by Dr. Vasanth Kumar Thimakpura. The findings presented in this document are not just theoretical speculations; they can empower farmers to increase their revenue.

At National Institute of Agricultural Extension Management MANAGE (MANAGE), we firmly believe that spreading knowledge is the foundation of farmers' progress. By sharing experiences, best practices, and innovative ideas, we aspire to empower farmers and stakeholders in the floriculture value chain to thrive in this emerging industry. The case study featured in this book is a testament to the perseverance and adaptability of farmers who have embraced floriculture as a means to improve their livelihoods.

I extend my heartfelt congratulations to Ms. K. Kusuma, intern, and Dr. M. Srikanth, Director, Centre for Agri-Business Management, for their valuable work, and I hope that their efforts inspire others to explore the immense potential of floriculture in improving the standards of living of our farmers and increasing the export earnings of our nation.

In conclusion, "ENHANCING FARMERS' INCOME THROUGH FLORICULTURE: A CASE STUDY ON CHRYSANTHEMUM IN RURAL KARNATAKA" is not merely a research report but a roadmap for change. The findings of this research hold the potential to empower the farming households in rural Karnataka. The adoption of Chrysanthemum's cultivation can act as a torch bearer, lighting the path towards achieving the ambitious goal of doubling farmers' income.

Hyderabad  
November, 2023

**Dr. P. Chandra Shekara**  
**Director General, MANAGE**

## PREFACE

Farmers are not mere producers of food; they are the architects of our food security as well as nutritional security. Their tireless efforts in the fields sustain nations, and their well-being is crucially linked to the prosperity of our societies. Therefore, the question of enhancing farmers' income is beyond economics; it is a moral perspective and a pivotal driver of agricultural sustainability and rural development of India.

Indian floriculture which remained homestead farming till late 80's assumed commercial scale in the early 1990s as a result of a series of economic reforms. This paved the way for the import of new plant material, introduction of protected cultivation technology in the country. Accordingly, the area under cultivation of floriculture jumped from 53,300 ha during 1993-94 to 282,300 ha, thereby registering over fourfold increase in 2022-23. The current state of global floriculture research demonstrates a paradigm shift towards innovative technologies over traditional methods. Floriculture is a significant agribusiness that offers employment opportunities in rural areas and entrepreneurial careers in export, production, marketing, and research.

Centre for Agri Business Management, MANAGE attempted to examine floriculture, its producers, productivity, net income levels, and success stories led by Green Grameen Services, a social business model developed by Dr. Vasanth Kumar, an Agri-scientist based in Karnataka. It is observed from primary data that the farmers witnessed enhanced profitability and productivity levels while growing Chrysanthemum in Mysuru and Mandya districts of Karnataka. Green Grameen Services has done commendable service to the farmers by offering technological support, arranging microcredit, and imparting education on various agronomic practices that led to high-quality output and ultimately resulted in enhanced income levels. Floriculture industry has the potential to enhance India's global presence in the international market, and contribute to a more diversified, sustainable, and resilient agricultural sector.

We hope that this brief study will serve as a source of inspiration and guidance for those who seek to engage on the journey of floriculture and, as a result, transform their lives and livelihoods. Through this study on floriculture, we invite you to explore the possibilities, challenges, and rewards that this vibrant sector offers. We encourage policymakers and researchers to pay attention to the insights within these pages and work towards the transformation of Indian agriculture. Together, we can nurture a more prosperous and sustainable future for our farmers.

*'Annadata Sukheebhava'*

Happy reading,

Hyderabad  
November, 2023

Dr. M Srikanth  
Director, Centre for Agri-Business Management  
MANAGE

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I sincerely extend my gratitude and appreciation to the honourable Director General of MANAGE, Dr. P. Chandra Shekara, for providing me with this opportunity to work on this project and for his vision to explore and strengthen the farming community.

I express my deepest gratitude to Dr. Vasanth Kumar Thimkapura, Agri-scientist, founder of Green Life Croptech (P) Limited, for his invaluable help, hospitality, motivation, and organising the required resources during the field visit in Karnataka. I'm thankful to the farmers of Mysuru and Mandya districts for their valuable information, which is the basis of this report, and to the staff of Green Grammen Services, Mr. Dileep and Mr. Shankar, for their continuous assistance and linguistic help.

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Hyderabad

Kusuma Kattamanchi

November, 2023

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## ABBREVIATIONS

@	- at a rate of
%	- Per Cent
\$	- Dollar
°C	- Degrees Celsius
APEDA	- Agricultural & Processed Food Products Export Development Authority
CSIR	- Council of Scientific & Industrial Research
DFR	- Directorate of Floricultural Research
DGCI&	- Directorate General of Commercial Intelligence and Statistics
et al.,	- and others
Etc	- eceetra
FPOs	- Farmers Producers Organisation
GATT	- Green Grameen Services
GLC	- Green Life Croptech Pvt.Ltd.
Govt	- Gross Domestic Product
Ha	- Hectare
HMNEH	- Horticulture Mission for North East and Himalayan States
i.e.,	- That is
IARI	- Indian agricultural research institute
ICAR	- Indian Council of Agricultural Research
IFABL	- International Flower Auction Centre Limited
KAIC	- Karnataka Agro Industrial Corporation
Km	- Kilo metre
KR Market	- Krishna Raj Pura market
LCD	- Local Crop Doctor
MANAGE	- National Institute of Agricultural Extension Management
Mm	- Milli meter
MSME	- Ministry of Micro, Small and Medium Enterprises
MT	- Metric tonnes
NHM	- National Horticulture Mission
Rs.	- Indian Rupee

U.S.A	- United States of America
UAE	- United Arab Emirates
UDAN	- Ude Desh ka Aam Naagrik
UK	- United Kingdom
UP	- Uttar Pradesh
USD	- US Dollar
UT	- Union Territory



## EXECUTIVE SUMMARY

In an era where agriculture faces unprecedented challenges, finding sustainable and innovative solutions to increase farmers' income has never been more critical. Floriculture, the art and science of cultivating flowers, has evolved from a mere ornamental pursuit to a dynamic and profitable branch of agriculture. Its significance extends far beyond the aesthetic appeal of flowers, it has the power to empower farmers, diversify income sources, and drive rural prosperity. India's floriculture industry has been experiencing steady growth in export volumes, reflecting the increasing global demand for flowers and ornamental plants. India primarily exports cut flowers, flower bulbs, and foliage. Roses, Marigolds, Chrysanthemums, Jasmines, and other varieties are commonly exported. It typically ranks within the top 10 to 15 flower-exporting countries globally, competing with the Netherlands, Colombia, Ecuador, Kenya, and Ethiopia.

The present study focused on the potential of floriculture as a game-changing avenue to enhance farmers' income and their livelihoods and key insights from a ground-breaking model, Green Grameen Services, managed by Dr. Vasanth Kumar, an Agri-scientist who tirelessly worked to improve the livelihoods of farmers in regions of rural Karnataka. The study made an attempt to examine the impact of Green Grameen services on the productivity and income levels of farmers growing Chrysanthemum in and around Mysuru and Mandya districts.

The study showcased how small & marginal farmers get benefitted through rural entrepreneurship by cultivation of Chrysanthemum flowers in areas where annual average rainfall is less than 700 mm. Based on the primary data, the sample farmers witnessed increase in their average net profit by 249 per cent; further, the average increase in yield was observed at 119 percent in respect of 16 sample farmers during 2018-2023 period. Also, total cultivated area of Chrysanthemum in the study area increased by 91 per cent during this period. Thus, the case study demonstrated that floriculture can be a commercially viable and financially sustainable model in Mysuru and Mandya districts due to technological interventions of Green Grameen Services.

