



Kingdom of the Netherlands

CUT FLOWER PRODUCTION SUB-SECTOR IN ARMENIA



***Cut-flower production sub-sector in Armenia** has been delegated by the **Netherlands Embassy in Yerevan, Armenia** and implemented by **ARGUMENT Consulting Bureau**. The analysis has been conducted in the period of August-December 2022.*

The main objective of the cut flower sub-sector analysis in Armenia was to assess the current status of the cut flower production in Armenia and identify the opportunities and threats for potential Dutch investors in the sub-sector and suppliers of the equipment, as well as seeds/seedlings from the Netherlands

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Abbreviations and explanations

AMD	▶ Armenian Dram
CEO	▶ Chief Executive Officer
CIS	▶ Commonwealth of Independent States
CJSC	▶ Closed Joint Stock Company
EAEU	▶ Eurasian Economic Union
EU	▶ European Union
EUR	▶ Euro
FAO	▶ The Food and Agriculture Organization of the United Nations
G.A.P.	▶ Good Agricultural Practices
GDP	▶ Gross Domestic Product
GSP	▶ Generalised Scheme of Preferences
ICARE	▶ International Center for Agribusiness Research and Education

IFOAM	▶ The International Federation of Organic Agriculture Movements
ISDS	▶ Investor-State Dispute Settlement
LLC	▶ Limited Liability Company
ME	▶ The Middle East
N/A	▶ Not Applicable
NGO	▶ Non-Governmental Organisation
OJSC	▶ Open Joint Stock Company
RUB	▶ Russian Rouble
S.P.	▶ Sole Proprietor
UAE	▶ United Arab Emirates
UN	▶ United Nations
UPOV	▶ The International Union for the Protection of New Varieties of Plants
U.S.	▶ United States of America
USAID	▶ United States Agency for International Development
VAT	▶ Value Added Tax

1 BACKGROUND AND PURPOSE OF THE ASSIGNMENT

1.1 BACKGROUND

1.1.1 Geography and climate



Armenia is an upper-middle income, landlocked country, located in western part of Asia. It occupies the north-eastern part of the Armenian plateau – between Caucasus and Nearest Asia. The country is located in the latitude of 38° 50' - 41° 18' N and longitude of 43° 27' - 46° 37' E.

The total area of the country is 29 743 km², 68.7% of which is agricultural land. About 36.4% of terrain are mountains and 76.5% of territory is at the altitude of 1,000-2,500m above sea level. The country's lowest point is the underflow region of Debed river (375m), the highest elevation – the peak of Aragats mountain (4090m). Armenia is abundant with water resources: Lake Sevan is the largest lake in Armenia with 1 279.46m² mirror surface, the longest river is Araks river (192km). Renewable freshwater resources comprise 4,771.0 million m³ (see Table 1.)

Table 1. Renewable freshwater resources, 2016-2021 (mln. m³)

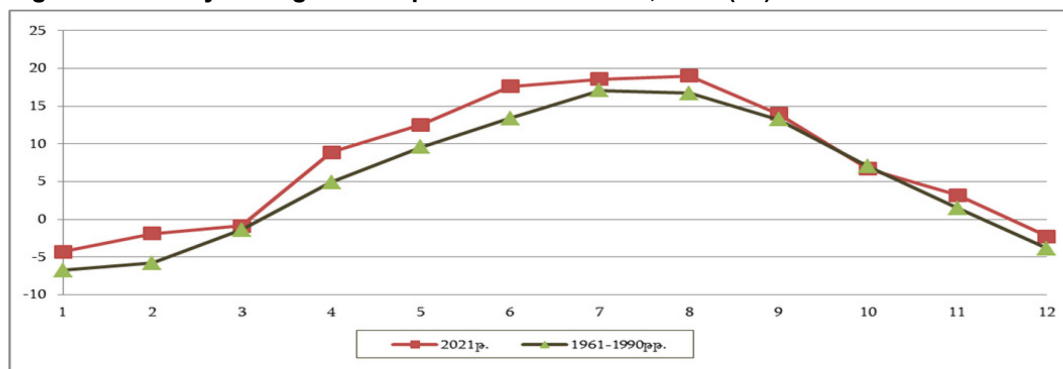
	2016	2017	2018	2019	2020	2021
Precipitations	19,012.0	14,335.0	18,059.0	13,371.0	16,032.0	14,009.0
Total evaporation	12,928.0	10,382.0	12,120.0	10,285.0	11,261.0	10,146.0
Internal flow	6,084.0	3,953.0	5,939.0	3,086.0	4,771.0	3,863.0
Surface waters and groundwater inflow	798.0	710.0	632.4	1,303.0	942.2	653.4

Important indicators for construction of greenhouses are weather and climate data, particularly the temperature, wind speed, monthly precipitation, sun intensity, sun radiation and a number of sunny days during the year etc.

Armenia's climate can be described as highland continental, with large variation between summer highs (June to August) and winter lows (December to February). The country also experiences large climatic contrasts because of its intricate terrain, and the climates range from arid to subtropical and to cold, high mountains (World Bank data, 2022¹). The average annual temperature in Armenia was 7.6°C in 2021, which is 2.1°C higher from the norm of 1961-1990 (5.5°C). The average temperature in January was -4.3°C, in June - +17.6°C (see Figure 1 for monthly average air temperature in 2021). The air temperature was higher than the seasonal norms (1961-1990), especially in the winter it was higher by 2.4°C, in the spring by 2.5°C, in the summer by 2.5°C, and in the autumn by 0.7°C.

