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STUDY ON FLOWERS AND ORNAMENTAL PLANTS SECTOR IN VIETNAM

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TABLE OF CONTENTS

FOREWORD	3
SUMMARY	5
PART 1: INTRODUCTION	6
1.1. Background.....	6
1.2. Objective	7
1.3. Research methodology	7
1.3.1. Data collection	7
1.3.2. Analysis method.....	8
PART 2: OVERVIEW OF FLOWERS AND ORNAMENTAL PLANTS SECTOR IN VIET NAM.....	9
2.1. Overview of flowers and ornamental plants sector in Viet Nam	9
2.2. Trade.....	12
2.2.1. Import	12
2.2.2. Export	14
2.3. Market and consumer preferences	18
2.3.1. Market value	18
2.3.2. Consumer preferences.....	18
2.4. SWOT analysis	20
PART 3: VALUE CHAIN ANALYSIS OF FLOWERS AND ORNAMENTAL PLANTS IN 5 TARGETED REGIONS	22
3.1. Lam Dong.....	22
3.1.1. Key characteristics of major market segments	22
3.1.2. Value chain mapping.....	24
3.1.3. SWOT analysis	25
3.2. Ha Noi.....	25
3.2.1. Key characteristics of major market segments	25
3.2.2. Value chain mapping.....	27
3.2.3. SWOT analysis	28
3.3. Ho Chi Minh City.....	29
3.3.1. Key characteristics of major market segments	29
3.3.2. Value chain mapping.....	31
3.3.3. SWOT analysis	32
3.4. Dong Thap.....	33
3.4.1. Key characteristics of major market segments	33
3.4.2. Value chain mapping.....	35
3.4.3. SWOT analysis	36
3.5. Son La.....	37
3.5.1. Key characteristics of major market segments	37
3.5.2. Value chain mapping.....	39
3.5.3. SWOT analysis	40
PART 4: CONCLUSION AND RECOMMENDATIONS	42
4.1. Conclusion.....	42
4.2. Recommendation.....	44
References.....	47

LIST OF FIGURES

Figure 1: The gross output of selected sector and sub-sectors at constant 2010 price and average growth rate in 2015 and 2021	9
Figure 2: Cut flowers production by types	11
Figure 3: Ornamental plants area in 2015 and 2021 by region.....	11
Figure 4: Ornamental plants area in 2021 by types	12
Figure 5: Vietnam's import value of flowers and ornamental plants in the period 2016-2022.....	12
Figure 6: Structure of Vietnam's flower and ornamental plant import market in 2022	13
Figure 7: Import value of 4 main types of flowers and ornamental plants in the period 2015-2022...	13
Figure 8: Structure of imported flowers and ornamental plants in Vietnam.....	14
Figure 9: Vietnam's flower and ornamental plant export value from 2016-2022	14
Figure 10: Vietnam's flower and ornamental plant export market structure in 2022	15
Figure 11: Structure of flowers and ornamental plants exported by Vietnam	16
Figure 12: Structure of cut flower export types of Vietnam in 2022	16
Figure 13: The main market of Vietnam cut flower export in 2022	16
Figure 14: Structure of fresh flowers exported to Japan in 2022.....	17
Figure 15: Flower area and output of Lam Dong in the period 2015-2022	22
Figure 16: Structure of flower growing area by district of Lam Dong in 2022	22
Figure 17: Structure of area by main flower type, 2022	22
Figure 18: Flower value chain in Lam Dong province	24
Figure 19. Current status of flower and ornamental plant production in Me Linh district in 2023	26
Figure 20: Cut flower value chain in Ha Noi	27
Figure 21: Area of flowers and ornamental plants by types in 2022	29
Figure 22: Area of flowers and ornamental plants by districts	30
Figure 23: Mokara orchids supply chain in Ho Chi Minh City.....	31
Figure 24: Area of flowers and ornamental plants of Lam Dong in the period 2015-2022 (ha)	33
Figure 25: Structure of area by districts in 2022 (%).....	33
Figure 26: Structure of area by main types in 2022 (%).....	33
Figure 27: Potted flower supply chain in Dong Thap	35
Figure 28: The area, production of flower cultivation in Son La province	37
Figure 29 Areas of flowers in Son La by districts (%).....	38
Figure 30: Areas of flowers in Son La by types (%).....	38
Figure 31: Cut flower distribution chain in Son La	39

LIST OF TABLES

Table 1: Some key indicators of flower and ornamental plans sector in 2000-2020	9
Table 2: Key characteristics of Lam Dong's cut flowers	23
Table 3 Key characteristics of Hanoi's cut flowers.....	26
Table 4 Key characteristics of Dong Thap's flower and ornamental plant sector	34
Table 5 Key characteristics of Son La's cut flowers.....	38

FOREWORD

It is with pleasure that we present to you the study report on Flowers and Ornamental Plants sector in Viet Nam. The report is commissioned to assess the current state of the Vietnamese flower and ornamental plant industry (potted plants and cut flowers), to identify the challenges and opportunities.

Viet Nam has advantages and enormous potential for the development of flowers and ornamental plants, considering its culture, diverse climate and natural resources for production, its ambition in the world market. The flower and ornamental plant sector plays a vital role in the crop production strategy of the country with vision to 2030. In recent years, the sector has experienced significant growth fueled by both domestic demand and international markets.

However, the sector is still constrained by numerous limitations and has not fully capitalized on its inherent advantages. These limitations diverse from fragmented production, unpredictable climate change development, poor enforcement of suitable policy for sector development, to the absence of qualified science and technology market, qualified labor and increasingly intensive global competition.

We see this report more than a compilation of findings but shedding light on existing issues and factors influencing the sustainable and prosperous future. It implies a call for action to bring the public and the private stakeholders, growers, industry, and knowledge closer. It urges all stakeholders to engage with the insights presented, fostering dialogue, innovation, and collaborative initiatives that uplift the resilience and efficiency of the sector.

Our sincere gratitude goes to the European Union for funding this study through the Brexit Adjustment Reserve and the Netherlands Enterprise Agency (RVO). Our appreciation also goes to the team of AGROINFO for their diligence and expertise in this study.

Thank you and we hope you enjoy reading.

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SUMMARY

Thank to varied climatic conditions, Vietnam has enormous potentiality for the development of flowers and ornamental plants, ranked as the 14th nation with most biodiversity globally and good tradition in this field. Flowers and ornamental plants' products are divided in to two main groups, including cut flowers (Rose, Chrysanthemum, Orchid, Carnation, and Lilies, etc) and ornamental plants (pot flowers and fruits, interior ornamental plants, bonsai trees and others. From 2015 to 2021, the gross output value of flowers and ornamental plants sector increased by nearly 2 times with the average growth rate of 11.8%/year. In 2022, the sub-sector's output was VND 37.97 thousand billion equivalent to 1559 million USD, accounting for 3.99% of the cultivation sector. Total flowers and ornamental plants area was 48.91 thousand ha, mainly in Red River Delta, Mekong River Delta and Central Highland regions. These three regions accounted for 76% of total flowers and ornamental plants area. Top provinces/cities with large area and output of flowers and ornamental plants are Lam Dong (9,740.5 ha), Ha Noi (8,293.65 ha), Nam Dinh (3,390 ha) Ho Chi Minh (2,325 ha), Dong Thap (2,162 ha) and Son La (267ha).

The majority of Vietnam's flower and ornamental plant market is driven by domestic consumption, constituting approximately 90% of the nation's total output. This sub-sector plays a significant role in various aspects of life in various occasions in Vietnam (Lunar new year, marriages, funerals, birthdays, anniversaries, traditional and cultural festivals). With rising incomes allows Vietnam's burgeoning middle class to buy more expensive and exotic flowers and plants. In addition to local consumption, Vietnam's flower indicates significant untapped potential and ample room for growth in the export market. From 2016 to 2022, the export value of flowers and ornamental plants from Vietnam increased with a compound annual growth rate (CAGR) of 8.57% per year. The export value rose from 64.65 million USD in 2016 to a record high of 105.91 million USD in 2022. Vietnam exported flowers and ornamental plants to 44 countries in 2022, with the top 5 markets being Japan, Korea, the Netherlands, the USA and Australia

Although the flower and ornamental plant industry is currently an important industry, contributing to the restructuring of the farming industry, it faces many limitations: (1) scattered and small production scale (only a few key localities have specialized and commercialize areas such as Lam Dong, Hanoi, and Dong Thap); (2) Lack of linkages in the value chains and limited number of businesses; (3) Backward flower and ornamental plant production techniques along with limited advancements in techniques for harvesting, processing, preserving, and packaging products; (4) Unqualified plant varieties and agricultural materials and lack of proper copyrights of most imported flower and ornamental plant varieties; (5) Over usage of Pesticide; (6) Most exported cut flowers are fresh, characterized by low value and perishability while higher durability and added value products represent a tiny portion of the export turnover of cut flowers.

Toward a sustainable development of flowers and ornamental plant sector in Vietnam, it is recommended to supplement and improve policies and specific support to develop and attract investment for the flower and ornamental plant industry in advantaged regions; increase investment in science and technology in production, processing and preservation and promote production linkages along the value chain.

PART 1: INTRODUCTION

1.1. Background

Vietnam has enormous potential for the development of flowers and ornamental plants, ranked as the 14th nation with most biodiversity (Nash, 2023) and having the world's oldest tradition in this field. Vietnam's diverse climate resources, encompassing tropical, subtropical, and temperate regions, enable the cultivation of a wide array of flowers and ornamental plants. Furthermore, Vietnam boasts a rich and varied genetic pool of these plants, encompassing numerous valuable resources that command high demand both domestically and internationally. In recent years, the floriculture and ornamental plant sectors have experienced significant growth in terms of productivity, quality, and efficiency, leading to job creation for thousands of households and contributing significantly to the agricultural industry's GDP. These advancements have facilitated participation in exports, contributing to the agricultural crop restructuring efforts and the establishment of new rural areas. As of 2021, Vietnam has cultivated around 50,000 hectares of flowers and ornamental plants, with an average income of approximately 350 million VND per hectare per year. The production value in 2021 reached 37.9 trillion VND at actual prices, with exports amounting to approximately 80 million USD annually.

The flower and ornamental plant sector play a vital role in the restructuring of Vietnam's cropping sector, offering access to a lucrative consumer market. Despite the previous need to import various types of flowers and ornamental plants, the industry has now witnessed significant growth due to the active participation of enterprises in production. This has not only fulfilled domestic demand but also enabled Vietnam to establish a strong presence in the global market, exporting a diverse range of products with substantial economic value. The demand for flowers and ornamental plants in the country is continuously on the rise. According to the survey data of the Research Institute of Fruits and Vegetables, the demand for flowers and ornamental plants increased by over 11% per year in the period of 2011-2019. The consumption of flowers and ornamental plants increased rapidly, especially in urban area.

Therefore, in the Scheme to develop the flower and ornamental plant sector to 2030, under Decision No. 4081/QĐ-BNN-TT issued by the Ministry of Agriculture and Rural Development on October 26th 2022, by 2030, the flower growing area will be about 43-44 thousand hectares, with an output of about 14-15 billion branches; The ornamental planting area will be about 16.0 - 16.5 thousand ha, with an output of about 55 - 56 million pots/tree. The key flower production areas are in the provinces of Hanoi, Quang Ninh, Hai Duong, Hai Phong, Hung Yen, Thai Binh, Nam Dinh, Lao Cai, Bac Giang, Son La, Thanh Hoa, Thua Thien Hue, Phu Yen, Gia Lai, Lam Dong, and Ho Chi Minh City. These key production areas will form specialized farming areas, based on craft villages, and be associated with rural tourism development. The main solutions to achieve these targets include the application of science and technology, and the development of standard organic and biological farming models. The goal is that by 2023, the flower growing area with high technology applications will account for 15-20%

However, Vietnam's flower and ornamental plant sector is also facing several limitations in both production and the market. The current production of ornamental flowers in Vietnam is mostly spontaneous, lacking a cohesive master plan and a long-term strategic outlook for future development. Moreover, specific solutions for sustainable growth are also lacking. Many varieties of beautiful ornamental flowers and plants with high commercial value are imported from abroad and are protected by copyright, limiting local production. Additionally, the consumption and market development for Vietnam's flower and ornamental products are constrained, particularly since the outbreak of the Covid-19 epidemic, which led consumers to reduce spending on non-essential goods and services. Despite these limitations, the flower and ornamental plant industry in Vietnam has the

potential to grow. The government has set ambitious targets for the industry, and there are a number of opportunities for growth, such as the increasing demand for flowers and ornamental plants in the domestic market and the growing export market. In order to achieve its full potential, the industry needs to address the limitations that it faces.

1.2. Objective

The objective is to assess the current state of the Vietnamese flower and ornamental plant sector (potted plants and cut flowers), identify the challenges and opportunities, then propose solution to develop a sustainable and profitable sector which is resilient and adaptable to the climate challenge.

1.3. Research methodology

1.3.1. Data collection

1.3.1.1. Secondary data collection

The research team reviewed related documents on current situation of Vietnamese flower and ornamental plant sector with the consideration of these issues: production, markets (import and export), distribution system, marketing and promotion of flowers and ornamental plants. The study also conducted a review of policies and strategies on Vietnamese flower and ornamental plant sector. In addition, secondary data and information were collected from General Statistics Office, Ministry of Agriculture and Rural Development; Department of Agriculture and Rural Development, Sub-Department of Crop to describe the status of flower and ornamental plant sector in Vietnam as well as in the selected provinces.

1.3.1.2. Primary data collection

a) Sampling method

Site selection: The research team selected 5 cities/provinces, including Hanoi, Ho Chi Minh city, Lam Dong, Dong Thap, Son La for the field study. The 5 provinces are selected based on the criteria: (1) large area and output of flowers and ornamental plants; (2) large consumption markets of flowers and ornamental plants.

Target respondents: The research team consulted and surveyed information of stakeholders related to Vietnamese flowers and ornamental plants sector in 5 cities/provinces. Target respondents include local authorities, farmers, enterprises, cooperatives, and flower associations.

Stakeholders	Hanoi	Ho Chi Minh City	Lam Dong	Dong Thap	Son La	Total	Survey tool
Local Gov.	2	2	2	2	2	10	Discussion, secondary data collection (reports, statistics, policies, etc.) Key informant interview
Enterprise	5 enterprises/province					25	Questionnaire;
Cooperative	5 cooperatives/province					25	
Farmer	10	10	10	10	10	50	Questionnaire; Focus group discussion
Others	Vietnam Ornamental Flower Association; Dalat Flower Association; etc. Wholesalers in Hanoi and HCM city;					10	Discussion, secondary data collection (reports, contacts of potential business partners, etc.); Key informant interview

Stakeholders	Hanoi	Ho Chi Minh City	Lam Dong	Dong Thap	Son La	Total	Survey tool
TOTAL						120	

b) Survey method

In-depth interviews using questionnaires with stakeholders including local authorities (Department of Agriculture and Rural Development at provincial level), companies, cooperatives and farmers to collect in-depth information on the current state of the Vietnamese flower and ornamental plant sector, and identify the challenges and opportunities of the sector.

Focus group discussion (FDG) with smallholder farmers to have understanding of flower and ornamental plant value chain, market information, marketing and promotion, and consumer preferences.

1.3.2. Analysis method

In this study, descriptive analysis of current situation of flowers and ornamental plants sector in Vietnam as well as selected provinces was conducted to have a better understanding of the flowers and ornamental plants sector in Vietnam. The value chain analysis in 5 selected provinces was conducted to clarify the roles and relationships of stakeholders in the flower and ornamental plants sector in Vietnam, finding out the key factors that can enhance efficiency, productivity, and sustainability across various stages of the value chain. In addition, the SWOT analysis was also utilized to assess strengths, weaknesses, challenges, and opportunities of the flower and ornamental plant sector in Vietnam. This analysis helped with strategic decision-making, identifying areas for improvement, exploiting opportunities, and addressing potential threats. It served as a foundation for developing effective strategies and action plans to achieve sustainable goals of the flowers and ornamental plants sector.

PART 2: OVERVIEW OF FLOWERS AND ORNAMENTAL PLANTS SECTOR IN VIET NAM

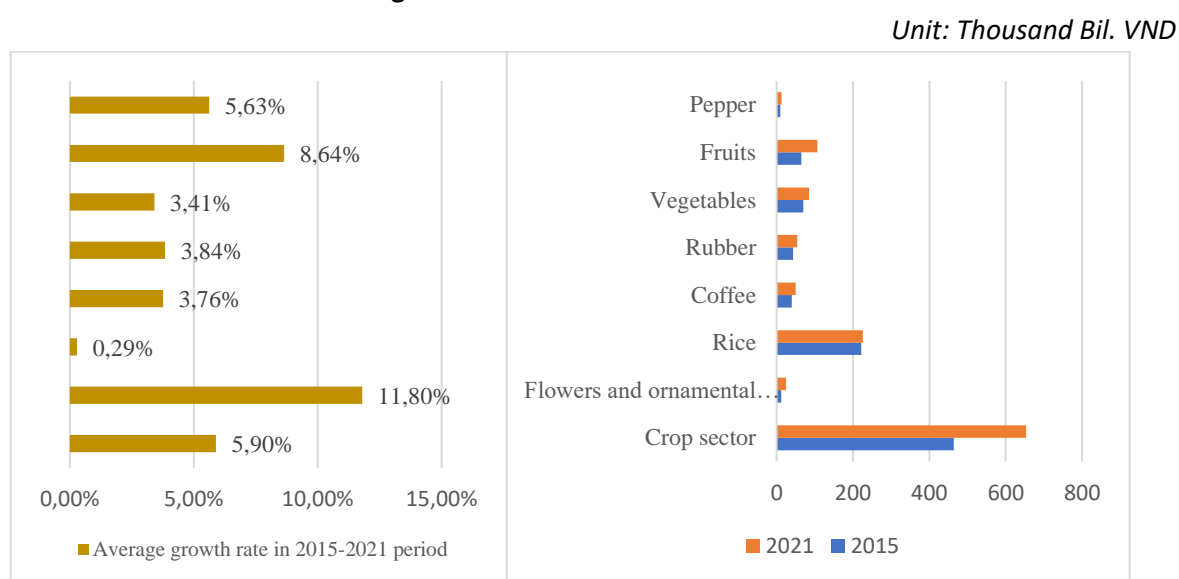
This section will present an overall picture of the development of flower and ornamental plants sector in Vietnam. The dimensions of production, trade, market and consumer preferences and SWOT analysis will be considered thoroughly.