Besides, it is noticed that the families which are cultivating Chrysanthemum crop in and around Mysuru and Mandya received socio-economic benefits like construction of Reinforced Concrete Cement buildings as pucca houses, providing better education and healthcare facilities for their children, etc.

The study highlights the need for farmers to receive proper guidance on choosing the right path to maximize profits. It also emphasizes the importance of adopting modern and sustainable cultivation techniques. These include organic practices, efficient irrigation methods, raising of disinfected seedlings, usage of need-based pesticides, and adequate supplementation of nutrients and growth promoters. These practices not only protect the environment and soil but also maintain the quality and quantity of the produce.

Floriculture can be a transformative force in enhancing farmers' income. It offers a viable alternative to conventional farming, harnessing the beauty of flowers to bloom economic prosperity. By implementing the recommendations outlined in this study, we can make significant progress towards achieving this goal while ensuring crop diversity, economic prosperity and sustainability of our agricultural sector.

+♦+

## ENHANCING FARMERS' INCOME THROUGH FLORICULTURE – A CASE STUDY ON CHRYSANTHEMUM IN RURAL KARNATAKA

### Chapter 1: INTRODUCTION

Floriculture in India is as old as human civilization. It is an ancient creative skill with imagination and an advanced science that has played a very important role in social and economic development of the nation. In most parts of the country, cultivation of flowers is done in small landholdings; however, commercial floriculture has assumed importance only in the recent past. Floriculture can be defined as *"a specialized branch of horticulture that deals not only with the cultivation of flowers, foliage, climbers, shrubs, cacti, succulents, etc. but also with their production and marketing of value-added products"*. Broadly, there are two categories of flowers in floriculture: *i)* cut flowers, and *ii)* loose flowers.

Modern-day floriculture involves the production of high-value cut flowers such as Rose, Gladiolus, Carnation, Orchids, Tuberose, Anthurium, Lilium, Gerbera, etc. Loose flowers mainly consist of Jasmine, Crossandra, Marigold, China Aster, Chrysanthemum, Gaillardia, etc. While the cut flowers are normally harvested along with their stems, the loose flowers are harvested without them. The cut flowers are used for making flower vases/floral decorations and for gifting purposes (bouquets), whereas the loose flowers are used for making garlands and for offering in worship. It is interesting to note that while loose flowers have a roaring business in South India, cut flowers have good demand across the country.

### Importance of Floriculture

No social function in India is complete without the use of flowers, bouquets, or floral arrangements, as they are the embodiment of beauty, peace, love, adoration, and purity. Flowers have a lot of significance, especially in the Hindu religious events. It is estimated that more than half of the total production of flowers is consumed in India for worship or auspicious purposes.

The liberalized seed policy introduced in the late 80's, coupled with reforms initiated in the Indian economy during 1991, paved the way for the advanced protected cultivation technology (green house/poly house, etc.) in floriculture. Since then, floriculture has been a fast-emerging income-generating activity in India and turned out to be a potential money-spinner for many a farmer cultivating in rain-fed areas, hilly regions, and arid zones. Floriculture in these locations transformed subsistence farming into sustainable farming through higher units of production, better returns on investment, generation of employment opportunities, and export earnings throughout the year. Besides, gestation period of flower crops is lower when compared to other crops. So floriculture provides a higher return on investment than any other agricultural or horticultural crop. For instance,

a single spike of Gladiolus and Gerbera flowers may sell for Rs. 3-5 in Kharif and Rs. 5–10 during Rabi and the summer season in Delhi, Mumbai, and other metros.

Further, floriculture has tremendous scope in terms of bio-aesthetic planning, landscaping, and gardening, apart from applications in horticultural therapy (healing the psychic debility by using gardens, landscape plants, etc., especially in psychiatric asylums, general hospitals, physical rehabilitation centres, homes for the elderly, prisons, and schools). Also, each flower expresses one or more meanings while arranging flowers through *Ikebana* (a Japanese of art of flowers so as to give life to flowers through various shapes of arrangement). Table 1 depicts various expressions of flowers, when given as gifts.

**Table 1: Subtle Expressions of Flowers**

<b>Exchange of Flowers</b>	<b>Subtle expression</b>
1. Red roses	Romantic love
2. Orange roses	Desire
3. Yellow roses	Joy and friendship
4. Pink roses	Gratitude and appreciation
5. White roses	Reverence and humility
6. Chrysanthemum (General)	You are a wonderful and cheerful friend
7. Chrysanthemum (White)	Truth

Source: Indian Council of Agricultural Research (ICAR)

The above table, illustrative but not exhaustive, is mainly applicable to roses but relevant for other flowers, as well. The current trend in floriculture is making dry flowers, extraction of natural colours and essential oils. There is a latent demand for good quality flower and ornamental plant materials across the world. According to one study, global consumption of the flowers is about US\$ 35 billion. Presently, more than 145 countries are involved in commercial floriculture, covering over three lakh hectares.

### **Motivation for the Present Study**

Inspired by the social business model of the Nobel laureate Prof. Muhammad Yunus, Dr. Vasanth Kumar Thimakapura, Agri-scientist & founder, Greenlife Croptech (P) Limited (GLC) facilitated over 10,000 farmers in various districts of Karnataka to practice floriculture (cultivation of mainly Chrysanthemum) thereby enhancing their income levels substantially. While GLC is the holding company and Green Grameen Services is its subsidiary. Since 2004, Dr. Kumar has been handholding the farmers through application of traditional knowledge blended with scientific technologies for creating a win-win situation for the farmers and the society, in an eco-friendly way. Besides, Green Grameen Services provided extension services, arranged micro credit, and

imparted training & capacity building to the farmers. In view of the above, we are motivated to study the 'Green Grameen Services' experiment of Dr. Kumar, with the following objectives in mind:

- To examine whether there is any enhancement in the income levels of farmers, who are cultivating Chrysanthemum in the districts of Mandya and Mysuru, after the interventions of Green Grameen Services; and
- To evaluate the impact of interventions of Green Grameen Services on the yields/productivity of Chrysanthemum in Mandya and Mysuru districts of Karnataka.

Besides, we found that most of the previous studies focused on knowledge and adoption behaviour of farmers (Vijaya Kumar, 1997; Ravi, 2000; Vinay Kumar, 2005; Tarde and Thorat, 2006; Hiremath 2007; Sivannarayana et al., 2008; Sumathi and Rathakrishnan, 2008; Umesh, 2009; and Mamathalakshmi et al., 2010). But none of them focused on income security of the farmers who grow Chrysanthemum. Therefore, MANAGE undertook the current study to examine enhancement of yields as well as income levels of Chrysanthemum farmers in Mandya and Mysuru districts of Karnataka.

## Chapter 2: Floriculture – An Overview

India is endowed with varied and dynamic agro-climatic conditions, good quality soil and water conducive for floriculture. Besides, labour cost is cheaper in India, when compared to the Netherlands, Israel, Japan, etc. Though the floriculture business has been growing in the world at 8-10 per cent per annum, India's share in the international market is miniscule i.e., less than 1 per cent. While the Netherlands and Germany are the leading producers of flowers, India holds the 14<sup>th</sup> rank in this context. Main flower growing areas in India are located in Andhra Pradesh, Haryana, Karnataka, Maharashtra, Rajasthan, Tamil Nadu, and West Bengal. According to Agricultural and Processed Food Products Export Development Authority (APEDA), India's export of floriculture produce was 21,024.41 metric tonnes, valued at Rs.708 crore in 2022-23. India's major export destinations are the Netherlands, USA, UAE, Germany, and the UK in this context. Table 2 provides information on toppers in floriculture in the international market.