¹ <https://climateknowledgeportal.worldbank.org/country/armenia/climate-data-historical>

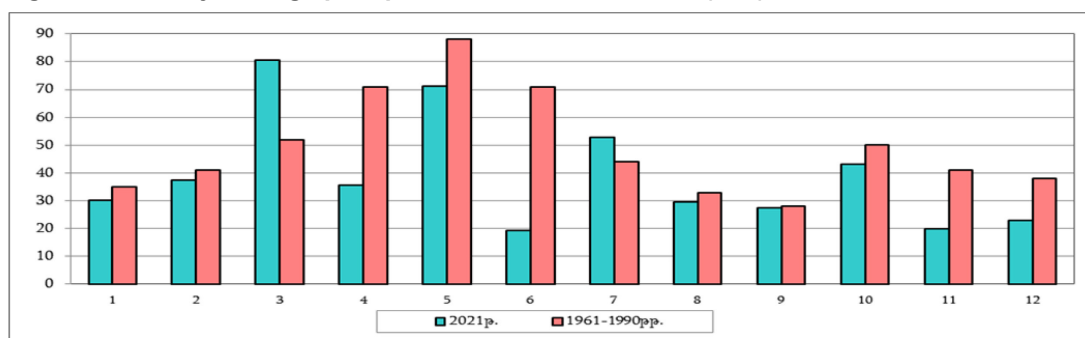
Figure 1. Monthly average air temperature and norms, 2021 (°C)



Source: Statistical Committee of Armenia, 2022

The average yearly number of precipitations was 470.1 mm in 2021, which is 79% of the norm (see Figure 2 for monthly average precipitation in 2021). March and July were especially rainy: the monthly amount was 155% and 120% of the norm respectively.

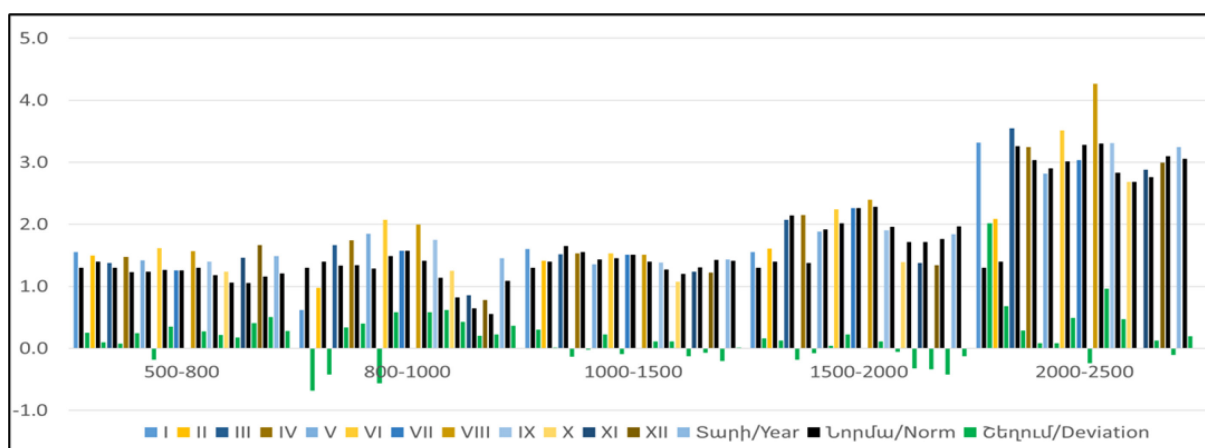
Figure 2. Monthly average precipitations and norms, 2021 (mm)



Source: Statistical Committee of Armenia, 2022

As it is presented in Figure 3, usually high-speed winds are registered at attitudes higher than 2000m. In 2021 the average annual wind speed in the republic was within the norm, with slight positive and negative deviations. In the valley (500-800 m) regions, a wind speed of 0.9 m/s was observed, which is 0.4 m/s lower than the norm. At altitudes of 1000-2000m, 0.4-1.1m/s was observed, which is 0.7-2.2m/s below the norm. In summer and autumn, the wind speed was close to the norm.

Figure 3 - Average wind speed by altitudes and months, 2021 (m/sec)



Source: Statistical Committee of Armenia, 2022

In 2021, the relative humidity was close to the norm.

Table 2. Deviation of relative humidity by altitudes, 2021 (%)

Altitude, m	Deviation of relative humidity	Norm	Average maximum	Average minimum
500-800	69.6	70.0	80.8	58.0
800-1000	56.5	61.2	78.8	38.0
1000-1500	67.7	67.1	80.6	56.2
1500-2000	72.1	70.0	81.8	61.3
2000-2500	72.8	71.7	82.0	63.6

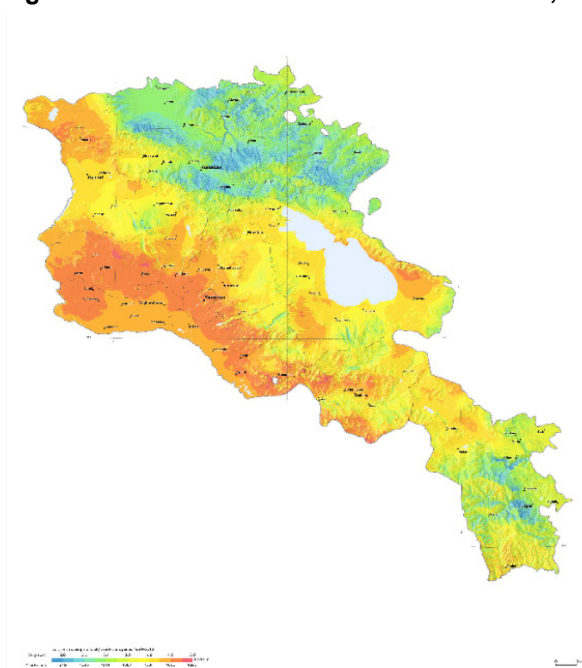
Source: Statistical Committee of Armenia, 2022

In total, 47 hazardous meteorological phenomena were registered in 2021. This number is less than it was registered in 2020. Table 3 presents all registered hazardous phenomena in the country in 2016-2021.

