Ministry of Foreign Affairs

SECTOR STUDY FLORICULTURE IN BANGLADESH

Commissioned by the Netherlands Enterprise Agency

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FINAL REPORT

SECTOR STUDY FLORICULTURE IN BANGLADESH

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REPORT

- Improvement of floriculture Value Chains
- Feasible interventions in floriculture
- Attractive business options in Bangladesh
- Routes for investment
- Exchange of knowledge and skills between Bangladesh and the Netherlands

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CONTENT

HOW TO READ THIS REPORT

Herewith you receive the report on the Floriculture sector in Bangladesh.
This sector has hardly been researched before, which limits the availability of macro data. Stand-alone statistics, field visits, on-the-spot collected figures, and newspaper items are the main sources. We combined figures from primary sources, and cross-checked these in order to get reliable figures, projections and references.
This report is for farmers, breeders, agro-food firms, suppliers of inputs, and distribution actors like traders, wholesalers and retailers. And the report is for policy makers, knowledge institutes, financial players like banks, Micro finance institutes, and investors. The report gives guidelines to Dutch breeders and companies to explore Bangladesh.

You can read this report in several ways.
It is recommended to read the complete report, in order to understand the full potential and the context. However, pay special attention to your own position in the floriculture value chain. The report guides you in this.
This report is very practical, concrete and to-the-point. Farmers, breeders and companies in Bangladesh and the Netherlands can immediately start with a relevant and quantified intervention/solution. We illustrated business options with figures, pictures and first-hand quotes. We give scenarios for market entry, cooperation and investment.

On-the-spot & figures
An important part of the research consists of on-the-spot researches of 3 weeks in Bangladesh. We visited breeders, farmers, traders and flower markets. We visited poly shade houses and flower fields. And we gathered figures at all these farms and markets. This approach gave us the opportunity to quantify yield, sales volume, retail prices and post-harvest losses. It gave us reality checks and validation. And this validation will continue during the coming years.

Small data, business cases and scaling
We limited the academic and abstract wording, and stayed away from too many generic statistics. We rather believe in 'small data' (concrete cases) than 'big data'. For sure we listed the trends, and zoom out to the bigger picture and numbers of the floriculture sector. But we also validated trends and innovations at the grassroots level by zooming in into farms in Godkhali or into flower shops of Dhaka. This combination makes it possible to judge the critical path in floriculture farming, and explore the scaling opportunities.

This reports pictures the opportunities along the floriculture value chain. It systematically describes where and which interventions could add value to farmers, breeders, companies, and to the value chain as a whole.
The most important opportunities have been worked out in business cases and business calculations.
Case descriptions of companies or potential Bangladeshi partners for Dutch companies have been written down in boxes. These deepen the business options and give more profile to actors in the floriculture sector.
We listed concrete incentives from the Government of Bangladesh for Dutch breeders and companies in case of starting business.

The annexes contain more detailed explanation on how to grow crops in Bangladesh.

Thanks to RVO and to the Royal Dutch Embassy in Dhaka - for their guidance, support and feedback.

Units
247 decimal = 1 ha
1 bigha = 33 decimal
1.000 BDT - € 8,90
1 lakh = 100.000
1 crore = 10.000.000
100 BDT - € 0,87

SUMMARY

In 2022 the Eight o'clock Evening News in the Netherlands broadcasted the waving tulip fields in Bangladesh. This was another milestone in the still young Floriculture sector of Bangladesh. And this sector has much more to offer.

Affordable luxury
The Floriculture sector in Bangladesh has really taken off, and is rapidly growing. Many trends and signs are in favour. Dutch breeders and companies can support and join this growth. Now is an excellent moment to enter this relative young sector in the fastest growing economy of Asia, with its 170 million people.
The people in Bangladesh like to give a bunch of flowers to their loved ones. Cultural changes amongst the young generation in celebrating western festivals such Valentine's Day, Friendship Day, Mother's Day, and iconic cultural events like Pohela Boishakh, have expedited the growth of flower business. Shops, offices and streets become colorful and greener because of flowers and ornamental plants. The 'affordable luxury' of buying flowers definitely comes within the reach of many people in Bangladesh.

A resilient sector
The domestic market is demanding for more varieties than the current 8-10 flower varieties. They ask for more colors, more quality, longer shelf life and niche products like Tulip and Carnation. City decoration and rooftop gardens are on the rise, and the market for pot/ornamental plants has accelerated. Probably most telling is the fact that the flower market totally collapsed during the COVID pandemic in 2019/2020; but that it strongly rebounced in 2021 and 2022; in some areas by 100% compared to 2019. The resilience of the sector is impressive, and tells the 'underlying demand'. Many farmers shift to flowers; at least for a part of the year, during the main flower season from October to March. For example in the area of Godkhali, in Jashore district, 60-70% of the farmers started flower growing. Farmers and breeders are investing in seedlings, poly shade house for growing, and new varieties of flowers like Gerbera, Rose and Gladiolus. More expensive flowers like Lilium entered the scene. This illustrates the progress of the floriculture sector.

Value Chain analysis
Our Value Chain analysis of the Floriculture sector in Bangladesh displays quite some bottlenecks and opportunities; for Bangladeshi- and for Dutch companies, breeders and farmers. The analysis is done in the capital city of Dhaka and hotspots like Godkhali, Jhenaidah, Shabagh Flower Market, Agargaon Flower Market and Gazipur. We spoke to farmers, breeders, NGOs, investors, traders, wholesalers, retailers and consumers. This resulted in many insights on choices (from vegetable to flower growing), successes (nursery), new markets (ornamental plants, Lilium), required improvements (packaging, transport, cooling), and market demands (more varieties, longer shelf life).

More innovators needed
Until recently the Bangladeshi Floriculture sector has been growing opportunistically. Typical are informal channels for seed(lings), corms, foliage plants, and cactus from India, scattered purchase of Tulip- and Lilium bulbs. The big service- and input gap is a huge constraint. NGOs tap into these bottlenecks. A few lead farmers are innovating the sector, like Mr Delwar and his wife of Moumita in Gazipur. He imports Tulip and Lilian bulbs from the Netherlands. He runs a nursery farm for Rose with all needed conditions and technology. But we need more innovative farmers and breeders. And more will follow. More farmers see the market, see the potential and pick up attractive business cases.

Maturity and investments
The floriculture sector is maturing from a side business of vegetable farmers. Farmers are asking for quality seed and seedlings, many growers have invested or are investing in poly shade houses for seedling production or the production of cut flower. The poly shade house protects flowers from harsh weather, insects and birds. It facilitates year around production, and yield and quality improve. It gives the steady supply, which is required by wholesalers, retailers and consumers.

The floriculture sector has entered the next stage. Big private companies like Lal Teer, Ispahani, Metal Seed and ACI entered the sector. They see attractive opportunities at the first part of the Value Chain: the production of seed, seedling, corm and bulb. They have planned investments in Tissue Culture Labs. So far the sector was seen as too 'small' and too 'low value' for serious investments. This vision has changed, and private sector massively makes its first steps in floriculture. Cooperation with Dutch partners seems to be an obvious and attractive option.

Excellent growing conditions
The climate (between 15^0 C and 34^0 C through the year), availability of water, fertile soil and cheap labor are attractive conditions to grow the sector. At present, flowers are cultivated on 5-6 thousand hectares of land in 24 districts including Jashore, Jhenaidah, Chuadanga, Dhaka (Savar), Gazipur, Panchagar, Manikganj. About 1,5 to 2 million people have their living in floriculture. The variety of flowers is limited. Tuberose, Gladiolus, Rose, Marigold, Chrysanthemum and Gerbera are being commercially cultivated in Bangladesh, and cover 90% of the volume. Bangladesh is importing flowers and ornamental plants from abroad. More locally produced varieties and colors will lift the whole Value Chain. It leads to more production, more sales and more attention. There is huge potential for year around production. Northern region of Bangladesh is very potential for commercial floriculture, as winter season lasts longer here compared to other parts of the country.

Financing value creation
Investments in the floriculture Value Chain – for example Tissue Culture Lab, Poly shade house, packaging - are attractive. It results in better quality flowers, lower costs, less post-harvest losses, higher yields and more profit. Return on Investment of a poly shade house and better packaging make the investment worthwhile. The business cases in this report illustrate these 'Value Creators'. Nevertheless (pre-)financing is an issue in floriculture, since it is a relatively young sector. NGOs like RRF and wholesale micro credit organizations like PKSF support the floriculture sector on this. Young graduates/farmers understand latest technology and business sheet, and become frontrunners for these investments.

Focus on the domestic market
More and more occasions for giving flowers are emerging, like weddings, business seminars, Language Day and birthdays. Cities decorate their streets and parks with flowers. The present market size is 16 Billion BDT (€165 million) annually and expanding at 10-15% rate. The research makes clear that the domestic market can for example easily absorb three times more gladiolus. The Chrysanthemum market can double. This growth makes clear that the domestic market should be the first priority. Besides demand the technical skills and logistic chain need improvements first, before export becomes an option. Export requires technical excellence, broad variety, logistic optimization and an attractive price. All four are not yet in place in Bangladesh.

Breeder's Rights and Phyto-sanitary regulations
Formalization of the Floriculture Value Chain and setting favourable conditions are an important next step. This entails clarity on phyto-sanitary requirements for import of seedlings and bulbs from the Netherlands, and respecting property rights. Bangladesh acknowledges and works on these topics. Breeders and companies assured that they would respect property rights and pay for the fees accordingly. It will give the Bangladeshi breeders access to new and better varieties. The breeders and farmers can claim the extra fees for these varieties on the market. The domestic market is ready for this.
We will connect local breeders and Dutch breeders.

Lack of knowledge, lack of quality inputs, and lack of private sector engagement
Most of the farmers are illiterate and they lack modern technology and knowledge of flower cultivation. Extension service is almost absent, but upcoming. Use of modern technology or equipment is very limited, but improving. Access to quality inputs will increase productivity and profitability of the farmers. That's why Bangladesh looks at the Netherlands and its reputation and expertise on flower growing.
Further commercialization and strengthening the floriculture sector in Bangladesh requires time, dedication and efforts. The perspective is great. The future looks flourishing.

KEY RECOMMENDATIONS ON THE FLORICULTURE SECTOR BANGLADESH

1. Motivate and support the **private sector to play a stronger role** in the floriculture value chain; for example in seed production, tissue culture lab, introducing more varieties, better logistics and marketing.
   - This innovates and accelerates the quality and yield of farming, distribution and sales. It creates business options for companies in Bangladesh and the Netherlands.

2. Introduce **more flower varieties**, and more colors in Bangladesh. Think of Lilium, Gerbera and Chrysanthemum.
   - This will increase sales and the number of occasions to buy flower. It will motivate farmers, traders, retailers and consumers.

3. Develop an **own flower seed production for Bangladesh**. Join forces of Dutch breeders and investors, and Bangladeshi private sector to ignite local seed production.
   - This concerns tissue culture labs and other techniques to produce seed.
   - This completes the local value chain, reduces the costs, and gives more control on quality and availability. There is less dependency on other countries.
   - Bangladeshi companies have experience with local seed production of potato tubers and vegetable seed

4. Professionalize and improve flower growing by **investing in quality seedlings, bulbs, seed, bio-pesticides, fertilizers, irrigation and poly shade house.**
   - Ispahani and ACI are front runners for sustainable farming
   - This improves quality, yield, shelf life and sales price

5. **Improve farming practices, skills and knowledge on cut flower** of Bangladeshi seed providers, breeders and farmers.
   - Make a differentiation amongst the 3 groups of farmers to be trained: innovators (1%), followers (5-10%), others (90-95%).
   - This results in healthier, brighter, safer flowers with longer shelf life and at lower costs, and with higher profits.
   - Don't make any compromise on quality, sustainability, yield and cost price. Become best in class. Otherwise other countries like China and Vietnam might export to Bangladesh and take over the domestic market.
   - Bangladesh builds up a bigger group of innovators and advanced flower farmers
   - The NGOs PKSF, RRF and Jagorani Chakra Foundation could playa role on trainings.
   - These trainings have the following items:
     a. Improve seed selection/purchase, seed production, preservation of seed, bulbs and flowers, fertilizer use, post-harvest techniques.
     b. Introduce knowledge and skills on diseases: preventive spraying, dose rates, timing of pesticide use, bio-pesticides and Integrated Pest Management.
     c. Start a demonstration farm for flower growing
     d. Facilitate exchange visits with the Netherlands and a country like Vietnam.
     e. Introduce experts like Dutch breeders, WUR, HAS and PUM to Bangladesh.

6. **Improve packaging and transport** of cut flowers in cooperation with local companies. Think of design of a solid box to pack & transport flowers. Think of regular services to transport flowers from production hotspots to Dhaka and Chittagong.
   - This reduces the post-harvest losses, and improves quality and profit

7. Develop a **more systemic marketing strategy and -plan on cut flower** in cooperation with Bangladeshi farmers, wholesalers and retailers to approach market and buyers.
   - Bangladesh Flower Society and the Flower Growers Society could take the lead.
   - This gives new sales occasions, new groups of buyers and more sales

8. **Formalize regulations and procedures** for importers, breeders and farmers. Think of phyto-sanitary regulations and procedures, and monitoring and respecting Intellectual Property Rights.

- The Ministry of Agriculture (MoA) and Department of Agriculture Extension (DAE) are leading on this.
- This leads to more varieties, investments and bi-lateral trade

9. Ornamental plants need special attention. Build and distribute **technical skills and knowledge on ornamental plants** for Bangladeshi farmers. How to grow, what are required conditions (temperature, shade, medium/substrate). Do this in cooperation with Bangladesh Agricultural Research Institute (BARI) and Dutch experts.
   - This results in extra varieties, better quality and the right selection of ornamental plants.
   - Ornamental plants bring flowers & green to people and city.

10. **Market ornamental plants** to the three markets: Business-to-Consumer (home, rooftop garden), Business-to-Business (office, shop) and Business-to-Government (street, garden)
    - This makes houses, offices and streets greener and healthier

11. **Focus on the domestic market**, rather than on the export market
    - The strongly growing domestic market, and currently still limited technical- and logistic performance of the Bangladeshi farmers, justify the focus on the domestic market.
    - The Middle East might be the first achievable export market for Bangladesh.

12. **Develop financing arrangements** for farmers and other value chain actors to grow and improve flower farming. **Build investment programs** for domestic and international investors in the floriculture sector.
    - This accelerates the sector and innovations
    - PKSF, RRF, Jagorani Chakra Foundation, banks and private investors play a role, and aim to play a role.

13. **Develop alliances amongst farmers, companies, investors and knowledge partners** to have a programmatic and long-term approach and strategy. This could be for a new flower variety, developing a certain area of Bangladesh or building an efficient (cold) chain
    - This leads to a more systemic growth and focus
    - Companies like Phenix, Lal Teer and others are open to this type of cooperation.

Bangladesh

> *Bangladesh grows and develops faster than many people and companies think.*
> *Flowers are an affordably luxury for many people in Bangladesh.*
> *And yes! Bangladeshi people love flowers and want to have the latest varieties.*

During the last five years Bangladesh was the fastest growing country in Asia with a growth rate of 6,5%. From 2010 to 2020, Bangladesh achieved the world's highest cumulative GDP growth. In a decade and a half, it lifted more than 25 million people out of poverty. Demographics are another tailwind for the world's eighth-most populated country (170 million people). The median age in Bangladesh is 27.9, compared to 38.1 in the US, 38.4 in China or 44 in the European Union. Its young, digitally savvy population signifies a booming domestic market.
Despite its macroeconomic stability, open economy and abundant opportunities, Bangladesh has comparatively lagged in terms of foreign direct investment. This is due to negative misconceptions. However, its strategic geographical position, natural resources, strong domestic consumption, private-sector-led growth, strong foreign currency reserves and recently simplified laws for foreign investors, make Bangladesh a compelling candidate for investment.

All together it makes Bangladesh a country to consider as a business partner in Floriculture. It is about anticipating growth, rather than huge immediate cash flow. The demographic dividend - millions and young - and the forecasted spending power are in favour.

CHAPTER 1 INTRODUCTION, GOALS & SCOPE

Bangladesh and the Netherlands have a long lasting relationship in the areas of Water management and Agriculture. The exchange of technology, knowledge and policies resulted in progress and business. Floriculture is a next area to be explored. Potential and ambition are present at both sides. This report unfolds business options and –perspectives for both.

GOALS

This sector study has the following goals:
1. Mapping the floriculture sector from several perspectives: institutional, policy, value chains, actors & stakeholders
2. Mapping the bottlenecks, opportunities and trends; and what are needed solutions and interventions
3. Determining the ambitions, skills, needs and intended actions of Bangladeshi companies and knowledge institutes
4. Determining the technology, products, services and knowledge of Dutch companies and institutes, which could be offered and introduced into Bangladesh; this includes their strategy and plan for entering Bangladesh.
5. Building concrete business options, illustrated by business cases, which are attractive for Bangladeshi companies as well as for Dutch companies and institutes
6. Mapping potential financing options and matching these with the interventions and business cases.

Three guiding principles

The project has three guiding principles
1. 'Focus on the value chains in the floriculture sector, which show a good match between Dutch interests and expertise, and Bangladeshi challenges and resources and ambitions.'
   → We choose private sector development (PSD) interventions, which have a potential direct link with assets of Dutch companies
2. 'Priority role for the private sector (companies, breeders, farmers, investors)– within the institutional field - as they are mostly responsible for progress in the sector'.
   → We develop business cases, which fit the approach of private companies and profitable/sustainable solutions. Return on Investment and commercial approach are key.
3. 'The technical and financial feasibility of solutions and interventions are conditional.'
   → Technical solutions and business cases fit the pace and speed of the development of the floriculture sector in Bangladesh. We link business options to financing partners

Scope of the study

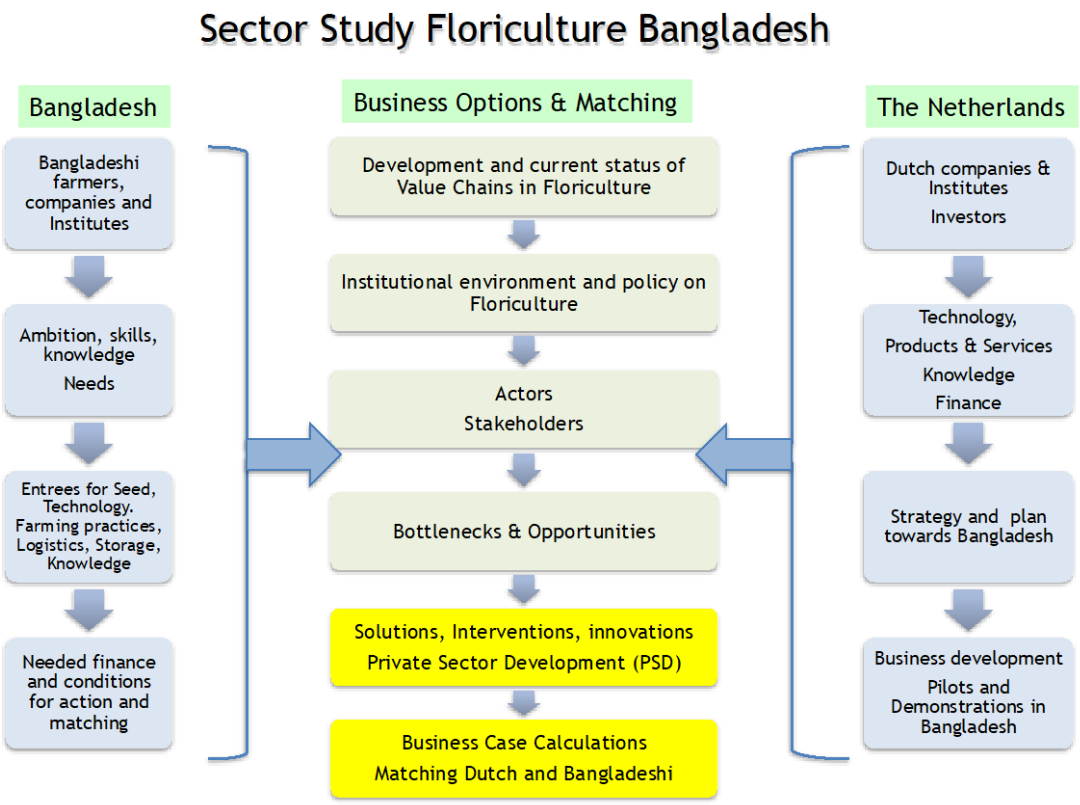
The scope of this study is at three levels.
- We study the macro level as part of the 8th five-year plan 2020-2025 and 'Bangladesh Vision 2041'. This includes the institutional environment (policy makers, financiers)
- We study the 'value chain level' (meso level) by analyzing floriculture value chains: from seed to end-user.
- And we map the opportunities at farmer- and at company level (micro level). How can farmers and companies improve their business?