2.1. Overview of flowers and ornamental plants sector in Viet Nam

Vietnam is a country that has tradition of growing flowers and ornamental plants with appropriate natural condition. Geographical location, soil conditions, diverse climate condition in both tropical, subtropical and temperate, so it can grow many types of flowers and ornamental plants. In recent years, flowers and ornamental plant sector has dramatically developed, bringing high economic value and income for producers. Many provinces have identified flowers and ornamental plants as an important economic sector.

From 2015 to 2021, the gross output value of flowers and ornamental plants sector increased by nearly 2 times with the highest average growth rate of 11.8%/year in comparison with crop sector and other sub-sectors. In 2021, the sector's gross output was VND 37.97 thousand billion equivalent to 1559 million USD, accounting for 3.99% of total gross out of crop sector (Figure 1).

Figure 1: The gross output of selected sector and sub-sectors at constant 2010 price and average growth rate in 2015 and 2021



Source: Statistical Yearbook of Provinces

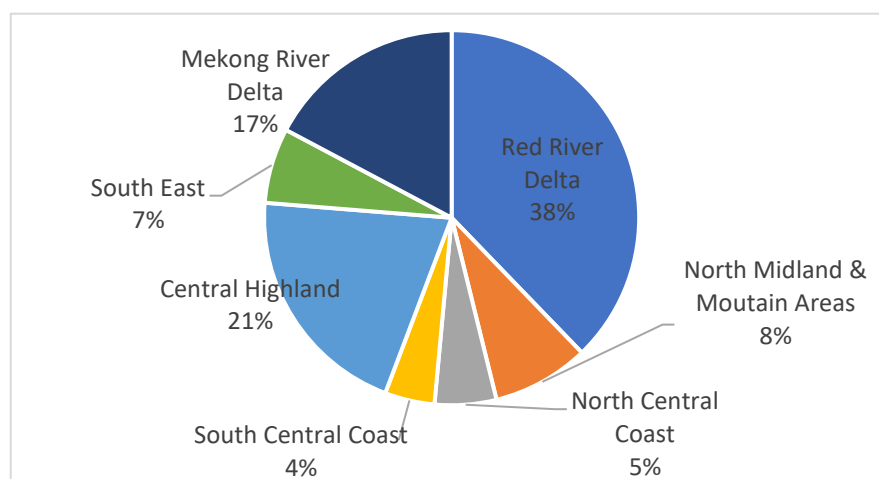
From 2000 to 2020, there was a sharp increase in both area and average income of flowers and ornamental plants. In 2015-2020 period, the average growth rate of the area and average income of flowers and ornamental plants was 11.03%/year and 13.18%/year, respectively. Specially, the average income from planting flowers and ornamental plants was very high (520 Mil.VND/ha/year) in comparison with other crop sub-sectors (about 100-200 Mil.VND/ha) (Table 1).

Table 1: Some key indicators of flower and ornamental plans sector in 2000-2020

	2000	2005	2010	2015	2020
Total area (ha)	6,800	11,600	22,000	26,672	45,000
Average income (Mil.VND/ha/year)	125	160	220	280	520

In 2021, total flowers and ornamental plants area was 48.91 thousand ha, mainly in Red River Delta, Mekong River Delta and Central Highland regions. These three regions accounted for 76% of total flowers and ornamental plants area. The provinces that have the largest area of flowers and ornamental plants area in Vietnam include Lam Dong in Central Highland (9.14 thousand ha), Ha Noi (7.8 thousand ha) and Nam Dinh (3.39 thousand ha) in Red River Delta, Dong Thap (2.17 thousand ha) in Mekong River Delta.

Figure 2: Total area of flower and ornamental plants in 2021 by regions



Source: Statistical Yearbook of Provinces

Vietnamese government has been encouraging the application of high-technology and digital technology in agriculture sector, including flowers and ornamental plants. There are many models applying high-technology in planting and producing seeds in flowers and ornamental plants sector. High-technologies have been applied such as net and glass houses, drip irrigation system, mist spray system, automatic control system in planting and tissue culture and asexual propagation technology to select high quality seed. According to Vietnam Ornamental Creature Association, the applied high-tech area of flowers and ornamental plants in 2021 was 5169.1 ha, accounting for 10.5% of total area. Central Highland takes the lead in applying high-technology with 3130 thousand ha, about 60.5 of total high-tech application area.

Flowers and ornamental plants' products are divided in to two main groups, including cut flowers (such as: Rose, Chrysanthemum, Orchid, Carnation, and Lilies) and ornamental plants. The ornamental plants include pot flowers and fruits, interior ornamental plants, bonsai trees and others.

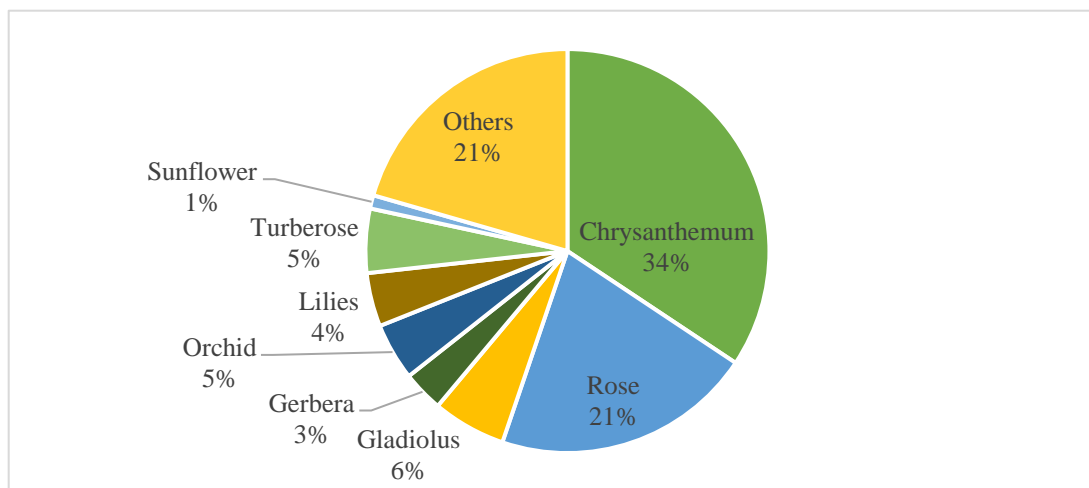
Cut flowers

In Vietnam, flowers are planted in most of provinces but there are three largest flower areas, including Red River Delta, Central Highland and Mekong River Delta. In 2021, total flowers area was 34.287 thousand area, increasing by 9.74 thousand ha comparing to 2015. Lam Dong is the largest flower area with 9.08 thousand ha, following by Ha Noi (9.67 thousand ha) and Dong Thap (2.55 thousand ha). In terms of production, cut flowers production in 2021 was about 9.687 billion branches, concentrating in Central Highland with 3.85 billion branches, Red River Delta with 2,37 billion branches, and Mekong Delta with 1.257 billion branches.

¹ <https://hoinhap.vanhoavaphattrien.vn/thuc-trang-tiem-nang-va-dinh-huong-nghien-cuu-phat-trien-hoa-cay-canh-viet-nam-a5880.html>

The main cut flowers include Chrysanthemums, Roses, and Gladiolus with the largest planted area of 11.8 thousand hectares, 7.2 thousand hectares, and 2 thousand hectares, respectively. Chrysanthemums are grown mainly in the Central Highlands and Red River Delta with an area of 5.9 thousand hectares and 3.3 thousand hectares, respectively, accounting for 50% and 28% of the total chrysanthemum area. Meanwhile, Roses are grown mainly in the Red River Delta with an area of 7.2 thousand hectares, accounting for 45% of the total rose area. Gladiolus is mainly planted in Central Highland with area of 1.2 thousand hectares, accounting for 60% of the country's total gladiolus area.

Figure 2: Cut flowers production by types



Source: 2022 Statistical Yearbook of provinces

Ornamental plants

The ornamental plants include pot flowers and fruits, interior ornamental plants, bonsai trees and others.

Pot flowers and fruits are including peach blossom, apricot, ornamental kumquat, orange and pomelo. These groups have been mainly used in many households in Tet holiday.

Orchid group includes many types of orchids in different color such as Phalaenopsis orchids, Cymbidium orchids. In recent years, The Fruits and Vegetables Research Institute has researched to create many types of orchid and farming process from small to large scale.

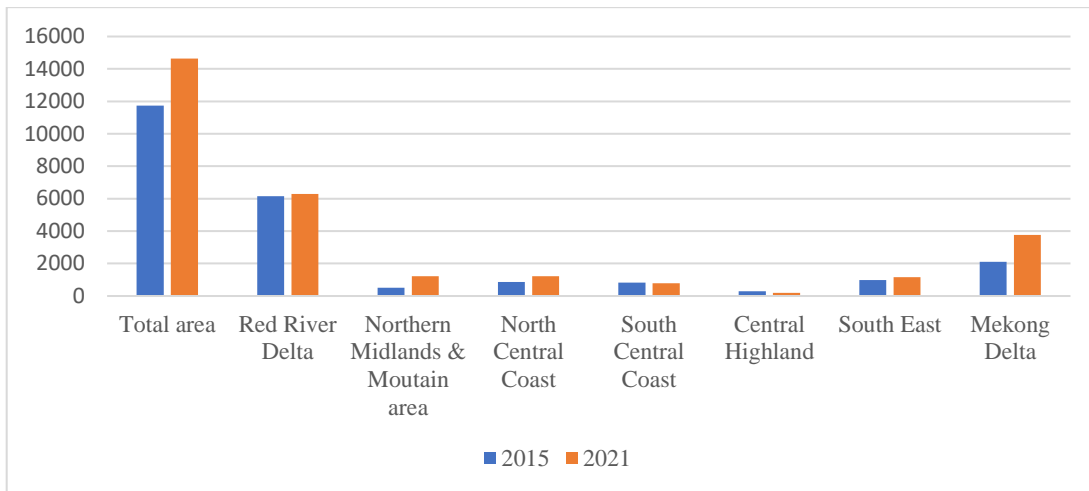
Interior ornamental plants include some small flowers and trees that are used to decorate house or office, such as poinsettia, anthurium, raspberry chrysanthemum, petunia, spring leopard, hydrangea, tulip, ...

Bonsai sub-sector are restructuring process towards diversifying and lowering price to meet the market demand.

Others ornamental plants include supporting flowers and leaves that enhance the beauty of a flower basket. Commonly used types of branches and leaves are cycad, cycad, magnolia, small-leaved areca palm, laurel, colored leaves...

In 2021, ornamental plants area of Vietnam was 14.641 thousand ha, increasing by 2.9 thousand ha in comparison with 2015 with average growth rate of 3.8%/year in 2015-2021 period. Red River Delta is the largest area of ornamental plants with 6.3 thousand ha (accounting for 43.1% of total area) but Mekong Delta has the highest area growth rate of 10.1%/year in 2015-2021 period.

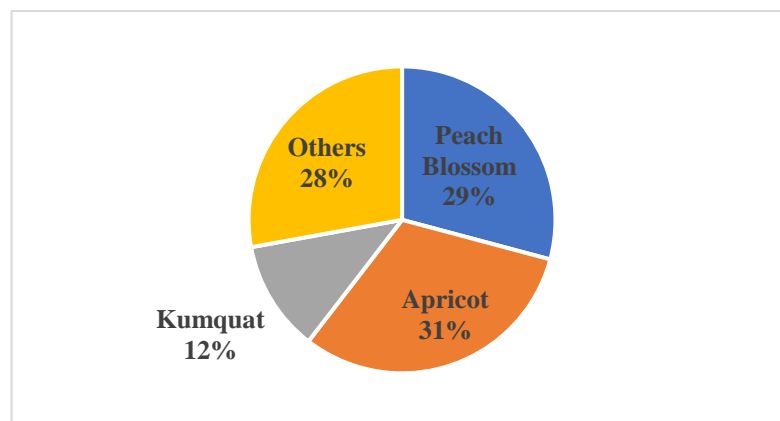
Figure 3: Ornamental plants area in 2015 and 2021 by region



Source: 2022 Statistical Yearbook of provinces

Peach Blossom, Apricot and Kumquat are three main ornamental plants that have the largest area. In 2021 the area of these three ornamental plants was 10.563 thousand ha, accounting for about 72% of total ornamental plants area. Of which Apricot and Peach Blossom area was 4.6 thousand ha and 4.2 thousand ha, respectively while the kumquat area was 1.712 thousand ha. Apricot is grown mainly in the South; Peach Blossom and Kumquat are grown in the North.

Figure 4: Ornamental plants area in 2021 by types



Source: Source: 2022 Statistical Yearbook of provinces

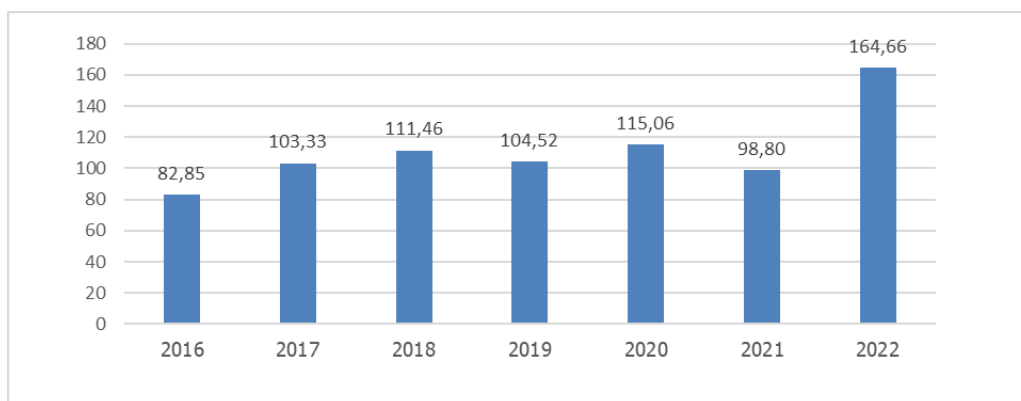
2.2. Trade

2.2.1. Import

In addition to domestic production, Vietnam imports many flowers and ornamental plants from other markets worldwide. In 2016-2022, Vietnam's import value of flowers and ornamental plants increased with a compound annual growth rate (CAGR) of 12.13%/year, from 82.85 million USD in 2016 to 164.66 million USD in 2022.

Figure 5: Vietnam's import value of flowers and ornamental plants in the period 2016-2022

Unit: million USD

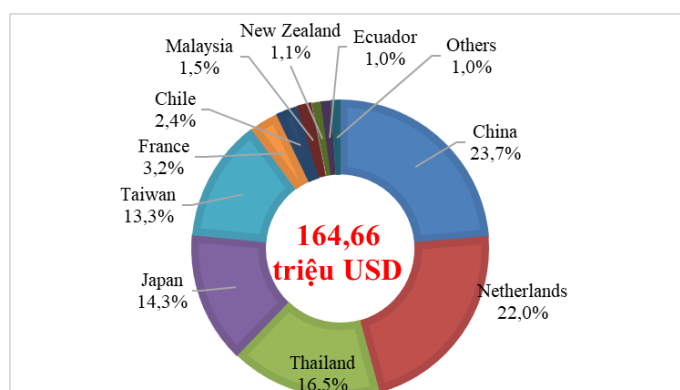


Source: General Department of Custom

Except for 2019, where import value decreased slightly by 6.22%, and 2021 decreased by 14.13%, due to the impact of the COVID-19 pandemic, all other years recorded positive growth. In particular, in the context of a robust economic recovery after more than two years of difficulties caused by the Covid-19 epidemic, the import value of flowers and ornamental plants in 2022 has reached a record level of 164.66 million USD, an increase of 66.67% compared to 2021. This shows that the demand for flowers and ornamental plants among Vietnamese people and the need for imported varieties for flower and ornamental plant production are increasing. The domestic market has not met consumers' quality, diversity, and novelty needs, especially in the high-income customer segment. Many imported flowers and ornamental plants have advantages in color, fragrance, shape, and durability compared to domestic flowers and ornamental plants.

According to General Department of Customs statistics, Vietnam imports flowers and ornamental plants from 31 countries. Of these, the five main supply markets for Vietnam are China 39.03 million USD, accounting for 23.7%; Netherlands 36.27 million USD (accounting for 22.02%); Thailand 27.18 million USD (accounting for 16.5%); Japan 23.49 million USD (accounting for 14.3%); Taiwan 21.93 million USD (accounting for 13.3%).