Table 3. The number of cases of hazardous meteorological phenomena, 2016-2021 (unit)

	2016	2017	2018	2019	2020	2021
Strong wind (speed of 25 m/sec and more)	23	14	11	35	8	8
Heavy fog (visibility less than 50 m)	16	43	29	21	24	29
Heavy rain (30 mm and more within 12 hours)	8	7	9	4	16	5
Heavy snow (20 cm and more within 12 hours)	10	3	2	1	1	3
Hailstorm (diameter of 20 mm and more)	7	5	1	5	-	-
Extreme hot (in the valleys: $\geq +40^{\circ}\text{C}$, in the foothills: $\geq +35^{\circ}\text{C}$, in mountainous areas of $\geq +32^{\circ}\text{C}$)	1	14	17	10	1	2
Strong blizzard (>10 m/sec, with a duration of 12 hours, visibility < 50 m)	...	2	-	-	-	-
Total	65	88	69	76	50	47

Source: Statistical Committee of Armenia, 2022

Figure 4. Direct Normal Irradiation in Armenia, 1999-2018

Average monthly hours of sunshine vary from approximately 2048 (Ijevan) to 2968 (Ararat) hours. In Yerevan, the monthly hours of sunshine were approximately 2696 hours in 2020 (average duration of sunshine exceeding 2200 hours with average of 4,773 MJ/m² solar radiation). The average annual solar radiation per square meter in Armenia amounts to 1720 kWh (the average European is 1000 kWh). The digital map, prepared in the framework of “Development of Geographic Information System of Armenia for Renewable Energy Projects” of Global Environment Facility and Armenian Renewable Resources and Energy Efficiency Fund³ shows the average annual solar radiation level in the whole territory of Armenia.

Figure 4 presents information on the average daily/yearly sum of direct normal irradiation covering a period of 20 recent years (1999-2018).

² The data is published by the World Bank Group using data from the Global Solar Atlas.

³ See https://sustainable-caucasus.unepgrid.ch/layers/geonode_data:geonode:solar_radiation

1.1.2 Agricultural land statistics

Before starting the presentation on the cut flower sub-sector of Armenia, it is important to present also several statistical information about the agricultural sector as a whole and its development potential.

Table 4. Land balance of RA, as of July 1, 2021 (thousand. ha)

Lands by significance	Total	of which: irrigation
1. Agricultural	2,042.48	155.62
1.1. arable land	443.42	117.04
1.2. perennial plants	38.06	37.08
1.3. hayfield	121.23	1.50
1.4. pastures	1,049.87	-
1.5. other types of land	389.90	-

As of July 2021, 68.7% of the total territory of the country or 2,043.5ths. hectares (ha) are agricultural lands, of which 444.0ths ha are arable lands, 37.3 thousand ha - perennial plants, 121.1ths ha - hayfield, 1,050.6 thousand ha – pastures and 390.8ths ha - other types of land (see Table 4).

Source: Ministry of Nature Protection of Armenia, 2022

The main agricultural area of the country is Ararat valley, where two provinces (marzes) are located – Ararat and Armavir. Though they cover a relatively small area of arable land, their contribution to the country's gross agricultural produce is higher, compared to other provinces (see Table 5.)

Table 5. Land balance of Armenia per province and their share in gross agricultural produce, 2021

RA marzes	Agricultural land, ha	Arable Land, ha	The share of gross agricultural produce in the country's economy, %
Yerevan	3 323.2	910.6	-
Aragatsotn	217 478.4	53 875.1	9.3
Ararat	156 129.7	24 344.1	15.1
Armavir	96 838.9	39 765.2	22.6
Gegharkunik	345 183.5	81 448.7	12.2
Kotayk	155 070.7	37 264.4	8.4
Lori	250 904.3	42 013.6	8.4
Shirak	211 012.6	78 144.2	9.4
Syunik	306 207.8	43 965.3	6.4
Tavush	110 675.7	25 495.6	4.9
Vayots Dzor	189 537.1	15 900.3	2.4

Source: Statistical Committee of Armenia, 2022

Contributing to roughly 13% of GDP and 40% of employment, the agricultural sector is key for Armenia's economic development. The farm structure in Armenia, like in many other countries in the region, is dominated by a large number of small-scale farms with fragmented land holdings. The average farm size is about 1.48 hectares (ICARE and IFOAM, 2017). According to 2014 census data, the 317,346 family farms contribute to more than 97% of total agricultural output (FAO, 2020).

Table 6. Gross Agricultural Output (at current prices, bln. drams)

	2018	2019	2020	2021
Agriculture, total including:	892.9	853.3	833.3	934.4
plant growing	415.8	410.9	399.5	469.1
animal husbandry	477.1	442.4	433.8	465.3

Source: Statistical Committee of Armenia, 2022

The analysis of statistical data shows that gross agricultural output declined in recent two years. Nevertheless, 12% growth was registered in 2021, which gives hope that the efforts of the Government of Armenia (in the last several years the government implements different support programmes, provides subsidies, introduced leasing systems etc.) were successful. Support programmes, Innovation, research and development, and efficiency has impacted the sector's growth as well.

In 2017, the Government of Armenia set a goal to increase agricultural productivity by introducing modern technologies, promoting high value-added agriculture, expanding export volumes, and providing favourable conditions to farmers. Later on, in December 2019, the Government adopted the National Strategy for Agriculture development (2020-2030), which aims to modernise the agricultural sector to achieve environmental sustainability, food security, and better livelihoods. The final objectives of the Strategy include enhancing farmers' productivity and income and increasing the diversification of agricultural food exports (10% more foreign markets), etc. Cut flowers are considered as high value products and this report could contribute to the strategic aim of the Government.