The three levels are interconnected.

Macro level (country, province)	Meso level (value chain)	Micro level (farmer/company)
• Phyto-sanitary regulations • Plant variety protection • Cool/cold storage facilities • Better (use of) infrastructure • Better export proposition • Knowledge exchange Bangladesh and the Netherlands • Financing options	• Local seed production • More varieties • Improved, consistent seed • Introduction of greenhouse technology for better yield • Reduction post-harvest losses • Cool/cold storage/transport • Certification	• New varieties • Lower costs of inputs • Mechanization • Poly shade house • Better farming practices • New outlets • Trainings, knowledge • Better information

CHAPTER 2 METHODOLOGY & APPROACH: THE AGRO VALUE CREATOR

This sector study aims to map the floriculture sector in Bangladesh. We map bottlenecks, opportunities and business options in Bangladesh. Based on these insights the Dutch floriculture sector could add value. How could the strengths and assets of Dutch companies, breeders and farmers tap into the opportunities and business options in Bangladesh? The picture below illustrates this.



Towards Business Options

This report focuses on the 'Bangladesh side' (left) and the 'Business options & Matching' (middle). Prior to the study we spoke to 10 companies and breeders in the Netherlands (right) to understand their assets and ambition towards Bangladesh. Based on these meetings and visits we could address and fine tune our questions to Actors and Stakeholders in Bangladesh, as well as make a start with matching.

'The engine' of the sector study will be the blocks ***'Solutions, interventions, innovations'*** **and *'Business Case Calculations – Match Dutch and Bangladeshi'***. Only if there is a quantitative business case of a solution or intervention, and enough scale and long-term perspective – for example better seed, new variety flower, packaging technology – we have the basis for a match; a match between a Dutch supplier and Bangladeshi farmer or company. The business calculation will make clear the Value Creation and motivate both. And the business calculation could interest financiers like banks and investors . 'We have to make floriculture measurable.'

An important step is the validation of our mapping and business options. We will present the findings to actors and stakeholders in both countries. We will adjust or fine tune accordingly. Matchmaking between actors in Bangladesh and the Netherlands is the next step.

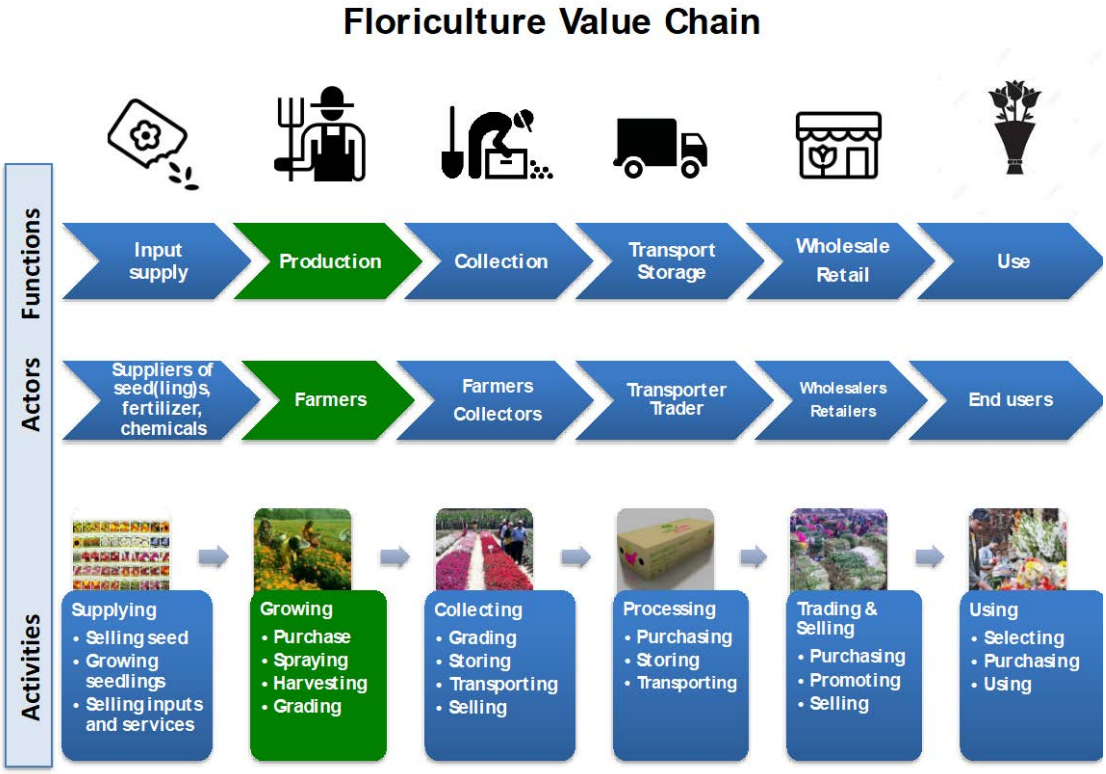
Information gatherings

The table below lists the sources of information and how it has been collected.

Source	Information	Overviews
Desk research	Reports, news items, interviews	Reports of PUM, Newspapers. Statistics
Interviews and company visits to Dutch companies	Insights on technical knowledge and assets, ambition and strategy	See list with companies in Annex 1
Farm visits, interviews with farmers	Farmers in Godkhali, Jhenaidah, Gazipur	See list with organizations in Annex 2
Company visits	Smaller and bigger companies	
Focus Group Discussions with farmers, traders and local government	Value Chain Actors in Godkhali, Jhenaidah, Gazipur	
Interviews with stakeholders	In Dhaka, Jashore, Jhenaidah	
Visits to market and shops	Godkhali, Jhenaidah, Shahbag, Agargaon, Gulshan	
Validation Workshop at EKN	Actors and Stakeholders of the Floriculture sector to review research results	See list with participants in Annex 3

The Agro Value Creator
The Value Creator is the systemic and holistic analysis of the Floriculture value chain and the eco-system around it. We use the approach of the 'Agro Value Creator'.

The Agro Value Creator is a proven and practical methodology to analyse agriculture value chains, and to come to concrete interventions and business options for the farmers and chain partners.
The Value Creator helps farmers, companies and other actors to figure out which opportunities they have in the value chain, in which they are active; and how to benefit from interventions.



We analyze the Floriculture value chain from 3 angles: function, actor and activities.
We map the following perspectives: logistic, technical, commercial, financial and information. This helps us profiling the farmer (strengths, ambition, scale, skills), how is the decision power in the chain, and how to shift this. It explains how to calculate Return on Investment of new flower varieties, a tissue culture lab, a poly shade house, or improved packaging.

Characteristics
The Agro Value Creator has the following characteristics:
- Analyzing all value chain actors and relevant stakeholders around the chain (a.o. government, banks, research institutes, regulators).
- Speaking to a broad range of farmers: smallholder farmer, innovator and big farmer.
- Collecting qualitative- and quantitative data.
- Conducting field visits to farmers, processors and other actors as reality check.
- Benchmarking on successful and innovative farmers and other chain actors pays off.
- Developing business cases with a Return on Investment of 1 – 5 years.
- Mapping (investment) opportunities in value chains for companies & service providers
- We come to practical and achievable interventions, which lead to more and better business for the chain as a whole, and to more income for farmers.

Proven and practical
This methodology is a proven and practical tool. We have questionnaires to interview value chain actors and stakeholders. We have calculation models to set up the business cases for improved seed, farming practices, reduction of post-harvest losses, and new distribution outlets. We come to a sound analysis and business options for the floriculture value chain.

Look beyond your farm
If the consumer demands new varieties and more colors, the farmer has to act on it. The farmer will ask the seed supplier for this new variety. If the consumer would like to have a longer shelf life of the flower, wholesaler and retailer have to take their measures to fix this by having a better packaging, transport and shorter logistics. So, the Value Creator approach looks beyond the farmer. All actors and activities are interconnected and dependent on each other; and have to be approached together.

Companies
Bangladeshi- and Dutch companies tap into opportunities by introducing proven innovations like attractive- and disease-resistant seed, better farming practices, affordable storage- and packaging facilities, and marketing techniques. They directly connect to agro value chains.

Knowledge transfer
We unfold 'the unknown unknown'. Farmers and other value chain actors do often not know what they don't know, and how they can improve; for example with a disease-resistant variety.. Education, training and knowledge transfer bridge the gap between opportunity and successful business. Knowledge providers, and also companies contribute by introducing product innovation, new techniques, and marketing.
The Value Creator helps farmers and value chain actors to 'see and understand the unknown unknown'. It is the starting point for innovating their value chains.

Make floriculture measurable
Key in our approach is collecting figures and making calculations. We collect figures on seed, crops, yield and sales. We identify and calculate achievable business cases.
'We make floriculture measurable'.
We make the business cases tangible. What does it mean for the yield and income of the farmer if he invests in high quality seedlings from the Netherlands instead of seedlings from informal channels in India? Are the costs of a better packaging and transport lower than the gains because of less post-harvest losses and more reliable time-to-market sales? What is the extra value of a climate control system in a poly shade house? We make the calculation and give options. That makes it easier to decide, to mobilize partners in the chain, and to convince financing partners.

All perspectives
We analyze the value chains from the technical side (nursery, seeds, diseases), from the logistic side (packaging, storage, efficient routing), and from the commercial side (quality, premium product, different retail outlets, branding).
We determine the critical path for the value chains. It could be that a better quality (seed, diseases) and yield (seed, farming practices, machinery) are priority before developing the distribution channel to supermarkets or export.
And we describe the political-economic context. For example what is the role of the government, and what is the impact of phyto-sanitary regulations.

Not a 'zero-sum-game'
The Agro Value Creator intends to let the value chain grow as a whole. The whole chain improves because of better quality seed, if the yield improves, or post-harvest losses go down because of better logistics. If the gain of one actor means that another actor looses, the implementation might not work. But it is not a zero-sum-game. All actors, who add value in the chain, benefit from the intervention. The whole chain benefits. The strongly growing market for flowers in Bangladesh can absorb the higher produce and new varieties.

CHAPTER 3 VALUE CREATORS – MORE REVENUES, LESS COSTS, MORE INCOME

Along the whole value chain – from seed to consumer – we analyzed strengths and weaknesses, opportunities and threats. Where are the business opportunities? We define 'The Value Creators'. The Value Creators are those interventions, which lead to 'more value'. More value comes from 'more revenues', 'cost savings', reduction of post-harvest losses, more outlets, or other innovations in the chain.

See Strengths, Weaknesses, Opportunities and Threats in picture below.

From SWOT-analysis to Value Creators

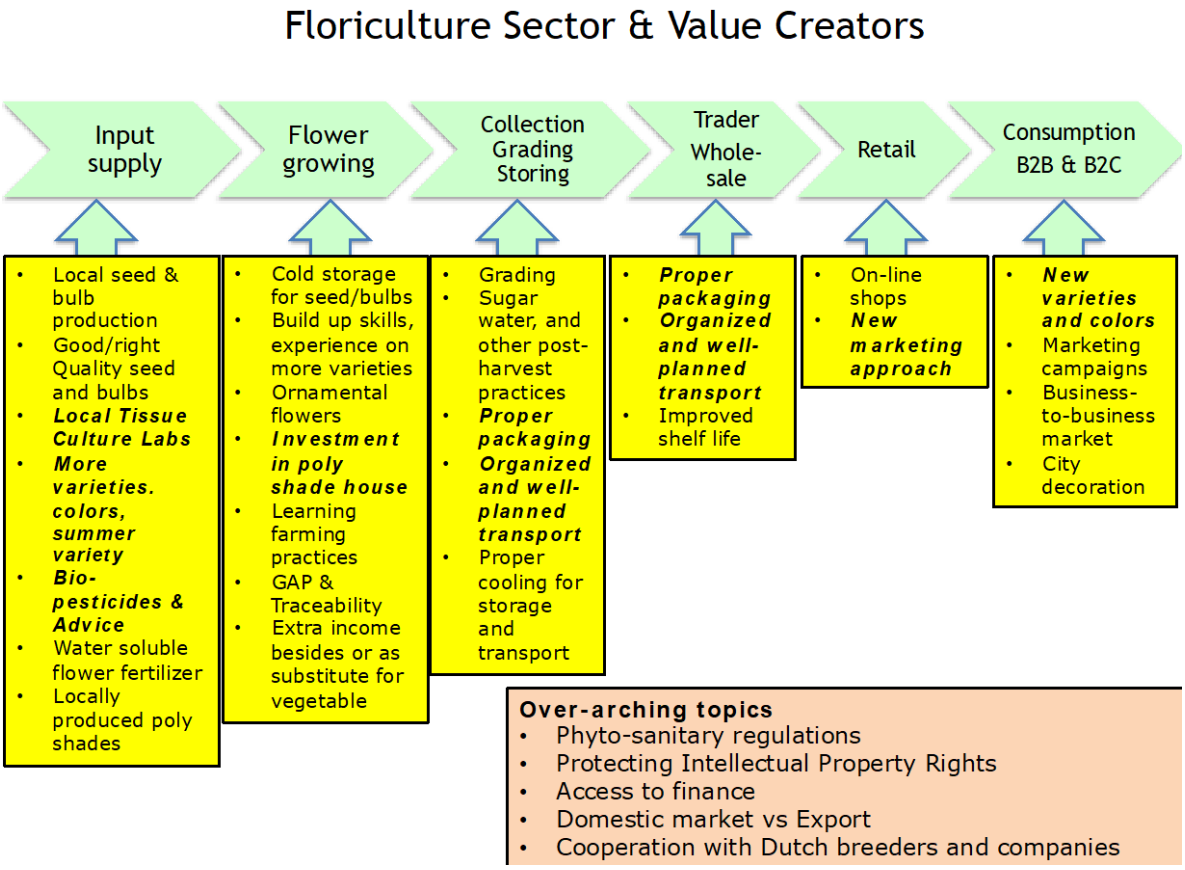
STRENGTHS • Investments in new varieties, poly shade houses and new plots for floriculture • Good skills to grow flowers amongst farmers and breeders • Innovating farmers experiment with new varieties and new farming practices • Ambitious farmers, breeders and companies • Horticulture expertise can be used for floriculture • Combination of horticulture and floriculture in for example poly shade house • Upcoming tissue culture labs for seedling production • Broad range of trials to grow and nurture ornamental plants	**WEAKNESSES** • Limited number of innovators • Poor packaging • Poor transport facilities • Limited shelf life • Vast use of pesticides and spraying and no integrated Pest Management • Limited involvement of private sector • Limited domestic seed /bulb/seedling production • Limited knowledge on Intellectual Property Rights • Informal channels from mainly India
OPPORTUNITIES • More occasions to give flowers • Big population with increasing disposable income • Flowers are seen as an affordable luxury • Strong demand for ornamental plants • Investments by businesses (offices, shops) • Investments by government (city decoration) • Introduction of new varieties and more colors • Attractive conditions and incentives to start business in floriculture	**THREATS** • Efficient production and logistics in China gives tough competition • Inferior seedlings entering Bangladesh from India • Artificial flowers, which are cheaper and can be used more often. • Competing 'flower production hubs' in the region (India, Vietnam)

From SWOT-analysis to Value Creators

Having the Strengths, Weaknesses, Opportunities and Threats, we formulate the Value Creators, the business opportunities. We come to Value Creators by 'Combining Strengths and Opportunities', 'Solving Weaknesses', and 'Countering Threats with Strengths'.
See examples:

- Investment in packaging and transport reduces post-harvest losses and improves shelf life.
- Private companies set up seed(ling) production and improve quality of flowers and affordability for farmers and breeders; and by-pass the informal channels from India.
- Integrated pest management improve plant health and saves costs.
- Investment in poly shade houses improves yield and quality, and lowers dependency on seasons.
- The segment of ornamental plants expands thanks to trials of BARI and breeders.

Value Creators
See picture below with the identified and potential Value Creators for the Floriculture Sector in Bangladesh.



Elaborating the Value Creator into Interventions and Business options.
Chapter 5 describes the Value Creators as mentioned in the overview above. In most cases it means Value Creators for local- and Dutch companies, breeder and farmers. The 'bold & italic written Value Creators' have been worked out in more detail.

At first we describe the market, market growth and farmers.

CHAPTER 4 MARKET, TARGET GROUPS AND TECHNICAL PERSPECTIVE

There are not many data available for cut flower.
Department of Agriculture Extension (DAE), Department of Agriculture Marketing (DAM), BBS (Bangladesh Bureau of Statistics) and BFS (Bangladesh Flower society) kept data on cut flower production and marketing. There is a remarkable difference among data available from difference sources. We identified realistic data through triangulation among agencies' data, wholesale market data of major production hubs, wholesale market data of selling hubs and physical observation.

4.1 MARKET AND MARKET GROWTH

Strong growth
The growth of the floriculture sector in Bangladesh is strong. Overall during the last 15 years, production volume, # hectares and turnover increased by 10-15% per year. During 2019 and 2020 COVID-19 gave the floriculture sector a serious setback. Priorities at production side and spending side were at the food production; for farmers, traders and consumers. Scarce transport was rather used for food than for flowers.
But in 2021 and 2022 production and growth strongly rebounced to previous levels, and beyond.