**Table 2: List of Top Producers, Exporters, and Importers in the world**

<b>Producers</b>	<b>Exporters</b>	<b>Importers</b>
The Netherlands	The Netherlands	US
Germany	Colombia	Germany
France	Ecuador	UK
Spain	Kenya	The Netherlands
Italy	Ethiopia	France
UK	Italy	Russia
Switzerland	China	Japan
Belgium	Malaysia	Poland
Portugal	Israel	Italy
Denmark	Spain	Switzerland

Source: Indian Council of Agricultural Research

It is evident from Table 2 that India is not figured in the list of top 10 producers, exporters and importers of floriculture. Therefore, good potential exists for Indian entrepreneurs in floriculture, especially exports. Floriculture does not require artificial lighting or heating for green house production of cut flowers owing to ample sunlight in India and moderate temperature during winter season. Also, India is strategically located between two major markets i.e., the Europe and East Asia. So there is enormous potential to export Indian flowers to temperate countries

during the winter season i.e., during peak demand conditions - Christmas eve, New Year Day and Valentine's Day. As the Government of India identified floriculture as one of the export thrust areas, and the European nations reduced import duty on floricultural products during post-implementation of General Agreement on Tariffs and Trade (GATT), floriculture is capable of attracting and retaining a large number of progressive farmers and entrepreneurs in India.

It is pertinent to mention here that several floriculture units have been established in India by taking advantage of various schemes of the Government of India during the last decade. Most of these units are located near major international air-cargo handling cities - Mumbai, Pune, Bengaluru, Hyderabad and New Delhi and are obtaining technical know-how from the Dutch as well as Israeli consultants. Table 3 captures India's major export destinations of floriculture produce during the last 3 years.

**Table 3: India's Major Export Destinations of Floriculture Produce**

Country	2020-21		2021-22		2022-23	
	Qty in MT	Rs. in Lakh	Qty in MT	Rs. in Lakh	Qty in MT	Rs. in Lakh
1. USA	3,139.19	15,895.51	3,520.05	22,231.02	2,631.82	18,078.94
2. Netherlands	1,603.87	10,930.30	2,206.37	14,710.77	1,552.80	12,844.60
3. UAE	1,659.88	3,443.22	3,074.79	3,659.65	3,973.82	4,733.00
4. UK	860.91	3,312.10	917.69	3,962.30	635.34	3,519.69
5. Germany	1,054.69	3,213.11	1,208.63	5,071.42	710.17	3,089.33
6. Malaysia	516.38	963.55	882.13	1,832.28	1,223.63	3,049.30
7. Canada	485.65	2,301.48	768.59	3,356.77	696.50	2,859.30
8. Italy	235.31	1,767.47	261.18	2,136.76	207.57	1,930.31
9. Singapore	1,418.93	1,119.58	1,932.30	1,558.16	2,009.12	1,894.29
10. France	262.64	769.49	302.59	1,578.39	246.82	1,727.53
11. Japan	114.16	2,614.74	70.07	1,150.21	182.27	1,545.48
12. Australia	57.71	1,044.08	75.42	1,359.81	103.36	1,334.21
13. Poland	232.45	800.56	252.73	1,068.93	223.41	1,099.34
14. China	43.00	209.33	124.85	501.64	333.11	997.67
15. Spain	190.64	925.37	135.63	809.38	89.57	852.29
16. Others	3819.91	8,288.56	7864.15	12,153.99	6205.10	11,225.23
<b>TOTAL</b>	<b>15,695.32</b>	<b>57,598.45</b>	<b>23,597.17</b>	<b>77,141.48</b>	<b>21,024.41</b>	<b>70,780.51</b>

**Source: Directorate General of Commercial Intelligence and Statistics (DGCI&S)**

According to Table 3, the USA, the Netherlands, the UAE and the UK are the top export destinations (i.e., having a share of more than half of total exports of Indian floriculture produce). In 2022-23, the country exported 21024.41 MT of floriculture products to the world for a total value of Rs. 707.81 Crore. Total export value rises from Rs. 576 crore in 2021 to Rs. 771 crores in 2022 before declining by Rs.63 crore in 2022-23. It is germane to refer here that Karuturi Global Limited is a leading producer and exporter of cut roses worldwide. Based in Bengaluru,

its farmlands, cover an area of 250 hectares under hi-tech cultivation, the company produces around 500 million rose stems every year. It has operations across India, Ethiopia, and Kenya. Ferns and Petals is another floricultural company located in New Delhi and it is one of the India's top flower and gift merchant establishments. The firm has over 320 outlets in the country's major cities and towns apart from having its presence in the markets of South East Asia and the Middle East. Table 4 presents data on cultivation and production of flowers in India since 1994.

**Table 4: Cultivation of Flowers in India**

Year	Area of Cultivation (In '000 Hectare)	Production of Flowers	
		Loose (In '000 MT)	Cut (In Lakh Nos.)
1993-1994	53.30	232.50	5122.80
1994-1995	59.90	260.60	519.00
1995-1996	81.90	333.80	537.00
1996-1997	71.20	366.70	6642.00
1997-1998	73.50	365.70	6222.00
1998-1999	74.00	418.90	6428.00
1999-2000	88.60	509.20	6806.00
2000-2001	98.50	556.40	8034.70
2001-2002	106.50	535.00	25647.00
2002-2003	86.40	754.90	11614.00
2003-2004	101.20	579.50	17926.00
2004-2005	115.90	654.80	19515.00
2005-2006	126.20	693.40	27618.00
2006-2007	144.00	880.40	37156.30
2007-2008	160.70	868.40	43654.00
2008-2009	166.50	987.40	47942.00
2009-2010	182.90	1020.60	66671.40
2010-2011	190.90	1031.30	69027.40
2011-2012	253.70	1714.50	74676.90
2012-2013	272.00	1677.00	75413.10
2013-2014	255.00	1754.50	47942.00
2014-2015	248.50	1658.70	484.01
2015-2016	278.00	1656.00	528.01
2016-2017	306.00	1699.00	693.01
2017-2018	324.00	1962.00	823.01
2018-2019	303.00	2263.00	647.01
2019-2020	323.00	2323.00	676.01
2020-2021	322.00	2152.00	828.01
2021-2022	283.30	2295.10	833.21
2022-2023*	282.30	2194.10	643.25

Note: \*As per 3<sup>rd</sup> Advance Estimates;

Source: Ministry of Agriculture & Farmers' Welfare, Govt. of India

As per table 4, total area cultivated increased by over 5 times, from 53,300 ha in 1993-94 to 324,000 ha in 2017-18 and later marginally decreased to 282,340 ha. Similarly, the production of loose flowers increased from 232,500 MTs in 1993-94 to 23,23,000 MTs in 2019-20, thereby registering almost 9 fold increase, before declining to 21,94,100 MT in 2022-23. Table 5 portrays cultivation and production of various flowers in India.