1.2 METHODOLOGY

The main objective of the cut flower⁴ sub-sector analysis in Armenia was to assess the current status of the cut flower production in Armenia and identify the opportunities and threats for potential Dutch investors in the sub-sector and suppliers of the equipment, as well as seeds/seedlings from the Netherlands.

The scope of conducting cut flower sub-sector analysis in Armenia contains, but is not limited to the following specific tasks and subjects:

1. Overview of Armenia's critical advantages of for the cut-flower sector (climate, soil, labour force),
2. Stock-taking of the cut-flower sub-sector participants in Armenia, including their geographical distribution (by regions) and product specialisation (major types of flowers produced in Armenia) with the trend of last 10 years,
3. Overview of the cut flower global and regional market,
4. Current situation of the sub-sector in Armenia: production volume, export and import opportunities, prices, main export market etc.,
5. Main technologies applied in the sub-sector, including major types, origins, effective sizes, specificities, and investments,
6. Assessment of preferable regions (and conditions) per type of flower,
7. Main opportunities and problems existing in the sub-sector (specifically logistics) and sub-sector development potential,
8. Summary of the existing legislation regulating (including tax regime, tax privileges, incentives for investors, gaps in the existing legislation, Intellectual Property Rights, UPOV convention etc.),
9. Available existing support projects (both internal and external, both state and private) aiming at the development and promotion of investments in the cut flower sub-sector, if available,
10. Interest of operators (current or prospectively interested) in cooperation with Dutch suppliers, buyers and/or potential investors.

1.2.1 Data collection

To meet this objective the following methods have been applied:

- Desk research/analysis of available literature, secondary information, statistical data, production volumes, market trends, etc.

⁴ Cut flowers refer to flowers or flower buds cut from the plant on which they are grown. They are usually taken out from plants for use in decorative purposes. Most gardeners harvest their own cut flowers in their gardens; however, most countries have a floral industry dedicated to cut flowers.

- ▶ Consultations and interviews with the cut flower producers in Armenia, cut flower variety breeders, producers, seeds exporters as well as potential buyers the Netherlands
- ▶ Discussions with the representatives of the state bodies and relevant provincial institutions
- ▶ Discussions with specialised operators of the sub-sector involved in trade, import and export of cut flower seeds or flowers in Armenia

One of the important steps of the work was **the desk research**, which included:

- ▶ the identification and analysis of relevant statistical data,
- ▶ analysis of reports, literature relating to cut flower production and market trends,
- ▶ identification of data relating to operators, retailers and traders, etc.

The next important step of the current analysis was consultations with the main players of the sub-sector. These included meetings and face-to-face interviews with:

- ▶ **cut-flower producers** – the consultation meetings with operators from different provinces of Armenia were conducted. These were not only organisations/companies operating with high-tech big greenhouses (more than 3 ha), but also organisations with small capacities having small greenhouses (less than 1000m²) and selling flowers mainly in local market and medium operators having greenhouses with a surface area of more than 1000m² involved in the export of cut-flowers to foreign markets. It is important to mention that small scale operators were not considered as a direct target group for this analysis, as they don't use modern technologies in their greenhouses and flowers grown in their greenhouses are used mainly for the local market. However, they are beneficiaries of this research, considering their growing potential and interest,
- ▶ representatives of **the suppliers**, including Dutch ones interested in or already having cooperation with Armenian producers,
- ▶ actors involved in **export of cut-flowers**, to understand the main tendencies existing in the foreign markets, main advantages and possible barriers/bottlenecks for exporting,
- ▶ representatives of **state bodies, international partners and other institutions** which provided relevant information on existing support programmes as well as data on cut-flower sub-sector.

1.2.2 Data processing and summarization

The following methods were used to process, analyse and summarise the collected information and data:

- ▶ Systematisation and classification of the collected information and data.
- ▶ Authentication, verification and triangulation of the collected and systematised information and data.
- ▶ Data analysis and preparation of the report.

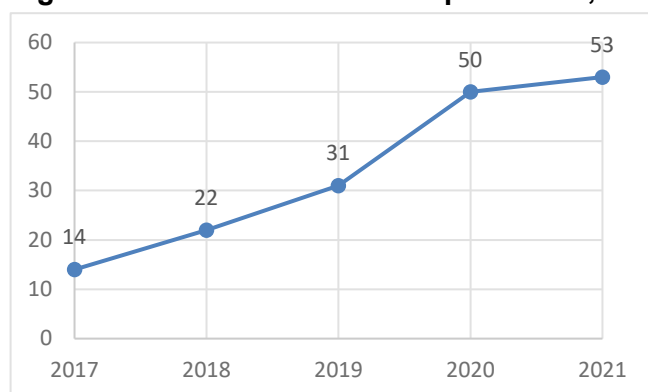
2 OVERVIEW OF THE CUT FLOWER GLOBAL AND LOCAL MARKET

2.1 CUT FLOWER MARKET OF ARMENIA

In Armenia cut-flower production is concentrated mostly in greenhouses, using both soil and hydroponic growing systems. According to the Statistical Committee of Armenia the sown area for flower production was 173 ha in 2021 (includes flower sown in field lands, greenhouses and hothouses). This is 10% more compared to 2017 (158 ha).

During the past few years, the number of cut-flower producers has grown as well. According to the State Revenue Committee of Armenia this number grew by around 4 times, reaching 53 producers in 2021 compared to 14 in 2017. The highest growth was recorded in 2020. However, these are only official data, i.e., data of those producers that are registered in the tax authorities. This research identified 272 micro, small, medium and big flower producers (see Annex 1). Micro and small producers mainly have open air cultivation of flowers or small tunnel greenhouses and grow flowers for sale at the local and/or provincial level. Medium and big operators use greenhouses and sell their products to the buyers from all over Armenia or abroad.