Growth factors
The reasons for this growth are:
- Disposable income of families increases
- People would like to spend money on (affordable) luxury
- The number of occasions to use or to give flowers emerge
- More flower varieties enter Bangladesh (although limited)
- There is a shift towards more expensive flowers
- Ornamental flowers find their way to shops, offices, homes and streets

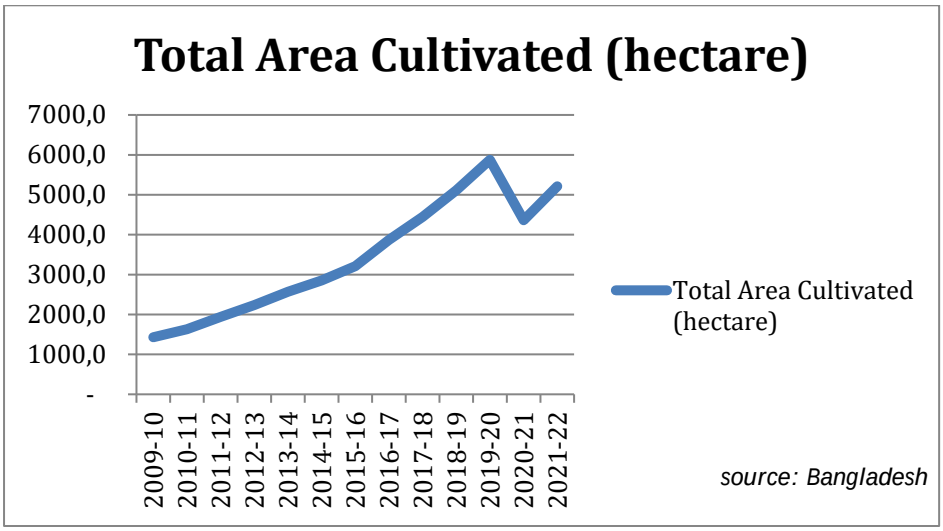
Risks factors
The major risks in the market are:
- Plastic flowers substitute fresh flowers (since 2014)
- Lack of varieties and colors limits growth
- The sector needs more efficiency and cost reduction at the production side to lower the cost price and to attract buyers/consumers. Retail price might be lower, but sales volume will increase
- Limited farming practices and rough post-harvest handling deteriorate the quality of flowers (diseases, smell, less brightness, broken)

Regional dynamics and Dutch companies
The competition in the region – for Bangladeshi and Dutch companies/breeders - comes from several perspectives:
- The seedlings from India have a lower price than those coming from the Netherlands. However, this informal channel limits quality, number of varieties and reliability of the seedlings. It could be that the Bangladeshi breeder thinks to have bought a red Gerbera, while it appears to be a yellow one. The quality of the seedling might result in only 10 flowers, while it should have 50 flowers. In other words cheap seedlings from India could be a 'penny wise, pound foolish purchase', compared to local production or buying seedlings from the Netherlands.
- India could be a hub to Bangladesh for Dutch companies. This means that current Dutch companies in India see Bangladesh as a serious market and formalize the current (informal) channels. In case the Bangladeshi floriculture market further matures, these companies could consider a base in Bangladesh.
- The competition from China could be that the production in China has more efficiency and quality. The shelf life of Lilium from China is 3-5 days more compared to the Lilium from Bangladesh. So farming practices and post-harvest treatment (packaging, transport, speed) should be improved to compete with China.
- No competition from Vietnam and Thailand, which focus more on Southeast Asia region.

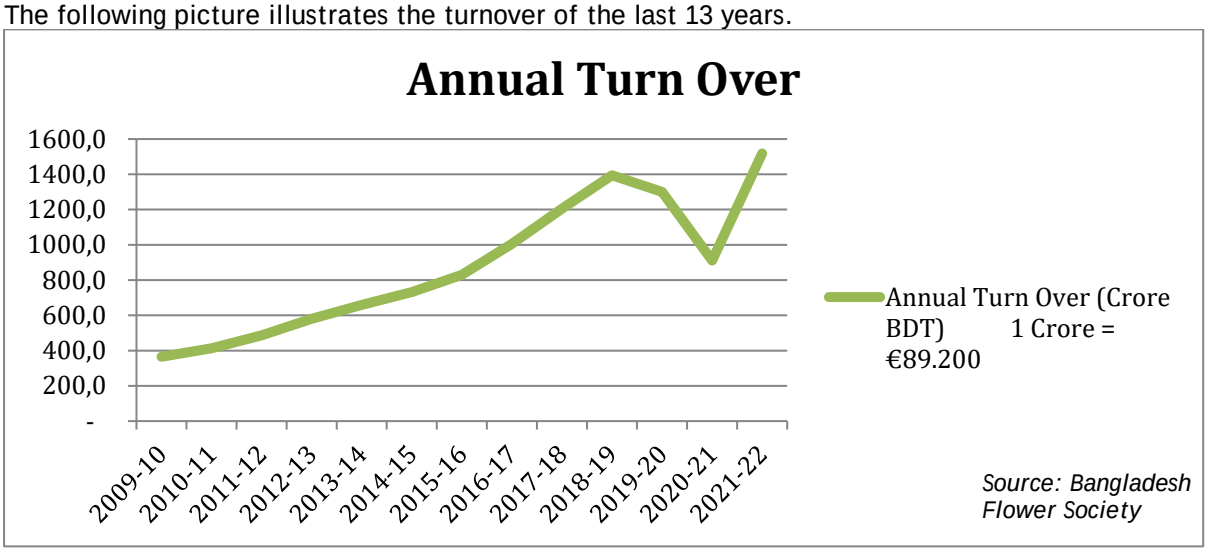
Dutch presence in Bangladesh and region

Country	Company
Bangladesh	• Jan de Wit & Zonen • Royal van Zanten • FlowerBulbs
India	• KF Bioplants (JV between Kumar Group and HilverdaFlorist BV)
Vietnam	• Onings Holland • Van der Valk • KP Holland
Thailand	• Floral Daily • Richard Bonnet-New Fashion Flowers • Royal van Zanten

Cultivated area
The picture below gives the increase of cultivated area over the last 13 years.

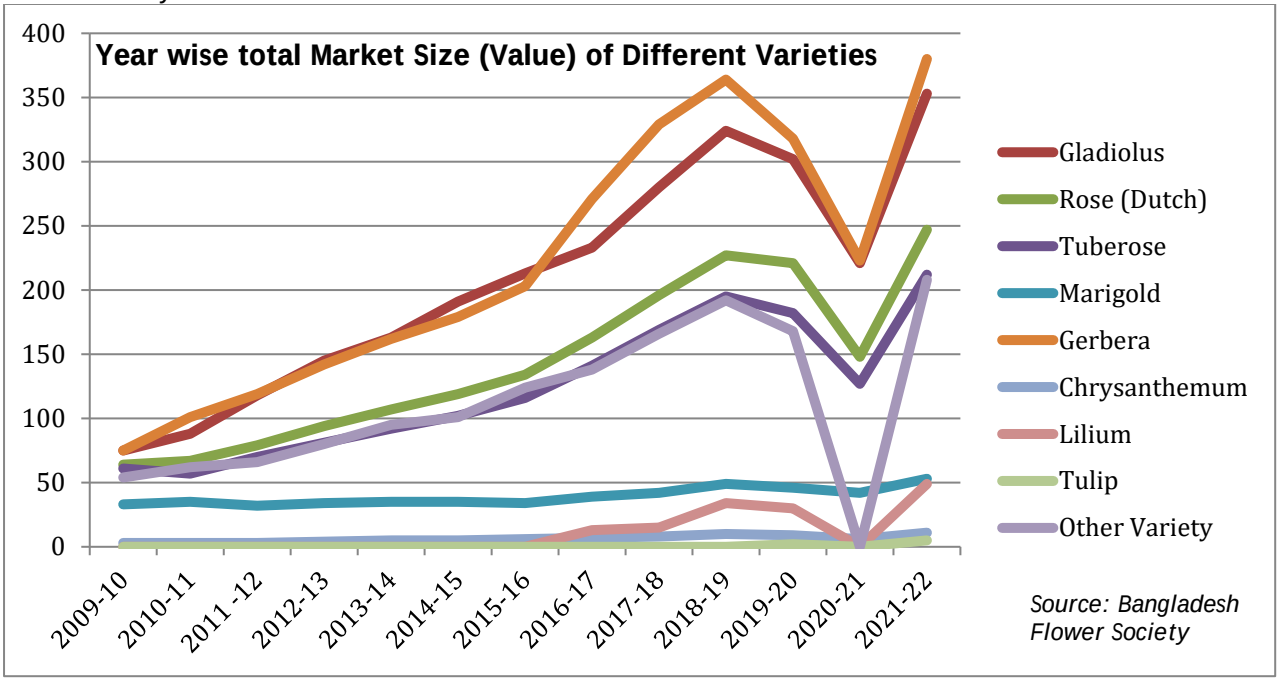


Turnover
The following picture illustrates the turnover of the last 13 years.



Note
The graph shows that the turnover grows faster than the # hectares. The reason for this is that the group of high value flowers – like Lilium and Gerbera - grows faster than the low value flowers. And the 'COVID-19 dip' has been clearly left behind.

Growth per variety
The following picture gives an overview of the annual turnover in Crore BDT per year per flower variety.



Notes
Marigold sales is very stable over the years.
Chrysanthemum is stable because of limited colors (white and yellow)
Gladiolus, Gerbera and Lilium are strongly increasing.

Retail price of flower varieties
The table below (BFS) displays the variation in retail price compared to quality of flower.

Flower	Unit	Premium Quality	Average Quality	Low Quality	% of price difference for quality
Gladiolus	Per stick	25	20	18	40%
Rose (Dutch)	Per stick	25	20	15	60%
Tuberose	Per stick	8	6	5	60%
Marigold	Per 1000	400	350	300	30%
Gerbera	Per stick	20	15	10	100%
Chrysanthemum	Per 100	150	120	100	50%
Lily (with 4-5 bud)	Per Stem	300	250	No Demand	20% for Average
Tulip	Per stick	150	120	No Demand	20% for Average

Source: Bangladesh Flower Society

Notes
Seeing the big difference in sales price for different qualities, it is clear that it pays off to invest in a better quality flower. Better quality is determined by pre-harvest practices like quality seed, fertilizer, irrigation, use of pesticides and prevention of diseases. At the post-harvest side handling, grading, packaging and transport determine the quality of the flower in the shop.

Retail price per season
See table below with the differences in retail price (in BDT) per flower variety per season.

Flower	Unit	Low Season (May-Sept)	Normal Season (Oct-Nov, April)	Peak season (Dec-March)	% Variation for Low	% Variation for Peak
Gladiolus	Per stick	15	20	30	25%	50%
Rose (Dutch)	Per stick	10	20	50	50%	150%
Tuberose	Per stick	5	6	8	17%	33%
Marigold	Per 1000	150	350	700	57%	100%
Gerbera	Per stick	12	15	25	20%	67%
Chrysanthemum	Per 100	100	120	200	17%	67%
Lily (with 4-5 bud)	Per Stem	200	250	300	20%	20%
Tulip	Per stick	120	120	150	0%	25%

Source: Bangladesh Flower Society

Note: The farmers can make serious extra money by producing during the peak season

Plastic flowers or artificial flowers.
Since 2014 plastic flowers – mainly produced in China - is a growing category in Bangladesh. Farmers and retailers see this as an annoying substitute for fresh flowers. The benefits are clear: cheap price, many varieties and colors, longer lifetime. Plastic flowers are being used for events like wedding, seminar, exhibition and in offices. The plastic flower can be used many times. In that sense it is a serious threat for fresh flowers. However people prefer real, fresh flowers at occasions like Valentine's Day, birthdays, Mother Language Day. The plastic flowers could be competed in three ways with real flowers. At first if more varieties and colors of flowers are grown, there is no reason to shift to plastic flower because of 'giving something different'. Secondly, the category of pot plants or ornamental plants is a good alternative for plastic flowers. Pot plants have a much longer lifetime than cut flower, which make them relatively cheaper than cut flower and maybe even cheaper than plastic flower. The third way of competing with plastic is that fresh flowers are better for a healthy and greener house, office or wedding.

4.2 TARGET GROUPS OF FLOWERS - FOR SPOUSE, SEMINAR AND CITY

The market for cut flower and pot plants in Bangladesh is very diverse. End-consumers, businesses and government purchase flowers and pot plants; for decoration, by tradition or just to have 'a moment of giving or joy'.
Everyone likes flowers. And, flowers are affordable for most people. If you have not much to spend, you just buy one flower. Flowers are 'an affordable luxury'.

Own dynamics
Whereas the seed, input, farming and distribution side of the floriculture Value Chain is very similar to horticulture, the sales- and market side of floriculture is totally different than horticulture. Food fulfills a totally other need than flowers do. In the case of flower the occasion of purchase, price and price elasticity, timing, emotion and frequency of buying differ from the purchase of food items. This dynamics creates volatility and opportunities.
We see three segments.

Business-to-Consumer (B2C) → Enjoy life
- Valentine's Day
- Wedding (December – March is wedding season)
- Mother's Day
- Pohela Falgun (start of Spring, in February)
- Mother language Day (for the teacher)
- Pot plants for (rooftop) garden, balcony, veranda, living room

Business-to-Business (B2B) → Expressing hospitality
- Offices and shops (flowers and pot plants)
- Seminar
- Festival, exhibition

Business-to-Government (B2G) → Bringing nature to the city
- Parks, tourist attractions
- Military gardens (Army Day 21 November)
- City decoration in the street (flowers and pot plants)
- Victory Day (16 December)

10% annual growth - online and cold storage
Present market size is close to 16 Billion BDT (€165 million) annually and expanding at 10-15% rate. Godkhali wholesale market in Jashore is the largest flower market. The two biggest wholesale markets in Dhaka are "Shahbagh Flower Market", and "Agargaon Flower Market". The number of flower traders is 3.000. There are around 2.000 flower shops in Bangladesh, and 1.000 of them are located in the capital city. A big number of online flower shops are doing relatively well like Florista and Bdflora, Flower processing centers and flower markets are being set up at Panisara, Jhenaidah and Jashore with the support of USAID and Bangladesh Government.

Retail prices
We see big differences in price at the shops.

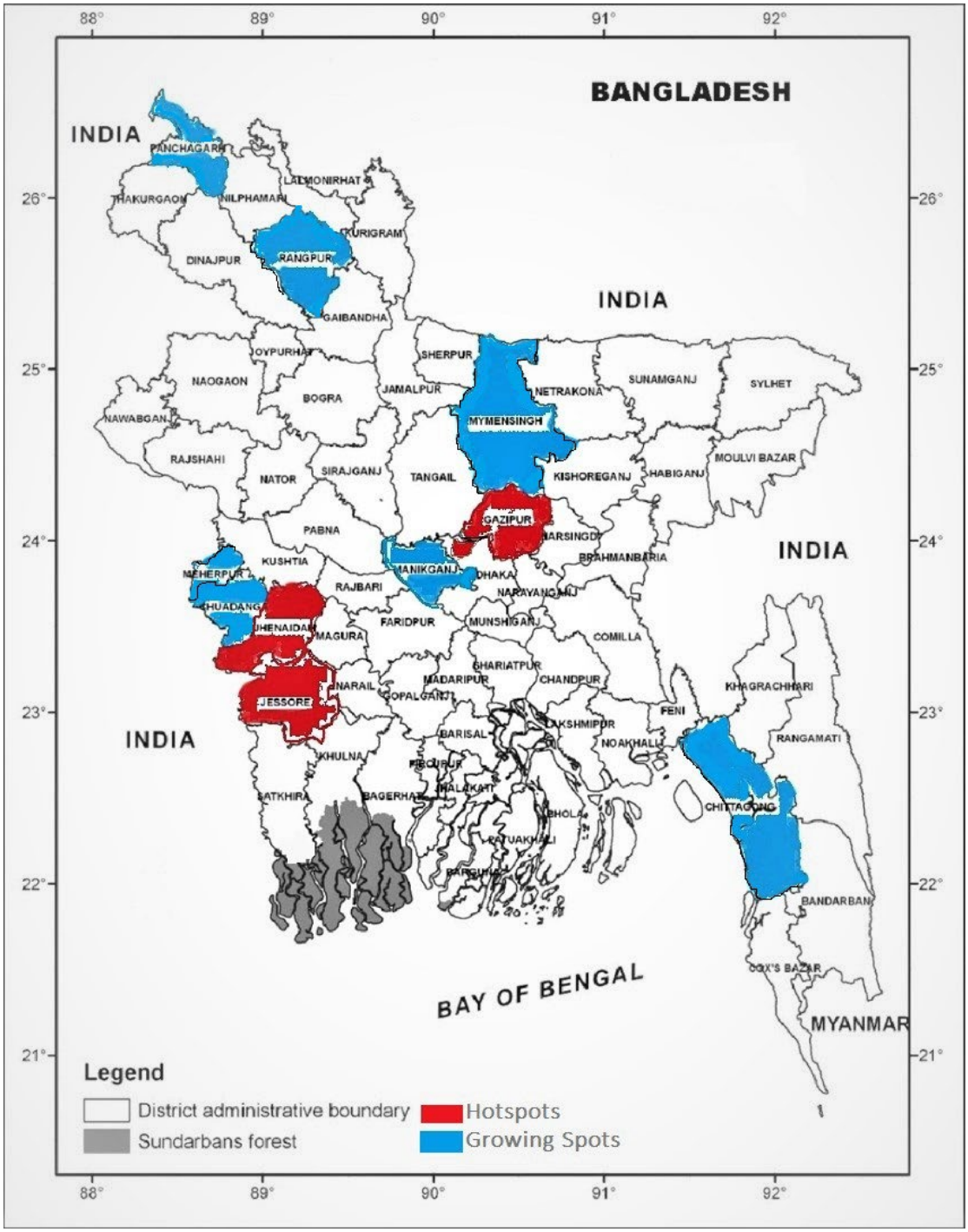
Retail price Variety	Dhaka (Gulshan)	Jhenaidah (close to farmers)	Other areas of Dhaka
Marigold (100 pcs)	Chain (4Ft): 60-80	10	7,50 - 25
Tuberose	10 2-3 in summer	5	6,50
Rose	40 - 80 (big size)	5	22
China Rose	20-30	10	13
Gerbera	25	10-15	15
Gladiolus	30/stick	10 (white) 15 (red, pink)	15
Chrysanthemum	30-35 (long stem) 4-5 (mini)	7 (long stem) 2-3 (mini)	11 (long stem) 1-2 (mini)
Jasmine	20 (single chain) 100 (Gajra round chain)	20 (round chain) 50 (China variety)	
Aster	10-15	50 (bundle, 20-25 pcs)	
Gypsophila	10/bundle (50 sticks, local) 200/stick (China)	2/50 sticks	40-100 (bundle)
Lilium	300 (Oriental)	500 (from Dhaka)	300 (Oriental) 165 (Asiatic)
Tulip	120		70-80
Orchid	35-40 (Mokara)	100	
Carnation (China)	70-80		

Opportunities at the consumer side
- Quality and shelf life of cut flower do not get much attention during production. While retailers and consumers are very sensitive to this. They rather would like to pay a higher price, than buying a poor quality. Shop owner: “I buy my Lilium plants in China, because they have a 3-4 day longer shelf life.
- The timing of flourishing is important (Valentine’s Day, Language Day). Then the flower sells at a better price
- More efficiency in production (lower costs), reduction in post-harvest losses (lower costs, better quality), and more varieties (choices, purchasing frequency, better price), improve consumer’s appetite to buy and to spend more on flowers.
- A fast growing and attractive segment is the ‘posh market’. Expensive flowers like Lilium, special Roses and Tulip are very much demanded. Niche varieties become blockbusters.
- Online sales is strongly on the rise. The big benefit of online is that consumers know when they need the flowers (wedding, Valentine’s Day, birthday), and can order accordingly. And the online shops can be positioned at logistically good locations.

Cooperation Bangladesh – the Netherlands
Marketing advice from Dutch companies:
- Determine which flower varieties fit in the Bangladeshi profile and purchase power.
- Determine which flower varieties serve the different occasions, setting and market.
- Determine - based on the accepted retail prices - which flowers/varieties could be grown or could be cheaper grown in Bangladesh.

4.3 TECHNICAL PERSPECTIVE – PRODUCTION REGIONS AND FARMING PRACTICES

Bangladesh' flowers cultivation had commercially started in 1980' in Godkhali in Jashore district, because of its proximity to the Indian border. Traders came here with flower seedlings, which were picked up by farmers. Good climate conditions and fertile soil boosted the sector. Several decades later the sector has matured. More districts in Bangladesh qualified for growing flowers. See picture below.