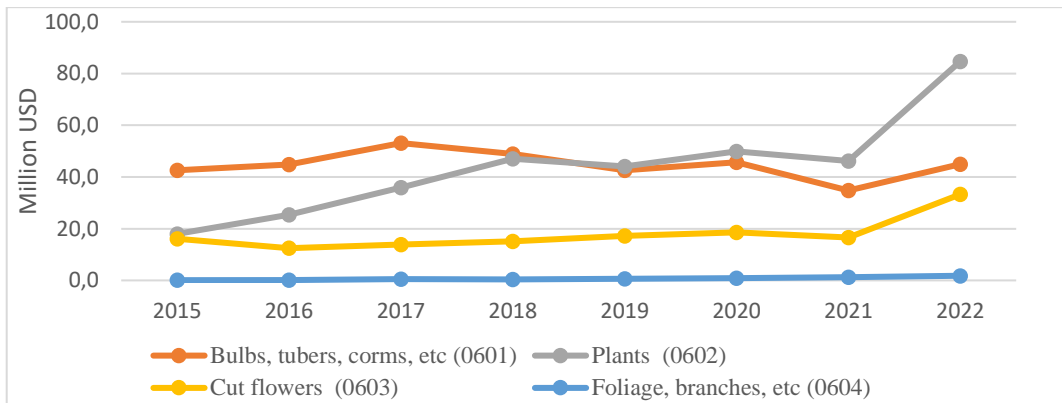
Figure 6: Structure of Vietnam's flower and ornamental plant import market in 2022



Source: General Department of Custom

The imported flowers and ornamental plants into Vietnam are categorized into four main groups: Bulbs, tubers, corms, etc. (HS0601); Plants (HS0602); Cut flowers (HS0603); Foliage, branches, etc. (HS0604). From 2015 to 2022, the import values of all four groups showed an increasing trend despite fluctuations in group 0601. Specifically, the import value of group 0602 experienced significant growth, rising from 18 million USD in 2015 to 84.7 million USD in 2022, accounting for the largest share in the total import value of flowers and ornamental plants in 2022.

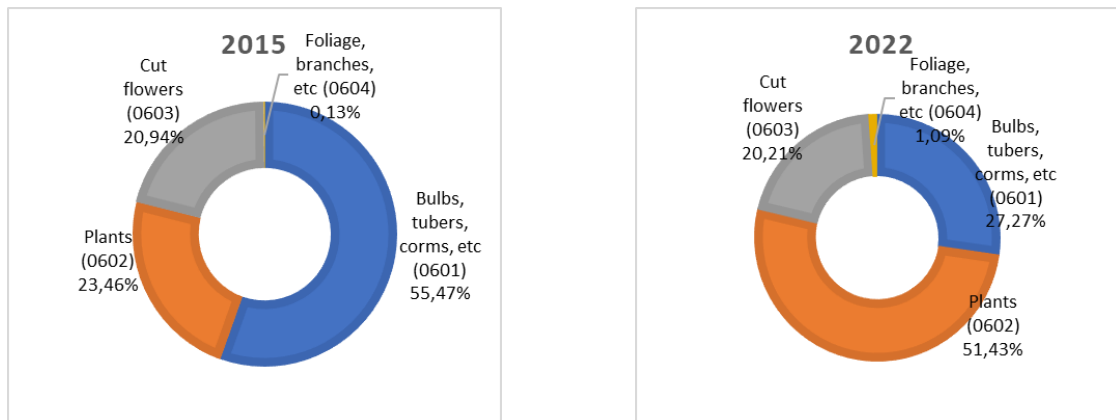
Figure 7: Import value of 4 main types of flowers and ornamental plants in the period 2015-2022



Source: General Department of Custom

Over the past eight years, the import structure has undergone a significant shift, with a substantial increase in the proportion of plants (HS 0602) and a considerable decrease in the share of bulbs, tubers, corms, etc. (HS 0601). Specifically, the share of plants (HS 0602) has experienced a substantial rise from 23.46% in 2015 to 51.43% in 2022. Conversely, bulbous flowers and ornamental plants achieved a trade value of 44.9 million USD in 2022, showing an increase in value but a sharp decline in proportion, decreasing from 55.47% in 2015 to 27.3% in 2022. The primarily imported bulbous plants include lily bulbs from the Netherlands and New Zealand. The cut flowers group (HS 0603) saw a slight decrease in proportion from 2015 to 2022.

Figure 8: Structure of imported flowers and ornamental plants in Vietnam



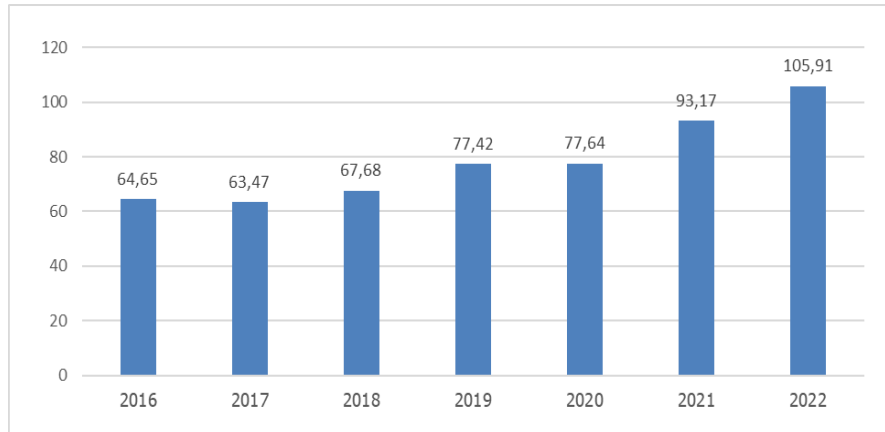
Source: General Department of Custom

2.2.2. Export

From 2016 to 2022, the export value of flowers and ornamental plants from Vietnam increased with a compound annual growth rate (CAGR) of 8.57% per year. The export value rose from 64.65 million USD in 2016 to a record high of 105.91 million USD in 2022. Although flowers and ornamental plants do not constitute a significant export commodity for Vietnam (accounting for only 0.2% of the total export value of agricultural products in 2022), the escalating export value of this category reflects positive developments in Vietnam's flower and ornamental plant exports.

Figure 9: Vietnam's flower and ornamental plant export value from 2016-2022

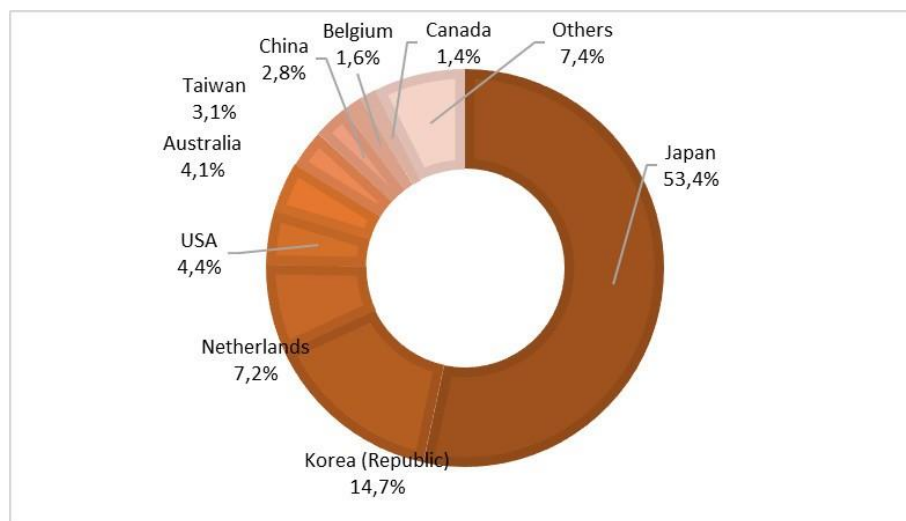
Unit: million USD



Source: General Department of Custom

According to trade statistics of Vietnam Customs, Vietnam exported flowers and ornamental plants to 44 countries in 2022, with the top 5 markets being Japan, Korea, the Netherlands, the USA and Australia. In which, Japan is the largest import market of Vietnam with an imported value of 56.51 million USD, accounting for 53.4% of Vietnam's total export value of flower and ornamental plant, ranked second is Korea with 15.55 million USD, accounting for 14.7% of Vietnam's total export value. The third is Netherlands with 7.66 million USD, accounting for 7.2% of Vietnam's total export value, ranked 4th is USA with 4.61 million USD, accounting for 4.4%.

Figure 10: Vietnam's flower and ornamental plant export market structure in 2022



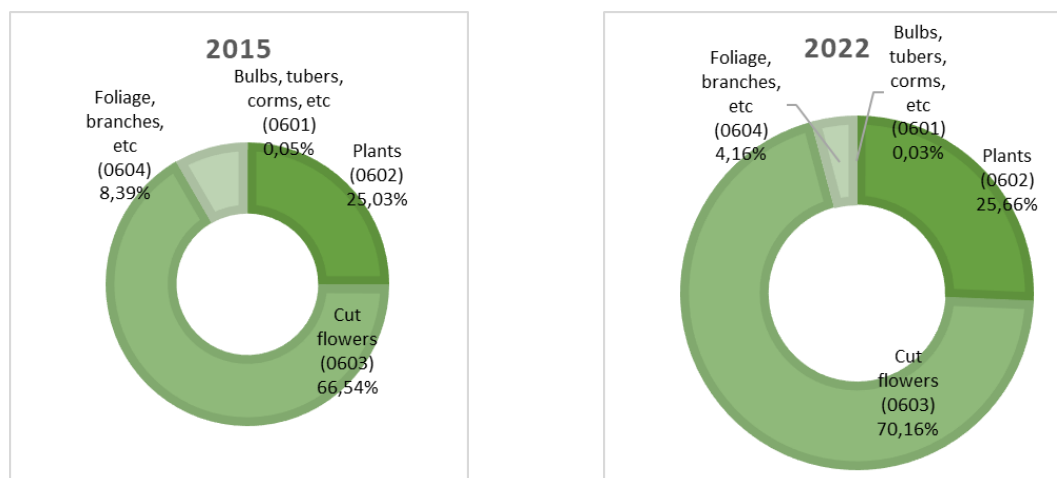
Source: General Department of Custom

From 2015 to 2022, the structure of export product groups for flowers and ornamental plants remains *mostly unchanged*. Cut flowers (HS0603) consistently dominated the export share, increasing from 66.54% in 2015 to 70.16% in 2022. The second largest share was maintained by live plants (HS0602), which had a minor increase from 25.03% in 2015 to 25.66% in 2022. By contrast, the export share of foliage, branches, etc. (0604) decreased from 8.39% to 4.16% between 2015 and 2022, however it was still ranked third. The bulb group (0601), which always had the smallest share, shown a slight decrease in share from 0.05% to 0.03% between 2015 and 2022.

In 2022, the export turnover of cut flowers reached 74.3 million USD, marking an impressive increase of 131.3% compared to 2015 and 53.2% compared to 2021. This indicates a growing preference for

Vietnamese flowers in the global market, attributed to their durability and significantly competitive pricing compared to Dutch flowers.

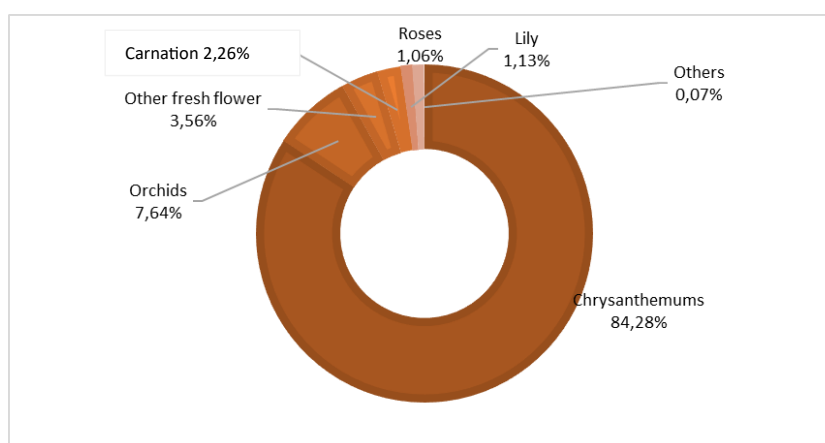
Figure 11: Structure of flowers and ornamental plants exported by Vietnam



Source: General Department of Custom

Regarding the types of exported flowers, 99.9% consist of fresh flowers, while the remaining 0.07% are dried, dyed, bleached, or processed flowers. Among fresh flowers, chrysanthemums are the highest-value export item, reaching 62.62 million USD and accounting for 84.28% of Vietnam's total export turnover in the cut flowers category in 2022, followed by (7.64%), Carnation (2.26%), lily (1.13%), roses (1.06%), and other flower varieties (3.56%).

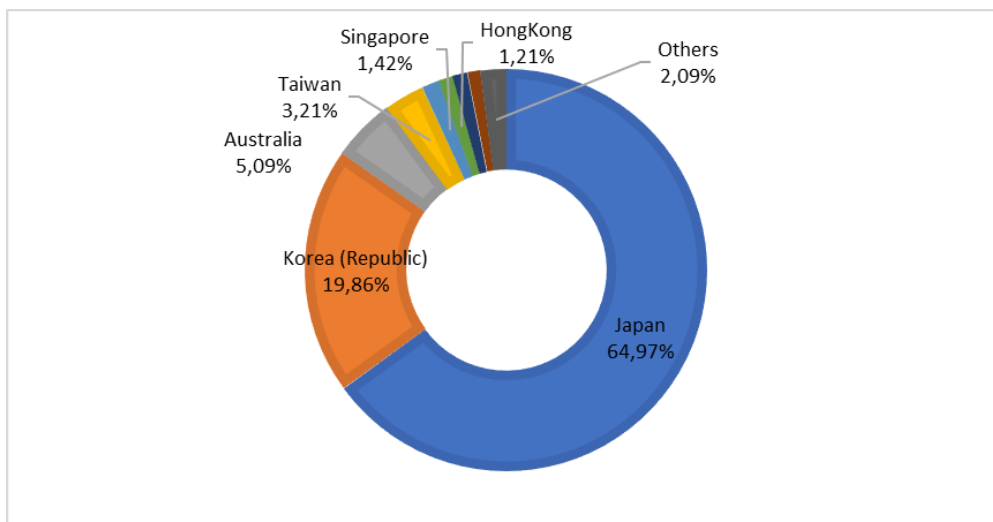
Figure 12: Structure of cut flower export types of Vietnam in 2022



Source: General Department of Custom

Japan is the largest export market for cut flowers from Vietnam, with an export turnover of 48.3 million USD, accounting for 64.97% of Vietnam's total export turnover in the cut flowers category in 2022. Additionally, Vietnam also exports flowers to South Korea (19.86%), Australia (5.09%), Taiwan (3.21%), Singapore (1.42%), Hong Kong (1.21%), and China (1.16%).

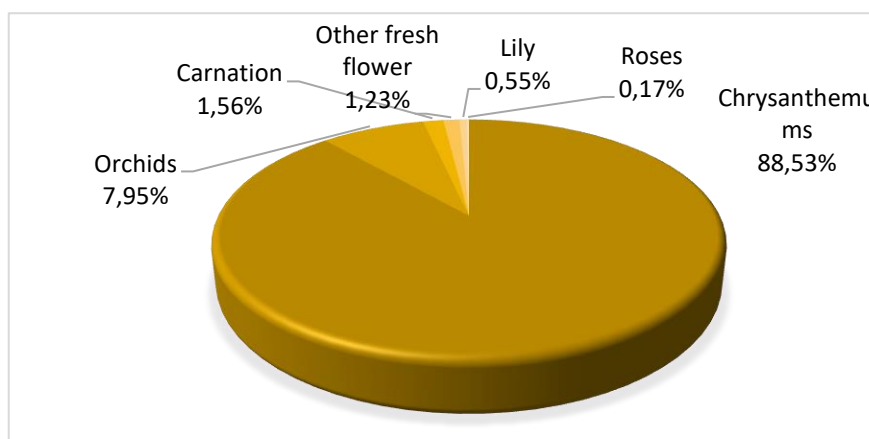
Figure 13: The main market of Vietnam cut flower export in 2022



Source: General Department of Custom

Vietnam is a significant supplier of flowers to the Japanese market. In 2021, Japan's flower imports totaled 528 million USD, with imports from Vietnam reaching 45 million USD, accounting for 8.52% and ranking fourth among flower-exporting markets in Japan. The number of people from Asian countries living and working in Japan is currently around 10 million, including approximately 500,000 from Vietnam. As a result, Vietnamese flower products are increasingly recognized and well-received by the Japanese and the Vietnamese community and people from other Asian countries in the Japanese market. These positive signals indicate that Vietnamese flowers have great potential to increase its market share in Japan.

Figure 14: Structure of fresh flowers exported to Japan in 2022



Source: General Department of Custom

Japan only imports fresh-cut flowers from Vietnam, primarily chrysanthemums, constituting 88.53% of the total flower export turnover to Japan in 2022. Additionally, Japan imports other flower varieties such as orchids, gladioli, lilies, roses, and various fresh flowers. Despite chrysanthemums being the national flower of Japan, challenging natural conditions and high labor costs hinder their extensive cultivation in the country. In contrast, Vietnam has favorable natural conditions and low labor costs, providing good conditions for exporting Vietnamese chrysanthemums to Japan. For decorative flowers and various imported agricultural products, Japan highly emphasizes safety and health standards for its consumers. Therefore, the chemicals used for preserving the freshness of flowers must comply with Japan's stringent regulations. Vietnamese flowers must meet over 1,000 quality criteria to be exported to Japan.

2.3. Market and consumer preferences

2.3.1. Market value

The majority of Vietnam's flower and ornamental plant market is driven by domestic consumption, constituting approximately 90% of the nation's total output. With a population of 99.47 million as of 2022, Vietnam, ranked as the 15th most populous country globally, has significant demand for flowers and ornamental plants. In addition to domestic supply sources, Vietnam annually imports a substantial quantity of flowers and ornamental plants to fulfill the high demand from local consumers.

In recent years, the income of Vietnam citizens has increased significantly. In 2022, the monthly per capita income is projected to reach 4.67 million VND at current prices, marking a nearly 3.4 times increase from the 2010 figure. As incomes rise, individuals tend to allocate more resources to non-essential expenditures, such as flowers and ornamental plants. Additionally, the ongoing urbanization process plays a pivotal role in driving the demand for these products. In the past 5 years, the demand for flowers and ornamental plants in Vietnam has increased by about 15%/year. According to the Institute of Fruit and Vegetable Research, on average, a Vietnamese person spends approximately 2 USD/year to buy flowers.