**Table 5: Cultivation of Various Flowers in India**

Name of the Flower Crop	2013-2014			2021-22		
	Area (In '000 Hectare)	Production (In '000 Metric Tonne)		Area (In '000 Hectare)	Production (in '000 Metric Tonne)	
		Loose	Cut		Loose	Cut
1. Rose	30.87	96.09	166.47	39.84	168.42	298.51
2. Chrysanthemum	16.63	179.37	5.72	31.40	482.54	28.73
3. Anthirium	0.13	0.40	2.58	3.33	1.01	2.04
4. Carnation	0.20	0.59	944.14	3.22	2.28	9.53
5. Marigold	12.25	65.23	1.70	84.09	916.24	32.98
6. Tuberose	7.77	40.22	13.90	21.77	117.14	102.25
7. Jasmine	12.25	65.23	1.70	21.54	216.66	34.80
8. Gerbera	0.82	3.96	17.84	5.89	9.54	28.05
9. Orchids	0.43	2.48	5.48	3.03	5.16	10.81
10. Gladiolus	11.67	50.70	92.89	11.77	14.51	245.01
11. Tulips	0.02	0.00	0.25	NA	NA	NA
<b>Total</b>	<b>93.04</b>	<b>499.72</b>	<b>1234.83</b>	<b>225.88</b>	<b>1933.5</b>	<b>792.71</b>

Source: Ministry of Agriculture & Farmers' Welfare, Govt. of India; NA = Not Available

Table 5 shows that highest production is recorded in case of Marigold, Chrysanthemum, Jasmine, Rose and Tuberose under loose flowers category during 2021-22. Among the cut flowers, Rose tops the list, followed by Gladiolus, and Tuberose during the same period. It is interesting to observe that while cultivated area almost doubled between 2014 and 2022 in respect of Chrysanthemum, its production of loose flowers and cut flowers increased by 169 per cent and 402 per cent respectively during the same period. Out of all the flowers, cultivated area as well production witnessed exponential growth in case of Marigold during 2014-22 period, perhaps due to its medicinal properties, coupled with use in food processing industry (natural colours). Similar growth has been observed in respect of Jasmine, Tuberose, and Gladiolus flowers during the period under study. Besides, it is noticed that total cultivated area under floriculture increased from 93,040 ha in 2013-14 to 225,880 ha in 2021-22, indicating a growth of 142 per cent. Further, production of total loose flowers in India increased by almost three times during this period. However, production of all cut flowers decreased by 36 per cent during the period 2014-22. Table 6 presents data on cultivation and production of flowers across various Indian states in 2022-23.



**Table 6: Cultivation of Flowers across Indian States in 2022-23**

States/ UTs	Area of Cultivation (in '000 Ha)	Production of Flowers (in '000 Metric Tonnes)	
		Loose	Cut
1. Karnataka	46.71 (16.54)	422.62 (19.26)	19.92 (3.1)
2. Tamil Nadu	45.61 (16.15)	590.32 (26.91)	2.49 (0.39)
3. Madhya Pradesh	38.27 (13.55)	432.82 (19.73)	0.00 (0.00)
4. West Bengal	30.04 (10.64)	74.95 (3.42)	219.58 (34.14)
5. Uttar Pradesh	22.93 (8.12)	49.97 (2.28)	70.5 (10.96)
6. Gujarat	20.57 (7.29)	194.83 (8.88)	0.00 (0.00)
7. Andhra Pradesh	14.58 (5.16)	113.26 (5.16)	17.55 (2.73)
8. Chhattisgarh	13.4 (4.75)	62.79 (2.86)	98.78 (15.36)
9. Meghalaya	12.47 (4.42)	0.00 (0.00)	0.35 (0.05)
10. Maharashtra	10.26 (3.63)	56.95 (2.6)	90.13 (14.01)
11. Odisha	5.66 (2.00)	31.8 (1.45)	33.8 (5.25)
12. Assam	5.31 (1.88)	35.58 (1.62)	57.8 (8.99)
13. Rajasthan	3.66 (1.3)	8.57 (0.39)	0.00 (0.00)
14. Telangana	3.55 (1.26)	52.45 (2.39)	4.08 (0.63)
15. Punjab	2.2 (0.78)	13.78 (0.63)	0.00 (0.00)
16. Other States	7.13 (2.53)	53.4 (2.43)	28.26 (4.39)
<b>TOTAL</b>	<b>282.34</b> <b>(100.00)</b>	<b>2194.09</b> <b>(100.00)</b>	<b>643.25</b> <b>(100.00)</b>

Note: \*As per first Advance Estimates for 2022-23; Figures in parentheses represent %  
Source: Ministry of Agriculture & Farmers' Welfare, Govt. of India

Table 6 indicates that Karnataka, Tamil Nadu, Madhya Pradesh and West Bengal together cultivate more than half (57%) of total cultivated area in India. West Bengal (34.14%) is number one in production of cut flowers and Tamil Nadu (26.91%) is the leading producer of loose flowers. It is also noticed that Tamil Nadu, Madhya Pradesh and Karnataka together produce nearly two third of total production of loose flowers in India. Though the market for flowers is largely unorganized, KR Market (Karnataka), and Dadar Market (Maharashtra) provide lucrative avenues for floral marketing.

## Floriculture and Chrysanthemum

Chrysanthemum is one of the most popular commercial flower crops not only in India but across the globe. It is interesting to note that Chrysanthemum is the national flower of Japan. Chrysanthemum is next only to Rose in value terms in the international trade. Chrysanthemum is traded both as a cut flower and as a potted plant in the international market and it is the most popular cut flower sold across the United States. The word '*Chrysos*' means 'golden' and '*anthos*' means 'flower'. It is commonly known as 'Queen of East' or 'Autumn queen' or 'Guldaudi'. It is said that the flower originated from the Europe and Asia (China).

Chrysanthemum flower has a wide range of sizes, colours and forms. While the extra-large bloomed cultivars have exhibition value, decorative and fluffy bloomed small-flowered cultivars are ideal for garland making and hair decoration. Long stem cut flowers are used for bouquets, vases, decorations, etc. whereas loose flowers are meant for garlands, veni, and worship. The flower has medicinal value and it is an important source of essential oil and insecticides. As it is a traditional flower, it has great demand during marriage and festival seasons in India. Table 7 displays cultivation of flowers in select locations in India.

**Table 7: Cultivation of Chrysanthemum and other Flowers in Select Zones in India**

Centre of cultivation	Flower Crops	Ideal growing conditions
1. Areas around Delhi, Uttar Pradesh, and Punjab	Chrysanthemum, Rose, Carnation, and Gladiolus	Chrysanthemum requires moderate humid conditions of 70 to 90 per cent and it should be preferably grown in areas where rains are not forthcoming during its flowering time.
2. Area around Bengaluru	Chrysanthemum, Rose, Carnation, Ornamental Foliage Plants and seeds	
3. Areas around Pune / Nashik	Chrysanthemum, Rose, Carnation, Gladiolus, Dahlia, Aster and Tuberose	
4. Area around Kolkata	Chrysanthemum, Lotus, Tuberose, Jasmine, and Dahlia	
5. Area around Coimbatore including Nilgiris	Chrysanthemum, Jasmine, Tuberose, Rose, Carnation and Orchids	

Source: Indian Council of Agricultural Research

It is evident from table 7 that most suitable cultivated areas for Chrysanthemum are located in Delhi, UP, Punjab, Karnataka, Maharashtra, Tamil Nadu, and West Bengal.

Aphids, thrips, leaf miners and mites are the common insects that attack Chrysanthemum crop. Cercospora leaf spot, Alternaria leaf spot, Fusarium stem rot and Powdery mildew are the common diseases affecting the flowers. While the crop yield starts from 3-4 months after planting, duration of main crop is 6 months, and Ratoon crop takes 4 months. Yield in the main crop is 9-10 tonnes/ha, it is 4-5 tonnes/ha in respect of Ratoon crop. Approximately one lakh stems can be obtained from one ha. Chrysanthemums are graded based on straightness & length of stem, appearance of flowers, number of flowers, colour and freshness of flowers. Post harvesting, Chrysanthemum cut flowers can be wrapped in plastics and stored dry for 6 to 8 weeks at a temperature of 0.5 degree Celsius. Table 8 provides data on cultivation and production of Chrysanthemum in India during the last decade.