Production areas

New flower varieties come up, more areas for flower growing have been developed. And some areas appear to be more suitable for certain varieties because of soil condition and climate. See table below.

Flower variety	Most suitable areas for growing in Bangladesh
Rose	Northern part of Bangladesh (Rangpur, Gaibanda, Bagura), Dhaka (Savar), Jhenaidah (kaligonj), Manikganj, Jashore (Gadkhali), Chuadanga (Jibon Nagar), Narayanganj, Gazipur, Cox'sbazar (Chokoria)
Tuberose	Jashore (Gadkhali), Chuadanga (Sadar & Gibonnagar), Jamalpur
Marigold	Jhenaidah (kaligonj), Jashore (Godkhali), Chuadanga (Sadar & Gibonnagar)
Gerbera	Dhaka (Savar), Jashore (Godkhali), Chuadanga (Jibon Nagar), Gazipur, Jhenidah (kaligonj), Manikganj, Brahmmanbaria
Gladiolus	All over Bangladesh specially Jashore (Godkhali, Sadar, Sharsha, Chowgacha), Kushtia, Chuadanga, Chattogram, Dhaka (Savar), Manikganj, Gazipur districts.
Chrysanthemum	Jashore (Godkhali), Dhaka (Savar), Gazipur (Sreepur & Sadar)
Lilium	Northern part of Bangladesh (Rangpur, Dinajpur, Panchaganr,) Gazipur (Sreepur & Sadar), Jashore (Godkhali), Rangpur (Sadar), Dhaka (Savar) districts
Tulip	Gazipur (Sreepur, Sadar), Panchaganr (Tetulia), Jashore (Godkhali), Rajshahi (Just introducing)

Farming practices

Annex 4 gives an overview of the farming practices and other information on the six flower varieties, which are most prevalent in Bangladesh.

Cooperation Bangladesh – the Netherlands

Dutch experts could advise Bangladesh on the following:

- Validate current 'location & variety' as best productions location seeing climate- and soil conditions.
- Which not yet present varieties could be grown in which areas of Bangladesh.
- Exchange of knowledge, skills and farming practices
- 

4.4 DOMESTIC MARKET VERSUS EXPORT MARKET

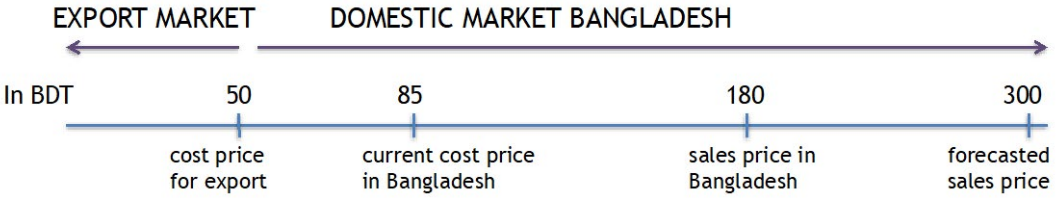
"The Bangladeshi market can absorb three times more Gladiolus."

The Bangladeshi floriculture market is strongly developing; at the production side as well as at the market side. This growth is illustrated by more occasions to give flowers, more unique buyers, higher frequency of buying, demand for more varieties, and more spending per bunch. New target groups like offices, shops and city decoration soar sales revenues. So our advice is to focus on the domestic market, rather than on the export market.
We see the following reasons for this:

- Strongly developing domestic market
- The sector is in the middle of the technical learning curve: this impacts seed production, farming practices, IPM, new varieties and shelf life. Let's improve this first. *The export market is like 'Playing Champion's League'.*
- The logistic chain is far from optimal: no or very basic packaging for harvested flowers, poor transport, lack of cool/cold storage lead to post-harvest losses of 30% or more. In case of export, this inefficiency will work even more against farmers and traders.
- Because of not (yet) optimal production, lower shelf life and hampering logistics, the price per flower of the Bangladeshi farmer will be too high to be competitive in the international market.

Export requires technical excellence, a broad variety, logistic optimization and an attractive price. All four are not yet in place in Bangladesh.

Example: Lilium Market



4.5 FLOWER FARMERS – FROM SIDE BUSINESS TO CORE BUSINESS

"Growing flowers is an attractive crop for farmers. It fetches three times more than vegetable growing. "

The overall cropping intensity (field crops, vegetable, fruit) in Bangladesh has increased to up to 400% in some areas (4 crops per year) during the last decades. This is because of better land use, short-term rice varieties, and short-cycle vegetable. This helps 'food security' in Bangladesh, So flower growing comes more into the picture, since land becomes available. Most of the flower farmers grow flowers during the winter season (October-March). A benefit is that for example investments in a poly shade house serve flower growing as well as vegetable growing (summer tomato, capsicum, cherry tomato). The higher sales value of flowers even justifies investments in a poly shade house.
The increasing number of flower farmers keeps pace with the strongly growing flower market and flower sales in Bangladesh.

Current situation

- In the areas of Godkhali and Jhenaidah of Jashore district, thousands of farmers (60-70% of total) shifted (partly) to flower farming during the last years. Godkhali alone has 6.000 flower farmers and 100.000 people depend on the flower production.
- Farmers started growing flower on an ad-hoc basis. However they do not have, or by far most of them do not have, enough skills and knowledge for this. They require more training on knowledge and skills.
- At first most of the flower farmers only looked at the costs. Now more and more farmers take the long term into account, and do investments along the whole value chain: seed, land preparation, poly shade house, logistics.
- Farmers need a poly shade house if they produce cut flower during the low season (April-September), or in case they grow cut flower or seedlings of Gerbera or Chrysanthemum. Rose gives better quality and whole year around flowers in case of a poly shade house.
- We see a couple of front-runners in the flower farming. Mr Delwar and his wife Ms Shelly of Moumita company in Gazipur are the absolute innovators. See box on the next page. But also farmers in Jhenaidah and Godkhali have invested in techniques, seedlings and poly house, and run a profitable flower farm accordingly.

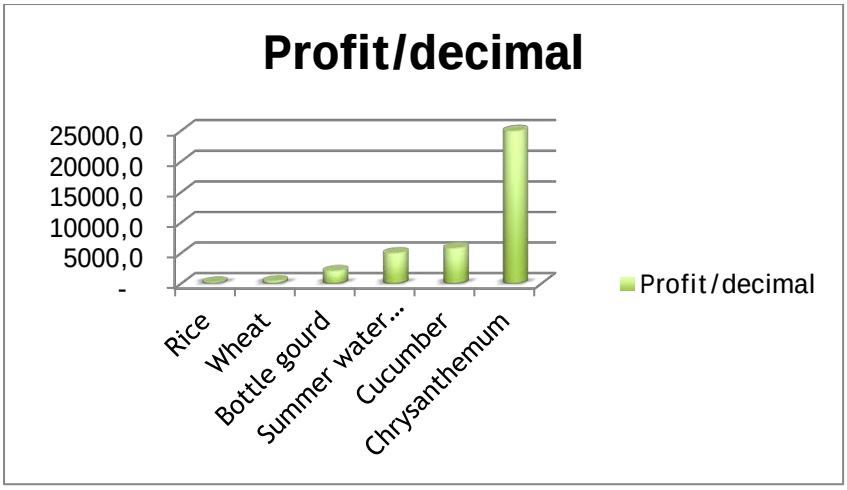
Farmer's profiles

We see the following farmer profiles amongst flower farmers.

Type of farmer Assets	1% Innovative flower farmers	10% Follower flower farmers	89% Average flower farmers
Entrepreneurship & Innovation			
Investment in poly house and bulbs			
Knowledge & skills on flower farming			
Explanation	*Good*	*Needs improvement*	*Poor to Moderate*

Attractive revenues for farmers - Comparison

- Rice → 10.000 BDT – 52 Decimal – 3 Months season
- Wheat → 20.000 BDT – 52 Decimal – 3 Months season
- Bottle gourd → 25.000 BDT – 12 Decimal – 3 Months season
- Summer water melon → 60.000 BDT – 12 Decimal – 3 Months season
- Cucumber → 70.000 BDT – 12 Decimal – 4 Months season
- Chrysanthemum → 500.000 BDT - 12 Decimal - 6 Months season



Remarks

- The season of flowers – like Chrysanthemum – is 6 months, instead of 3 months
- The combination of vegetable (summer) and flower (winter) could be a good pick.
- A well-balanced crop rotation and cropping calendar gives the best opportunity.

MOUMITA & PKSF: SMART & SUCCESSFUL ALLIANCES IN FLORICULTURE

Mr Delwar and Ms Shelly Hussain started in 2013 with flower growing under their company name Moumita. By that time they followed a 21-day training on flower farming in Kunming, China, and they saw the opportunity for Bangladesh. Started as a flower farmer, after a few years they shifted to the role of breeder for other farmers. Moumita distributes bulbs and seedlings all around the country. Everyone knows them. The seedlings from their nurseries for Rose and Chrysanthemum are well received. The Hussain family imports Lilium bulbs since 2017, and the first 1.000 Tulip bulbs reached Bangladesh in 2019; followed by 20.000 bulbs in 2020, and 200.000 bulbs in 2022. They reached the headlines in newspaper and on television – even in the Netherlands - with the waving tulip fields in Bangladesh. They created another 'turning point'.

Even more important, they inspired many more farmers to start growing Rose, Tulip, Lilium and other flowers. They lined up PKSF, the wholesale Micro Finance Organization, to support them with the pre-financing. Besides the financing, PKSF is distributing 150.000 of the purchased Tulip bulbs to other farmers. Smart and successful alliances emerge and boosted the floriculture in Bangladesh.

And the story continues. PKSF joins next investments in the floriculture sector, and plays a pivotal role in scaling the floriculture sector. Mr Fazlul, Managing Director of PKSF, unfolded plans to facilitate further growth of the floriculture sector. PKSF finances investments in poly shade house, quality seed and bio-pesticides. PKSF is fully aware of the next steps in floriculture like answering the tough competition with China, the need for more varieties, and the needed support from the Netherlands.

Mr Delwar keeps on developing. He spends 500.000 – 1 million BDT per year on training and new skills. More and more he is playing the role of advisor for nurseries and farmers. It is amazing that one person plays such a strong and important role in the sector. It also illustrates how young and starting the floriculture sector is.

Moumita and PKSF are a very useful entry point for the Dutch floriculture sector.

NURSERY FOR ROSE IN GAZIPUR

Moumita has a so-called 'rooting chamber' for Rose seedlings.

- Seedlings for grafted roses, all are grafted
- Capacity of 100.000 seedlings → 65 days in rooting chamber
- Sell 450.000 seedlings per year at 30 BDT
- Fogging system, 35 degrees C, high humidity (85%)
- Currently the rose from Bangladesh can compete with the Indian market
- Mother plant comes from India.
- Focus is on seedling production

- Drip irrigation, water soluble fertilizer, protected house, protection shade from Israel

Business case & business calculation for Chrysanthemum farmer

This business calculation is typical for advanced flower farmers.

VARIABLES (all amounts in BDT)	DATA
Total plot in decimal	25
COSTS	
# Needed seedlings	12.000
Seedling/piece	3
Other costs (pesticides, fertilizer, irrigation, labor) in BDT	164.000
FLOWERING & PRODUCTION	
# Days until flowering	80
# Days flowering 1st period	60
# Days of rest	40
# Days flowering 1st period	60
# Flowers per plant in 60 days	70
# Periods of flowering	2
Losses due to diseases	10%
SALES	
Sales price White short stem	0,50
Sales price White long stem	2,00
Sales price Yellow short stem	1,00
Sales price Yellow long stem	4,00
Percentage of White flowers with short stem	40%
Percentage of White flowers with long stem	10%
Percentage of Yellow flowers with short stem	40%
Percentage of Yellow flowers with long stem	10%
Post-harvest losses (not proper packaging/transport/handling)	15%

YEARLY REVENUES OF CHRYSANTHEMUM (in BDT)	
REVENUES	
Short white	336.000
Long White	336.000
Short Yellow	672.000
Long Yellow	672.000
Sub total 1	1.814.400
Loss due to diseases	181.440
Sub total 2	1.632.960
Post-harvest losses	244.944
Total	1.388.016
COSTS	200.000
PROFIT	1.188.016

Options for improvement and more revenues:

- Recognizing- and better understanding of diseases
- Integrated Pest Management
- More Chrysanthemum with long stem

- More varieties/colors of Chrysanthemum
- Better post-harvest practices

CHAPTER 5 VALUE CREATORS & BUSINESS OPTIONS AS ENTRIES FOR THE DUTCH

This chapter describes the most important and most attractive Value Creators – Business options for companies and breeders from the Netherlands.

5.1 LOCAL PRODUCTION OF SEED AND BULBS

"Next year we will be break-even with our tissue culture lab. And we will supply high quality Gerbera seedlings for the domestic market."

Operational tissue culture lab for Gerbera in Jashore
We visit the tissue culture lab of RFF, an NGO in Jashore and very active in the floriculture sector. The botanist/operational manager is passionate about seedling production of Gerbera. Technically and commercially a Bangladeshi tissue culture lab is a win for everyone: farmer, breeder, country. All actors in the value chain will have more profit and more quality. So far an own seed production is a missing link in the floriculture value chain in Bangladesh. This tissue culture lab means a big leap forward.
Companies like Ispahani, Lal Teer and ACI follow with plans for a tissue culture lab.

Dependence on Indian channels
Bangladesh has very limited local seed- and bulb production. It totally depends on import from India, the Netherlands and other countries. Informal channels from India are the main source for seedlings. The India channel works to a certain extent for Jashore area, which is close to the Indian border. However the logistics are more complicated for other areas in Bangladesh. Farmers need a good quality, well-rooted seedling. Nursery farming is a special job, and needs full attention in the floriculture value chain in Bangladesh.

Current situation – Costly and unreliable
- Import of seedlings and seed from India (50%) and other countries is unreliable and rather ad-hoc and informal
- Seedlings and bulbs from abroad give fewer flowers than promised, and are quite expensive. According to the calculation, local production is significantly cheaper (see business calculation at the next page).
- Scarcity of some varieties like Gladiolus (farmers have techniques to grow but no seed)
- Unreliable concerning color, quality and logistics
- Until now Bangladeshi floriculture market was a 'low-value, small market'. Now market matures, demand for seed grows and actors want to start domestic seed production and more varieties, like Lilium, Tulip, Chinese Rose, long stem Chrysanthemum.
- Emerging 'Posh market' requires new and best varieties
- Land, labor, irrigation, inputs and climate conditions are very favourable in Bangladesh

Solution & Intervention – Tissue culture lab

- Until recently this informal Indian channel worked. However, now the floriculture sector in Bangladesh is maturing, this part of the value chain should be in 'own hands' and formalized. There is a need and market for own seed(ling) production.
- Ambitious organizations from different directions are picking up. Government (BADC), NGOs (RRF) and private sector (Getco, Ispahani, ACI, Lal Teer) have started, or will start a tissue culture lab for the production of flower seed and seedlings.
- Most of these labs currently produce seed potato and vegetable seed. Remind that in vegetable 98% of the seed comes from the private sector. Staff and skills for seed production are already available within these organizations.
- The business case calculation of the tissue culture lab of RRF for Gerbera shows an attractive profit. The business calculation has been made in case the mother plants comes from India. We have to make the calculation for import from the Netherlands and include the intellectual property rights (IPR).
- The expectation is that a Bangladeshi breeder has more security on quality, variety and color in case of purchase from Dutch breeder compared to an Indian breeder. Better revenues of local seed production compensates for extra costs of mother plant and IPR.

Business case (Jashore)

VARIABLES (in BDT)	DATA
Current operation (2022)	
Production & Sales	27.000
Operational costs per month	100.000
Sales price per seedling	50
Sales price India per seedling	80
Full Capacity (from 2023 or 2024)	
Production & Sales	90.000
Operational costs per month	220.000
Sales price per seedling	60
Sales price India per seedling	80
FARMER	
Average purchase/year in # seedlings	2.500
IPR for 1.000 seedlings in BDT	1.200

OPERATION TISSUE CULTURE LAB FOR GERBERA (in BDT)		
	YEAR 2022	AT FULL CAPACITY
PRODUCTION	27.000	90.000
REVENUES	1.350.000	5.400.000
COSTS	1.200.000	2.640.000
PROFIT	150.000	2.760.000

SAVING PER FARMER (in BDT)		
	From India	From Tissue Culture Lab
Costs for seedlings	200.000	150.000
Savings for farmer	50.000	

Value Creation

- Extra revenues for owners of the tissue culture lab and seed producers (a.o. RRF, BADC, Getco, ACI, Lal Teer)
- Local testing on soil/media, climate, temperature, timing of planting/sowing to optimize yield and quality of the seed(ling)
- Cost saving for farmers because of lower price of seedling
- The locally produced seedling is stronger than the imported seedling
- Seedlings from tissue culture lab will gives flowers during more years
- Bangladesh will be more in charge with regard to varieties, colors and quality
- Domestic seed production gives a push to new varieties, tuned to the market
- Import substitution for Bangladesh because of own seed(ling) production; less dependence from India and other countries
- Step into professionalizing, formalizing the Flower Value Chain

Cooperation Bangladesh – the Netherlands

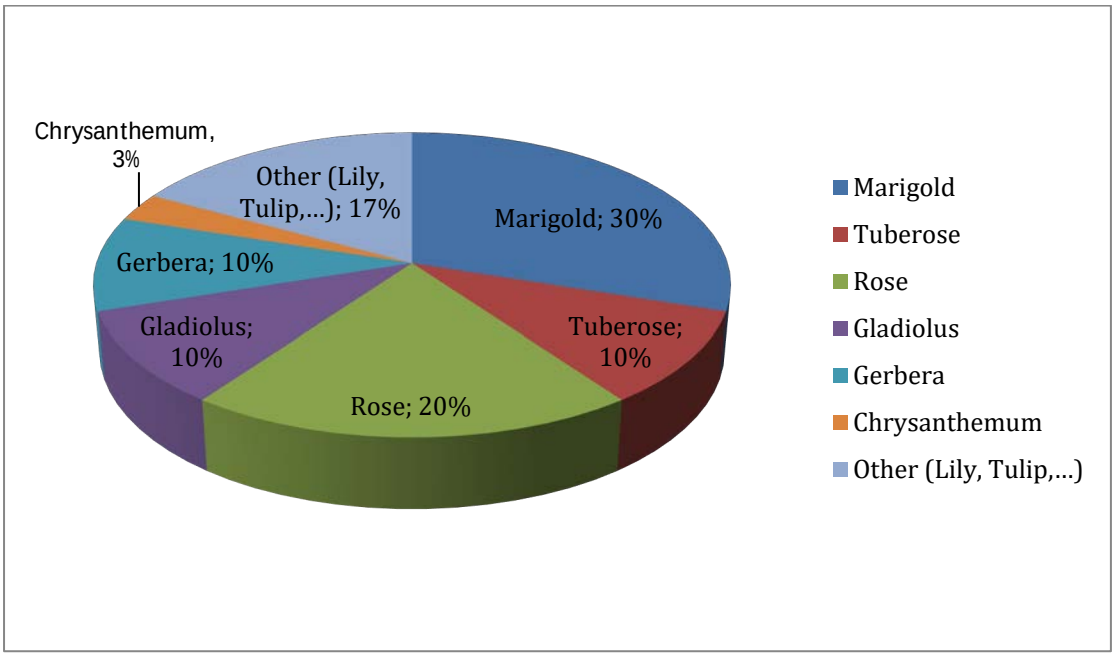
- Dutch breeders provide (new) varieties flowers (mother plants) to Bangladeshi breeder.
- Dutch breeder supports Bangladesh in making the protocol for the tissue culture lab.
- Joint Ventures between Dutch breeders and Bangladeshi companies (companies like ACI and Lal Teer have experience on cooperation with Dutch companies)
- Training for Bangladeshi staff on seed production for floriculture.