Figure 5. Number of cut-flower producers, 2017-2021



Source: State Revenue Committee of Armenia, 2022

some cases Armenian producers cannot ensure year-round production and supply of those flowers.

According to different researches conducted in the sub-sector, *“the local flower production has been providing more than 95% of the domestic demand and recording a growing tendency in export⁵”*. Different types of flowers are growing in Armenia, though production of roses, lisianthus, gerbera and alstroemeria are widespread in Armenia with large scale production focused not only on the local markets but also on foreign markets. Carnation and some other flowers are grown as well, though in

Table 7. Flower production in Armenia per province, (in 1000 units)

RA marzes	2015	2016	2017	2018	2019	2020	2021
Aragatsotn	-	2	2,741	642	902	2,156	5,046
Ararat	8,861	14,181	23,923	18,160	19,703	24,995	27,614
Armavir	6,799	6,230	2,991	3,097	7,116	6,478	14,086
Gegharkunik	-	-	-	-	-	-	-
Lori	-	-	-	11	1	-	-
Kotayk	18,187	23,870	36,629	29,305	30,337	27,773	43,017
Shirak	415	493	1,100	6	172	141	301
Syunik	-	-	-	88	72	54	33
Vayots Dzor	-	70	-	-	-	-	-
Tavush	15	9	12	6	138	785	1,367
Yerevan	84	112	1,276	1,282	2,044	-	-
TOTAL	34,361	44,967	68,672	52,597	60,484	64,427	91,507

Source: Statistical Committee of Armenia, 2022

As it is practiced in the world, in Armenia greenhouse flowers are mainly grown with rootstocks. Seed-based growing is not used in greenhouses.

According to the Statistical Committee of Armenia, a total of 91,507 thousand flowers were produced in Armenia in 2021. This includes flowers grown in field lands, greenhouses and hothouses, 1.7 times more than in 2018.

⁵ Middle East as an Alternative Market for Armenia; World Bank Group (WBG)/International Finance Corporation (IFC), 2020

Kotayk province is the main producer of cut flowers in Armenia with 43,017 thousand flowers produced in 2021. Compared to 2017 the cut flower production in this province grew by 17.4%. Here are located the majority of biggest and medium cut flower producers of roses (because of the preferential climate for construction of greenhouses). The second largest cut flower producer province is Ararat province, with 27,614 thousand flowers produced in 2021, though mainly micro and small producers are located in this province. The flower production has significantly increased in Armavir province in recent years. This growth doubled in 2021 compared to 2019 achieving 14,086 thousand flowers per year. **It shall be noted, that the official statistics does not reflect the real picture of the sub-sector, because there are many producers that are not registered anywhere and don't provide statistical data to relevant institutions.**

In recent years growth was also recorded in fresh cut flower wholesale and retail trade related activities. There were more than 1,000 companies involved in fresh flower wholesale and retail trade in 2021. This number grew by 45% compared to 2017. Moreover, if in 2017 there was no agent involved in fresh flower wholesale trade, 15 new agents were involved in the sector in 2021.

Table 8. Number of operators involved in fresh flower trade

Activity	Number of operators				
	2017	2018	2019	2020	2021
Wholesale trade	33	37	54	79	84
Retail trade	708	712	840	891	976
Agents involved in wholesale trade of flowers	-	1	4	14	15

Source: State Revenue Committee of Armenia, 2022

All these data show that the fresh flower production sub-sector has increased in recent years and continues to have a growing potential. Operators involved in the sub-sector explain this tremendous growth by increased demand for Armenian cut flowers in foreign markets and continuous growth of export.

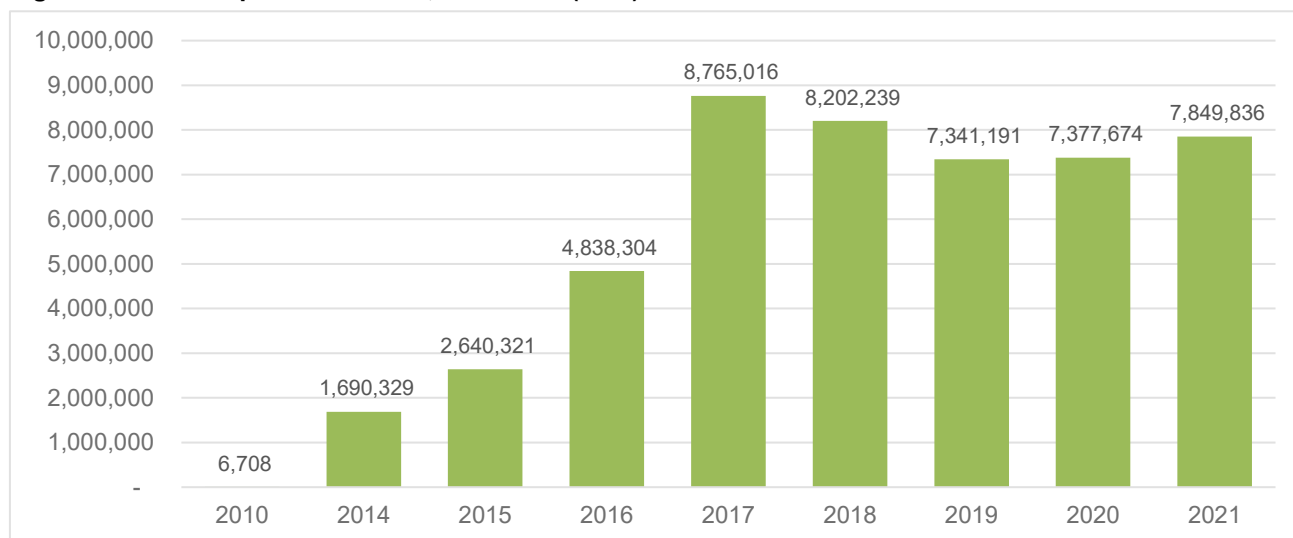
441 people were hired by the businesses involved in cut flower production sub-sector of Armenia in 2021. This number of workforce is 2.5 times more than that registered in 2017 (177 people). According to different estimations, these figures have a tendency to grow, because of the growth registered in the sub-sector. Also, it needs to be noted that there are many cut flower producer individuals (natural persons) that don't need workers or don't sign labour contracts with them.