Although the flower and ornamental plant market in Vietnam has developed significantly in recent years, it is still considered a young market. According to Mordor Intelligence, the Vietnam floriculture market size is growing at a CAGR of 10.49% during the forecast period (2023-2028)². However, flowers are mainly used in anniversary, holidays or for worship purposes. Only 18.2% of flower buyers in Hanoi and 8.6% in Ho Chi Minh City buy flowers for daily enjoyment. Vietnam's consumption of flowers and ornamental plants is still low compared to other countries and unevenly distributed. Spending each year on flowers and ornamental plants in Vietnam is only about 1.85 EUR/person, while in Spain it is 14 EUR/person, France is 78 EUR/person, Japan is 37 EUR/person, and America is 101 EUR/person³. In rural areas, the corresponding consumption level is only 20% of that in urban areas. In addition to personal consumption, the demand for flowers and ornamental plants for services such as floral and garden design, landscaping, green urban planning, green urban maintenance is also growing in Vietnam. However, statistical data for this market's development is currently unavailable.

Currently, the consumer market has two main channels: the traditional channel through the market system (including wholesale markets, retail markets, stalls, and street vendors) and the modern channel through shops, supermarkets, and shopping centers. Besides offline purchases remain popular, especially in rural areas where up to 90% of people prefer buying directly, the development of E-commerce has promoted online consumption of flowers and ornamental plants in Vietnam. The convenience offered by digital platforms, especially during the Covid-19 pandemic, has led to a significant increase in online flower purchases. Many businesses, responding to changing consumer habits, have established online flower shops, with approximately 60% of flower production and distribution businesses engaging in online sales. The demand for online flower orders has surged, constituting 50-70% of some shops' revenues. Urban areas witness a higher inclination towards online flower orders compared to rural areas, attributed to better access to modern applications and a greater concentration on online flower shops.

2.3.2. Consumer preferences

In Vietnam, flowers and ornamental plants play a significant role in various aspects of life. For private market segments, individuals frequently use flowers and ornamental plants for various occasions (such as Lunar new year, marriages, funerals, birthdays, anniversaries, and more). Specifically, flowers and

² [Floriculture Market in Vietnam - Size, Share & Industry Analysis \(mordorintelligence.com\)](https://mordorintelligence.com)

³ https://aiph.org/wp-content/uploads/yearbook/SYB_2021-updated-2.pdf

ornamental plants are an integral part of Lunar New Year celebrations in Vietnam with huge cultural significance. Flowers are placed as offerings to the ancestors at altars in homes and businesses around the country. The most consumed products during Tet holidays such as roses, chrysanthemums, lilies, gerberas, orchids, peach blossoms/plants, apricot flowers/plants, etc. The North and the South have different consumption patterns. During Tet, the North prefers peach blossoms/plants or kumquat trees, whereas the South chooses apricot plants. According to the spiritual concepts, they consider these flower/plants to bring luck and help every family have a happy and prosperous year. Vietnam also has many traditional and cultural festivals and events throughout the year so the demands for flowers is very high. In addition, many Vietnamese people follow Buddhism region and they have the custom of praying every two weeks

Flowers also account for a significant portion of the overall expenditure budget for weddings and are considered to have a high cultural significance during marriage ceremonies in Vietnam⁴. Flowers are also cherished as special gifts exchanged among Vietnamese people, who often use flowers as a means to express love, gratitude, and sincerity.

In addition, people are also increasingly investing in their gardens, landscaping as well as in interior decoration, which is contributing to the growth of the market. For decoration purpose, people tend to choose flowering and foliage pot plants over fresh-cut flowers because they have greater durability and practicality in care. Currently, more and more people view flowers and plants not merely as decorations but also lifestyle products that symbolize their identity values and to enhance their well-being.

There is an increasing disparities in spending on flowers and ornamental plants among different income groups and between urban and rural areas in Vietnam. In urban areas, where living standards are higher, there is a robust demand for premium flowers for various occasions and ornamental plants for home and office decoration. Moreover, urban residents are growing concern about the negative impacts of cities on the environment and life quality, leading to a strong desire to reestablish direct connections with nature. As the expansion of urban upper and middle classes, there is an essential need to incorporate green elements into their lives. This shift in lifestyle preferences is expected to drive increased demand for both flowers and ornamental plants in homes and offices, both in terms of volume and value, while decrease its sensitivity to price fluctuations⁵. Domestic producers and traders need to grasp the flower consumption preferences of urban dwellers, especially high-income groups, to take advantage of market opportunities.

Private companies and public organizations also have increasing demand for flowers and ornamental plants. They have acknowledged the positive impacts of flowers and plants on the creativity, productivity, health, and happiness of workers, and the qualification of work spaces. Interior design companies also often use ornamental plants to decorate offices, shopping malls, restaurants, hotels, etc. Large plants are favored for decoration in new or renovated projects, and public spaces. In addition, the increase in private and government-sponsored events (such as festivals, meetings, conferences) has significantly boosted flower and ornamental plants consumption in Vietnam. In Ho Chi Minh City, the market share for events and conferences in the city alone has surpassed 82.61 million USD, distributed across various venues.

⁴ https://www.technavio.com/report/floriculture-market-industry-in-vietnam-analysis?utm_source=prnewswire+&utm_medium=pressrelease&utm_campaign=RDT_wk34_2023_018_rr2&utm_content=IRTNTR72320

⁵ Centre for the Promotion of Imports from Developing Countries of The Netherlands Ministry of Foreign Affairs (CBI). What Requirements Should Your Cut Flowers and Foliage Comply with to Be Allowed on the European Market? CBI Ministry of Foreign Affairs Market Information. 4 May 2017. Available online: <https://www.cbi.eu/market-information/cut-flowersfoliage/buyer-requirements>.

2.4. SWOT analysis

The SWOT analysis would clarify strengths, weakness as well as opportunities and threats to Vietnam’s flowers and ornamental plant sector.

<p style="text-align: center;">Strengths</p> <ul style="list-style-type: none"> • Favorable climate and soil suitable for growing flowers and ornamental plants in different climates • Diverse and rich varieties of flowers and ornamental plants, especially diverse genetic source of orchids. • Cheap labor cost and hardworking farmers • Many support policies from State and local government for the development of crop sector in general (funding research projects, conservation and development of genetic resources; high-quality flower and ornamental plant production models, and breeding programs; science and technology transfer program) • Vietnam's production technology and techniques have been improved significantly 	<p style="text-align: center;">Weakness</p> <ul style="list-style-type: none"> • Small sub-sector and lack of a distinct policy framework for its development. • Scattered and small production scale (only a few key localities have specialized and commercialize areas such as Lam Dong, Hanoi, and Dong Thap). • Lack of linkages in the value chains and limited number of businesses • Backward flower and ornamental plant production techniques along with limited advancements in techniques for harvesting, processing, preserving, and packaging products. Only around 45% of the flower and ornamental plant areas were applied with modern agricultural techniques, with approximately 25% of cultivation indoors. • Unqualified plant varieties and agricultural materials and overuse of pesticide • Most exported cut flowers are fresh, characterized by low value and perishability while higher durability and added value products represent a tiny portion of the export turnover of cut flowers. • Lack of proper copyrights of most imported flower and ornamental plant varieties.
<p style="text-align: center;">Opportunities</p> <ul style="list-style-type: none"> • Increasing domestic demand for flowers and ornamental plants due to the increase in population and living standard. Vietnam's population is projected to increase from 98.8 million in 2023 to 104 million in 2030. • Significant untapped potential and ample room for growth in the export market. The global flower and ornamental plants market is valued at USD 40.25 billion in 2022 and is forecasted to reach USD 61.51 billion by 2027, with a compound annual growth rate (CAGR) of 8.8%. • Active engagement and integration into the global economy with the reduction of tariffs and commitments to equitable treatment within new-generation Free Trade Agreements (FTAs) 	<p style="text-align: center;">Threats/Challenges</p> <ul style="list-style-type: none"> • The rapid urbanization process reduces the agricultural land area and putting pressure on specialized areas for flower and ornamental plant cultivation. • Stiff competition from other countries, such as the Netherlands, Kenya, and Ecuador, which are major producers of flowers and ornamental plants. • For domestic markets, the reduction of import taxes according to the commitment schedule when implementing FTAs leads to locally produced flowers and ornamental plants facing strong competition from imported products. • For international markets, flower producers have to face increasingly strict quality requirements and phytosanitary barriers in developed markets such as the EU, the United States, and Japan.

<ul style="list-style-type: none">• Opportunities from the development of science and technology, coupled with the digitalization• Improvement of logistics infrastructure facilitating the production and consumption of flowers and ornamental plants on a large scale and at a higher level.	<ul style="list-style-type: none">• Complicated climate change and natural disasters are major threats to the productivity and quality of flower and ornamental plants.• Threats of unauthorized replication of varieties or unofficial imports for cultivating flowers and ornamental plants.
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PART 3: VALUE CHAIN ANALYSIS OF FLOWERS AND ORNAMENTAL PLANTS IN 5 TARGETED REGIONS

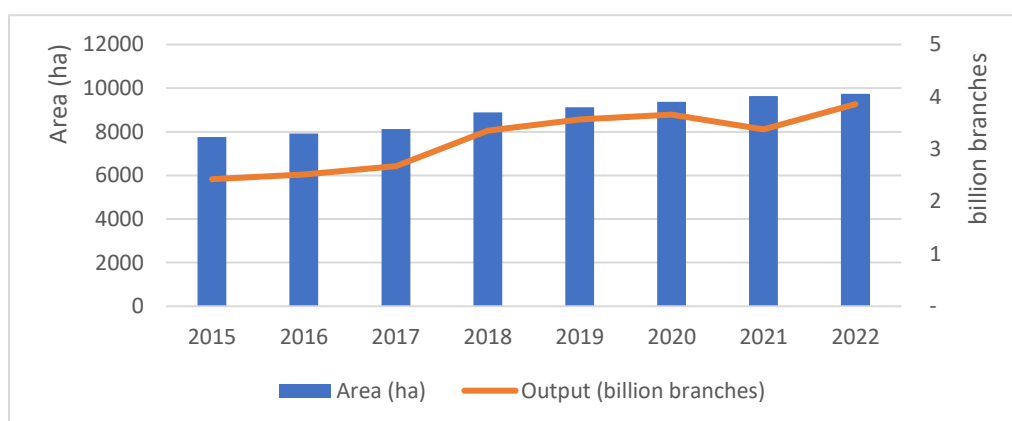
In this section, the research team carried out value chain analysis of flower and ornamental plants in 5 cities/ provinces of Hanoi, Ho Chi Minh city, Lam Dong, Dong Thap, Son La where have large area and output of flowers and ornamental plants and large consumption markets of flowers and ornamental plants to have a more detailed picture on this sub-sector in Vietnam.

3.1. Lam Dong

3.1.1. Key characteristics of major market segments

Lam Dong province, located in the southern Central Highlands of Vietnam is currently one of the leading flower capitals in the country. According to a report by the Lam Dong Department of Agriculture and Rural Development, the flower growing area of Lam Dong province has rapidly increased from 7,761.4 hectares in 2015 to 9,740.5 hectares in 2022, with an average annual growth rate of about 3.3% per year. Additionally, cut flower production has also increased significantly from 2.43 billion branches in 2015 to 3.9 billion branches in 2022.

Figure 15: Flower area and output of Lam Dong in the period 2015-2022



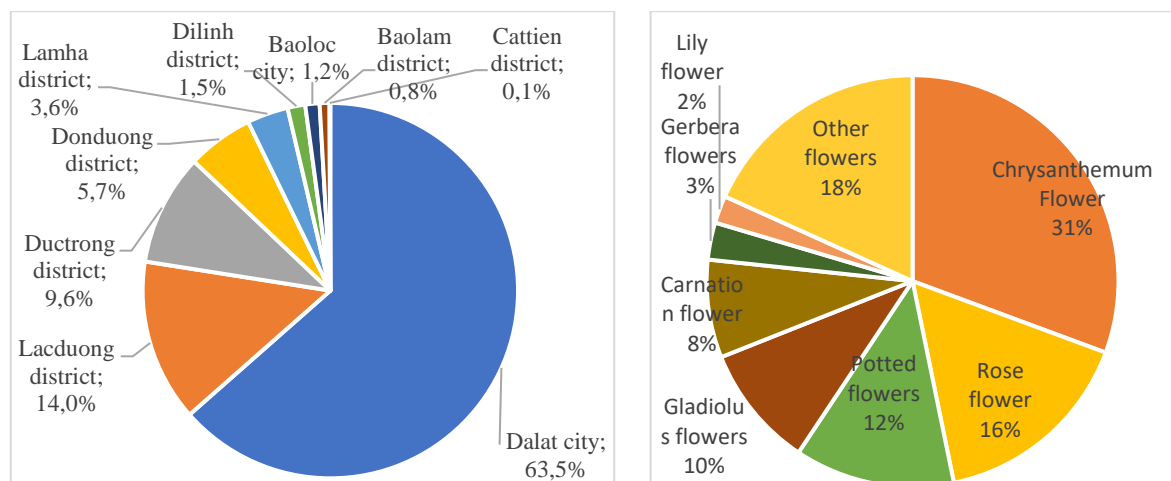
Source: Lam Dong Department of Agriculture and Development, 2023

Lam Dong, prioritizing the flower industry, aims to cultivate 3,000 hectares of new varieties by 2025, constituting 26.5% of the total planting area, with plans for 35-40% allocation to proprietary varieties. The province emphasizes the organization of production areas, attracting high-tech investments, and implementing branding initiatives. Three approved high-tech flower zones covering 180.22 hectares demonstrate Lam Dong's commitment to technological advancements. Adopting advanced agricultural technologies, the province incorporates modern greenhouse techniques and IoT technologies, enhancing cultivation efficiency. Lam Dong's focus on brand development is evident through trademark certification for "Hoa Đà Lạt," while successful flower tourism models like Ysa Orchid Garden underscore its dedication to economic growth and vibrant floral industry promotion.

The flower production in Lam Dong province is mainly concentrated in Da Lat city, which accounts for over 62% of the total area and 64.5% of the flower output of the entire province, is equivalent to an area of 6070 hectares and an output of 2.5 billion branches in 2022. The second-largest growing area is Lac Duong district, which covers 2,031 hectares and an output of 848.1 million branches, accounting for 20.8% of the total flower area in the province.

Figure 16: Structure of flower growing area by district of Lam Dong in 2022

Figure 17: Structure of area by main flower type, 2022



Source: Lam Dong Department of Agriculture and Development, 2023

Lam Dong, blessed with ideal soil and climate conditions, thrives as a vibrant center for diverse flower production. Popular varieties like chrysanthemums and roses, alongside high-value options such as lilies and orchids, contribute to the region's dynamic floral landscape. In 2022, chrysanthemums, roses, and gladiolus dominated the cultivation area, comprising 30.6%, 16.1%, and 9.7%, respectively. Noteworthy changes from 2015 to 2022 include a significant rise in potted flowers, constituting 12.6% of the area, and a segment catering to high-end markets (carnations, gerbera, lilies), representing about 13%.

Da Lat, nestled in Lam Dong, boasts over 400 flower species and a year-round production of thousands of varieties. These include indigenous flowers, as well as those sourced from Asia, Europe, America, Africa, and Australia, with Orchids and Chrysanthemums families hosting the highest number of varieties, showcasing the region's rich floral diversity.