**Table 8: Cultivation of Chrysanthemum in India**

Year	Area of Cultivation (In '000 Hectare)	Production of Chrysanthemum Flowers (In '000 Metric Tonne)	
		Loose	Cut
2011-2012	18.68	195.10	1476.68 <sup>^</sup>
2012-2013	18.36	175.61	30.58 <sup>^</sup>
2013-2014	16.63	179.37	5.72
2014-2015	11.05	106.76	6.03
2015-2016	20.09	185.24	14.93
2016-2017	21.28	300.08	15.14
2017-2018	25.76	464.41	14.85
2018-2019	22.09	521.26	15.09
2019-2020	25.28	585.64	15.86
2020-2021	24.02	456.11	15.74
2021-2022	30.50	443.59	18.49
2022-2023*	30.76	445.37	17.75

Note: <sup>^</sup> in Lakh Nos.; \*as per the first Advance Estimates for 2022-23

Source: Ministry of Agriculture & Farmers' Welfare, Govt. of India

It is clear from Table 8 that the area under cultivation of Chrysanthemum jumped from 18,680 ha to 30,760 ha during the period 2012-23. As a result, production of loose flowers augmented by 128 per cent during this period.

### **Institutional Ecosystem of Floriculture in India**

Since early 1990s, the Government of India has been encouraging the commercial floriculture, which led to exponential growth in production of flowers cultivated through poly / green houses. As there was no organized market for the flowers, Karnataka Agro Industrial Corporation (KAIC) joined hands with APEDA to establish International Flower Auction Bangalore Limited (IFABL) on October 15, 1995 at Hebbal, Bengaluru. It is first of its kind and only digital auction centre in the Asia. The Centre has state of the art infrastructure and functions through digital Dutch auction

system to ensure transparent price discovery for all types of flowers. Flowers auctioned in the Centre reach the entire India, besides Singapore, Malaysia, Middle East, and the European countries. The auction centre operates throughout the year and works as a common platform for both sellers and buyers. The main advantages of IFABL are: a) professional handling of flowers and foliage; b) cold storage facilities for flowers; c) offering market intelligence to the stakeholders; d) providing technical support to the registered growers and buyers; and e) assuring electronic payments to the farmers on weekly basis. The Government of Karnataka and APEDA together established four flower auction centres including one in Bengaluru, NOIDA, Mumbai and New Delhi. APEDA also established a marketing centre at Aalsmeer (The Netherlands) to promote Indian floricultural produce.

The Council of Scientific & Industrial Research (CSIR) Floriculture Mission focuses on the cultivation of flower crops that can be used in apiculture, commercial floral crops, seasonal/annual crops, foliage plants, wild ornaments, and ornamental wild plants. Since its inception, the CSIR has been engaged in the research and development of new floricultural varieties. Further, The Indian Council of Agricultural Research (ICAR)-Directorate of Floricultural Research (DFR) was set up on December 10, 2009 at Indian Agricultural Research Institute (IARI), New Delhi, to promote research in floriculture.

### **Major Challenges of Floriculture in India**

Flowers, in general, have been grown in India in the open fields, where they have been exposed to both biotic and abiotic stresses. Hence, the quality of the flowers is not up to the mark. However, in the era of globalization, the produce needs to be of superior quality and globally competitive, as there is a lot of demand for different floricultural products in the international market. Major challenges of floriculture industry are: Inadequate infrastructure facilities like greenhouse/poly house and cold chains, lack of quality consciousness among the exporters, sub-optimal coordination between private and government agencies involved in export/import logistics, low factor productivity coupled with higher costs, absence of market intelligence on selling prices, ruling varieties – which continuously keep on changing in the international markets, limited knowledge on advanced cultivation practices like high density planting, fertilizer and irrigation management, plant protection, proper grading, etc. Besides, the floriculture suffers from insufficient research and development expenditure especially on new varieties, post-harvest techniques, advanced cultivation methods, etc.

### **Chapter 3: Review of Literature**

As there exists huge business potential of floriculture in India and across the world, several researchers studied its business potential (Kaul and Dadlani, 1995; Datta, 2006, 2016, 2019; Datta and Mitra, 1999; Singh, 2011; Misra and Ghosh, 2016; Raj, 2017; Vahonia *et al.*, 2018; De and Singh, 2016; Geetha and Lissy, 2018). Sahu *et.al.*, (2011) carried out research on growth of floriculture in Purba Medinipur District of West Bengal and its impact on socio-economic status of the farmers. The study revealed that per capita income of the floriculturists increased by 216 per cent during the period 1990-2006. Further, the floriculturists experienced improved socio-economic conditions in terms of purchase of consumer durables namely television, refrigerator, motor vehicles, etc. apart from providing better education and healthcare facilities for their children, thanks to higher remunerative prices of flowers. The authors highlighted lack of cold storage chains, fewer roads, absence of transport/marketing infrastructure facilities, exploitation by middlemen, and volatility in price as well as demand conditions are the major hurdles in floriculture.

Gunabhadra *et al.*, (2016) found that per hectare cost of cultivation of chrysanthemum flower was Rs. 61,767/- in Tumkur district, Karnataka. The study concluded that the average annual gross return realized per ha by the respondents was Rs. 1,90,541/- thereby providing a surplus of Rs.1,28,774/- per ha, after recovering the fixed and variable costs. Mamathalakshmi *et.al.*, (2013) conducted a study in Mandya district of Karnataka on knowledge and adoption behaviour of farmers with respect to Chrysanthemum flowers during 2009-2010. The study found that age, cultivation area under Chrysanthemum, family size, and family type had the most significant relationship (@1% level) with the adoption behaviour of the growers. While occupational status, economic motivation, mass media utilization and management orientation had significant association (@5% level) with their adoption behaviour. Further, the study indicated that insufficient irrigation facilities, limited and irregular power supply, lack of credit facilities, attack by pests & diseases, and inadequate extension services were the main adoption constraints perceived by the farmers. Besides, the study pointed out that fluctuations in prices, exploitation by middle men, and poor marketing infrastructure facilities are the major hurdles faced by the floriculturists in Mandya district.

In view of the developmental interventions of Green Grameen Services, in Mandya and Mysuru districts of Karnataka in 2018, it is felt that a fresh study may be undertaken by MANAGE to see whether the status of cultivators of Chrysanthemum has been improved in terms of their income security through higher productivity and lucrative prices. More specifically, the study has been taken up with a view to finding out whether there is a tangible enhancement in the yields and income levels of the farmers between 2018 (the year of interventions of Green Grameen Services in Mandya and Mysuru districts of Karnataka) and 2023.

#### **Chapter 4: Green Grameen Services: A Social Business to Empower the Farmer**

Green Life Croptech (P) Limited (GLC), has been established as a technology driven social enterprise in 2004 by Dr. Vasanth Kumar Thimakapura, Agri-scientist & founder based in Mysuru, Karnataka. While GLC is the holding company and Green Grameen Services is its subsidiary. Initially, Dr Kumar was supporting the farmers by extending technological and financial assistance to the farmers of Flue Cured Virginia Tobacco in Mysuru. Later, Prof. Muhammad Yunus, the Nobel laureate from Bangladesh, visited GLC in 2016 and urged Dr. Kumar to shift his focus from Tobacco to food and horticultural crops. Accordingly, GLC has been hand holding the cultivators of Chrysanthemum, who were reporting lower yields and income levels in water scarce villages in and around Mysuru and Mandya districts of Karnataka.