5.2 MORE VARIETIES

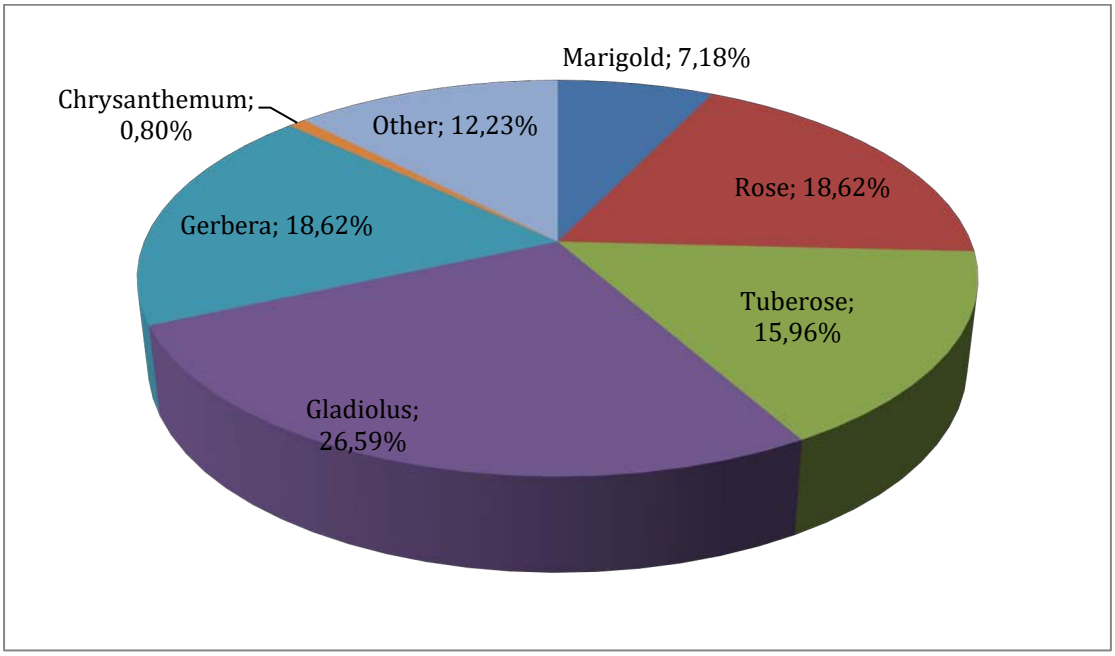
"Much more than a new type of vegetable or fruit, is a new flower variety or a new color cheering up farmer and consumer. Flower is about beauty, emotion and uniqueness. And people are willing to pay for this."

Limited number of varieties in Bangladesh
Bangladesh has a very limited number of varieties and colors of flowers. This hampers the market and sales volume. Farmers, breeders, retailers, consumers and companies are asking for more varieties, new varieties and different colors. For example Chrysanthemum only comes in yellow and white. Lilium is coming up. Many types of roses are being imported from China, while the conditions in Bangladesh for growing roses are excellent. So far this limited number of varieties has worked, in order to ignite the floriculture market in Bangladesh. Now it is time for next steps. And the 'big numbers' of Bangladesh will work here. If 10% of all consumers buy an extra bunch of flowers in case of more varieties/colors, the total sales dramatically increases. Or if a new variety justifies a higher price, this innovation pays off.
See picture below with the varieties, sales volume and sales value.

Distribution of flower varieties according to volume



Variety wise Flower Market Size (Value)



Segments

We see three groups of flowers:

1. Biggest group, slowly growing, low value: Marigold, Rose, Tuberose, Gladiolus
2. Growing market, high value: Lilium, Gerbera, Chrysanthemum
3. Niche market, high value: Tulip

Current situation – missed opportunity because of limited varieties

- Limited number of varieties
- Reasons are: dependent on India, not enough expertise, breeders rights
- There is a market demand for more varieties, more colors

Solution & Intervention – Tissue culture lab

- Start Tissue Culture Lab and own seed production for new- and more varieties/colors
- Cooperation with Dutch breeders. Two models (both include training on growing):
  - Yearly fee for a certain variety
  - Pay 1-1,5 Tk per plant
- Cooperation with BARI and growers to learn best conditions in Bangladesh for new varieties

Value Creation

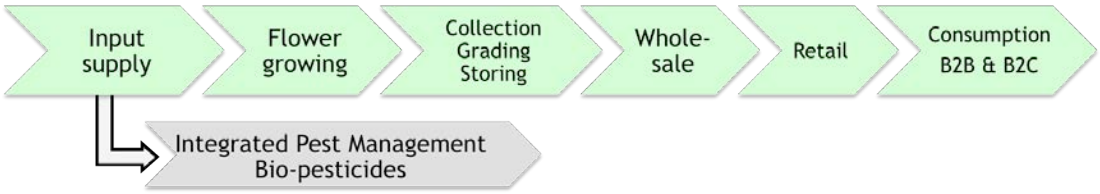
- More expected sales because of more varieties and colors
- More varieties and colors will create new occasions to give and to use flowers
- Breeders and farmers learn new farming practices
- Trigger for own seed production

Cooperation Bangladesh – the Netherlands

- Cooperation with Dutch breeders creates a pipeline of new varieties and new colors. Format, royalties and payment need to be agreed upon. A construction of a joint venture between a Dutch breeder and Bangladeshi company is proven approach in Bangladesh and India (e.g. Kumar & KF Bioplants in India)
- Dutch breeders assess the local conditions of Bangladesh for certain varieties, and how to grow these.
- Marketing research to determine which (type of) flowers would be picked up by consumers in Bangladesh

5.3 INTEGRATED PEST MANAGEMENT AND BIO-PESTICIDES

"Farmers, traders and government are talking about exporting flowers from Bangladesh. However, Global GAP and less use of pesticides is a must to compete on world markets. It's about quality, shelf life and brightness. So first things first"



The floriculture sector has limited experience on Integrated Pest Management (IPM). Farmers are not very experienced in recognizing diseases, do not know what to spray, when to spray and dose rate. Farmers spend quite a big budget on pesticides. The irony is that a supplier of pesticides recommends 20-30% less use of pesticides than farmers are applying.
Rose, open field: Recommended: 8.000-9.000 BDT/30 decimal. Used by farmer: 10.000 BDT
Gerbera, open field: Recommended: 5.000-6.000 BDT/30 decimal. Used: 10.000 BDT
Gerbera poly house: Recommended: 3.500-4.000 BDT/30 decimal. Used: 5.000 BDT

Current situation

- Prevalent pests & diseases: mite, mildew, white fly, ground rot, trips, fungal infection
- High use of chemicals by farmers → risk for people and environment
- Limited knowledge on diseases, (integrated) pest management and bio pesticides
- Perception that pesticides do no harm, because flower is not for human consumption.
- The big service- & input gap is a systemic constraint for the sector; and a potential area to address.
- Shelf life and quality of flower and color are influenced by the use of chemicals.
- Incidental use of sex pheromone and sticky trap (via Russell IPM)

Solution & Intervention – Towards sustainable farming

- Training on recognizing and knowing diseases, in combination with well-timed spraying, saves money and crop.
- Training on IPM for flower farmers. Good seed quality is part of IPM.
- Conventional pesticides can be purchased on credit, bio-pesticides cannot
- Introduction of bio-pesticides like pheromones
- Organic fertilizers improve soil health through organic matter and pH.
- Cooperate with BARI and BADC

Value creation

- Biological pest management improves quality, safety and shelf life
- Currently 10-20% of the crops get lost due to diseases. If we could reduce that by 10% with good IPM, it already pays off.
- 20-30% less costs for pesticides in case of IPM and well-timed spraying and dose rate.
- Better quality, longer shelf life and better smell make Bangladeshi flowers competitive. Retailers prefer flowers from China, which have a better smell and longer shelf life.

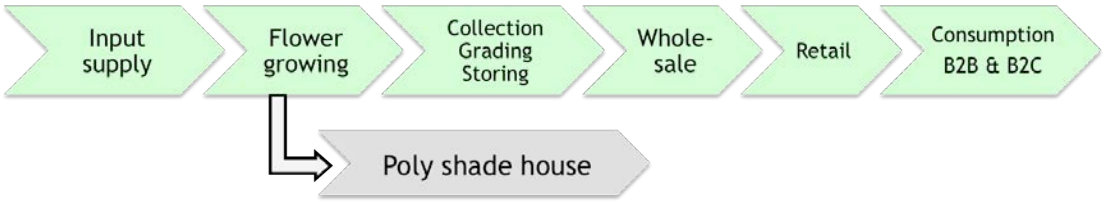
Flower variety	Current shelf life (in days)	Wished shelf life (in days)
Marigold	4-5 2-3 (summer)	7
Gerbera	7-8 3-4 (summer)	15
Rose	4-5 2 (summer)	10
Tuberose	4-5 2 (summer)	10
Chrysanthemum	3-4	7
Lilium	3-4	7

Cooperation Bangladesh – the Netherlands

- Ispahani and others on bio-pesticides in Bangladesh, are good partners for Dutch companies like HortiPro and Koppert with products like pheromones and monitoring too
- Showcase and educate farmers on practices and benefits of IPM and bio-pesticides.

5.4 INVESTMENT IN POLY SHADE HOUSE – FOR FLOWERS AND VEGETABLE

"I consider to building a poly shade house myself. It really pays off." (farmer in Jhenaidah)



Fruitful investment

Growing flowers in poly shade houses is a big success in Bangladesh.
Government and farmers have built poly shade houses to grow cut flowers, seedling and pot plants. Once the farmer learns about the benefits of the poly shade house, they invest in a next poly shade house again. The business case calculation shows a very attractive Return on Investment; no doubt about investing in poly shade houses. Financing is the only hurdle.

Current situation

- Most flower fields are in open air
- Losses due to insects, birds, diseases, tough weather
- Shorter season (only dry season, 7-8 months)

Solution & Intervention – An attractive investment

- Building a poly shade house with steel or bamboo (less durable)
- Finding financial sources and financing partners
- New varieties and seedlings can be grown in the poly shade house

Business case (Godkhali, Jashore)

VARIABLES (amounts in BDT)	**DATA**
LAND PLOT in decimals	30
SEEDLINGS	
# Plants for 30 decimal	6.000
Costs per seedling	50
Life time of China Rose plants in years	5
PRODUCTION OPEN FIELD	
COSTS	
Fertilizer per week	500
Pesticides per week	1.500
Labor per month	1.200
PRODUCTION OPEN FIELD	
# Roses/day dry season	1.000
# Roses/day rainy season	-
Rainy season in days	122
Dry season in days	243
SALES	
Sales price high (dry season)	4,00
Sales price low (rainy season)	3,00
PRODUCTION POLY SHADE	
Production dry season in # flowers	1.000
Production rainy season in # flowers	700
Rainy season in days	122
Dry season in days	243
SALES	
Sales price high (dry season)	6,00
Sales price low (rainy season)	5,00

PRODUCTION CHINA ROSE OPEN FIELD (in BDT)	
REVENUES	
Sales in dry season	972.000
Sales in rainy season	
Total	***972.000***
COSTS	
Seedlings	60.000
Fertilizer	26.000
Pesticides	78.000
Labor	14.400
Total	***178.400***
PROFIT	**793.600**

PRODUCTION CHINA ROSE IN POLY SHADE HOUSE (in BDT)	
REVENUES	
Sales in dry season	1.458.000
Sales in rainy season	427.000
Total	1.885.000
COSTS	
Building costs poly shade	136.364
Replacing poly every 5 years	80.000
Interest	15.682
Seedlings	60.000
Fertilizer	26.000
Pesticides	26.000
Labor	14.400
Total	358.445
PROFIT	**1.526.555**

Value creation

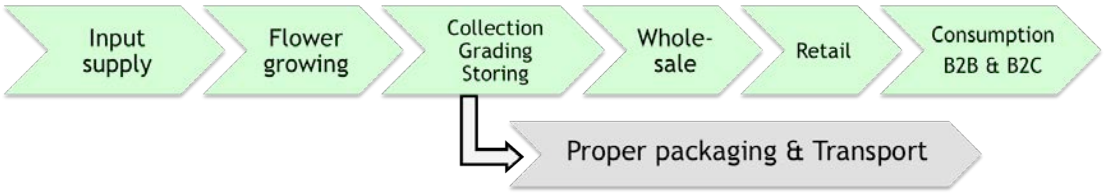
- Poly shade house protect the plants from insects, birds, diseases and harsh weather conditions.
- More varieties can be grown, because some flower seedlings (Rose, Chrysanthemum), and some cut flower (Lilium, Gerbera) need a poly shade house for growing
- 25% higher yield compared to open field production
- Flowers have a better quality in the poly shade house, e.g. Rose fetches 2-3 BDT/piece more
- Longer season: 12 months instead of 7-8 months in case of Rose
- 50 -80% more profit (see business case)
- Less pesticides are needed (20-30%)
- Use of the poly shade house for high value vegetable (cherry tomato, capsicum, summer tomato, seedlings) as well.

Cooperation Bangladesh – the Netherlands

- Farmers have a request for quality and affordable climate control in poly shade house
- Currently all poly shades come via India from Israel. Could this be supplied by a Dutch company?
- Which other technology and farming practices for poly shade houses do Dutch companies and breeders have in order to improve quality and yield?

5.5 BETTER PACKAGING & TRANSPORT

"In Godkhali we see a man, whose T-shirt says 'Unbreakable'. We wish the hundreds of red roses he is collecting, bundling and binding could say the same. Life of a flower is tough between harvest and shop. Packaging and transport is a matter of 'surviving'."



On-the-spot research in Jashore markets makes clear that much improvement in packaging and transport is wanted and possible. Beautiful flowers have been harvested, and then traders bundle 100s of roses together. Many Marigold flowers are dropped in one box, so are Gladiolus. Transport to Dhaka and Chittagong goes by bus; if available. Busses leave during the hottest hours of the day. Sometimes the flowers have to wait many hours before being transported. Farmers, traders and wholesaler take for granted that 20-30% of the flowers will not survive. That's already calculated in the purchase price. Valuable flowers are being wasted. All actors in the chain pay for this, or loose. Better packaging and transport must be a 'value chain effort'.

Current situation

- Good Quality flowers and no/poor packaging
- Opportunistic and unpredictable transport → bus, during hot afternoon
- Damaged flowers (esp. Rose and Tuberose)
- In most cases flower bulbs and corms are stored together with potato (7°C), while it needs 2-5°C.
- Not well-stored flower bulbs could have a damage of 75%
- Farmers in Jashore addressed the issue of not having proper cold storage for Gladiolus bulbs for 3 months.
- USAID and Bangladesh Flower Society have a cold storage facility in Godkhali. But this is not in operation
- Post-harvest losses and lower prices in retail (less fresh, smell, quality)

Solution & Intervention – Reduction of post-harvest losses

- Make packaging 'need to have' instead of 'nice to have'
- Invest once in 're-usable' boxes → Return on Investment within months
- A Dutch company could introduce an affordable and practical design for packaging flowers to a Bangladeshi company (for example PRAN-RFL). An NGO like RRF is willing to support on this with microfinance and distribution.
- Regular truck services or AC-train between Jashore and other flower production hotspots and Dhaka/Chittagong

Business case (Jhenaidah)

Amounts in BDT	**Farmgate price Godkhali**	**Retail price Gulshan**	**Retail price rest of Dhaka**	**Fictive quantity**
Tuberose	3,50	7,00	6,00	1000
Rose	8,00	60,00	50,00	1000
Gladiolus	11,00	30,00	25,00	1000
Gerbera	7,50	20,00	16,00	1000
Chrysanthemum	4,00	30,00	22,00	1000
Post-harvest-losses high	25%			
Post-harvest-losses low	10%			

POST-HARVEST LOSSES DUE TO POOR PACKAGING & TRANSPORT (for 1.000 flowers of each variety)		
Amounts in BDT	**Value for farmer**	**Value for trade channel**
Tuberose	3.500	7.000
Rose	8.000	60.000
Gladiolus	11.000	30.000
Gerbera	7.500	20.000
Chrysanthemum	4.000	30.000
Potential Value	34.000	147.000
Post-harvest losses		

HIGH (25%)	**8.500**	**36.750**
LOW (10%)	**3.400**	**14.700**

Value creation

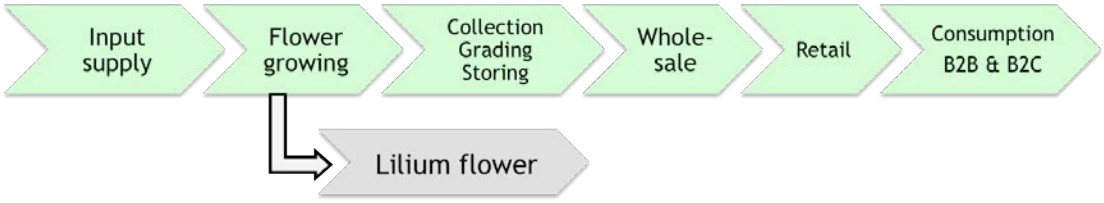
- 10 - 25% Reduction of post-harvest losses → see business case
- Good packaging and transport means more freshness, smell and quality; this justifies a higher price of up to 25%
- Savings of seed, inputs, labor, land

Cooperation Bangladesh – the Netherlands

- Dutch companies already supply to Bangladesh: FlowerHands BV, Terlouw Techniek and Cyklop for cutting & packaging. Let's work out a business case for these interventions.
- Spraying techniques to lengthen the shelf life of flowers.
- Introduce the Dutch design of a box to companies in Bangladesh
- Explore cold storage rooms for storing bulbs/corms (Tulip, Lilium, Gladiolus) with for example the Dutch company Growpact.

5.6 LILIUM – AND OTHER UPCOMING VARIETIES

"We speak to many farmers. If we talk about new varieties, or favourite flowers, they mention Lilium. Mr Tipo Sultan in Jhemaidah as well. He bought 60.000 Lilium bulbs from Mr Delwar, and resold half of them. He just received advice from Dutch experts on growing Lilium."



Lilium production at BARI

Lilium and more new varieties

New varieties are very much in demand by consumers and growers. One of these successes is Lilium. Farmers, consumers and other buyers have picked up this flower. And Lilium growing, testing, selling in Bangladesh could be a benchmark, an example for many more new flower varieties. The Lilium bulbs come from the Netherlands.
Bangladesh Agriculture Research Institute (BARI), importers (Moumita) and several farmers grow Lilium, and get familiar with required techniques. The shops are eager to have Lilium in their product range. One shop owner mentioned that the quality and shelf life of the Lilium in Bangladesh is not yet on par with the Lilium from China. But as soon it is, he will shift to the domestic Lilium.
Lilium is the first in a range of upcoming and profitable flowers in Bangladesh.

Current situation

- Limited number of varieties in Bangladesh
- Limited (technical) experience with regard to new flower varieties
- The market asks for more varieties, colors and special flowers
- Bangladesh has ambitious and innovative farmers
- Lilium is flower variety, which could be well grown in Bangladesh, and ranks fourth in the world as most marketed flowers.