Table 2: Key characteristics of Lam Dong's cut flowers

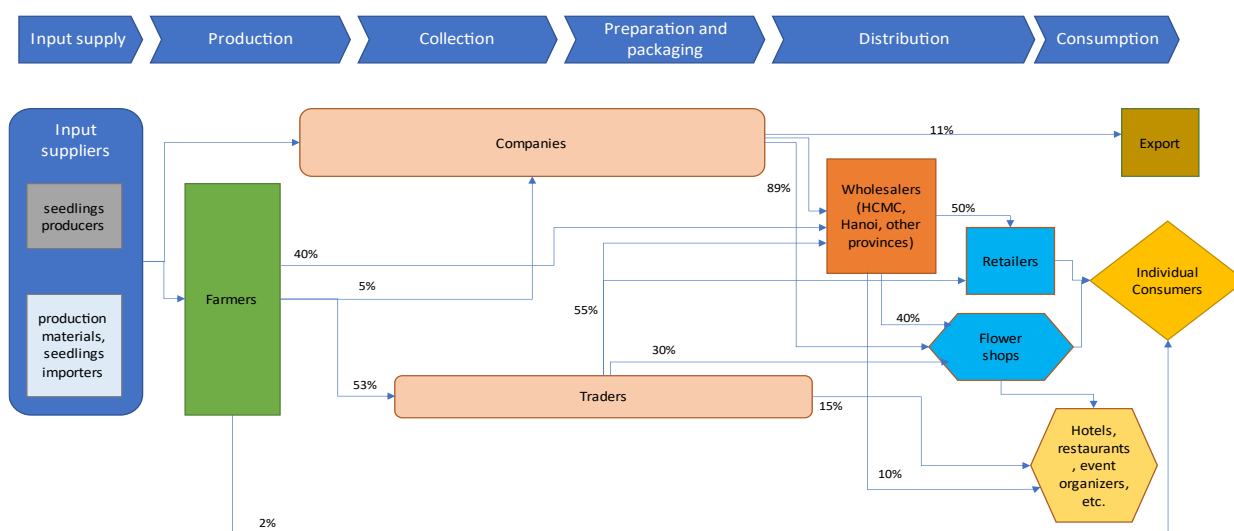
	Lam Dong province
Types of flowers/ ornamental plants	<i>Cut flowers:</i> Chrysanthemum (31%); Rose (16%); Gladiolus (10%); Carnation (8%); Gerbera (3%); Lily (2%); Others (18%) <i>Potted flowers</i> (12%)
Total areas and outputs	9,740.5 hectares
Total outputs	3.9 branches
Annual Growth rate	3.3% per year
Material zones	Da Lat city (62% of total area and 64.5% of total output), Lac Duong (20,8%), Duc Trong, Don Duong, Lam Ha, Di Linh, Bao Loc, Bao Lam, and Cat Tien
Total Annual revenue	33,408 billion dong (~1.36 billion USD) in 2022
Brand name or certification	"Hoa Đà Lạt" "Đà Lạt – kết tinh từ đất lành"
Target markets	Domestic consumption: 89% of total output Local markets: big cities of Ho Chi Minh City and surrounding provinces (60%), Hanoi, Da Nang, and Can Tho Export: 74 million USD (11% of total output) Key international market: Japan (59.3%), Australia (3.3%), Taiwan (3.1%), China (1.6%), and others (South Korea, Belgium, the Netherlands) Export types: Flower seeds (61,7%), chrysanthemums (24.9%), daisies (4%), roses (2.4%), and carnations (1.2%)
Number of farmers and cooperatives/ enterprise	Small farmers: 85% of the total flower production Many foreign companies (Dutch companies; 03 Japanese companies; 5-6 Taiwanese companies)

	33 export-oriented companies. Key player: Dalat Hasfarm, Bonnie Farm, Apolo, Innova, Sunflower Technology Co., Ltd., and Biological Technology Co., Ltd. Dalat Hasfarm (50% of the total exported flower volume)
Average farming areas/ HH	0.3 – 0.5 ha
Average investment per ha per year or production cycle	Basic investment costs (greenhouse, land, etc.): 400~500 million VND/ha Annual production costs: 600 ~750 million VND/ha/year
Average productivity	396.490 flowers/ha/year
Selling price/kg (in the main season)	Roses: ~1,200 VND/flower; Peony chrysanthemum: ~24,000-25,000 VND/flower; Cymbidium orchid branches: ~ 60 – 70,000 VND/branch; Phalaenopsis orchids: ~ 80 – 145,000 VND/branch in a pot
Annual income (VND) per HH	Overall: 970 million VND/ha/year High-end flowers (lilies and cymbidiums): 2.5 - 3 billion VND/ha/year
Value chain linkages	Linked 305 households/ farms in 147 hectares Linked farmers contribute around 5% of the total production 80-90% of the total supply from imported sources 60% of the local flower production distributed through traders
Technology application	Hortimax technology (Netherlands); automated controls using IoT technology (adopted from European and Japanese practices), greenhouses technology of Israel, France, and the Netherlands.

3.1.2. Value chain mapping

Currently, there are six value chains comprising 305 households, covering 147 hectares in Lam Dong. Focusing on the primary value chain for cut flowers and potted flowers, the study explores six stages, including input preparation, production, distribution, and consumption..

Figure 18: Flower value chain in Lam Dong province



Source: Field survey, 2023

In Lam Dong Province's flower value chain, the input supply relies significantly on imported materials, especially for copyrighted varieties meeting export standards. Small farming households contribute 85% to total production, while foreign enterprises from the Netherlands and Japan dominate, shaping the industry. Collection, sorting, and packaging are managed by companies and traders, with over 60% of local flower production acquired by traders through direct purchase or consignment. Distribution involves various actors, serving a diverse consumer range from individual households to hotels, restaurants, and event organizers, both domestically and internationally.

Lam Dong's flower market sees over 89% consumed domestically in major Vietnamese cities, with the remaining 10-11% exported to markets like Japan and Australia. Despite challenges, Lam Dong maintains a significant global presence, with an export turnover of USD 74 million in 2022, driven primarily by foreign companies serving the domestic market. Insights from traders and businesses suggest that Da Lat flowers are highly favored across diverse domestic market segments. These flowers cater to a broad customer base, including ordinary consumers and high-end clients, serving purposes like home/office decoration, gifts, and event embellishment. Demand for Da Lat and Lam Dong flowers remains consistently high throughout the year, extending beyond specific holidays or festivals. The growing tourism industry has also boosted the demand for flowers and ornamental plants, expanding the appeal of Da Lat flowers for landscape decoration and establishing them as a year-round choice for various purposes.

3.1.3. SWOT analysis

Based on surveys and expert insights, this study examines the factors influencing the growth of the cut flower and potted plant industries in Da Lat and Lam Dong, categorizing them into strengths, weaknesses, opportunities, and challenges:

Strengths	Weaknesses
<ul style="list-style-type: none"> - Favorable climatic and soil conditions; - Experienced farmers and technological advancements; - Advanced infrastructure and technical proficiency; - Investment from domestic and foreign enterprises; - Research and innovation; - Established branding 	<ul style="list-style-type: none"> - Inconsistent quality and pricing; - Lack of technical advisory and international market knowledge; - Low infrastructure and technology adoption; - Copyright issues with flower seeds; - Insufficient technical expertise and market understanding; - Limited production and post-harvest technologies; - Lack of modern distribution and logistics systems.
Opportunities	Threats
<ul style="list-style-type: none"> - Researching and developing flower varieties program; - Digital transformation in agriculture; - The restructuring plan for the agriculture sector; - Investment and infrastructure development, regional and national tourism events 	<ul style="list-style-type: none"> - Legal and international standard; - Technological gaps and landscape challenges.

To capitalize on its strengths and pursue the goal of becoming the global leading hub in flowers, Lam Dong should implement a comprehensive strategy. This entails investing in research for new flower varieties, adopting digital technology for agricultural processes, establishing a modern management and distribution system, offering training for farmers in modern cultivation techniques, fostering international collaborations, enhancing management and marketing capabilities, building robust local brands, and improving infrastructure connectivity to facilitate market expansion.

3.2. Ha Noi

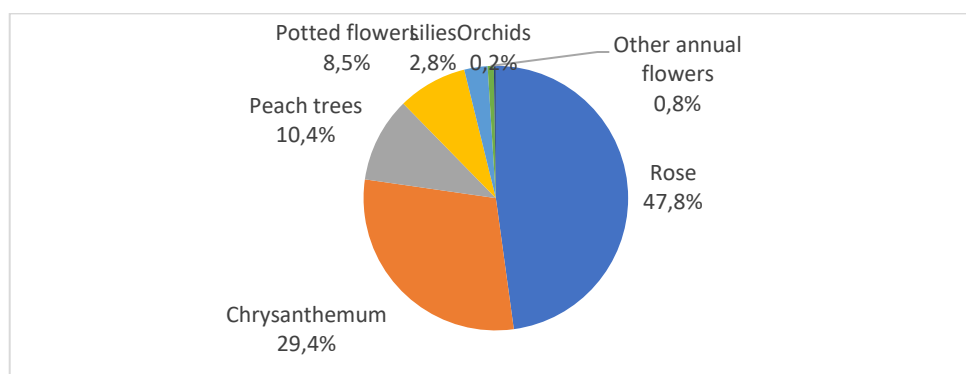
3.2.1. Key characteristics of major market segments

Hanoi is the locality with the most significant growth rate in the area of growing flowers and ornamental plants in the country, increasing from 5,484 hectares in 2015 to nearly 8,293.65 hectares in 2022. Of which 70% of the area is cultivated concentrated in districts Me Linh, Bac Tu Liem, Tay Ho, Dan Phuong, Thuong Tin... with many models of growing flowers and ornamental plants applying new technology advances in varieties and cultivation processes to increase productivity and quality. The main production areas are primarily located on the outskirts of urban areas, having advantage of alluvial

areas along large rivers for production. Every year, Hanoi's production areas provide the market with about 1,000 million flower stems and 3 million pots of ornamental plants.

Me Linh is the district with the largest area of flowers and ornamental plants in Hanoi. The district's flower and ornamental plant area is 824.8 hectares. Of which, the cut flowers area is 667 hectares, accounting for 80.9% of the total area, the ornamental plants are 72 hectares, accounting for 19.1%. Cut flowers include roses (394.5 hectares), chrysanthemums (242.8 hectares), lilies (23.5 hectares), and other annual flowers (6.2 hectares). The primary ornamental plants are peach trees (85,8 hectares) and orchids (2 hectares). The area for growing cut flowers and ornamental plants in Me Linh has decreased in recent years due to rapid urbanization. In this report, the research team will focus more on segment of cut flowers in Hanoi.

Figure 19. Current status of flower and ornamental plant production in Me Linh district in 2023



Source: Me Linh District Economic Department, 2023

Hanoi also develops traditional craft villages of flowers and ornamental plants. In 2022, Hanoi recognized 313 craft villages and traditional craft villages, including 11 craft villages and traditional craft villages of flowers and ornamental plants such as Ornamental craft villages of Co Giao, Xam Xuyen, Noi Thon (Thuong Tin district); flower and ornamental plant craft villages of Ha Loi, Lieu Tri, Dai Bai (Me Linh district); bonsai and bougainvillea craft village in Phu Dong village (Gia Lam district); Tay Tuu traditional flower craft village (Bac Tu Liem district); kumquat growing craft village in Tam Xa commune (Dong Anh district); Nhat Tan traditional peach blossom craft village, Tu Lien kumquat traditional craft village (Tay Ho district)... The flower industry here is not only a stable source of income but also an interesting symbol of Hanoi.

Table 3 Key characteristics of Hanoi's cut flowers

	Ha Noi
Types of flowers/ ornamental plants	<i>Cut flowers: 80,9% total area; Roses (25%), Chrysanthemums (38%), Lilies (9%), Gerberas (3%), Orchid (1%), Sunflowers (1%), Others (23%)</i> <i>Ornamental plants: 19,1% (peach tree and orchid)</i>
Total areas and outputs	7.125 hectares
Total outputs	~ 1 billion branches
Annual Growth rate	5,4% per year
Material zones	Me Linh, Dan Phuong, Gia Lam, Dong Anh, and Bac Tu Niem districts...
Total Annual revenue	19,5 billion dong (~0,79 billion USD) in 2022
Brand name or certification	N/A
Target markets	Domestic consumption: 99% of total output Local markets: big cities of Ha Noi, Lam Dong, Ho Chi Minh, Dong Thap and surrounding provinces (80%)
Number of farmers and cooperatives/ enterprise	Small farmers: 90% of the total flower production

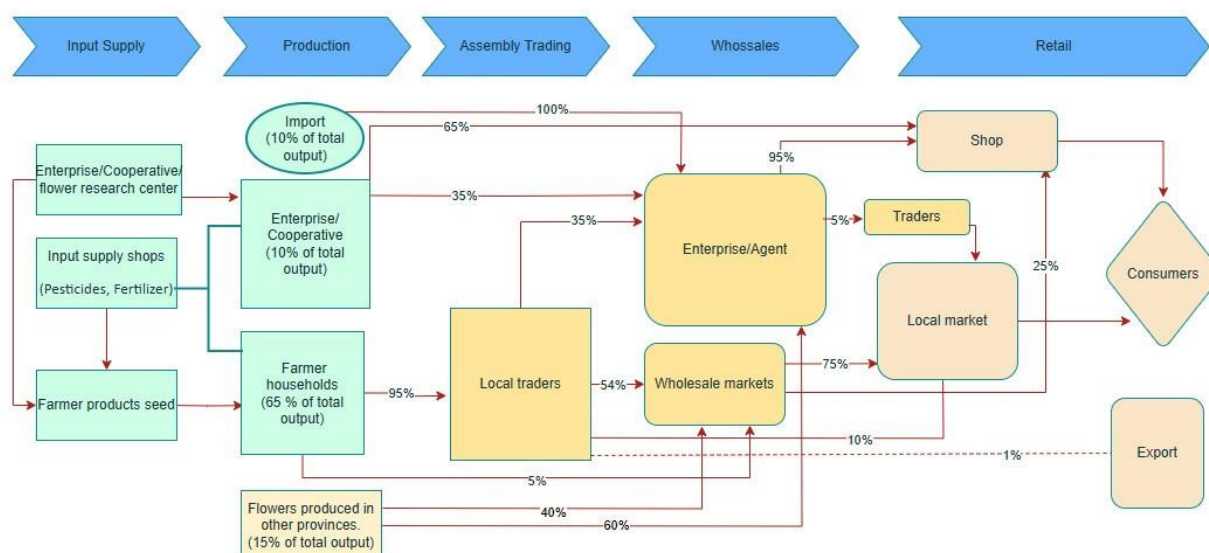
	1 big business (Global Investment Development High Agricultural Technology Joint Stock Company) Many flower cooperatives Key player: Cooperative Đan Hoai- Flora Viet Nam
Average farming areas/ HH	0.2 – 0.4 ha
Average investment per ha per year or production cycle	Annual production costs: 800 ~850 million VND/ha/year
Average productivity	Chrysanthemum: ~740 thousand flower/ ha/ year
Selling price/kg (in the main season)	Chrysanthemum: 1.500 – 2.500 VND/ flower
Annual income (VND) per HH	Overall: Nearly 900 million - 1.1 billion VND/ha/year
Value chain linkages	None
Technology application	Enterprises and cooperatives are the application of building greenhouses and net houses with semi-automatic systems in controlling irrigation systems, fertilizing, and adjusting humidity, temperature, and light; IoT technology, landless farming technology, blockchain technology for traceability

3.2.2. Value chain mapping

The cut flower market in Hanoi is large, with many actors participating in the production and distribution chain. Cut flowers (roses/chrysanthemums) are mainly grown locally in specialized areas by smallholding farmers and enterprises/ cooperatives accounting for 85% of total output, 10% of cut flowers is imported (mainly in Taiwan, China, etc.) and distributed, and about 15% of Hanoi's flower consumption is supplied from other provinces such as Lam Dong, Nam Dinh, Dong Thap... Smallholding farmers in Hanoi are the main suppliers of flowers in Hanoi city, accounting for 65% of total output. Most flower producers in Hanoi are local people with good cultivation experience but they mainly cultivate with traditional methods. 10% of total output is from businesses in Hanoi who apply high technology and regularly provide the market with high quality flower products. In recent years, Hanoi has promoted the application of high technology in agricultural production in general and ornamental flowers and plants in particular. Hanoi has 212 high-tech farming models with a total area of 2.89 thousand hectares. Of which, the area of flowers and ornamental plants applying high technology in production reached 207.4 hectares (22 establishments with an area of 183.5 hectares producing in membrane houses and net houses).

Cut flowers in Hanoi are mainly consumed domestically in markets such as Hanoi and big cities such as Nam Dinh, Vinh, Lam Dong, Ho Chi Minh, and Dong Thap. Only a small portion of cut flowers in Hanoi are exported to the Chinese market, but the quantity is still very limited. For cut flowers produced locally, most products are sold through the local trader system to major wholesale markets in Hanoi (Me Linh flower market, Quang Ba flower market) and stores/purchasing facilities in some localities such as Nam Dinh and Thanh Hoa. Hoa, Nghe An, Da Lat, Ho Chi Minh City, Dong Thap... from there to consumers. For imported cut flowers (roses, chrysanthemums), which are mainly imported from Taiwan and China markets, these products are distributed mainly to flower shops. A very small number of imported flowers are sold by businesses/dealers to traders and to consumers through local markets.

Figure 20: Cut flower value chain in Ha Noi



Source: Field survey

3.2.3. SWOT analysis

Drawing insights from survey findings and consultations with local experts, this study has compiled key factors and considerations influencing the growth of the cut flower in Hanoi. The analysis categorizes these issues into four dimensions: strengths, weaknesses, opportunities, and challenges as follows:

Strength	Weaknesses
<ul style="list-style-type: none"> - Favourable climate and product diversity - Many traditional craft villages of followers with abundant workforce - Convenient location and transportation - Large consumption market of big cities - Active support from the local government - 	<ul style="list-style-type: none"> - Limited water supply - Risk from pests and diseases - Weak linkages in production and consumption
Opportunities	Threats
<ul style="list-style-type: none"> - Increasing demand for flowers and ornamental plants - Trend of green and sustainable living - Development of e-commerce - Growth of tourism and events 	<ul style="list-style-type: none"> - Urbanization - Climate Change - Competition from import products - Laws and regulations - Prices of raw materials and labor

Source: Field survey results, 2023

❖ Recommendations

Hanoi is the political, economic and cultural center of the country, not only focusing on traditional flower production but also aiming to develop high-tech flower production models. This aims to meet the growing market demand, bring economic efficiency, and protect the environment. Some key recommendations are as follow:

- Develop cut flower production with the application of high technology such as smart greenhouses and net houses for flower production, digitalization with automation technologies. Smart greenhouse systems may help control the production environment, creating ideal conditions for flower plants to grow strongly.
- Carry out market research and develop flowers with high commercial demand in Hanoi, such as chrysanthemums, roses, lilies, and orchids.

- Develop agritourism models with flowers farms to increase the value and income of flower producers.