Subsequently, GLC conducted a diagnostic survey in Mysuru district and identified that the farmers growing Chrysanthemum had lack of knowledge in cultivation, plant protection methods, no free access to reliable agri-inputs including formal credit, indulged in indiscriminate use of pesticides/chemicals, etc. Besides, the diagnostic study of GLC unravelled that availability of family labour and water are the most important contributing factors of Chrysanthemum crop. It was noticed that while the farmers were planting seedlings in excess of recommended density, apart from facing root rot and other diseases of the plants. Further, replenishment of soil nutrition was grossly inappropriate since the choice and quantities of fertilizers/chemicals often depended on affordability and availability of these items on credit, rather than on scientific analysis of soil health and other requirements of the crop. This resulted in high cost of cultivation on one side and low productivity of Chrysanthemum crop on the other.

After collecting soil and plant samples, GLC conducted laboratory tests and extended technological assistance to the farmers in Mysuru and Mandya districts since 2018. Essentially, Dr Kumar and his team at GLC prescribed suitable nutritional and crop protection regimens, demonstrated Tray technology to produce disease-free seedlings, introduced drip irrigation and mulching for irrigation efficiency, advocated eco-friendly insect management practices like pheromone traps, coloured sticky traps, etc. while the farmers were encouraged to avail finance for installation of drip irrigation systems from the government and they were supplied with the critical nutritional and plant protection formulations on credit by GLC. Also, the concept of Local Crop Doctor (LCD) has been adopted, wherein a progressive young Chrysanthemum farmer from each village is being trained by GLC, in all aspects of crop production and protection. The LCD has been provided a two-wheeler and a smart phone to ensure timely supply of critical inputs to the farmers, in consultation with the scientists at GLC and to resolve issues related to pests and diseases. Meanwhile, the *Jalamurtha* scheme of the Karnataka Government revived the dried water tanks for the benefit of Chrysanthemum growers.

The aforementioned developmental interventions of GLC resulted in reduced cost of production and increased the incomes of the farmers substantially since 2019. Net surplus of the farmers ranged from -10 per cent to 338 per cent as per a pilot study undertaken by GLC during June, 2019 in Dinkashetti halli, Mandya District, Karnataka. It is worth mentioning here that although, the village is located near the Krishna Raj Sagar dam, it is dry most of the time and does not have proper irrigation facility. Post-intervention of GLC, average profit of 100 sample farmers in this village during the post interventional year (2019) was recorded @69 per cent, by taking a crop cycle of four months. The entire experiment revived the rural entrepreneurial activities and provided gainful employment for the women and the aged, thereby increasing their living standards. Judicious use of available water through drip irrigation and regular *In-situ* technical support backed by a team of experts from GLC led to retention of (young) farmers and ultimately resulted in reverse migration.

It is also reported that Green Grameen Services has been handholding the farmers who are cultivating Papaya, Tomato and Okra crops in and around Karnataka as part of its social business in order to boost their food, nutritional, and income security.

In sum, the interventions of Green Grameen Services showcased that technological interventions (Plant tonics such as Power plus, Phytol, etc.) alongside training & capacity building, timely extension, and micro finance can solve many of the issues and challenges in Indian agriculture, when properly implemented in letter and spirit. As such, Green Grameen Services has been spreading smiles on the faces of poor, hapless, and helpless farmers of Karnataka.

## Chapter 5: Research Methodology

Chrysanthemum (*Dendranthema grandiflora*), belongs to Asteraceae family and it is being cultivated from ages in Karnataka as the climatic conditions of Mysuru and Mandya districts are the most suitable. The temperature in this region ranges from 18°C to 29°C with annual average rain fall of less than 700 mm. It may be noted that agriculture is the primary source of income of the farmers in these districts. As many areas in and around Mysuru and Mandya districts suffer from severe drought conditions and minimal flower output, farmers' survival was a question mark till 2018.

Since 2018, Dr. Vasanth Kumar, Agri-scientist & founder, Green Grameen Services has been handholding the farmers in Mysuru and Mandya districts of Karnataka to practice floriculture (cultivation of mainly Chrysanthemum) thereby enhancing their income levels substantially. Essentially, Green Grameen Services supported the farmers by providing extension services, arranged micro credit, and imparted training & capacity building to the farmers. In view of the above, we are motivated to study the 'Green Grameen's experiment' on the farmers who are cultivating Chrysanthemum crop in Mysuru and Mandya district, by collecting the data before and after the developmental interventions.

The main focus of the study is on income and production levels of farmers who are cultivating Chrysanthemum crop in Mandya and Mysuru districts of Karnataka with the active handholding support of Green Grameen, founded by Dr. Vasanth Kumar. Brief details of Green Grameen Services are provided in Chapter 4. The primary objectives of the study are as given below:

- To examine whether there is any enhancement in the income levels of farmers, who are cultivating Chrysanthemum in the districts of Mandya and Mysuru, after the interventions of Green Grameen Services; *and*
- To evaluate the impact of interventions of Green Grameen Services on the yield/productivity of Chrysanthemum in Mandya and Mysuru districts of Karnataka.

With a view to fulfilling the above objectives, the study was undertaken by MANAGE during July and August, 2023 in Mysuru and Mandya districts of Karnataka. These districts are purposely selected for the study as Chrysanthemum flower growers are relatively higher in these districts. Also, technological interventions of GLC had been taken place in these two districts in 2018. By administering a semi-structured interview schedule, primary data were collected from 16 farmers, who were randomly selected from 8 villages in these two districts. The primary data include production quantity of flowers, total cost of production (seedlings, pesticides, fertilizers, labour, interest, transport, marketing expenses, etc.), productivity, selling price and net income of the farmers before and after interventions of Green Grameen Services. A copy of the interview schedule administered for collection of primary



data is enclosed in the annexure. Table 9 captures brief details of sample group of farmers of the study.

**Table 9: Details of the Sample**

<b>District</b>	<b>Mandal</b>	<b>Village</b>	<b>No. of Farmers</b>
1. Mandya	1. Krishnarajapete	1. Balenahalli	3
		2. Dinka Shettihalli	6
		3. Kabbalagerepura	1
	2. Pandavapura	4. Anthanahalli	1
		5. Banamgadi	1
		6. Halesayapanahalli	1
		7. Settahalli	1
2. Mysuru	3. Krishnarajanagara	8. Mandanahalli	2
<b>Total</b>			<b>16</b>

Source: Field Survey

As per Table 9, primary data were collected from 2 districts, 3 mandals and 8 villages covering 16 sample farmers in Karnataka, wherein the Green Grameen Services has been providing handholding support. Dinka Shettihalli in Mandya has the larger sample of 6 farmers, followed by Balenahalli and Mandanahalli. It is noticed that out of 16 farmers, only one female is cultivating Chrysanthemum. However, it is observed that majority of the women from the farming families involved in harvesting, grading, making of garlands, packing, etc. Though majority of Indian rural women involve in hard agricultural labour: sowing, weeding and transplanting, etc. hardly 13 per cent own the land. It is observed that 'feminization of agriculture sector' is an emerging phenomenon, during post-Covid-19 period.

## Chapter 6: Results and Discussion

After collecting primary data from 16 farmers located in 8 villages, 3 mandals, 2 districts in Karnataka, we cleaned it in order to obtain realistic results. Specifically, we removed the outliers, which otherwise exaggerate the findings of the study especially with regard to enhancement of productivity and profits of the farmers. This exercise is important as the farmers find it difficult to recall past data in respect of their costs, yields, and prices of Chrysanthemum during 2018. Further, we contacted Dr Vasanth Kumar, the man behind the interventions, to validate our findings. Accordingly, the findings of the study are given below:

In line with objectives of the study, it is observed that the Chrysanthemum growers in the study area experienced higher yields in their Kharif crop i.e., average increase in yield was 119 per cent in respect of 16 sample farmers in 2023 when compared to 2018. While the maximum yield was noticed as high as 400 per cent, the lowest increase in yield was 7.14 per cent during this period. Apart from this, total cultivated area of Chrysanthemum in the study area increased significantly (91%) from 818 cents to 1565 cents during 2018-23 period.