Solution & Intervention

- BARI executes experiments with new (pot) plants and cut flower, like Lilium (media, climate, timing, sunlight) → Training Rangpur (2022)
- Farmer Delwar imports and distributes Lilium bulbs into Bangladesh with support of PKSF, and grows Lilium
- More breeders and farmers get inspired to grow Lilium (Metal Seed, farmers in Jhenaidah).
- Dr. Farjana Nasrin Khan of BARI has given well-attended trainings on Lilium growing in Rangpur, Jashore, Savar and Gazipur

Trials at BARI in Gazipur

- Cold storage for bulbs is a must
- BARI is executing all kind of trials with Lilium: weather impact, temperature, sunlight, several types of media/substrate (cocopit).
- Diseases are monitored
- Just a bamboo construction with a simple mosquito net does the job; an expensive poly shade is not needed.
- Multiplication of Lilium bulbs is tested.
- BARI exchanges trials results with Moumita and other farmers

Season for Lilium

- The outdoor (flowering) season is October-May
- Flourishing starts after 60-70 days after planting. By planting in different weeks, production can be managed. And harvesting period is longer

Distribution & Sales

- Moumita imported 65.000 bulbs from the Netherlands
- He distributed to others areas, like farmer Mr Tipu Sultan in Jhenaidah.
- Retail sales price in 2022 is 140-160 BDT/stick. Expected for 2023: 180-200 BDT/stick
- Cost price of a Lilium flower should go down to 50-55 in order to have a good sales and profit.

Business case (Gazipur)

VARIABLES (amounts in BDT)	DATA
# Bulbs	1.000

Needed plot size in m2	50
COSTS (for 1000 bulbs)	
Bulbs - purchase	54.000
Bulbs - quarantine, freight, customs	17.500
Simple shade net house	7.500
Net (lifetime 5 years)	600
Operational costs	6.000
Estimate cost increase 2023	10%
SALES	
Sales price farm gate per stick	150
Expected sales price next year	190
Retail price per stick	300

LILIUM PRODUCTION WITH 1.000 BULBS (in BDT)		
	2022	**2023**
REVENUES	150.000	190.000
COSTS	85.600	94.160
PROFIT	**64.400**	**95.840**

Value Creation

- Lilium fetches a profit of 65.000 BDT at 1,25 decimal in 2022.
- Strong market demand, price increase and better farming lead to an expected 45% profit increase in 2023
- Lilium is a flower, which combines new, modern techniques and an attractive profit. It makes Lilium a worthwhile investment.

Cooperation Bangladesh – the Netherlands

- Cold chamber for storing the Lilium bulbs (Growpact).
- Guidance from the Netherlands how to grow Lilium to BARI and to farmers. Which trainings are required?
- Select other flowers from Dutch breeders, which could be grown and marketed in Bangladesh.
- Could Dutch breeders/farmers advice Bangladeshi farmer on bringing the cost price of Lilium down from 85 BDT to 50-55 BDT per stick?

5.7 CITY DECORATION – BRINGING NATURE TO THE CITY

" The headlines of the Dhaka Newspaper reads: "Plan on greening metro rail with flowers." On the way to the meetings in Dhaka I pass Marigold plants in the street. And ornamental plants in the shops. Flowers are taking over the city."

Green cities
Flowers become part of the city, offices and shops. This requires the right match of 'varieties of cut flower and pot plants' and 'destination/function'. Flowers bring color and joy to people.

Current situation
- Scattered initiatives to flourish towns and cities (along the road, parks, metro)
- Cities and towns look grey and not attractive

Solution & Intervention
- Select suitable cut flowers (Tulip (short season), Marigold, Rose, others)
- Select suitable ornamental plants
- Approach 'City decoration' from a conceptual perspective. Determine which plants fit in which part of the city. Integrate plants and green into the architecture of street, metro, building. What do people prefer? How can plants and flowers be easily maintained?

Value Creation
- Greener and healthier cities (less CO2, fresh air)
- Enjoyable cities, streets, shops and offices

Cooperation Bangladesh – the Netherlands
- Guidance from the Netherlands about which cut flowers and pot plants are most suitable for 'city decoration' and parks; and can be grown in Bangladesh.
- Dutch companies can be introduced to mayor of Dhaka and to the Metro Authority.
- Cooperation with local breeders and companies to decorate cities


NEWS
Plan on greening metro rail depots, corridors too
Uttara's Dhabari depot has already turned more verdant with floral and fruit bearing trees
PREPARING THE FIELD FOR MUST

5.8 ORNAMENTAL PLANTS – A FASTLY GROWING SEGMENT

"Let me show you my garden. It is at the roof of my house."

Great opportunities
Besides cut flower production, ornamental plants like foliage, cactus, succulent and various attractive trees are a strongly growing segment in Bangladesh. It is also attractive for floriculture business and trade. These find their way to indoor- and outdoor decoration. Some nurseries have been established supply indoor and outdoor plants to office, restaurant, hotel, bank, school and shop. More and more farmers are producing cut foliage/cut greens (thuja, kaminee, few palm species) to fulfil the market demand. As most of the important foliage and ornamental plants are native to tropical regions, these can be successfully grown in Bangladesh. Bangladesh has very good potentialities to become an important supplier of ornamental plants for Asia, the Middle East and Europe. Recently this segment has emerged as a good source of employment, especially for women entrepreneurs; because limited space and finance are needed. Online business has been started mainly in the urban areas.

Indoor and outdoor
In recent years, foliage and ornamental plants and cultivation of the plants have become popular for interior decoration, because of their beauty and vitality. They can endure filtered light, widely varying temperatures, and low humidity levels as found in most homes. In Bangladesh, modern architectural designing of homes, having larger windows and well-lighted rooms, has made indoor garden a popular, hobby; particularly in big cities. These plants are marketed in domestic as well as for export.

Indoor foliage plants like Snake plant, Spider plant, Aglaonema, Pothos, Dracaena, Dieffenbachia, Various palm and Fern are popular in Bangladesh now. Cactus and succulents cultivation have become a fascinating hobby among amateur gardeners. And these are suitable for growing in pots for indoor and outdoor decoration.

Current situation
- This is a relatively young segment in Bangladesh, which needs testing, trials and skills
- 20-25% expected annual growth
- Ornamental plants for decoration in house, rooftop garden, office, shop, school
- Strong growth during COVID-19
- Many cut flowers can be used / live as an ornamental plant
- Origin from many countries
- Only a few companies in Bangladesh are allowed to import seedlings of pot plants.
- Growing marketing opportunities for cactus and succulents emerge in urban areas.
- Big price differences → price in Dhaka triples compared to the country-side: e.g. Aglaonema fetches 800-1.000 BDT in Rangpur and 2.500-3.000 in Dhaka.
- BARI is testing/nurturing ornamental plants: temperature, media/substrate, water, sun

Value Creation
- The use of ornamental plants is a very efficient and inspiring way of indoor- and outdoor decoration.
- More green, joy, freshness, and health in buildings and cities.
- Trials to learn which conditions are most favorable for ornamental plants

Cooperation Bangladesh – the Netherlands
- Guidance from the Netherlands about which ornamental plants are suitable to grow, propagate in Bangladesh, and to use for indoor- and outdoor decoration in Bangladesh.

CHAPTER 6 INSTITUTIONAL- AND REGULATORY FRAMEWORK

6.1 PROFESSIONALIZATION & FORMALIZATION – FLORICULTURE SECTOR BECOMES MATURE

At a certain moment a novel sector is beyond the point of 'a starting sector'; farmers, traders and buyers become mature. The floriculture in Bangladesh has reached this point. Regulations need to come in place, informal channels need to be formalized, and dependency on a few innovators is not enough to grow the sector; and to make next steps. This maturity comes back in more varieties and better farming practices, intellectual property rights and domestic seed production, proper transport and finance. Value chain actors and government have to chalk out new propositions and new business options.

Policy making needed to set conditions for growth

Policy makers have the following agenda:

- Establish a resilient year-around flower production and stable income for farmers. This means that investments in seed production and poly shade house are required.
- For field crops and vegetable all procedures are in place concerning import, quality, trading. For flowers these are not. This hampers quality seed, investments in seed production, farming practices and post-harvest practices. Customs, DAE and others need to develop these procedures.
- Climate smart practices on flower production: drip irrigation, bio-pesticides and solar panel to pump water for irrigation.
- Tests and trials of new varieties, like BARI is doing with ornamental plants, Lilium bulbs and Tulip, are being set up. More exchange between technical staff of BARI and farmers
- Set clarity on phyto-sanitary requirements for import of flower seed. Use a country like Vietnam as a benchmark. The Bangladeshi Embassy in The Hague could assist on this.
- Ministry of Agriculture: "In case a Dutch company and a Bangladeshi company have an agreement on property rights, MoA of Bangladesh will monitor the execution, and respect this agreement."

Quarantine regulations

On April 24, 2018, the Ministry of Agriculture issued the Plant Quarantine Rules 2018 to protect domestic plants and plant products from foreign invasive insects and pests. The Rules shared formats for phyto-sanitary certificates, and import permit applications.

- There are seven quarantine stations in Bangladesh.
- For any first consignment, seed/bulb need to quarantine for full one season. This is why, it is suggested to import small amount for first time to observe results. But after that, it doesn't need this quarantine. On the other hand, if supplier declare/ certify that the product is free from concerned disease/pest, it doesn't need any quarantine.
- Plant quarantine activities regulated under the rule, "Plant Quarantine Rules 2018". Under this rule, schedule-2, serial 74-104 is considered for flower plant and inputs (bulb/ tuber/ seed/ corn/ cutting/ bud etc)
- The facilities under these quarantine stations, is very limited.
- See ANNEX 4 for detailed information per plant variety.

Cooperation Bangladesh – the Netherlands

- Dutch Ministry and Dutch advisory services could assist Government of Bangladesh (a.o. DAE, BARI) on professionalizing and formalizing the Bangladesh floriculture sector.
- Clarity and agreement on the phyto-sanitary requirements on for example import of Dutch flower bulbs. This requires a meeting between Ministry of Agriculture in Bangladesh, EKN and Ministry of LNV of the Netherlands.
- Make the calculation, which illustrates that it pays off to use high quality Dutch mother plants and bulbs to multiply and to use in Bangladesh. And that this is more interesting for farmers than those informal routes via India with sub-optimal quality plants and no guarantees. It's time to go directly to Bangladesh, instead of going via India.
- Explore cooperation like a Joint Venture between Dutch company and Bangladeshi company to secure finance, growth, speed, and distribution of profits.

6.2 KNOWLEDGE & FARMING PRACTICES

A Chrysanthemum farmer in Jhemaidah proudly shows his fields with flourishing white and yellow flowers. We see that several flowers are infected with a sort of fungi, as we found out later. The farmer does not know what kind of disease is infecting his crop. So, he is not able to take action, he does not know how to prevent or cure this disease.
Flower farming is a young sector, with opportunism and 'unknown unknowns'. That's where knowledge transfer and training come in.

Current situation

- Famers have limited knowledge on seed selection/purchase, seed production, preservation of seed, bulbs and flowers, farming practices, fertilizer use, packaging and post-harvest techniques.
- Knowledge and skills on diseases and pest/insect management is lacking: preventive spraying, dose rates, timing of pesticide use, bio-pesticides and Integrated Pest Management. The research illustrated that farmers use way too many pesticides.
- Flowers, retailers and consumers are very sensitive to quality and brightness of flowers. A not 'healthy looking' or even infected, harmed flower will never be bought. This means a lot of waste; waste of land, labor, seed, fertilizer and pesticides. Or the other way around: training is a very good investment to produce quality flowers from the beginning.
- A good training pays off. For example knowing how a quality seedling must look like. Now flower farmers learn by trial & error. Good training can make the learning curve much steeper. Mr Delwar of Moumita attended a 21-day training in Kunming, China, and started trials and practicing. He was able to start a successful flower business because of a good technical training.
- BARI and other institutes are conducting trainings.
- BARI is very active on trials with new varieties (Lilium) and ornamental plants.
- BADC, NGOs and companies have the intention to start tissue culture labs. But they only have experience with vegetable and potato seed.

Cooperation Bangladesh – the Netherlands

- Start and continue training- and coaching programs between Bangladesh (HORTEX Foundation, Bangladesh Flower Society, BARI) and the Netherlands (PUM, breeders, schools and companies)
- Bring Dutch expertise from breeders, companies, Wageningen University & Research (WUR), High Agriculture School (HAS) to Bangladeshi trainers, breeders and farmers
- Support Bangladeshi companies with setting up the tissue culture lab
- Combine sales of bulbs or seedlings to Bangladesh with a training program from the Dutch breeder.
- Train and educate Bangladeshi farmers on getting the maximum crop from a poly house by better climate control, soil and pest management.
- Start 'Demonstration Farms' in the floriculture hotspots in Bangladesh: pest-free farming, bio-pesticides, cost-efficient, new varieties.
- Exchange visits to the Netherlands, and for example Vietnam. Vietnam is a couple of years ahead of Bangladesh and went through the same learning curve.

6.3 FINANCING – GAME CHANGER OR BOTTLENECK

PKSF is the wholesale micro finance organization with programs in floriculture. Its Director Mr Fazlul acknowledges that financing is on the critical path of many ventures, innovations and sectors; and he acts accordingly by being a frontrunner in floriculture. PKSF sees a bright future for floriculture in Bangladesh. It finances investments in bulbs, bio-pesticides and poly shade house. And it has more ideas in mind. Financing arrangements accelerate this growing sector.

Current situation

- Since floriculture is a relatively young sector and until recently a low-value sector (small volume, no big assets and cheap flowers like Marigold), financers are rather skeptical towards investments in this sector.
- Many farmers only look at the costs, and not at the revenues in case of long term investments (poly shade house)
- Financing is often a combination of donors, MFI, farmer himself
- Much proof can be adopted from horticulture sector, where farmers have experimented with investments in bio-pesticides, seed, poly shade house, packaging and cold storage.

Cooperation Bangladesh – the Netherlands

- Combine supply of bulbs, technology, packaging and other equipment from the Netherlands with financing arrangements. Or even start a JV with a Bangladeshi company. Use insights and experiences from horticulture as benchmark.
- PKSF asks the Dutch floriculture sector to support not only technically (for example on tissue culture lab), but also with marketing and market development.
- Combine financing of innovations in floriculture sector with a coaching program with for example PUM.
- NGO Jagorani Chakra Foundation in Jashore provides financing and training to farmers; for example a poly shade house + technical training. Currently they have 1.200 flower farmers in their programs. For example a ToT by HAS or Dutch breeders for their staff could be a multiplier.

PHENIX – LOOKING FOR A DUTCH PARTNER & INVESTOR

We spoke to Mr Rafiul of Phenix company. Phenix is a Bangladeshi agro-food firm in Gazipur and Shabag, with branches in poultry and aquaculture. They are exploring floriculture and intend to invest in this sector. They have 9 acres of land available for flower growing, a sound technical staff, and budget. They work with Hendrix Genetic in the Netherlands.

They look for Dutch investors, who bring knowledge, technology and finance.

They will start with building a poly shade house and 1 acre of Rose. Other flowers they think of are: Chrysanthemum, Lilium and Lysianthus. They practice organic farming with bio-pesticides and waste stream recycling. And Phenix knows that the learnings of the horticulture sector can be of value for the floriculture sector.

Their farm is close to Dhaka (50 km), which give them a logistic advantage. They have experience with cold chain.

Their preference is having a joint venture and a long term cooperation with a Dutch company.

6.4 FLORICULTURE & HORTICULTURE

The market side of the Floriculture sector is totally different from the Horticulture sector. But the production side of both sectors have many similarities. Flower farmers can learn from vegetable farmers.

Opportunities

- Floriculture is a young sector. Many practices and learnings of Horticulture can be applied in Floriculture. Phyto-sanitary regulations, Seed production, PR, investments, farming practices, post-harvest practices can even lead to cross-learnings and joined investments.
- Many companies have experience with operating a tissue culture lab (seed potato, banana seedling). Now they can apply these knowledge and skills on flower seed.
- The investment in a poly shade house has a faster Return on Investment in case it is used for flower growing compared to vegetable. And the poly shade house can be used for both. So the farmer, who invests in a poly shade house, spreads the risks amongst more crops, with different dynamics, and different seasons. For example summer tomato, cherry tomato or capsicum during June-September and Gerbera from October-March. In this case the farmer benefits from two peak seasons, and maximum from the poly shade house.
- Negotiations between Dutch Ministry and Ministry of Agriculture in Bangladesh on phyto-sanitary regulations and Intellectual Property Rights could be combined. Or Floriculture follows Horticulture.
- It is very attractive for Dutch companies, which intend to do business in Bangladesh, to combine Horticulture and Floriculture.

The table below illustrates the overlap and the potential learnings of the two sectors. The green boxes indicate overlap and learnings from both sectors (horticulture and floriculture)

Value Creator	Horticulture	Floriculture
Local seed production and tissue culture lab	Potato tubers, vegetable. Companies like ACI, Lal Teer, Ispahani	Just starting or exploring by RRF, ACI, Ispahani, Lal Teer, Getco
Phyto-sanitary regulations for seed/bulb import	See Plant Quarantine Rules 2018 in Annex 5	See Plant Quarantine Rules 2018 in Annex 5
Intellectual Property Rights (IPR)	Agreements between companies about payment	No experience yet. Bangladeshi companies are open to pay for IPR
Pipeline of new varieties	In place, trials with new varieties	Hardly any new varieties and colors
Water soluble fertilizer	Practiced	Demanded
Cold storage for seed/bulbs	Available for high value crops	Hardly existing. Required for flower bulbs and corms like Tulip, Lilium and Gladiolus
Poly shade house	Existing for high value crops and seedling	Even more attractive in case of flower farming (faster Return on Investment). Joined investment and spreading risks
(Global) GAP	Practiced and more and more introduced	Not yet practiced
Farming practices	Big group of farmers have skills and knowledge	Very limited. Only the frontrunners and at BARI
Bio-pesticides and IPM	Widely practiced	Does not exist Way too much spraying
Improve shelf life	Practiced for some vegetable	Not practiced
Packaging	Existing designs and boxes	No proper packaging
Transport	Scheduled transport for vegetable and fruit	No scheduled transport. Ad-hoc transport with busses
Cold storage and cold transport	Available for high value crops. Supermarkets require this	Not available. Few cold chambers for bulbs and corms at BARI
Marketing	Widely practiced, especially by retailers and brands	Hardly. No brands. Not yet to specific groups or for specific varieties. For example flowers for certain occasions, or ornamental plants for rooftop garden, office or city
Online shops	Increasing	Established and increasing
Export	Established position for some vegetables	Focus needs to be on the domestic market first.
Access to finance	Widely available because of familiar crops	Limited available because of unknown crop, and seen as risky. But improving (PKSF)
Knowledge exchange between Bangladesh and the Netherlands	Existing	Not yet initiated

CHAPTER 7 NEXT STEPS

7.1 PRESENTATIONS, TRADE MISSION, SCENARIOS FOR STARTING BUSINESS

This study of the Floriculture sector in Bangladesh is a starting point. It gives a range of opportunities in Floriculture to Dutch breeders and companies.
A next step is that RVO in cooperation with EKN in Dhaka organizes a 'Floriculture trade mission' by the end of May 2023.
In preparation of this mission, there will be a webinar in February/March, which presents the results of this study.

Recommendations

- Consider face-to-face presentations in the Netherlands to the floriculture sector. This works much better than a webinar.
- Invite not only companies of the floriculture sector, but also 'supporting companies and sectors', like packaging, cold storage, cutting machines, training institutes, investors.
- Develop a small audio-visual or Youtube movie to trigger the audience. For example like the 'Tulip movie of 2022'. It immediately sets the scene and makes breeders and companies aware of the potential.
- Send out – as EKN in Dhaka – a press release with a 2 pages summary of the report. All domestic newspapers will pick up.
- Dutch breeders and companies can reach out to start preparatory meetings with one or more of the 30 farmers, breeders, companies and stakeholders (NGO, investors, government departments), which have been visited and interviewed. All contact details are available for you.