3.3. Ho Chi Minh City

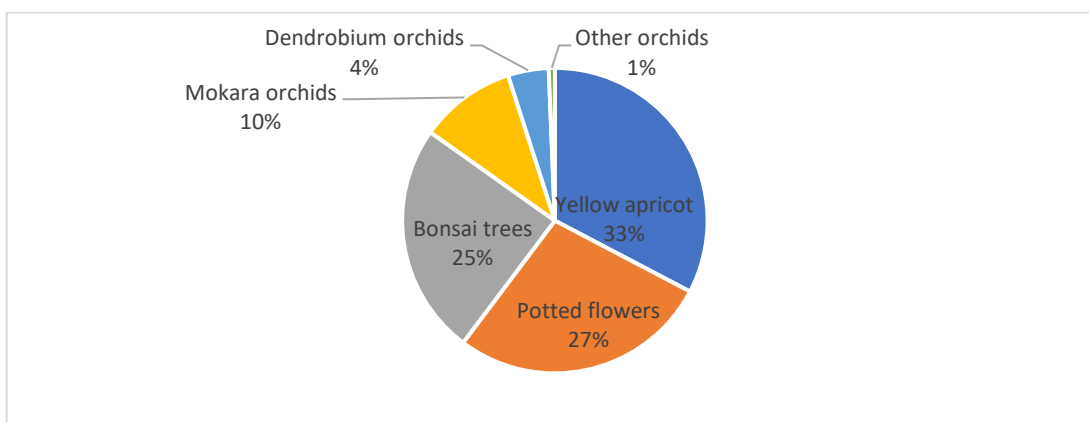
3.3.1. Key characteristics of major market segments

Ho Chi Minh City's tropical climate, characterized by warm temperatures and abundant sunlight, makes it an ideal location for flower cultivation. The region's consistent conditions throughout the year, coupled with fertile soil and a tradition of agriculture, create a favorable environment for a diverse range of flowers to flourish, contributing to the city's suitability for vibrant and successful flower cultivation.

Flowers and ornamental plants are identified as one of the key sectors of Ho Chi Minh City⁶. According to Department of Agriculture and Rural Development of Ho Chi Minh City, the area of flowers and ornamental plants in Ho Chi Minh City in 2022 reached 2,325 ha, an increase of 9.2% compared to 2021. Of which, the area of ornamental plants in 2022 reached 2,086 ha, accounting for 89.7% of the total area, while the area of cut flowers was 239 ha, accounting for 10.3%. Ornamental plants encompass a variety of species such as yellow apricots, potted flowers, Bonsai trees, and Dendrobium orchids, whereas cut flowers predominantly consist of Mokara orchids.

Yellow apricot, potted flowers and Bonsai trees are the 3 types with the largest areas, accounting for 85% of total area of flowers and ornamental plants. Of which, the area of yellow apricot in 2022 was 765 ha, accounting for 33% (a slightly 0.1% increase compared to 2021). Potted flowers followed closely with an area of 645 ha, accounting for 27% (a significant 59.3% increase compared to 2021). The area of Bonsai trees was 575 ha, accounting for 25% (a 2.5% decrease compared to 2021).

Figure 21: Area of flowers and ornamental plants by types in 2022



Source: Department of Agriculture and Rural Development of Ho Chi Minh City

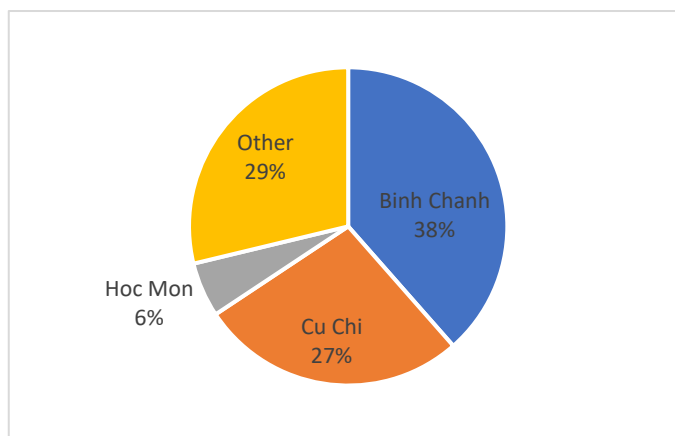
Orchids are the main flower of Ho Chi Minh city, catering not only to the city itself but also to neighboring provinces. At present, the predominant orchids cultivated by farmers are Mokara and Dendrobium varieties. Furthermore, the city plays an important role as a central hub for importing cut orchids from overseas as well as Lam Dong province. These imported orchids are distributed within the city and to neighboring provinces.

In Ho Chi Minh City, the primary cultivation for cut flowers centers on Mokara orchids, while other cut flowers including lilies, chrysanthemums, roses, and phalaenopsis orchids are primarily sourced from Lam Dong province.

⁶ Decision 4545/QĐ-UBND dated October 15, 2018 of the City People's Committee promulgating a list of key product groups in the city's agricultural sector

Ho Chi Minh City's flower and ornamental plant production is mainly concentrated in Binh Chanh district with an area of 895.5 hectares, accounting for 38% of the city's flower and ornamental plant production area. The second largest area is Cu Chi district with 631.5 hectares, accounting for 37%. Hoc Mon district has the third largest area with 129.3 hectares, accounting for 6%. The remaining area for growing ornamental flowers and ornamental plants is located in Thu Duc District, District 12, and other districts.

Figure 22: Area of flowers and ornamental plants by districts



Source: Department of Agriculture and Rural Development of Ho Chi Minh City

Table 3: Key characteristics of Ho Chi Minh's cut flowers and Ornamental plants

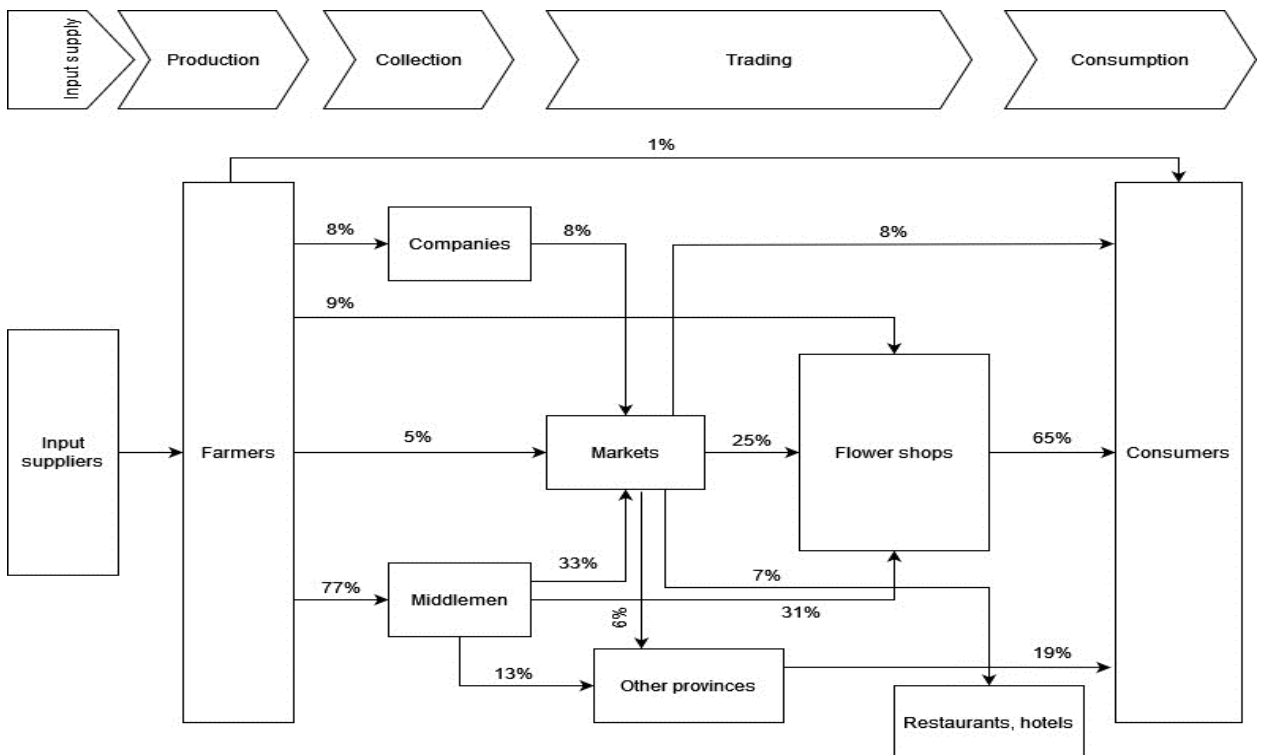
	Ho Chi Minh City
Types of flowers/ ornamental plants	<i>Ornamental plants:</i> Yellow apricot (33%), potted flowers (27%), Bonsai trees (25%), Dendrobium orchids (4%). <i>Cut flowers:</i> Mokara orchids (10%)
Total areas	2,325 hectares (flowers and ornamental plants)
Total outputs	69.0 million branches/pots/baskets (flowers)
Annual growth rate	7.5%/year
Material zones	Binh Chanh (38%), Cu Chi (27%), Hoc Mon (6%)
Total Annual revenue	N/A
Brand name or certification	N/A
Target markets	Domestic consumption: 99% of total output Local markets: Ho Chi Minh City and surrounding provinces.
Number of farmers and cooperatives/ enterprise	5 cooperatives and 3 cooperative groups.
Average farming areas/ HH	N/A
Average investment per ha per year or production cycle	Nearly 146 million VND/1000m ² /year annual cost for Mokara orchids production
Average productivity	28.800 branches/1000m ² /year
Selling price/kg (in the main season)	7,500 VND/branch
Annual income (VND) per HH	70 million VND/1000m ² /year
Value chain linkages	10% farmers having a contract with middlemen. 77% of the local flower production distributed through traders
Technology application	Net house, automatic irrigation and fertilization. In 2022, about 195 ha (8.4%) of flowers and ornamental plants in the city was applied with

	advanced technology. Farmers growing flowers and ornamental plants have promoted the application of mechanization and automation in production, especially in economical watering and spraying.
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3.3.2. Value chain mapping

Despite ornamental plants covering 90% of the cultivated area for flowers and ornamental plants in Ho Chi Minh City, they are primarily utilized during the Lunar New Year holiday rather than for daily consumption. Consequently, the research team opted to concentrate on analyzing the value chain of cut flowers, specifically focusing on Mokara orchids in this context. Key stakeholders in Mokara orchids supply chain in Ho Chi Minh City include farmers, middlemen, companies, markets, flower shops and consumers.

Figure 23: Mokara orchids supply chain in Ho Chi Minh City



Source: Field survey, 2023

Farmers primarily sell cut flowers to local middlemen and, occasionally, to traders from neighboring provinces. Approximately 10% of farmers formalize their sales through contracts with middlemen, while the remaining 90% rely on verbal agreements established on trust. The absence of a formal contract poses numerous risks. Particularly during peak harvest times, middlemen tends to prioritize those with contracts, leaving non-contracted farmers at a disadvantage. For those without contracts, middlemen may buy their flowers at lower prices while imposing stringent quality requirements, resulting in limited purchases compared to their production capacity. In some cases, middlemen may stop purchasing completely, compelling farmers to seek alternative buyers or cut off their flowers. Traders play a crucial role in the flower value chain, purchasing a significant 77% of floral products directly from farmers. Moreover, traders take an important role as the main decision-makers in establishing the purchasing prices. After acquiring flowers from farmers, traders subsequently distribute and sell flowers to both traditional markets and flower shops in urban areas. In addition to traders, approximately 8% of flowers are procured by enterprises. Typically, these enterprises sign direct contracts with farmers, providing seeds and services and supporting the cultivation of flowers. Farmers are mandated to sell all flowers to these enterprises, with the selling price subject to periodic

fluctuations. However, there are still many cases of farmers violating contracts and selling flowers to other buyers when the selling price is higher. Local markets and flower shops purchase flowers from traders, enterprises, and to some extent, directly from farmers for distribution to consumers. In addition, approximately 7% of flowers are allocated for distribution to restaurants and hotels.

Consumer preferences for cut flowers in Ho Chi Minh City vary based on the occasion, recipient, and individual preferences. During major events like International Women's Day, Valentine's Day, and Vietnamese Women's Day, there is a diverse demand for cut flowers with various types and designs. Besides commonly favored flowers like carnations, peonies, lilies, sunflowers, and roses, there is also a market for high-end imported varieties, including Ecuadorian roses, Dutch tulips, and cut flowers from China such as roses and auspicious blooms. However, in 2023, there has been a notable decline in the demand for cut flowers compared to previous years. This decline is attributed to individuals tightening their personal spending habits, leading to reduced demand for non-essential items like flowers. Furthermore, the gift market has witnessed the emergence of new and unique gift options, contributing to a diminished performance in the flower business during festive periods compared to the past.

3.3.3. SWOT analysis

Strengths	Weaknesses
<ul style="list-style-type: none"> - The tropical climate provides an ideal environment for cultivating various flowers and ornamental plants. - With extensive experience in flower and ornamental plant cultivation, farmers are well-positioned to embrace innovative and advanced production techniques. 	<ul style="list-style-type: none"> - Small-scale production without effective linkages. - Lack of market information. - The main consumption channels heavily rely on middlemen. - The development of new varieties in the country is still limited. - High initial investment costs (irrigation system, net house system, seedlings, fertilizers, etc).
Opportunities	Threats
<ul style="list-style-type: none"> - Ho Chi Minh City is one of the largest flower and ornamental plant consumption markets in the country. - Local authorities are keen on guiding and steering the development of the flower and ornamental plant sector. 	<ul style="list-style-type: none"> - Due to the economic recession, demand for flowers and ornamental plants tends to decrease in the short-term. - The epidemic situation on flowers and ornamental plants is complicated. - The transportation system is incomplete in yellow apricot production areas, causing difficulties in transportation. - The rapid increase in urbanization causes the agricultural land area to shrink.

Source: Field survey results, 2023

❖ **Recommendations:**

As Ho Chi Minh City is one of the largest flower and ornamental plant consumption markets in the country, to sustainably develop the flowers and ornamental plants sector in Ho Chi Minh City, some recommendations are as follows:

- Research and build pilot models applying high technology (green houses, net houses, irrigation systems) with materials suitable to the investment conditions of farmers.
- Research and apply biotechnology to produce high-quality and high-yield flower varieties to become the flower seedling center of the region.

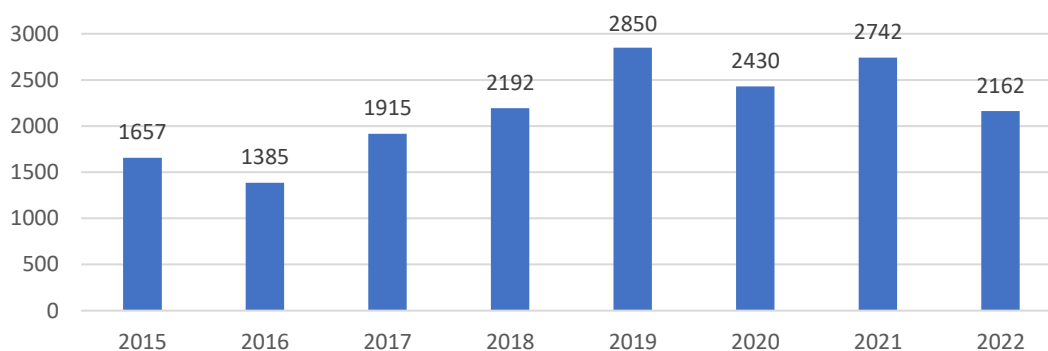
- Build a model of growing flowers and ornamental plants associated with implementing the program to develop eco-tourism and new rural development.

3.4. Dong Thap

3.4.1. Key characteristics of major market segments

Dong Thap is the leading province in the Mekong Delta for the production area of flowers and ornamental plants, ranking fourth nationwide. According to Dong Thap Department of Agriculture and Rural Development, the area of flowers and ornamental plants in the province has increased from 1,657 hectares in 2015 to 2,162 hectares in 2022, with an average annual growth rate of 6.2% per year. Despite a 21.2% reduction in production area in 2022 compared to 2021, the gross output of the sector still reached 5,736 billion VND in 2022, a 13.4% increase over 2021.

Figure 24: Area of flowers and ornamental plants of Lam Dong in the period 2015-2022 (ha)



Source: Dong Thap Department of Agriculture and Development, 2023

The largest flower and ornamental production zone is in Sa Dec city, which covers 946.5 ha, accounting for 43.78% of the total area of flowers and ornamental plants in the province. The remaining production zones are in Lai Vung district (837.5 ha, 38.74%), Lap Vo district (357 ha, 16.51%), and Cao Lanh city (21 ha, 0.97%).

Figure 25: Structure of area by districts in 2022 (%)

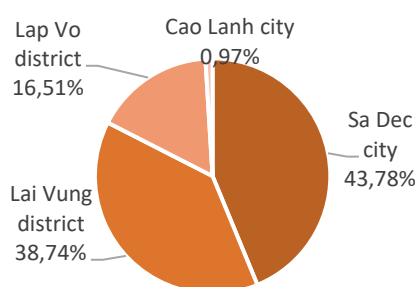
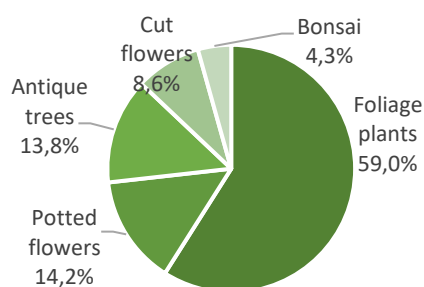


Figure 26: Structure of area by main types in 2022 (%)



Source: Dong Thap Department of Agriculture and Development, 2023

Dong Thap has about 1,200 different varieties of flowers and ornamentals. Foliage plants cover the largest area, accounting for about 59% of the total area of flowers and ornamental plants in the province. Foliage plants are cultivated and consumed throughout the year. They don't face the risk of being discounted, unlike potted flowers and cut flowers that might need to be sold at a lower price if they don't bloom at the right time. The demand for foliage plants is increasing, driven by a growing trend towards incorporating green elements into modern lifestyles and living spaces. Potted flowers represent the second-largest production area, accounting for about 14.2% of the total area of flowers and ornamental plants in the province. The planting period for potted flowers extends from June to

December, mainly consumed to meet the demand during the Tet holiday. The demand for potted flowers experiences a substantial surge in the days just before Tet.