Similarly, the study revealed that the farmers witnessed enhancement of their net income i.e., average increase in net income was 249 per cent in respect of 16 sample farmers in 2023 when compared to 2018. While the maximum hike in net profit was noticed as high as 561.48 per cent, the lowest increase in net profit was 27.58 per cent during this period.

Besides, it is noticed from our field visit that the families which are cultivating Chrysanthemum crop in and around Mysuru and Mandya received socio-economic benefits like construction of Reinforced Concrete Cement buildings as pucca houses, providing better education and healthcare facilities for their children, etc. mainly due to the technological interventions of Green Grameen Services.

While interacting with farmers and officials of Green Grameen Services, it is understood that the farmers sell their products in Balenhalli or Mysuru markets, which are 30 KM away from their farm lands. Some of the farmers even transport their produce to Bengaluru's Krishna Raja Pura flower market, which is one of the big flower markets in India.

Table 10 reports the data on productivity and net Income levels of 16 Chrysanthemum farmers in 2018 Vs 2023.

**Table 10: Change in Productivity and Net Profit of Chrysanthemum Farmers**

Name	Age (Years)	Family Size (Nos.)	Area of Cultivation (Cents)	Total Cost of Production (Rs.)	Income (Rs.)	Net Profit in 2023 (Rs.)	Net Profit in 2018 (Rs.)	Productivity in 2023 (KG/Cent)	Productivity in 2018 (KG/Cent)	Change in Productivity (%)	Change in Net Profit (%)
1. Yogesh	23	5	200	422940	720000	297060	47000	18.00	11.20	60.71	532.04
2. Bala Krishna	23	5	50	295760	320000	24240	19000	32.00	8.00	300.00	27.58
3. Suman. P. J	21	6	40	102780	600000	497220	258000	75.00	70.00	7.14	92.72
4. Sanjaya	19	3	50	129180	160000	30820	23000	32.00	8.00	300.00	34.00
5. Rajinikanth	24	5	100	365400	925000	559600	145000	37.00	22.00	68.18	285.93
6. Ramya	49	5	100	161800	250000	88200	40000	20.00	4.00	400.00	120.50
7. Manjunath. S. N	40	5	75	167860	400000	232140	43000	26.67	24.00	11.11	439.86
8. Dileep	29	5	50	111820	240000	128180	44000	32.00	16.00	100.00	191.32
9. Chandre Gowde	63	2	200	189880	600000	410120	62000	20.00	12.00	66.67	561.48
10. Ramaiah Gowda	65	5	100	272040	360000	87960	25100	24.00	12.80	87.50	250.44
11. Umesh	31	4	50	142860	360000	217140	122500	36.00	32.00	12.50	77.26
12. Ravi	43	6	50	158260	400000	241740	52000	40.00	12.00	233.33	364.88
13. Naveen Kumar	46	8	100	278640	480000	201360	39000	32.00	24.00	33.33	416.31
14. Rajesh	49	6	100	246860	390000	143140	31000	24.00	16.00	50.00	361.74
15. Yogesh. M	34	4	100	165100	300000	134900	91000	24.00	12.00	100.00	48.24
16. Kumar	36	3	200	175580	540000	364420	127000	18.00	10.00	80.00	186.94

Source: Field Survey

**Change in Productivity & Net Profit in 2023 over 2018 (%)**

1. Average increase in yield (%)	<b>119.41</b>
2. Average increase in Net Profit (%)	<b>249.45</b>

## **CHAPTER 7: CONCLUSION**

Agriculture in India has not been a viable proposition especially in case of small and marginal farmers, who constitute 86 per cent of total cultivators. Though India experienced Green Revolution 1.0 thereby achieving food security, the farming households need to graduate themselves in terms of nutritional and income security. Sustainability of the Indian agriculture is the need of the hour by focusing on triple bottom line – Planet, People, and Prosperity. Agriculture, by following the best practices, can provide constructive employment opportunities for the rural youth, economic prospects to the farmers, and environmental benefits to the society.

As indicated elsewhere in the study, Dr. Vasanth Kumar, Agri-scientist & founder, Green Grameen Services has been handholding the farmers in Mysuru and Mandya districts of Karnataka to practice floriculture (through cultivation of mainly Chrysanthemum) thereby enhancing their income levels substantially since 2018. Dr Kumar supported the farmers by providing extension services, arranged micro credit, and imparted training & capacity building to the farmers. In view of the above, we are motivated to study the 'Green Grameen's experiment' on the farmers who are cultivating Chrysanthemum crop in Mysuru and Mandya district, by collecting the data before and after the developmental interventions.

The present study showcased how small & marginal farmers get benefitted through rural entrepreneurship by cultivation of Chrysanthemum flowers in areas where annual average rainfall is less than 700 mm. Based on the primary data, the farmers witnessed four-fold increase in productivity, thereby increasing their average net profits by 249 per cent; further, the average increase in yield was observed at 119 percent in respect of 16 sample farmers during 2018-23 period. Also, total cultivated area of Chrysanthemum in the study area increased by 91 per cent during this period. Thus the case study demonstrated that floriculture can be a commercially viable and financially sustainable model as per the findings of the study.

Besides, the study highlighted that social business can thrive in a country like India in general and in agriculture sector in particular mainly because most of the farmers are ignorant about the scientific way of cultivation of crops, and they are resource poor in terms of free access to quality Agri-inputs including timely and adequate credit. Besides, market linkages are poor coupled with inadequate infrastructure facilities in India. Certainly, this model can be replicated in other parts of the country namely Punjab, UP, Tamil Nadu, West Bengal, Maharashtra, etc. wherein Chrysanthemum is being cultivated in a commercial scale. As the flower has medicinal value and it is an important source of natural colours, essential oil and insecticides,

the stakeholders may think of its expansion to the extent possible. Apiary may also be tried in a big way to obtain the multiplier effect in the farmers' income levels.

The floriculture in India offers lucrative agri-business opportunities in production, marketing, export, research & development. Additionally, floral designers, horticultural therapists, landscape architects, and makers of (kitchen) gardens have good potential business due to increased disposable incomes and urbanization. The sector also offers employment for skilled and unskilled workers, including the youth and women from rural areas.

The government needs to concentrate on providing the requisite infrastructure facilities that are necessary for the production of floriculture produce, which have significant potential in national and international markets. International air cargo facilities may be developed at catchment areas of production by leveraging UDAN scheme of the government. Besides, the farmers can take advantage of other schemes namely National Horticulture Mission (NHM) and Horticulture Mission for North East and Himalayan States (HMNEH) while developing commercial floriculture. There is a compelling need to set up processing and cold storage units (through promotion of MSMEs) to reach the export target of USD 100 billion by 2027. The government should also take steps to educate farmers about cutting-edge technologies and turn primary fresh harvests into secondary products with added value, thereby reducing waste (secondary agriculture). Market linkages through formation of FPOs may be strengthened to transform floriculture in India as a thriving agri-business venture. Institutional (micro) finance may be improved to support the Chrysanthemum farmers in reducing their cost of production. Exports through e-commerce may be promoted in a big way by having constant market intelligence, conducting international fairs and exhibitions, and arranging exposure visits to countries such as the Netherlands, Germany, Israel, etc. in this regard. Government may be liberal in providing funding for R&D projects in floriculture for development of new methods of cultivation, high yielding varieties, etc.