Export of cut flowers amounted to USD 7.8 mln in 2021 (more than 3 mln kg or more than 23 mln units of cut flowers⁶), which is slightly more than in 2020. However, as it can be seen in Figure 8, the highest level of cut flowers export was registered in 2017, when it reached USD 8.7mln. Nevertheless, it is worth mentioning that in the last twelve years export of cut flowers increased by more than thousand times: from USD 6,708 in 2010 to USD 7,8mln in 2021. This shows the highest growth potential of Armenian cut flower sub-sector as an export oriented sub-sector.

The Russian Federation is the main export market of fresh cut flowers from Armenia (mainly for roses). Georgia, Belarus and Kazakhstan are also considered as export markets but for some types of flowers.

⁶ According to the State Revenue Committee of the Republic of Armenia

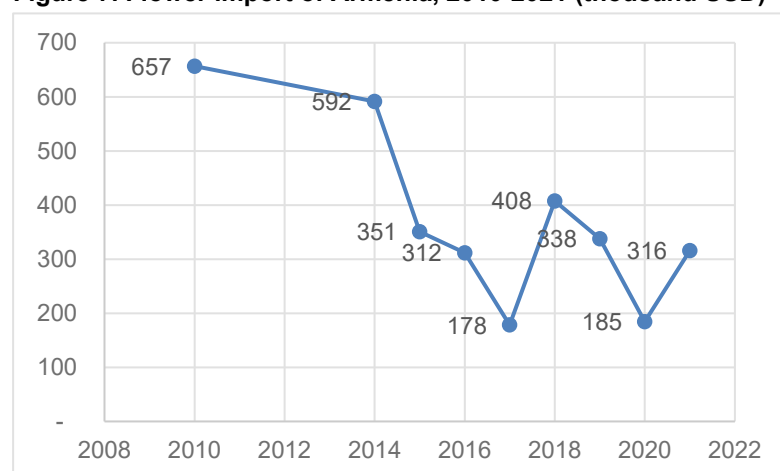
Figure 6. Flower export of Armenia, 2010-2021 (USD)



Source: Statistical Committee of Armenia, UN COMTRADE, 2022

The Table 9 presents main export markets for Armenian cut flowers in 2017-2021 for different types of flowers. As can be seen from the table, small-scale export was registered to the United Arab Emirates, UAE (USD 900) in 2017 and to Sweden (USD 194.9 and USD 17,001.3 in 2019 and 2020 respectively).

Figure 7. Flower import of Armenia, 2010-2021 (thousand USD)



Source: Statistical Committee of Armenia, UN COMTRADE, State Revenue Committee of Armenia, 2022

exported in 2021. In total 53 companies were involved in the export of fresh cut flowers from Armenia in 2021. This is twice more than in 2020 and almost three times more than in 2017.

Apart from roses and chrysanthemums, Armenia exports also lilies, carnations, gladioli, gerbera, etc.

Geography of the import of flowers is more diversified. Flowers are imported not only from Russian Federation or Georgia, but from the countries of the European Union such as the Netherlands, Germany, or Italy, as well as from Ecuador, South Africa, Iran and China. Import of flowers steadily decreased from 2010 to 2017, which corresponds to the increase of export of flowers from Armenia. Armenia imports mainly fresh roses (from Ecuador) and other fresh cut flowers (other than roses, carnations, orchids, chrysanthemums or lilies). Sharp decrease in the import of fresh flowers in 2020 is explained by the limitation of foreign trade because of COVID-19 pandemic.

Roses are the types of flowers with the highest export quantities and values, with Russia as the main export direction. Though the total value of exports of roses to this country decreased from 2017, the total quantity continues to grow achieving 19.8 mln flowers in 2021 compared to 15.8 mln in 2017. Armenian roses are exported to Georgia and Belarus as well, though in less quantities than to Russia. Nevertheless, it is worth mentioning that exports to these countries increased in 2021 compared to 2019 and 2020. Saudi Arabia is another export market, where mainly chrysanthemums were

Armenia also imports a high number of live plants (rootstocks for roses - HS 060240). It is imported mainly from the Netherlands. It is worth mentioning that import of these plants increased by 14 times in 2021 compared to 2020 and 15 times compared to 2019, mainly because of significant increase in imports from the Netherlands.