Table 4 Key characteristics of Dong Thap’s flower and ornamental plant sector

	Dong Thap province
Types of flowers/ ornamental plants	<i>Potted flowers:</i> 14,2% (<i>Chrysanthemum morifolium</i> , Roses, Gerbera, etc.) <i>Foliage plants:</i> 59% (<i>Aglaonema rotundum</i> pink, Snake Plants, Pothos, Zoysia grass, etc.)
Total areas	2,162 hectares
Total outputs	NA. Gross output: 5,736 billion VND (~0,23 billion USD) in 2022
Annual growth rate	6.2% per year
Material zones	Sa Dec city (43.78%), Lai Vung district (38.74%), Lap Vo district (16.51%), Cao Lanh city (0.97%)
Total annual revenue	3,349 billion VND (~0,14 billion USD) in 2022
Brand name or certification	Sa Dec Flower Village
Target markets	<i>Potted flowers:</i> Domestic consumption: 98,4% of total output. Main local markets: Ho Chi Minh (HCM) city, surrounding provinces in the Mekong Delta, Hanoi Export: Cambodia <i>Foliage plants:</i> - Interior ornamental plants: Domestic consumption: 100% of total output. Main local markets: Mekong Delta provinces (60%), HCM city (30%), Hanoi and other central provinces of Viet Nam (10%). - Landscape ornamental plants: Domestic consumption: 99% of total output. Main local markets: HCM city (50%), Da Nang, Ha Noi, Thanh Hoa, other provinces in Vietnam (49%). Export: Taiwan, Cambodia (1%)
Number of farmers and cooperatives/ enterprise	5 cooperatives
Average farming areas/ HH	0.2 – 0.5 ha
Average investment per ha per year or production cycle	~800 - 1040 million VND/ha/year
Average productivity	<i>Chrysanthemum morifolium:</i> ~18000-20000 thousand pots/ ha/ year
Selling price/kg (in the main season)	<i>Chrysanthemum morifolium:</i> ~ 75,000 VND/pot <i>Roses:</i> ~ 30.000-35.000 VND/pot
Annual income (VND) per HH	400 million – 700 million VND/ha/year for <i>Chrysanthemum morifolium</i>
Value chain linkages	80% of the local flower production distributed through traders
Technology application	Tissue culture, digital technology (mainly e-commerce platforms and social networks), shade net houses and polyhouses, automatic mist irrigation and drip irrigation.

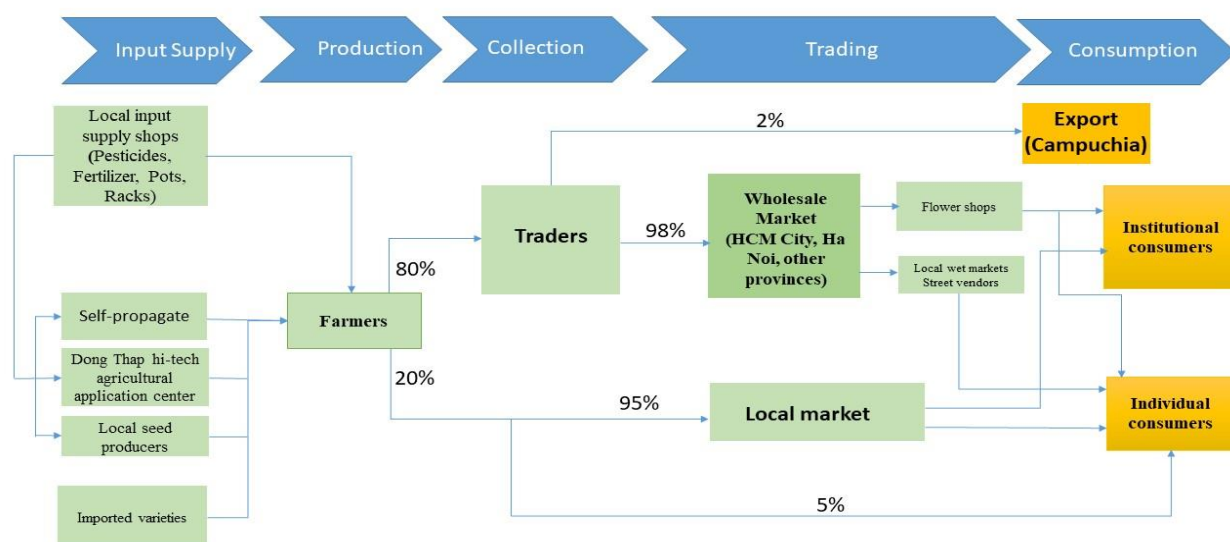
Since 2014, flowers and ornamental plants have been identified as one of the five key sectors of Dong Thap province. Many support policies were issued to develop the sector in a sustainable direction with high-added value, such as supporting linkages in production and consumption; supporting trade development, establishing the Center for High-tech agricultural application, etc. The province has developed flower and ornamental plant products under the country’s “One Commune-One Product” program, and developed brand names for Sa Dec flowers and ornamental plants. The sector has increased its value as the province develops it in combination with tourism services. The sector attracts a large number of tourists year-round, especially during the Tet holidays and recently the first Sa Dec

flower and ornamental festival. Sa Dec Flower Village has become a typical tourist destination of the Mekong Delta region and the country. Since August 2023, Dong Thap has cooperated with the Netherlands-Vietnam Agricultural Business Cooperation Association to promote the development of the flower and ornamental plant sector.

3.4.2. Value chain mapping

In Dong Thap, potted flowers have greater export potential and higher value-added potential than foliage plants, mainly due to their smaller size, ease of transport, and greater popularity in international markets. Meanwhile, the Netherlands stands out as a powerhouse in flower exports, possessing robust research and development capabilities and a well-established supply chain. Thus, the research team focus on analyzing the value chain of potted flowers in the province to provide valuable insights into the opportunities for cooperation between Dong Thap and the Netherlands. Key stakeholders in potted flower supply chain include input suppliers, farmers, traders, markets, and consumers.

Figure 27: Potted flower supply chain in Dong Thap



Source: Field survey

Most of farmers use their household land to cultivate potted flowers outdoors, relying heavily on pesticides. With a relatively small cultivation area of approximately 3000m² per household, each household typically grows various types of flowers to meet the diverse demands of the market. The source of seed supply for farmers comes from the High-Tech Agriculture Application Center in Dong Thap, local private seed production facilities, or from other provinces (such as Da Lat). According to interview results, the total amount of seeds supplied to the market has not yet met the growers' demands, both in terms of quantity and especially in terms of new, unique, beautiful flower varieties that attract consumer preferences. Some new seed sources have to rely on imports from abroad, mainly from Thailand. Traditionally, farmers initially purchase flower varieties in the first year and subsequently engage in self-propagation in the following years. While self-propagation helps save costs, the predominant use of traditional methods such as cutting, grafting, and dividing shoots or seedlings can lead to degeneration and increased vulnerability to diseases. In addition to seeds, input materials include flower pots, materials to make racks, which are supplied by production facilities in neighboring areas. Fertilizers and pesticides are provided by local input supply agents located in the area.

There are two market channels for potted flowers. Approximately 80% of the total consumption goes through local traders. These traders purchase directly from the fields and deliver the products to major

wholesale markets in Ho Chi Minh City, nearby provinces in the Mekong Delta, Hanoi, and some other provinces. Additionally, traders also export potted flowers to Cambodia. For the remaining 20%, farmers sell at markets or directly to consumers, who can be local residents or tourists.

In the potted flower supply chain, traders play a crucial role, and act as the main decision-makers in determining purchase prices. Meanwhile, agricultural cooperatives play a limited role. They are involved in buying and supplying seeds, fertilizers, pesticides and providing technical guidance to its members. They have not yet become a central role for consuming flowers for farmers, so they depend heavily on traders.

3.4.3. SWOT analysis

Drawing insights from survey findings and consultations with local experts, the internal strengths and weaknesses, as well as external opportunities and threats facing the flower and ornamental sector in Dong Thap, is presented in the table below:

Strengths	Weaknesses
<ul style="list-style-type: none"> - Diverse tropical flowers and ornamental plants thanks to favorable natural conditions - Experienced and diligent local farmers - Investments from large companies - Support from collective economic models - High-tech Agricultural Application Center - Established Trading Center for market accessibility - Active use of social media for promotion - Favorable transportation system 	<ul style="list-style-type: none"> - Lack copyrighted varieties, limited variety research and development, most of varieties rely on foreign sources or self-breeding by local farmers. - Small-scale, fragmented production - Weak linkages in the supply chain and heavy dependence on traders - Reliance on chemical fertilizers and pesticides - Lack of modern technology adoption - Limited post-harvest preservation methods - Lack of diverse marketing activities - Spontaneous development without planning; oversupply issues. - Limited information on prices, preferences, and market forecasts - Untapped tourism potential associated with flower and ornamental plant production
Opportunities	Threats
<ul style="list-style-type: none"> - On the supply side: ✓ Potential to develop the production area for flower and ornamental plants from 2,162 ha in 2022 to 3,500 ha in 2025. ✓ As one of the five key sectors in Dong Thap, the flower and ornamental plant sector receives considerable support from local authorities, fostering an environment conducive to increased supply. - On the demand side: ✓ Growing per capita income and urban greening trend ✓ Growth of tourism, festivals - E-commerce and social media platform development 	<ul style="list-style-type: none"> - Short-term decrease in demand due to recession - Competition from foreign products - Unpredictable weather and climate change impacts - Consumer demand for unique and exotic varieties - Increasing social and environmental concerns

Source: Field survey results, 2023

❖ Recommendations

Based on the above issues and local consultation, some key solutions were proposed to develop the Dong Thap's flower and ornamental plant sector:

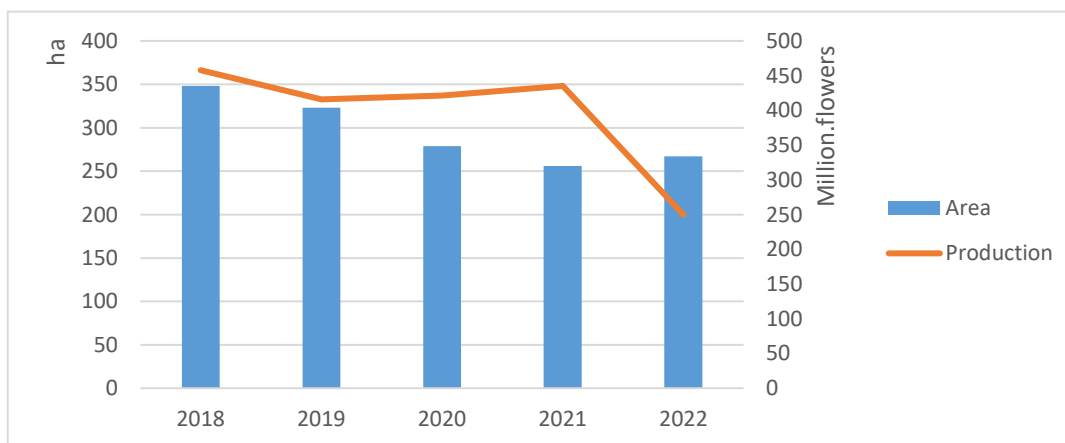
- Research and development of new, unique, high-quality flower varieties suitable to local conditions and to the preferences of domestic and foreign consumers.
- Investing in advanced technologies such as greenhouses, irrigation systems and post-harvest processes to increase product value, increase economic efficiency and adapt to climate change.
- Developing products with higher added value such as dried flowers, dyed flowers.

3.5. Son La

3.5.1. Key characteristics of major market segments

Son La, a province in the Northwest of Vietnam, covers a vast natural area of 14,123 square kilometers. It features two extensive, flat plateaus—Moc Chau and Son La. These regions are well-suited for large-scale production. Son La experiences a tropical, humid, monsoonal climate, characterized by high rainfall and major river systems like the Đa River and the Ma River. The province offers an ideal environment and vast potential for the flower and ornamental plant industry. Despite these favourable conditions, the flower industry in Son La remains relatively underdeveloped, failing to fully leverage its potential and lacking significant investment compared to other crops such as fruits or vegetables. Only 0.06% of the total agricultural land is dedicated to flower cultivation in Son La, producing around 250 million flowers. Notably, the flower cultivation area has declined from 348 hectares in 2018 to 267 hectares by 2022, primarily focusing on cut flowers.

Figure 28: The area, production of flower cultivation in Son La province



Source: Statistical Yearbook of Son La Province 2022

The flower cultivation area in Son La is predominantly concentrated in three main regions: Son La city (55.1%), Moc Chau district (16.9%), and Muong La district (18.7%). The flower cultivation areas in other regions are relatively small and negligible.

The primary flowers cultivated in the province are mainly cut flowers, including roses, chrysanthemums, lilies, and a few other varieties. Among these, roses cover the largest area, accounting for approximately 80.5% of the total flower cultivation area in the province. These flowers are primarily grown in the outskirts of Son La City. Roses are cultivated and harvested year-round in the province. Lilies cover 31 hectares, with Tropical Flower Company leading with 16 hectares. Chrysanthemums span 6.75 hectares in scattered households, focusing on an off-season market. Orchids are primarily cultivated by the Tropical Flower Company.

Figure 29 Areas of flowers in Son La by districts

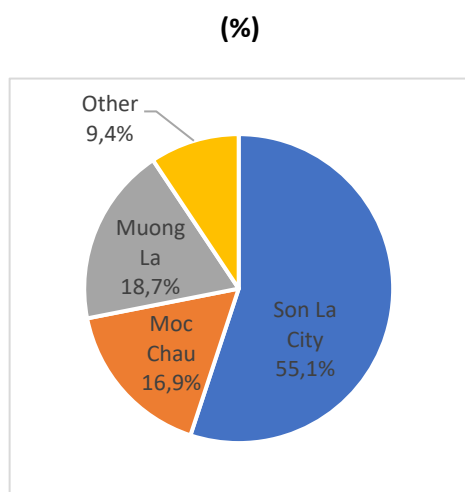
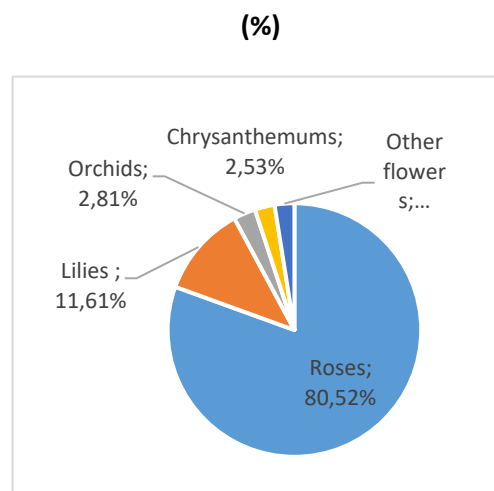


Figure 30: Areas of flowers in Son La by types



Source: Statistical Yearbook of Son La Province 2022.

The flower industry faces challenges such as small-scale operations, excessive chemical use, and a lack of quality certifications. The use of pesticides and fertilizers has led to soil degradation, reducing competitiveness in major markets. Growers, facing declining profits, are shifting to crops like strawberries and vegetables, contributing to the shrinking flower cultivation areas in Son La.

Son La has implemented effective agricultural support policies to drive local development. Notably, Resolution No. 08-NQ/TU, issued in January 2021, outlines a strategy for sustainable development in agriculture, forestry, and aquaculture, focusing on high-tech applications. The province aims to become a leading high-tech agricultural center in the Northwest by 2030. Additionally, Resolution No. 128/2020/NQ-HĐND, enacted in February 2020, encourages investments in agriculture and rural areas, offering support for interest rates, brand development, market expansion, and various essential aspects of agricultural development. However, the current support policies in Son La primarily focus on the development of fruit trees, vegetables, and livestock. The flower industry, on the other hand, continues to face a lack of prioritization and specific support. Despite the existence of a development plan for flowers and ornamental plants in the province, there is still no dedicated policy to effectively encourage and implement this initiative. As a result, businesses, cooperatives, and individuals in the flower industry have not yet benefited from the province's support policies.

Table 5 Key characteristics of Son La’s cut flowers

	Son La
Types of flowers	Cut flowers: Roses (80,5%), lilies (11,6%) chrysanthemums (2,5%), orchids (2,8%)
Total/estimated production areas	Total: 267 hectares - Roses: Son La city (144ha) and Muong La district (50ha) - Lilies: 31 ha in Moc Chau - Orchids: 2ha in Moc Chau - Chrysanthemum: Moc Chau (3ha), Thuan Chau (2ha)
Total areas of quality certified production	NA
Material zones	Son La City, Muong La, Moc Chau district.
Annual production	250 million flowers of all types

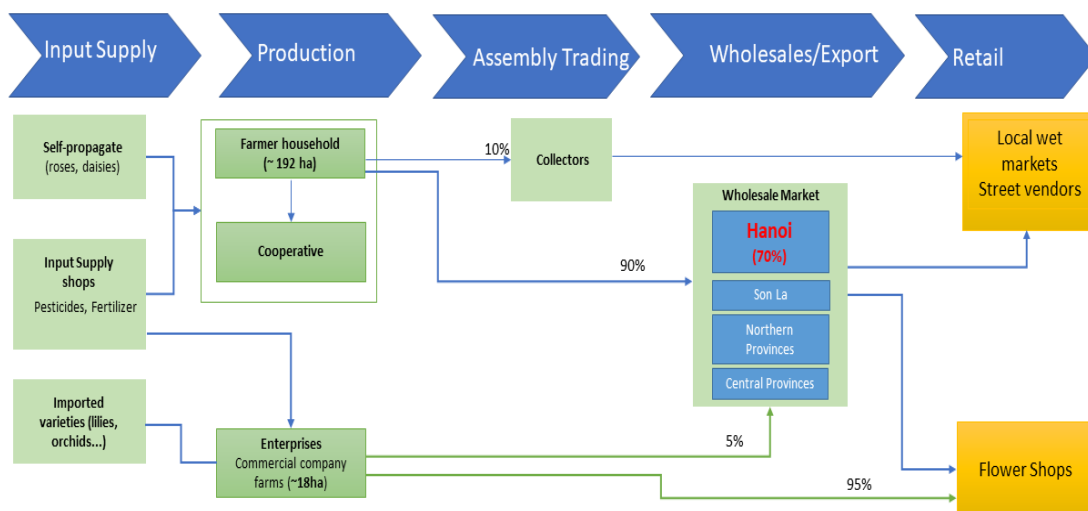
Annual revenue	260 billion dong
Number of businesses/ cooperatives	1 big business (Tropical Flower Joint Stock Company) There are no statistics on flower cooperatives
Target markets	Ha Noi
Average farming areas/ HH	2,5 ha for roses
Average investment per year or production cycle	Nearly 900 million VND/ha/year annual cost for rose production.
Average productivity	700.000 flowers/ha/year
Selling price/kg (in the main season)	Rose: 500 vnd – 1500 vnd/flower Chrysanthemum: 2500 – 3500 vnd/flower
Annual income (VND)	50 – 65 million/ha/year for rose production.
Technology application	While traditional experiences shape flower cultivation in Son La, a few enterprises, like the Tropical Flower Joint Stock Company, incorporate high-tech agriculture method.