7.2 COOPERATION BETWEEN BANGLADESH AND THE NETHERLANDS

It pays off for Dutch breeders and companies to work with their counterparts in Bangladesh. Bangladeshi companies like ACI, Ispahani and Lal Teer are used to work with Dutch companies like RijkZwaan, East West and Bejo Seeds. The companies in Bangladesh could be useful entry points and multipliers for them in Bangladesh.
Bangladesh and the Netherlands also have a strong and fruitful cooperation at government level. This helps in smoothen regulatory issues.

EXAMPLE: ACI as entry and multiplier for Dutch companies
ACI – big in vegetable seed - has 33 acres of trial fields and 6 trial stations for product development. ACI supplies to 3 million farmers via their 1.200 seed dealers and via 22.000 retail shops. Market promotors and sales staff could bring Dutch flowers, new varieties to the attention of the Bangladeshi market. ACI has 7.000 contract farmers for seed. Lal Teer, Ispahani and Malik have a similar structure for distribution and sales. All these companies and more have entered, or have the intention to enter the floriculture sector.
Knowledge exchange is key. Bangladeshi farmers, breeders and companies want to learn from Dutch experts. This knowledge exchange paves the path for collaboration. And once the local company performs, the multiplier is starting to work because of their vast reach to farmers. ACI has even a chain of supermarkets to reach the end consumer (Shwapno).

Potential scenarios for starting business in Bangladesh (short term and long-term)

- Selling seed, bulbs to farmers in Bangladesh like to Mr Delwar and other 'frontrunners'.
- Selling 'mother plants' and 'seedlings' to Bangladeshi breeders.
- Introduce disease-resistant and climate resilient varieties to farmers.
- Start a long-term partnership with ambitious breeders of Chrysanthemum, who look for a steady pipeline of new varieties & colors. They have market and know how to grow.
- Start a joint venture with a local breeder (e.g. Phenix) or others. Mutual investments, mutual profits. This accelerates innovations from several perspectives: skills and knowledge, new varieties, scale.
- Work with City of Dhaka to decorate and green the city with flowers and plants. We have direct contacts with Mayor of Dhaka and Metro Authority.
- Pre-finance Lilium and Tulip bulbs as Dutch breeder/company to ignite and grow the Bangladeshi market. We see the momentum.
- Start a demonstration farm in Bangladesh together as Dutch farmers and breeders.
- Knowledge institutes and schools transfer knowledge, skills and practices with farmers and companies in Bangladesh.
- Tap into flower market as supporting companies like bio-pesticides, fertilizer, packaging, cooling. They could benefit from the growing Floriculture sector. Think of cold chambers for storing bulbs. This could be good entry for more cooling facilities.
- Combine Horticulture and Floriculture. Companies, which are active in both (inputs, greenhouse, packaging, cooling), could combine their portfolio in both sectors.
- Check and secure Intellectual property rights and phyto-sanitary requirements with Department of Agriculture and Netherlands Embassy in Dhaka.

Example of a breeder from the Netherlands

- Dutch breeder of a.o. Chrysanthemum is interested in Bangladesh
- Two options of selling to breeder in Bangladesh:
  - Sell seedlings (free varieties)
  - Sell 'Mother plant'
- If 'Mother plant' goes to breeder in Bangladesh
- Agreement on property rights:
  - Royalties per year or per plant
  - Different per country
- Breeder in Bangladesh starts reproduction
- Training & guidance from the Netherlands
- New varieties and colors in pipeline

Incentives for Dutch companies and breeders

The Government of Bangladesh is quite generous for companies investing in Bangladesh. See the most relevant incentives below:

- To further strengthen the ecosystem in agribusiness, Ministry of Industries plans to launch Agro-food Processing Industry Promotion Policy 2021.
- Agro-based industries like livestock rearing, poultry, fish farming, horticulture, floriculture. are exempted from Corporate Income Tax (CIT) for different income slabs.
- Wide range of agro-based products and agro-logistics services exempted from Value Added Tax (VAT).
- 20% special rebate on electricity consumption to agro processing units.
- Tax exemption on royalties, technical knowhow/ assistance-related fees (and their repatriation).
- Exemption of import duties on capital machineries.
- Full repatriation of profits & initial investment amount
- 50% tax exemption for income derived from export.
- No VAT imposition on export goods.
- For foreign direct investment, there is no limitation pertaining to foreign equity participation, i.e. 100 percent foreign equity is allowed. Foreign investors or companies may obtain full working loans from local banks.
- Bangladesh has concluded bilateral agreements for avoidance of double taxation and investment treaties for promotion and protection of investment with the Netherlands.

ANNEXES

ANNEX 1 – DUTCH ORGANIZATIONS, WHICH HAVE BEEN INTERVIEWED/VISITED

Organization	Profile
6 Companies (names known at Research team)	Flower breeder
2 Companies (names known at Research team)	Builder/supplier of greenhouse technology
1 Company (name known at Research team)	Developer and supplier of bio-pesticides
1 Company (name known at Research team)	Developer and supplier of amino acid fertilizer
2 Companies (names known at Research team)	Builder/supplier of cooling technology
1 Company (name known at Research team)	Trader of steam machines for cleaning soil (supplied to Bangladesh in 2016)
PUM	Advisory- and coaching service
RVO Ministry of Economic Affairs	Government agency for international business
Embassy of the Netherlands in Dhaka	Embassy
Embassy of Bangladesh in the Netherlands	Embassy

ANNEX 2 – BANGLADESHI ORGANIZATIONS, WHICH HAVE BEEN VISITED AND INTERVIEWED

The table below displays the organizations, which we spoke to during the research.

Organization	Profile	Options for cooperation
Companies		
2 Companies (names known at Research team)	Agro-Food firm	• Tissue culture lab • Distributor of seed • Partner for Dutch breeders
4 Companies (names known at Research team)	Seed producer	• Tissue culture lab • Distributor of seed • Partner for Dutch breeders
Bayer CropScience	Producer and supplier of Agro inputs (fertilizer, pesticides)	Supply of pesticides, fertilizer and other inputs
Phenix	Agro firm & Investor	Start a long term floriculture program / farm
Moumita	Seedling, bulb, cut flower	• Distributor of seed
Many innovative farmers	Growing seedlings, bulbs and flowers	• User and distributor of seed • Partner for Dutch breeders
Traders and wholesalers	Trading and distributing flowers	• Partner for Dutch packaging company • Partner for Dutch cold storage company
NGOs & MFI		
Bangladesh Flower Society (Dhaka and Godkhali)	Association for 12.000 flower farmers	Training, Coaching, Access to farmers
Flower Growers Society	Association for 5.000 flower farmers	Training, Coaching, Access to farmers
Palli Karma-Sahayak Foundation (PKSF)	Wholesale micro finance institute (credit, insurance, training)	• As investment partner for long term floriculture program • Credit for farmers and entrepreneurs
Rural Reconstruction Foundation (RRF)	Working on tissue culture lab, training, finance for farmer	Partner for Dutch breeders
Jagorani Chakra Foundation	Micro Finance and training	Accelerating local breeders and farmers
Solidaridad	Strengthening value chains	Participating in intervention programs
Government		
Bangladesh Agriculture Research Institute (BARI)	• Policy on Floriculture in Bangladesh • Trials of new varieties Approval of new varieties	• Cooperation on new varieties • Testing existing and new varieties on Bangladeshi conditions
Department of Agriculture Extension (DAE)	Technical support to flower farmers	Training on floriculture
Bangladesh Agriculture Development Center (BADC)	Technical support to flower farmers	• Tissue culture lab • Partner for Dutch breeders • Distributor of seed
Ministry of Agriculture	Policy on Floriculture in Bangladesh	• Phyto-sanitary regulations • Intellectual Property Rights
Department of Agricultural Marketing	Research and Export promotion	Support on promotion of flowers

ANNEX 3 - PARTICIPANTS OF WORKSHOP AT EKN ON 15 DECEMBER 2022

SN	Name	Mobile No.	Designation	Organization	Email
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11	Monjur Kader	01713-090963	Head of Market Development	A R Malik Seed	homd@malikseedsbd.com
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17	Delower Hosain	01790-028608	Importer + Large Farmer	Moumita Nursery	
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ANNEX 4 TECHNICAL & COMMERCIAL INFORMATION ON TOP-6 CUT FLOWER BANGLADESH

ROSE	
GENERAL	
1. Characteristics	Rose is woody perennial plant belongs to family Rosaceae usually used as cut flower and known as queen of the flowers. Most species are native to Asia, with smaller numbers native to Europe, north America, and north-western Africa. Roses are most commonly associated with love and romance. It is popular for its elegance, beauty, nobleness which vary in colour, size and shape.
2. Volume (annual) & market growth	21,940 MT per year, 10% growth per year
TECHNICAL	
3. Production locations (current and favourable)	Currently: Dhaka (Savar), Jhenaidah (kaligonj), Manikganj, Jashore (Gadkhali), Chuadanga (Jibon Nagar), Narayanganj, Gazipur, Gaibanda, Cox'sbazar (Chokoria), Chattogram districts. Favourable: Rangpur, Bagura, Mymensingh, Tangail, Pabna, Brahmmanbaria, Kishoreganj districts
4. Present Production Practices	Open condition
5. Improved Production Practices	Under UV Poly shade or green house
6. Cultivation Duration	Round the year (One establishment for 6-7 years)
7. Present production per decimal (one harvest)	Average 6000 flower stick/decimal/year (under open condition flower is produced for 8 months)
8. Potential production per decimal (one harvest), incl needed improvements and investments	Average 9000 flower stick/decimal/year (under protected condition flower is produced round the year)
9. Required soil conditions	Roses can be grown in almost any type of soil. Naturally it is deep rooted plant. Well drained rich in organic matter, sandy loam soil (P^H=6.0-6.5) is suitable for rose production. Roses can't tolerate water logging and high water level condition
10. Required climate/weather conditions	Rose can be cultivated under various agro-ecological conditions. The plants require minimum of 5 to 6 hours sunshine throughout the growth period. The temperature range of 15^0c (night) to 28^0c (day time) is ideal for rose cultivation.
11. Techniques pre-harvest	So many tasks are needed after planting to harvesting. Some important tasks of them are as follows: -Weeding and hoeing should be carried out after every alternate irrigation -The suckers which are different in shape and colour appear near the base on the stem, these should be removed as soon as they appear on the plants -Flower buds/flowers from the new plants should not be allowed during initial stage of planting for attaining good growth -Faded, dead or diseased flowers should be removed regularly -All roses require pruning in the second year of their planting and subsequent years -After pruning, yearly manure and fertilizers should be added

	-The rose flower buds should be inserted with a nylon cap which helps for increasing the compactness, to avoid damage in transportation and maintain the micro-climate in package - Flower harvesting should be done with sharp secateurs with long stalks
12. Disease and Insects	Diseases: Powdery mildew, Black spot, Die-back, Grey-mold, Mosaic etc. Insects: Aphid, Thrips, Red Spider Mite, Scale Insect etc.
13. Propagation and growth	The rose crop can be propagated through seedlings (budding on Natal Briar root stocks by desired scion). One year old budded seedlings are recommended to plant
14. Optimum harvesting stage	For cut flower, they should be harvested at tight bud stage when the colour is fully developed and the petals have not yet started unfolding
15. Current shelf life	3-4 days (Local varieties) and 5-6 days (improved varieties)
16. Potential shelf life	7-12 days or more depending on the variety, improved production and postharvest management practices e.g. adding preservatives, changing water, maintaining water P^H etc.
17. Techniques post-harvest	-As soon as the flowers are harvested, the stems are to be kept into clean buckets containing water -After collecting the flowers, un-necessary leaves (1/3rd) should be removed to reduce the transpiration loss -After sorting the flowers should be graded according to the length. It varies from 40 to 75cm depending on the variety and requirement of the market -In rose, 8-10 flowers stick should be kept per bunch. Two level bunching by rubber band is also practiced which helps in protecting the flowers from damage by bruising against each other -With roses, head wraps are used to protect bunches from damage by bruising against the box sides and ends. Usually soft corrugated paper 15-20 cm wide is secured with the help of a rubber band around the head of each bunch For local market, cartoon box may be used for packaging of high quality roses
18. Cooling & storage* (optimal temperature)	Flowers are to be kept at cold storage (0 to 1^{0}c) for 5-10 days for export purpose. For local market, the flowers can be stored at 5 to 6^{0}c for 5 to 6 days. The length of keeping time depends upon the variety and quality of the roses. Cool chain management (15 to 20^{0}c) should be followed from assembling centre to storage and also at the shop (20 to 25^{0}c).
COMMERCIAL	
19. Chain/Actors	Producer, wholesaler, retailer, nurserer, importer, commission agent
20. Sales price at farm gate	China- 2-5 BDT/stick, Thai/ Dutch- 10-20 BDT/stick
21. Sales price to consumers	China- 5-10 BDT/stick, Thai/ Dutch- 30-40 BDT/stick
22. Locations of sales	Everywhere in the country
23. Attractiveness (smell, color, size)	Dazzling colour combination, swirling petals, long stems and oval leaflets are very attractive part of Roses. Roses have a wide range of complicated smells, which are just as lovely but some modern hybrids don't have any fragrance.
24. Occasion to give	Day celebration, valentine day, new year (Bangla, English), Eid, Puja, official/ formal welcome
25. Consumer profile	All economic class, mainly young people

MARIGOLD	
GENERAL	
1. Characteristics	Flowering annuals belongs to family Asteraceae which has gained popularity for it's easy culture, wide adaptability, attractive colours, shape, size and good keeping quality. Flowers are single to fully double with large globular heads. It is extensively used as loose flowers for making garlands for religious and social function. It is used to attract insects attacking the main crop as trap crop in the borders.
2. Volume (annual) & market growth	1,777 MT and 6% growth per year
TECHNICAL	
3. Production locations (current and favourable)	Currently: Jhenaidah (kaligonj), Jashore (Gadkhali), Chuadanga (Sadar & Gibonnagar), Satkhira, Narayanganj (Sadar, Bandar and Rupganj), Gaibanda districts Favourable: Rangpur, Bagura, Mymensingh, Pabna, Brahmanbaria, Kishoreganj districts
4. Present Production Practices	Under open condition
5. Improved Production Practices	Under open condition with good seedlings and F_1 hybrids
6. Cultivation Duration	5-6 months. The blooming duration is near about 3 months
7. Present production per decimal (one harvest)	45000-48000 flowers/decimal/season
8. Potential production per decimal (one harvest), incl needed improvements and investments	45.000-48.000 flowers/decimal/season
9. Required soil conditions	Marigold can successfully be cultivated on a wide range of soils. Sandy loam soil that is deep, fertile, friable having good water holding capacity and well drained (P^H=6.5-7.5) is ideal.
10. Required climate/weather conditions	Marigold requires mild climate for luxuriant growth and flowering. The optimum temperature range for its profuse growth is 18-20^{0}c. But some varieties can tolerate the temperature up to 30^{0}c. Depending on environmental condition, it can be grown three times in a year-rainy, winter and summer season but not by the same seedlings. Hence, flowers of marigold can be obtained throughout the year
11. Techniques pre-harvest	• Weeds are a major problem in marigold especially in rainy season crop. During the entire growth 3-4 manual weeding are required • Pinching (Removal of shoot) is very important for bushy growth of the plant and development of lateral branches ultimately yield more flowers which is done after 40days of transplanting • Field should be irrigated before flower plucking, so that flowers keep well for long period after harvest • Dead heading (removal of dead flowers) should be done to enhance new flowering • Harvesting should be done in cool hours of the day either in the evening or morning
12. Disease and Insects	Diseases: Botrytis blight, Damping off, Wilt and stem rot, Flower bud rot Insects: Red Spider Mite, Caterpillar
13. Propagation and growth	Marigold is mainly propagated by seeds. As marigold is highly heterozygous plant so isolation distance must be maintained for

	producing pure seeds otherwise mixture will be happened. Cutting from mother plants are also used to maintain the purity
14. Optimum harvesting stage	Flowers should be plucked when they attain full size depending upon the variety
15. Current shelf life	Marigold flowers mainly used as garland which remain in fresh condition up to 2-3 days
16. Potential shelf life	4-5 days by maintaining the appropriate post-harvest management procedure and also cool chain management
17. Techniques post-harvest	Loose flowers are plucked in bamboo basket and carried to home or assembling place by gunny or nylon bags After harvesting, it is better to keep flowers in cool place for making garland
18. Cooling & storage* (optimal temperature)	Marigold can be stored at 2 to 4^0c for 3-7 days. For local market marigold garland can be stored at 10-15^0c for 2 to 4 days but cool chain management should be followed from assembling centre to storage and also at the shop (20 to 25^0c).
COMMERCIAL	
19. Chain/Actors	Producer, wholesaler, retailer, nursery, commission agent
20. Sales price at farm gate	300 BDT per 1000 flowers
21. Sales price to consumers	600-800 BDT per 1000 flowers
22. Locations of sales	Everywhere in the country
23. Attractiveness (smell, color, size)	Marigold blooms in vibrant colour for summer, rainy and winter season. Flower colour varies from lemon yellow to yellow, creamy white to primrose, golden, orange. The plants have the pungent aroma. The smell, which is mostly in the leaves, probably developed as a defence mechanism against pest attack. Marigold flowers are bitter with a spicy, herbal flavour. Some people find the smell unpleasant.
24. Occasion to give	Mainly weeding ceremony, different national day, event management
25. Consumer profile	All economic class everywhere in the country

GLADIOLUS	
GENERAL	
1. Characteristics	Gladiolus is a popular flowering plants grown all over the world belongs to family Iridaceae. It is mainly cultivated as cut-flower because of its elegant appearance, attractive colour and prolonged vase life. Gladiolus spikes are most popular in flower arrangements and for preparing attractive bouquets.
2. Volume (annual) & market growth	3,793 MT per year; 15%
TECHNICAL	
3. Production locations (current and favourable)	Currently: Jashore (Godkhali, Sadar, Sharsha, Chowgacha), Kushtia, Chuadanga, Chattogram, Mymensingh, Dhaka (Savar), Manikganj, Gazipur districts. Favourable-All over of the country specially northern part of Bangladesh
4. Present Production Practices	In open condition for winter and summer season
5. Improved Production Practices	For commercial production Gladiolus can be cultivated under open field condition easily. Poly tunnel may be used in rainy season but will not be cost effective
6. Cultivation Duration	5-6 months
7. Present production per decimal (one harvest)	850-900/decimal/season
8. Potential production per decimal (one harvest), incl needed improvements and investments	850-900/decimal/season (as one flower stick is found from one corm).
9. Required soil conditions	It can be grown in a wide range of soil but grow well in sandy loam soil having p^H of 6.5-7.0
10. Required climate/weather conditions	Gladiolus can be grown in a wide range of climatic conditions. It can be grown from plains to an altitude of 2500 m. For better growth, cool temperature (15-25^{0}c) is ideal but in areas having moderate climatic conditions, gladiolus can be grown throughout the year. Gladiolus prefers sunny conditions (8-10 hr light/day)
11. Techniques pre-harvest	-Earthing up (the technique of piling soil up around the base of a plant) should be done to conserve the soil moisture and also support the plants -Flood irrigation can be applied in gladiolus production to minimize the cost -Staking (rope is placed by bamboo stick at 2m distance in both side of gladiolus row at 15cm above from ground level and spike initiation level) should be done in rainy season gladiolus production to support the plants Removal of spike is important to produce quality corm from cormel (mini corm)
12. Disease and Insects	Diseases: Fusarium blight, corm rot, Botrytis blight, rust and virus Insects: Thrips, Aphids, mites and cutworms
13. Propagation and growth	Good quality corms are the main propagating materials to produce quality flower. Besides, cormels (mini corm) are to be utilize to produce quality corm which takes 2-3 years
14. Optimum harvesting stage	Gladiolus should be harvested when first 1-5 buds (florets) show colour
15. Current shelf life	6-7 days
16. Potential shelf life	8-10 days by maintaining the appropriate post-harvest management procedure and also cool chain management
17. Techniques post-harvest	-As soon as the flowers are harvested, the stems are to be kept into clean buckets containing water -De-leafing: After harvesting, 50% leaves should be removed to reduce the transpiration loss