Table 9. Export of cut flowers from Armenia per type of flowers and countries, 2017-2021

Country	2012		2013		2014		2015		2016	
	Quantity (items)	Value (USD)	Quantity (items)	Value (USD)	Quantity (items)	Value (USD)	Quantity (items)	Value (USD)	Quantity (items)	Value (USD)
060240 - Plants, live; roses, grafted or not										
Georgia	-	-	-	-	-	-	238,630	14,188.0	-	-
060311 - Flowers, cut; roses, flowers and buds of a kind suitable for bouquets or ornamental purposes, fresh										
Russian Federation (kg)	100,291	985,477.0	208,348	1,799,104.0	167,534	1,238,018.0	251,114	2,036,268.0	576,457	4,008,002.0
Georgia (kg)	5,092	54,932.0	18,043	118,678.0	65,516	400,999.0	92,774	476,924.0	84,127	587,687.0
Belarus (kg)	6,798	94,184.0	7,122	107,576.0	2,737	42,280.0	9,879	100,857.0	34,192	219,743.0
France (kg)	84	1,176.0	-	-	-	-	-	-	-	-
Sweden (kg)	6,620	74,965.0	-	-	-	-	-	-	-	-
Latvia (kg)	754	9,806.0	-	-	-	-	-	-	-	-
Netherlands (kg)	843	566.0	25	539.0	-	-	-	-	-	-
United Arab Emirates (kg)	-	-	-	-	-	-	253	1,248.0	2,126	12,568.0
060312 - Flowers, cut; carnations, flowers and buds of a kind suitable for bouquets or ornamental purposes, fresh										
Georgia (kg)	-	-	-	-	-	-	2,358	5,760	-	-
Russian Federation (kg)	-	-	-	-	-	-	180	85	74	149
060314 - Flowers, cut; chrysanthemums, flowers and buds of a kind suitable for bouquets or ornamental purposes, fresh										
Russian Federation (kg)	-	-	-	-	402	2,112.0	-	-	27	46.0
06031910 - Flowers, cut; flowers and buds of a kind suitable for bouquets or ornamental purposes, fresh, gladioli										
Georgia (kg)	-	-	-	-	-	-	3,530	2,000.0	-	-
06031980 - Fresh cut flowers and buds, of a kind suitable for bouquets or for ornamental purposes (excl. roses, carnations, orchids and chrysanthemums) fresh										
Georgia (kg)	-	-	-	-	-	-	14,320	17,000.0	-	-
Russian Federation (kg)	-	-	2,933	34,740.0	694	6,859.0	45	613.0	5,836	9,727.0
060390 - Flowers, cut; flowers and flower buds of a kind suitable for bouquets or ornamental purposes, dried, dyed, bleached, impregnated or otherwise prepared										
Georgia (kg)	-	-	-	-	-	-	200	202.0	-	-
Russian Federation (kg)	-	-	-	-	-	-	400	282.0	153	322.0
Austria (kg)	-	-	60	100.0	-	-	-	-	-	-
United Kingdom (kg)	-	-	-	-	4	61.0	-	-	-	-

Country	2017		2018		2019		2020		2021	
	Quantity (items)	Value (USD)	Quantity (items)	Value (USD)	Quantity (items)	Value (USD)	Quantity (items)	Value (USD)	Quantity (items)	Value (USD)
060240 - Plants, live; roses, grafted or not										
Georgia	505,250	15,758.7	343,800	11,053.6	523,300	18,725.4	465,950	16,369.6	696,540	31,479.2
UAE	15,000	900.0	-	-	-	-	-	-	-	-
Russian Federation	-	-	-	-	-	-	37,000	12,873.9	15,000	16,348.6
060311 - Flowers, cut; roses, flowers and buds of a kind suitable for bouquets or ornamental purposes, fresh										
Russian Federation	15,749,190	8,058,531.1	16,117,814	7,783,771.8	14,274,432	6,742,894.1	18,137,065	6,434,374.8	19,821,717	6,248,271.2
Georgia	1,273,020	462,135.0	647,602	212,664.1	1,200,440	443,695.7	1,181,178	398,876.2	2,618,249	707,176.9
Belarus	584,985	294,017.4	245,305	122,845.5	172,275	861,37.5	28,695	14,794.5	227,885	79,759.8
Kazakhstan	5,595	2,141.4	-	-	-	-	-	-	-	-
Sweden	-	-	-	-	180	194.9	48,575	17,001.3	-	-
060312 - Flowers, cut; carnations, flowers and buds of a kind suitable for bouquets or ornamental purposes, fresh										
Georgia	37,600	2,654.0	24,390	3,087.2	16,350	1,241.6	2,500	127.8	7,900	447.0
Russian Federation					2,840	178.1	9,805	1,909.3	199,129	23,343.6
060314 - Flowers, cut; chrysanthemums, flowers and buds of a kind suitable for bouquets or ornamental purposes, fresh										
Georgia	211,420	8,340.9	1,694,30	7326,3	-	-	208,946	8,055.8	298,610	10,833.3
Saudi Arabia	1,500	505.0	-	-	400	190.1	12,428	2,553.7	10,811	1,171.0
060315 - Flowers, cut; lilies (Lilium spp.), flowers and flower buds of a kind suitable for bouquets or ornamental purposes, fresh										
Georgia	-	-	384	42.6	-	-	20	23.0	-	-
06031910 - Flowers, cut; flowers and buds of a kind suitable for bouquets or ornamental purposes, fresh, gladioli										
Georgia	7,500	344.8	16,900	451.1	30	31.2	-	-	-	-
Russian Federation	-	-	-	-	-	-	-	-	500	95.3
06031970 - Flowers, cut; flowers and buds of a kind suitable for bouquets or ornamental purposes, fresh, other than roses, carnations, orchids, chrysanthemums or lilies										
Georgia (kg)	-	-	-	-	146	301.0	2,555	2,256.0	60	43.0
Russian Federation (kg)	-	-	-	-	1,075	2,708.0	63,695	82,798.0	217,981	234,769.0
Saudi Arabia (kg)	13	787.0	-	-	-	-	-	-	-	-
060390 - Flowers, cut; flowers and flower buds of a kind suitable for bouquets or ornamental purposes, dried, dyed, bleached, impregnated or otherwise prepared										
Georgia (kg)	3,087.5	3,358.1	5,298.5	7,957.3	1,449.0	3,132.7	988.0	1,513.3	6,397.5	6,870.7
Russian Federation (kg)	-	-	-	-	1,718.0	1,762.8	447,131.0	53,399.2	1,178,617.6	302,668.7