Since tenor of the present study (internship) is just two months, a larger sample could not be collected. Further, the main limitation of the study is recall or memory of the farmers in respect of data related to costs and prices of the crop, pertaining to year 2018. However, second phase of the study may be undertaken by MANAGE in future to collect primary data for a larger sample to validate the findings of the current study. Future study may adopt Randomized Control Trails as part of its research design for better findings in this context. Further, action research may be tried to replicate the model elsewhere in the country to enhance the income of the farmers along with their living standards.

Apart from Chrysanthemum, Green Grameen Services has been supporting farmers engaged in cultivation of Papaya, Tomato and Okra crops, agri-extension officers and other stakeholders may assist in these agri-business ventures. Contract farming can also be tried, wherever possible, to see that the farmers are smiling.

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## IMAGES OF THE FIELD SURVEY



Fig 1. Fully grown Chrysanthemum crop ready to bloom



Fig 2. Green Grameen Services outlet in the village





Fig 3. Dr. Vasanth Kumar explaining farmers about plant and soil health





Fig 4. Chrysanthemum Intercrop with Coconut



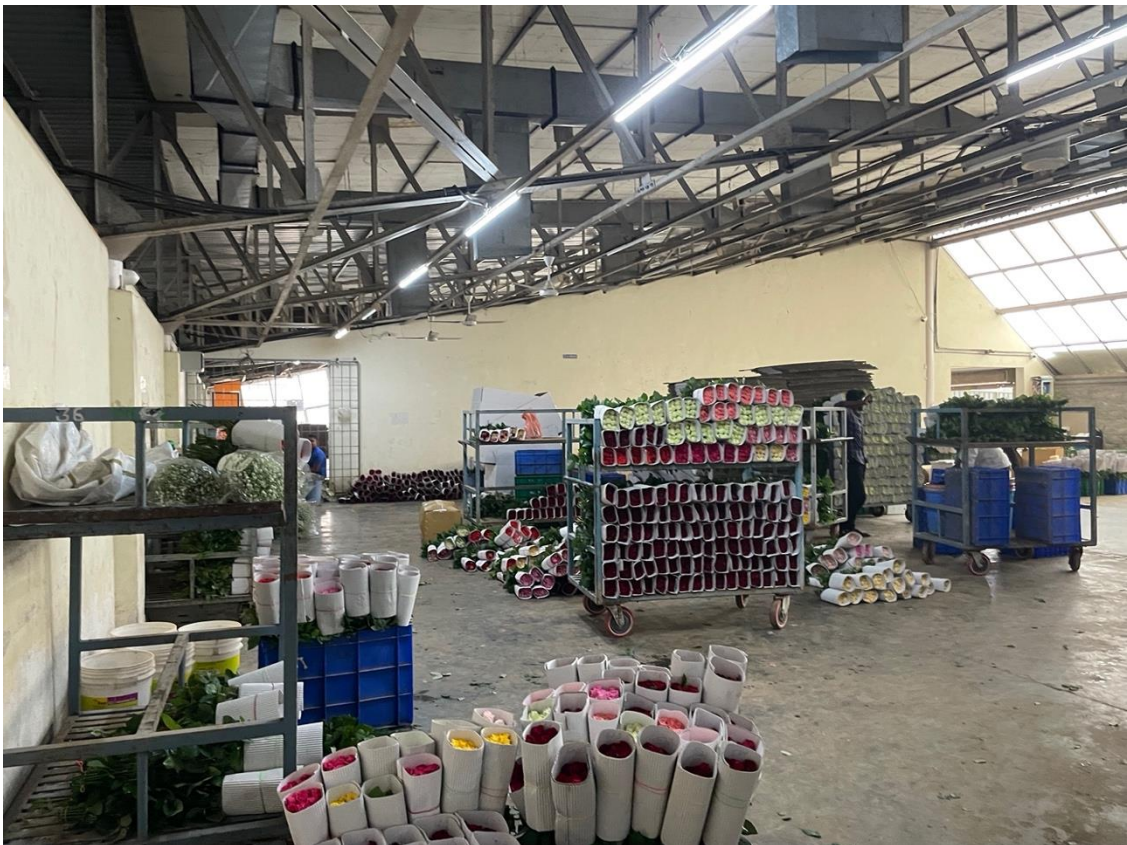


Fig 5. Farmers discussing with Local Crop Doctor and Staff of GLC





Fig . 6. Images of IFABL







## Interview Schedule for Farmers in Mysuru & Mandya Districts

### 'Chrysanthemum Farmers' Income through Floriculture'

This schedule is intended to study the income patterns of the farmers who are engaged in floriculture and how their incomes have been enhanced. The schedule consists of questions under which different viewpoints are listed out. Kindly choose the most appropriate one. Please note that the information collected will be kept confidential and will be used for academic purpose only.

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Village:

Mandal:

District:

#### Part I: Personal and Household Details of Respondent Farmer

i. Name of the farmer : M. Ph. No.

ii. Age :

iii. Education : Not educated, 1<sup>st</sup> to 10<sup>th</sup>, Intermediate, Degree, Vocational / Others

iv. Land holding (acres):

a. Own Land: .....; out of which wet land:-----

b. Leased Land: .....; out of which wet land:-----

v. Size of family: ..... Adults: ..... Children.....

vi. Social Category: 1. General 2. SC 3. ST 4. OBC

vii. Details of my crops:

Season	Crop	Area (Acres)	Production (Qtl./Acre)	Total Cost of production* (Rs.)	Selling price (Rs./Qtl.)
Kharif: 2018					
Kharif: 2023					
Rabi: 2018					
Rabi: 2023					

\* Typically includes expenses related to seeds, fertilizers, pesticides, labour (including family labour), irrigation, transportation, fuel, marketing expenses, taxes, etc.

## **Part II: Technical Questions**

1. I am able to get good and timely advice (crop advisory and extension services) for cultivation of flowers from M/s. Green Life Crop Tech (P) Ltd., and plant pathologist, Dr Vasant Kumar, especially with regard to seeds, fertilizers, pesticides, etc. **Yes / No**

2. My crop yield in floriculture has increased mainly due to the technological support received from M/s. Green Life Crop Tech (P) Ltd., and plant pathologist, Dr Vasant Kumar. **Yes / No**

3. I am able to sell my flowers at higher prices after consulting M/s. Green Life Crop Tech (P) Ltd., and plant pathologist, Dr Vasant Kumar. **Yes / No**

4. I am able to enhance my income from Floriculture after consulting M/s. Green Life Crop Tech (P) Ltd., and plant pathologist, Dr Vasant Kumar. **Yes / No**

5. If yes, the prices of Agri-produce are given below: (Amount in Rs. per Quintal)

<b>Price of Crops per quintal</b>	<b>Crop 1 ----</b>	<b>Crop 2 - Flowers</b>
Before consulting		
After consulting		

6. After consulting, I have received the following benefits in respect of Floriculture:

<b>Crop Advisory Services</b>	<b>Yes/No</b>
<b>a) Market linkages</b>	
<b>b) Subsidy/grant from the Government / NGOs</b>	
<b>c) Insurance for my crops</b>	
<b>d) Credit linkages / finance from banks/Financial Institutions</b>	
<b>e) Technological support, please specify</b>	

7. Specific views of the Farmer with regard to challenges in Floriculture, suggestions for other farmers who wish to cultivate flowers, if any.

**+++**