	-After sorting the flowers should be graded according to the length. It depend on the variety and market demand -In gladiolus, 20-30 stick may be kept per bunch -For local market packaging, each bunch of flower should be covered by paper and is made one bundle. Later on, 4-5 bundle should be covered by paper again and finally should be wrapped with gunny cloths. In this way, gladiolus is marketed easily in less price.
18. Cooling & storage* (optimal temperature)	For local market, fresh flowers can be stored at 6 to 8^0c for 7 to 8 days if harvested at optimum stage After cleaning, corms should be soaked **in** fungicide (preferably Bavistin ot Autostin @ 0.1%) and dried in a well-ventilated place for about 2 weeks and then stored at cold storage Storage temperature may be 5-10^0 C and relative humidity is 70-75% Corms need to be stored for 3-4 months to break their dormancy
COMMERCIAL	
19. Chain/Actors	Producer, wholesaler, retailer, nursery, importer, commission agent
20. Sales price at farm gate	5-7 BDT per flower stick
21. Sales price to consumers	10-30 BDT/ flower stick
22. Locations of sales	Big urban market mainly
23. Attractiveness (smell, color, size)	Having magnificent inflorescence with florets of dazzling colours, varying forms and sizes and long vase life make it an attractive cut flower. Sometimes petals having different stripe and spots and also curly form. Gladiolus don't have any smell.
24. Occasion to give	Day celebration, valentine day, new year (Bangla, English), Eid, Puja, official/ formal welcome
25. Consumer profile	Middle class group

LILIUM	
GENERAL	
1. Characteristics	Most species are native to the temperate northern hemisphere though their range extends to the northern subtropics. Mainly cultivated as cut flower but also used as potted plant. The wide diversity of color, attractive shape, multi-flowering stalk, sweet fragrance and long vase life gave lilium 4th position in the International flower trade.
2. Volume (annual) & market growth	80,000 pc; 60% per year
TECHNICAL	
3. Production locations (current and favourable)	Currently: Gazipur (Sreepur & Sadar), Jashore (Godkhali), Rangpur (Sadar), Dhaka (Savar) districts Favourable: Rangpur, Dinajpur, Panchaganr, Bagura, Mymensingh districts
4. Present Production Practices	Under UV poly-shade, Agro shade net and also mosquito net
5. Improved Production Practices	Under Green house, UV poly-shade, Agro shade net
6. Cultivation Duration	5-6 months
7. Present production per decimal (one harvest)	900-950 flower stick/decimal/season
8. Potential production per decimal (one harvest), incl needed improvements and investments	900-950 flower stick/decimal/season (as one flower stick is found from one bulb).
9. Required soil conditions	Soil with good texture and proper drainage is preferred. The soil should be light and porous but rich in organic matter. It is advisable to maintain a pH of 6 to 7 for the Asiatic and longiflorum hybrid groups and a pH of 5.5 to 6.5 for the oriental hybrids.
10. Required climate/weather conditions	Lilium need cool weather. For good plant growth and quality flower production, the night temperature should be around 10-15^{0}C and the day temperature should be 20-25^{0}C. The plant should not be grown under direct sunlight. A shading screen with 40-50% shade will be beneficial.
11. Techniques pre-harvest	- Lilium bulbs should be planted at raised bed -It does not like water stagnation. After planting the bulbs, light watering should be done and it should be continued as and when necessary -Staking is an important task in lilium production to keep the plants erect. Nylon mesh net is used to support the plants - Removal of spike is important to produce quality bulb from bulblet
12. Disease and insects	Diseases: Botrytis blight, Scale and bulb rot, Root rot, Virus Insects: Aphid, Leaf feeder
13. Propagation and growth	-Liliums are normally propagated asexually by natural formation of daughter bulbs Production of quality bulb is very important for commercial lilum cultivation which may be produce from bulblet and scale -A six week cold storage period at 2-5^{0}c is needed to break dormancy of bulbs -Micro-propagation is the best way to produce large scale disease free quality bulbs

14. Optimum harvesting stage	Harvesting should be done when 2-3 lower most bud shows colour but is not open
15. Current shelf life	6-7 days
16. Potential shelf life	7-9 days by maintaining the appropriate post-harvest management procedure and also cool chain management
17. Techniques post-harvest	-Immediately after harvest, the lower portion of the cut spikes should be kept in water for prolonging the vase life of spikes -Un-necessary leaves (1/3rd) should be removed to reduce the transpiration loss -The flower sticks should be sorted by number of flower buds per stem and length of the stick -The leaves from the bottom 10-15 cm of the flower stick should be removed to mitigate the transpiration loss - For local market, cartoon box may be used for packaging of lilium -After cleaning, bulbs should be soaked **in** fungicide (preferably Bavistin ot Autostin @ 0.1%) and dried in a well-ventilated place for one day and the dried stem should be removed
18. Cooling & storage (optimal temperature)	-For local market, fresh flowers can be stored at 5 to 6^{0}c for 5 to 6 days if harvested at optimum stage -Lilium bulbs need to be vernalized (the artificial exposure of bulbs to low temperature) in order to stimulate flowering -Bulbs are to be stored at 2.1 to 2.4^{0}c temperature and >90% relative humidity for 6 to 8 weeks -Bulbs can be stored at -2^{0}c up to one year
COMMERCIAL	
19. Chain/Actors	Producer, wholesaler, retailer, bulb importer, commission agent
20. Sales price at farm gate	120-200 BDT per flower stick
21. Sales price to consumers	200- 300 BDT/ flower stick
22. Locations of sales	Only posh market
23. Attractiveness (smell, color, size)	Liliums are erect plants with leafy stems, clustered flowers and scaly bulbs. Each lilium variety have different meaning but the most common meaning is purity. Among various lilium species, Oriental liliums are more fragrant
24. Occasion to give	Special occasion- marriage day, birthday, propose day, welcome special guest
25. Consumer profile	upper-class customers mainly.

GERBERA	
GENERAL	
1. Characteristics	Gerbera belongs to family Asteraceae, is popular as cut flower with wide range of colour and shapes- a native of South Africa. It is perennial in nature and can be grown in open as well as protected conditions. The vegetatively propagated plants are more vigorous which produce larger number of good quality flowers with longer vase life.
2. Volume (annual) & market growth	117 MT; 17% per year
TECHNICAL	
3. Production locations (current and favourable)	Currently: Dhaka (Savar), Jhenidah (kaligonj), Manikganj, Jashore (Gadkhali), Chuadanga (Jibon Nagar), Gazipur Favourable: Rangpur, Bagura, Mymensingh, Brahmmanbaria, Manikganj
4. Present Production Practices	Under polycarbonate shade, UV poly shade
5. Improved Production Practices	Under permanent polycarbonate shade and also UV polyshade following Good Agricultural Practices
6. Cultivation Duration	Round the year
7. Present production per decimal (one harvest)	7000-7500 flower stick/decimal/year
8. Potential production per decimal (one harvest), incl needed improvements and investments	8000-10000 flower stick/decimal/year (After cleaning UV poly film every year, by changing old UV shade after 3 years and also applying some fertilizers like Calcium Ammonium Nitrate which is not available in Bangladesh and also not allowed to import
9. Required soil conditions	Gerbera thrive best when grown in porous and well drained rich, light, neutral to alkaline soil (with pH 5.5 –7.0) which permit better root growth and penetration (gerbera roots go as deep as 50-70 cm). The gerbera production soil should be rich in organic matter (OM: Soil-70:30).
10. Required climate/weather conditions	Gerbera can be cultivated in a wide range of climatic condition but cool weather is good. It's production is best practiced under protected conditions of a greenhouse and require high light intensities for good plants and flower bud production. Temperature, particularly the night temperature (15 – 18^{0}C) is important. Whenever the day temperature goes high (>25^{0}C) ventilation should be able to cool down the greenhouse. The humidity levels should generally be maintained below 70 percent during the day and below 85 percent during night
11. Techniques pre-harvest	-Gerberas should be grown on raised beds (45cm) to avoid water logging condition -Gerbera can be planted round the year but optimum time is October-November - While planting gerbera, the crown of plants should be 1- 2cm above soil level - Generally two rows should be planted on one bed at 30 cm distance between the rows and 30 cm distance between the plants in one row -Fertigation (Fertilizer application and Irrigation) should be applied by drip irrigation system
12. Diseases and Insect	Diseases: Crown rot, Powdery mildew, Root rot, Bacterial blight, Leaf spot Insects: White fly, Leaf miner, Aphid, Red Spider Mite
13. Propagation and growth	**Micro-propagation** is the main method of producing quality plants world over. The tissue cultured plantlets are used as propagating materials.

	Propagation of gerbera is also achieved through seeds, cuttings or through clump division
14. Optimum harvesting stage	Gerbera flowers should be harvested when fully open and when the second circle of disc florets show pollen, it is advisable to pluck the flowers from the plant with gentle rotation of the base of the stem Avoid cutting the flowers, as the cut portion can be a point for start of disease infection
15. Current shelf life	8-9 days
16. Potential shelf life	10-12 days by maintaining the appropriate post-harvest management procedure and also cool chain management
17. Techniques post-harvest	Cut off the lower 2-4 cm hard portion of the stem. This facilitates water take up by the stem Put the cut stems in clean water and store in cool area. Ideally 3-4cm stem should be in water Pre cool the flowers as soon as possible at 2-5^{0}C to remove the field heat Cover the flower head with polythene. Make bunches of 10 or 20 flowers as per the market demand and secure the bunch in at least two places, i.e. about 5 cm from below and above, with rubber band. Avoid putting the band too tightly, lest it causes physical damage Place the bunch facing the box ends with stems towards middle of the box. Secure the bunch in the box to protect them from damage by shifting within the box while in transit For local market, cartoon box may be used for packaging of gerbera Place the bunch in clean water on opening the box before putting up for marketing
18. Cooling & storage (optimal temperature)	Gerbera can be stored at 1 to 4^{0}c for 3-7 days for export purpose For local market, fresh flowers can be stored at 6 to 8^{0}c for 7 to 8 days if harvested at optimum stage
COMMERCIAL	
19. Chain/Actors	Producer, wholesaler, retailer, nurserer, importer, commission agent
20. Sales price at farm gate	8-12 BDT / flower stick
21. Sales price to consumers	12-20 BDT / flower stick
22. Locations of sales	Big urban market mainly
23. Attractiveness (smell, color, size)	Gerbera is the staple in the cut flower world which have sturdy stems that don't hollow out like other cut flowers. They also have long vase life. It is a scentless flower
24. Occasion to give	Day celebration, valentine day, new year (Bangla, English), Eid, Puja, official/ formal welcome
25. Consumer profile	All economic class, mainly young people

TULIP	
GENERAL	
1. Characteristics	Tulips belongs to family liliaceae are very famous ornamental bulbous flowers grown due to their attractiveness. In temperate country, it is grown in open condition but in comparatively warmer region, it can be grown under green house, poly house and shade net as well.
2. Volume (annual) & market growth	200.000 bulbs in 2022; 20% or even more growth per year
TECHNICAL	
3. Production locations (current and favourable)	Currently: Gazipur (Sreepur, Sadar), Panchaganr (Tetulia), Jashore (Godkhali), Rajshahi Favourable: Rangpur, Bagura, Mymensingh, Dinajpur
4. Present Production Practices	Under shade net
5. Improved Production Practices	Under shade net using good quality bulbs following Good Agricultural Practices
6. Cultivation Duration	4-4.5 months
7. Present production per decimal (one harvest)	1000 flower stick/decimal/season
8. Potential production per decimal (one harvest), incl needed improvements and investments	1000 flower stick/decimal/season (as one flower stick is found from one bulb).
9. Required soil conditions	Tulips require well drained light sandy loam soil for better growth and yield. The soil p^H of 6 to 7 is ideal for Tulip
10. Required climate/weather conditions	Tulip is an excellent flower of temperate zone. Recently the flower has been introduced in Bangladesh. Day temperature 20-26^{0}c and night temperature should be 5-12^{0}c during growth period. Partial shade is required to protect the direct sunlight
11. Techniques pre-harvest	-Not excess but sufficient amount of moisture should be maintained through it's growth period for better quality flowers -The Tulip field should be kept weed free -Mulching should be done with a layer of chopped straw, chopped leaves for preserving moisture, control weed and cooling the soil
12. Disease and Insects	Diseases: Botrytis blight (tulip fire), Bud rot Insects: Thrips, Aphid
13. Propagation and growth	Tulips are propagated by bulbs. Bulblets are used to produce bulbs
14. Optimum harvesting stage	When the flower buds show colour, but before they begin to open, the scapes along with two leaves should be cut Regarding bulbs harvesting, bulbs should be harvested when leaves turn to yellow colour or 45 to 60 days after flowering
15. Current shelf life	2-3 days in Bangladesh condition as temperature rises during blooming period
16. Potential shelf life	Tulip blooms last 3-7 days if given proper care
17. Techniques post-harvest	-After harvesting flowers should be kept in cool place and also in water -Flowers should be graded considering flower colour, stem length, blooming stage etc - Excess leaves at the bottom should be removed -In tulip, 10-12 flowers stick can be kept in one bunch

	-After cleaning, bulbs should be soaked **in** fungicide (preferably Bavistin ot Autostin @ 0.1%) and dried in a well-ventilated place for one day -For local market, cartoon box may be used for packaging of tulip
18. Cooling & storage (optimal temperature)	-Tulip fresh flower can be stored at 5-6^{0}c for 3-4 days (as temperature rises during blooming time in Bangladesh) - - Bulbs are to be stored at 5 to 7^{0}c temperature and 80 to 85% relative humidity for 8 to 10 weeks
COMMERCIAL	
19. Chain/Actors	Producer, wholesaler, retailer, bulb importer, commission agent
20. Sales price at farm gate	80-160 BDT / flower stick
21. Sales price to consumers	200-300 BDT / flower stick
22. Locations of sales	Only posh market
23. Attractiveness (smell, color, size)	The flowers of Tulip are usually large, showy and bright coloured. When it comes to flower, it is usually shaped like a cup with 6 petals. The petals are available from single colour to multi colours with different patterns depending on the variety or species. The majority of tulips are odourless but some of them are blessed with a quite pleasant
24. Occasion to give	Special occasion- marriage day, birthday, propose day, welcome special guest
25. Consumer profile	upper-class customers mainly; middle class also interested for special occasion

ANNEX 5 – QUARANTINE RULES FOR FLOWER

What are the current regulations concerning 'quarantine for flowers, seedlings

On April 24, 2018, the Ministry of Agriculture issued the Plant Quarantine Rules 2018 to protect domestic plants and plant products from foreign invasive insects and pests. The Rules shared formats for import permits, phytosanitary certificates, and import permit applications.

- There are seven quarantine stations in Bangladesh.
- For any first consignment, seed/bulb need to quarantine for full one season. This is why, it is suggested to import small amount for first time to observe the result. But after that, it didn't need any such type of quarantine from next. On the other hand, if supplier declare/ certify that the product is free from concern disease/ pest, it didn't need any quarantine.
- Plant quarantine activities regulated under the rule, "**Plant Quarantine Rules 2018**". Under this rule, schedule-2, serial 74-104 is considered for flower plant and inputs (bulb/ tuber/ seed/ corn/ cutting/ bud etc)
- The facilities under these quarantine stations, is very limited.

List of plants and plant products permitted for importation

Sl No	Category of Commodity	Plant Species	Use	Country of Origin	Requirement of Additional declarations	Special Conditions of Import
74	Flower bulbs	Dahlia (Dahlias pp.)	(i) Tubers for planting or propagation	Any Country	Freedom from: Virus affecting dahlia except dahlia Mosaic virus	(i) Post-entry quarantine for one growth season. (ii) Freedom from soil.
			(ii) Seed(ling)		Not applicable	Freedom from quarantine weeds seeds.
75	Flower bulbs	Chrysanthemum (Chrysanthemum spp.)	(i) Seed(ling)	Any country	Freedom from: Bacterial leaf blight of tomato (Pseudomonas viridiflava)	Freedom from quarantine weeds seeds.
76	Flower bulbs	(b) Gladiolus spp.	Corms/ Cormlets for planting or propagation		Freedom from: (a) Smut (Urocystis gladiolicola) (b) Rusts (Uromyces gladioli and U.transversalis) (c) Cormrot (Fusarium. Oxysporum f.sp. gladioli) (d) Hard rot (Septoria gladioli) (e) Scab and neck rot (Burkholderia sp.)	(i) Post-entry quarantine for one growth season. (ii) Freedom from soil.
77	Flower	Rose (Rosa spp.)	Rooted cuttings/		Freedom from: (a) Crown gall	(i) Post-entry quarantine for a

			Grafts/ Bud wood/Saplings for planting		(Agrobacterium tumefaciens) (b) Hairy root (A. rhizogenes) (c) Brand canker (Coniothyrium wernsdorfiae) (d) Brown canker (Cryptosporella umbrina) (e) Downy mildew (Peronospora sparsa) (f) Rust (Phragmidium spp.) (g) Rose streak virus	period of 18 months except budding for 90 days. (ii) Freedom from soil for rooted cuttings.
81	Flower Bulb	Lily (Lillium spp.)	(i) Bulbsfor planting		Freedom from: (a) Fusariumwilt (Fusarium oxysporumf.sp.lilii) (b) Anthracnose (Colletotrichum lilii) (c) Bacterialleaf spot(Burkholderia gladioli pv. Gladioli) (d) Lilly viruses (lilly rosette,lilly symptom less, tulip breaking and lilly curl stripe)	(i) Post-entry quarantine for one growth season. (ii) Freedom from soil.
82	Flower Bulb	(h) Tulipa spp.	Bulbs for planting or propagation	Any Country	Freedom from: (a) Bulb and stem nematode (Ditylenchus dipsaci) (b) Yellow pustule and hellfire (Curtobacteriumflaccumf acienspv.oortii) (c) Tulipa viruses viz. band breaking, chlorotic blotch, virus and other seed borne viruses.	(i) Post-entry quarantine for one growth season. (ii) Free from soil. (iii) Hot-water treatment of bulbs at 45°C for 4hrs followed by suitable fungicidal treatment and the treatment shall be endorsed on the Phytosanitary Certificate. Or Treatment with Phosphine at recommended or equivalent any other treatment.
83	Flower bulb	Gerbera (Gerbera jamesonii)	(i) Seed(ling)	Any Country		Freedom from quarantine weed seeds.

			(ii) Seed(ling) for propagation	(i) Netherlands	Freedom from: (a) Frankliniella occidentalis (Western flower thrips) (b) Otiorhynchus sulcatus(Vine weevil) (c)Thripsangus ticeps(Field thrips) (d) Phytonemus pallidus (Strawberry mite) (e) Phytophthora cryptogea (Tomato root rot)	Post-entry quarantine growing for a Period of 45 days.

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