3.5.2. Value chain mapping

Due to the relatively small scale of the flower industry in Son La, there are fewer stakeholders involved, and the flower distribution chain in Son La is short, almost directly from producers to the consumer market, as shown in the diagram.

Flower cultivation in Son La engages both smallholding farmers, primarily migrants from traditional flower villages in Ha Noi, and enterprises. Individuals lease land for flower cultivation, utilizing techniques inherited from established flower communities, typically under lease contracts lasting up to 5 years. Enterprises like the Tropical Flower Joint Stock Company incorporate advanced agricultural technologies, managing approximately 18 hectares dedicated to cultivating orchids and lilies.

Figure 31: Cut flower distribution chain in Son La



Source: Field survey

Concerning input supply, most suppliers, especially for fertilizers and plant protection chemicals, are situated outside the province. Flower producers often obtain these inputs from Hanoi, leading to additional transportation costs and potential production challenges. In terms of seeds, while most individual flower-producing households rely on self-propagation methods to economize, flower

enterprises choose to import orchid tissue culture from Taiwan or China and lily bulbs from the Netherlands. After harvesting, flowers are directly sent to wholesale markets in Hanoi, and those of lower quality are transported to neighbouring provinces. The primary transportation methods involve regular trucks or even passenger buses, with no specialized transport dedicated to flowers. This approach has the potential to jeopardize the quality of the flowers and result in heightened post-harvest losses. Intermediary traders have a limited role, primarily active during the Lunar New Year when demand reaches its peak.

The consumption market of the Son La flower industry exhibits a certain degree of simplicity, with most products being predominantly consumed at flower wholesale markets in Hanoi, making up approximately 70% of the total output. The remaining portion is utilized within the province, primarily catering to local establishments such as restaurants, hotels, and homestays. Another smaller portion finds consumption in provinces neighbouring Hanoi. Some flower products from Son La have faced difficulties competing in the Hanoi market due to not meeting quality standards. However, the province has an advantage in cultivating certain off-season flowers, such as chrysanthemums, compared to provinces in lower areas. Nevertheless, transporting and maintaining product quality to reach the Hanoi market remains a significant challenge for Son La's flower products.

3.5.3. SWOT analysis

<p><u>Strengths</u></p> <ul style="list-style-type: none"> - Experienced households excel in production, especially in nurturing various types of flowers. - The products boast diversity, thanks to the natural advantages, meeting various consumer preferences and demands. - The emergence of high-tech enterprises encourages traditional households to change their production mindset. 	<p><u>Weaknesses</u></p> <ul style="list-style-type: none"> - Flower cultivation relies excessively on chemical fertilizers and pesticides. - Flower products have yet to meet quality standards. - Limited application of high-end technology in production. - Uneven and inconsistent use of plant varieties, lacking quality assurance. - High post-harvest losses due to inadequate preservation and transportation. - Cooperatives' role within the industry remains limited.
<p><u>Opportunities</u></p> <ul style="list-style-type: none"> - The growth of tourism in Sơn La increases the demand and exposure for flower products. - The Flower Development Plan in Sơn La provides numerous opportunities to access provincial support policies. - The trend of migrating to larger cities and industrial zones contributes to an increased land supply locally, easing the pressure on land rental prices. 	<p><u>Threats</u></p> <ul style="list-style-type: none"> - Climate change has led to more frequent extreme weather events. - Short land lease periods create challenges in implementing technological advancements. - Increasing demands from the market pose significant challenges.

Based on the above issues and local consultation, some key solutions were proposed to develop the flower industry in Son La as follows:

- **Extend Land Lease Periods:** Increase land lease durations from 5 to 10 or 15 years through local policies, providing producers more time for investment and technological advancements.

- **Enhance Support Policies:** Strengthen financial, technical, and managerial support for expanding cultivation areas and improving product quality. Encourage the adoption of new technologies for optimized production.
- **Establish Support Programs:** Collaborate with businesses to provide flower producers with seedlings, materials, and technology. Promote cooperative organizations among producers for consolidated production and shared market access through online platforms.
- **Build Cooperative Capacity:** Provide financial assistance or low-interest loans to flower cooperatives for investing in infrastructure and adopting new technologies, improving overall productivity and management efficiency in the industry.

PART 4: CONCLUSION AND RECOMMENDATIONS

4.1. Conclusion

Vietnam has many advantages and potential for developing the flower and ornamental plant industry

Ranked as the 14th nation with most biodiversity (Nash, 2023) and the world's oldest tradition of cultivating flowers and ornamental plants, Vietnam holds significant potential for the growth and development of flowers and ornamental plants. The country benefits from a wide range of climatic conditions, encompassing tropical, subtropical, and temperate zones, allowing for the cultivation of various flowers and ornamental plants. Additionally, Vietnam possesses abundant and diverse genetic resources for flowers and ornamental plants, including many precious genetic resources with high value in the domestic and international markets.

In recent years, flower and ornamental plant growing has made remarkable progress in terms of productivity, quality and efficiency, creating jobs for many households and contributing significantly to the GDP of agricultural sector, thereby contributing to shifting crop structure and building new rural areas. From a country importing many types of flowers and ornamental plants, Vietnam has now transformed successfully to address domestic demand by actively involving businesses in production. As a result, the country not only satisfies domestic demand but also access to the global market, exporting diverse products with significant economic value. The cultivation of flowers and ornamental plants is now recognized as a potential industry that contributes to the restructuring of the agricultural sector.

The government has promoted flower cultivation by expanding investments and fostering flower production in areas with suitable conditions. In recent years, various policies have been implemented to support the development of flowers and ornamental plants. These include investing in research projects for the conservation and development of genetic resources, selecting and breeding ornamental plant varieties, establishing high-quality production models, initiating breeding programs for rare flowers, and implementing science and technology transfer programs to localities. Additionally, agricultural extension programs on ornamental flowers and plants have been introduced. Thanks to these initiatives, scientific agencies have developed hundreds of flowers and ornamental plant varieties and created technical processes for transfer to the public and farmers. As a result, most producers in the flower and ornamental plant industry now have access to new varieties and have acquired the essential techniques for advancing flower and ornamental plant production.

As an increasing number of population have better living standards, there is a rising demand for flowers and ornamental plants. Consequently, these items serve not only as a spiritual necessity but also as a lucrative sector within urban ecological agriculture, yielding substantial profits. The market demand for flowers and ornamental plants is on the upswing in Vietnam, particularly among urban residents, driven by the needs of planting in offices, new urban areas, and expansive traffic median strips. Flowers and ornamental plants in Vietnam find extensive applications, serving various purposes such as celebrating the new year, holidays, traditional and cultural festivals, grand openings, welcoming guests, birthdays, and marking both joyous and somber occasions.

The flower and ornamental plant sector in Vietnam is still constrained by numerous limitations and has not fully capitalized on its inherent advantages

Although the flower and ornamental plant industry is currently an important industry, contributing to the restructuring of the farming industry, the development of craft villages, and the construction of new rural areas, it still has many limitations as follows:

- The growing area is scattered and small, making it difficult to form a large-scale concentrated production area. In the country, there are only a few key localities having specialized and commercialize areas such as Lam Dong, Hanoi, and Dong Thap. The rapid urbanization process, especially in large cities, reduces the area of agricultural land, putting pressure on areas specializing in flower and ornamental plant cultivation.
- There is lack of linkages in the value chains. Limited number of businesses engaged in distributing products from producers to consumers.
- Flower and ornamental plant production techniques are quite backward compared to other countries in the region. Only around 45% of the flower and ornamental plant areas were applied with modern agricultural techniques, with approximately 25% of cultivation indoors. Insufficient availability of equipment for net houses, greenhouses, and preservation houses, along with limited advancements in techniques for harvesting, processing, preserving, and packaging products, has led to a notable decline in the quality of post-harvest flowers.
- Unqualified plant varieties and agricultural materials leads to low and uneven productivity and quality. Flower and ornamental plant seed production units do not meet the needs of producers in terms of type and quantity. There are few high-quality flower varieties adapted to each region's conditions; most new, high-quality varieties have to be imported. In addition, the majority of flower and ornamental plant varieties in Vietnam are unofficial imports from abroad, lacking copyright protection.
- Pesticide usage remains inconsistent, with practices such as elevating dosage concentrations, combining multiple pesticide types in a single application, insufficient water spraying per unit area, and premature pesticide application before reaching the threshold. These practices adversely impact the growth and development of plants, compromise the effectiveness of prevention and control measures, and contribute to environmental pollution.
- For domestic market, the production of flower and ornamental plants has not met consumers' quality, diversity, and novelty needs, especially in the high-income customer segment. The import value is higher than the export value.
- For export, flowers and ornamental plants do not constitute a significant export commodity for Vietnam (accounting for only 0.2% of the total export value of agricultural products in 2022). Most exported cut flowers are fresh, characterized by low value and perishability while dried, dyed, or processed flowers, with higher durability and added value, represent a tiny portion of the export turnover of cut flowers.

There are many reasons leading to unsustainable development of flowers and ornamental plant sector in Vietnam

- Vietnam's flower and ornamental plant production sector is relatively nascent, characterized by small-scale and low level of science and technology application compared to other nations. The orientation for developing flower and ornamental plant areas still has many problems and inadequacies. There is no stable market for flower and ornamental plant products. The planning of areas for growing flowers and ornamental plants has not received much attention from many localities.
- The absence of suitable policies to support the development of the flower and ornamental plant cultivation industry based on its inherent potential, coupled with a deficiency in advanced production technology and high-tech practices integrated into the preservation and processing chain, represents a significant challenge.
- The science and technology market has yet to establish an efficient link between research, education, and the production and trade of flowers and ornamental plants. This deficiency results

in low productivity and quality of flowers and ornamental plants, accompanied by high production costs. Consequently, prices remain elevated, impacting the competitiveness of the products.

- Agricultural investment remains limited, despite some recent business invests in flowers and ornamental plants. The state's investment in flower and ornamental plant sector is insignificant. There is a lack of focus on infrastructure development and scientific research, and the absence of preferential policies for fostering the flower and ornamental plant industry.
- There is a shortage of specialized technical personnel and researchers, with only a small number of distinguished scientific researchers in the field. The majority are young scientists who lack professional training and substantial experience in this field.
- Global competition is intense, with Vietnamese products facing challenges in international markets against countries like China, Taiwan, and Thailand, which boast advanced flower and ornamental plant production. These countries offer higher-quality products, establish strong brands, and foster connections among businesses in the industry. The competitive landscape intensifies with our country's active engagement in agreements such as TPP, FTA, and the ASEAN community, further emphasizing the challenges faced in this context.
- Unpredictable developments in climate change, coupled with increasingly complex natural disasters and epidemics, pose significant challenges to the agricultural sector, particularly affecting the flower and ornamental plant production industry.

4.2. Recommendation

From the research results, the research team synthesized and proposed a number of solutions to develop the flower and ornamental plant industry in Vietnam as follows:

❖ Supplement and improve policies and specific support to develop and attract investment for the flower and ornamental plant industry in advantaged regions

- Formulate policies to support and incentivize the adoption of high technology in flower and ornamental plant production. This includes providing assistance to maintain and develop model sites for applying high technology in flower and ornamental plant production. The aim is to create favorable conditions for widespread implementation of high technology, producing flowers and ornamental plants with enhanced productivity, quality, and competitiveness.
- Develop policies aimed at supporting tariff barriers for imported flowers and ornamental plants in the market, bolstering domestic production. This strategy assists farmers and entrepreneurs in gradually adapting and integrating into the market.
- Formulate and issue policies to incentivize the preservation and consumption of high-quality flowers and ornamental plants. This involves supporting cooperatives, individuals, households, and businesses in participating in developmental investments.
- Establish a legal framework to align with international regulations regarding copyright protection for the use of imported flower and ornamental plant varieties. Encourage research and development in domestic breeding to cultivate Vietnamese flower varieties that align with market demands.
- Undertake initiatives to support the management and development of flowers and ornamental plants, including activities such as reviewing, evaluating high-tech flower and ornamental plant areas and enterprises. Develop criteria and standards for high-tech agriculture, smart agriculture, and high-tech products, encompassing production processes. Additionally, invest in training and enhancing the qualifications and capabilities of industry management and technical staff to access new technologies and techniques.
- Promote propaganda and provide guidance to businesses, cooperatives, farm owners, and farmers involved in the production and trade of flowers and ornamental plants, as well as local authorities

at the commune level in concentrated production areas. This aims to facilitate their understanding and implementation of existing effective mechanisms and policies.

- Develop infrastructure tailored for concentrated flower and ornamental plant production areas, including in-field roads, electricity, and irrigation canal systems in areas transitioning to specialized production. Ensure that irrigation systems in concentrated production areas meet the requirements for proactive and regular water supply and drainage. Additionally, these systems must align with technical specifications, incorporating synchronization and compatibility with modern, advanced water-saving irrigation technologies like drip irrigation and mist irrigation.
- Provide support for in trade promotion, brand building, and encourage business participation in linkages and consumption.

❖ *Increase investment in science and technology in production, processing and preservation*

- Research to enhance flower varieties, investing in the development of unique, aesthetically tropical flowers widely accepted in the market. Additionally, encourage researching and developing seasonal temperate flower varieties. This involves acquiring the copyright for valuable flower and ornamental plant varieties while also engaging in joint ventures, partnerships, or hiring foreign experts to expedite the creation of varieties.
- Promote the integration of information technology in the management of flower and ornamental plant products, covering activities from propagation and planting to care, harvesting, production, preservation, and consumption. Strengthen collaboration with scientific research organizations focusing on genetic resources of flowers and ornamental plants to preserve and utilize genetic resources, develop varieties, and enhance techniques for planting and care.
- Promote research initiatives and the adoption of techniques in the initial processing and preservation of flowers and ornamental plants to elevate the value and competitiveness of these products. Encourage and prioritize the application of advanced and organic technologies to produce clean and environmentally friendly items.
- Utilize iMetos weather-environment technology to forecast and provide warnings for weather, environmental conditions, natural disasters, and pests affecting plants. Employ technology for net houses, greenhouses, irrigation systems, and incorporate information technology, automation, light, humidity, and temperature control sensor systems, as well as spray irrigation technology. These measures should align with automatic fertilization based on the nutritional needs of plants.
- Enhance the quality of flower and ornamental plant seed production by supporting the capacity development of seed production research units. Facilitate the import and utilization of copyrighted varieties in accordance with international regulations. Prioritize infrastructure and equipment investments in Seed and Agricultural Material Centers in key flower and ornamental plant provinces like Hanoi, Lam Dong, and Dong Thap.
- Develop human resources and transfer technological advancements in flower and ornamental plant production. Increase awareness and the application of science and technology among producers to foster a linkage between science and agriculture for mutual development.

❖ *Promote production linkages along the value chain*

- Develop efficient production organization models, with the engagement of cooperatives and enterprises to establish and advance chain connections in the production, processing, and consumption of flowers and ornamental plants.
- Enhance incentives and attract businesses to undertake investment projects in the production of flowers and ornamental plants. Establish a network of enterprises investing in agriculture and rural areas, assuming a central role in input supply, processing, and trade. These enterprises will connect with farmers, leading the value chain and cultivating market development. Develop an industry

ecosystem that integrates large businesses with small enterprises and establish and nurture a startup business incubator.

- Implement joint ventures among stakeholders based on agreements involving signing, co-investment, benefit sharing, and adherence to contractual agreements and market mechanisms in the realm of flowers and ornamental plants.
- Continue to provide support for the establishment of new cooperatives and cooperative groups, ensuring that each concentrated area for flower and ornamental plant cultivation includes a cooperative model engaged in both production and consumption.
- Establishing linkages in the production and consumption of flowers and ornamental plants involves not only collaboration among actors within the Vietnamese flower and ornamental plant industry but also extends to partnerships with countries renowned for their expertise in this sector, such as the Netherlands, China, Taiwan, and Thailand. Domestic producers should foster and enhance collaborations amongst themselves to amplify their negotiating power when procuring input materials and selling output products. Simultaneously, this collaborative effort will bolster supply capabilities in terms of quantity, flower types, and regular delivery.
- Foster international cooperation and partnerships in high-tech flower and ornamental plant production to selectively adopt and import new technological techniques. Conduct conferences and seminars focused on flowers, high-tech ornamental plants, and smart agriculture, introducing machinery and equipment to enhance knowledge and technological advancements in the industry.
- Integrate the development of the flower and ornamental plant industry with craft villages and tourism activities. Establish connections between craft villages producing flowers and ornamental plants in provinces with both local and external tourism companies to develop tourism.

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