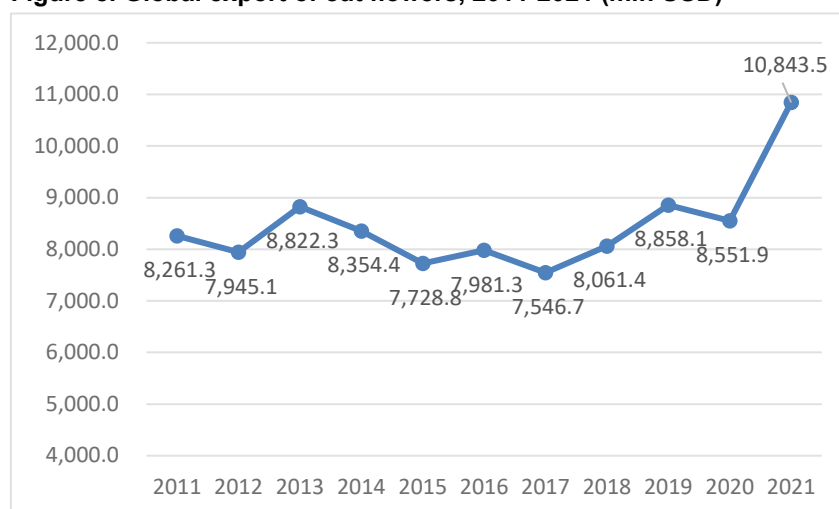
Source: UN COMTRADE, State Revenue Committee of Armenia, 2022

2.2 CUT FLOWER GLOBAL AND REGIONAL MARKETS

Fresh cut flower global market is characterised by continuous growth in the period of 2017-2021. Despite a small decrease in 2020 (because of COVID-19 pandemic) the average growth of international trade in the period of 2017-2021 was 10%.

According to Rabobank International, cut flowers are some of the most important floricultural products sold globally. Based on flower type, the cut flowers market is segmented into rose, carnation, lily, chrysanthemum & gerbera, and others. The rose segment accounted for the largest share of the global market in 2021. Rose plants range in size from compact, miniature roses, to climbers that can reach seven metres in height.

Figure 8. Global export of cut flowers, 2011-2021 (mln USD)



Source: UN COMTRADE 2022

The Netherlands have long been known for their cut flower exports, though other countries are increasingly taking up more of the global market share of the sector, especially in Africa and South America. Colombia, Ecuador, Kenya, Ethiopia and China gradually become the biggest producers of cut flowers. The warm and humid climates of these regions and their cheaper labour, contribute to their dominance in the global flower market. Nevertheless, the Netherlands is the leading supplier of floriculture plants, including tulips and

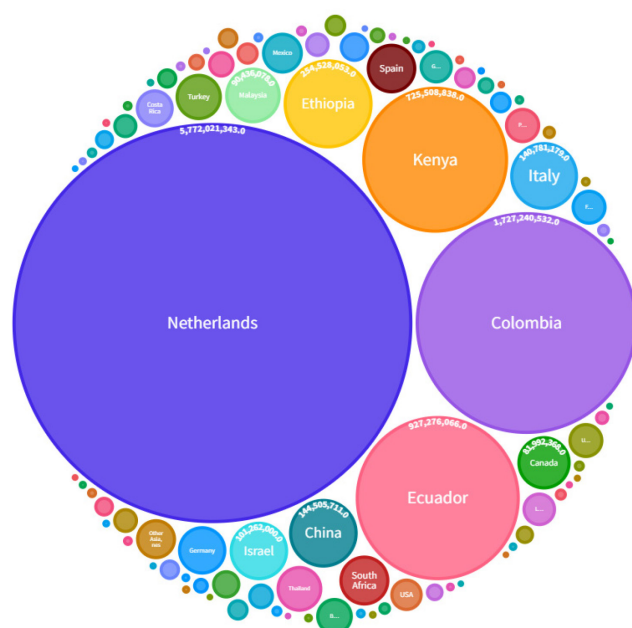
chrysanthemums, and continues to be the center of cut flower production in the global floral market. The country also hosts the largest flower market in the world, that being the auction at Aalsmeer (Royal FloraHolland). As it has done for years, *“Royal FloraHolland still plays a critical role importing and then re-exporting 40% of flowers from all over the world”*⁷. In 2017 the Netherlands occupied 52% of the global market share in the cut flower export sector while in 2021 exported more than 5.7bln cut flowers or 53.2% of the total global cut flower export. Despite this high share in the global market, the country is currently facing intense competition from other countries that are producing cut flowers more inexpensively and on a larger scale than ever before.

Thanks to its ideal climate conditions, Ecuador and several African countries grow roses that bloom huge petals and last longer than most flowers. Ecuador has diverse conditions that allow the roses to bloom brightly and in many vivid colours. Flowers are believed to lose about 15 percent of their quality each day from their growth. For that reason, long-lasting flowers are an ideal option.

Meanwhile, growth of the greenhouse sector of Armenia, with favourable climatic conditions for greenhouse sector development and increased demand of high-quality flowers in one of the biggest flower markets in the world (Russia) influenced the production of high-quality cut flowers in Armenia such as roses, alstroemeria, lisianthus and others. According to several estimations and feedback from buyers, the lifecycle of Armenian flowers is longer than those grown in Ecuador or other countries. Geographical location and membership of the same economic union, where customs duties are exempted, provide Armenia competitive advantage compared to other countries.

⁷ <https://www.bbc.com/future/bespoke/made-on-earth/the-new-roots-of-the-flower-trade/>

Figure 9. Global export of cut flowers, 2021 (mln USD)

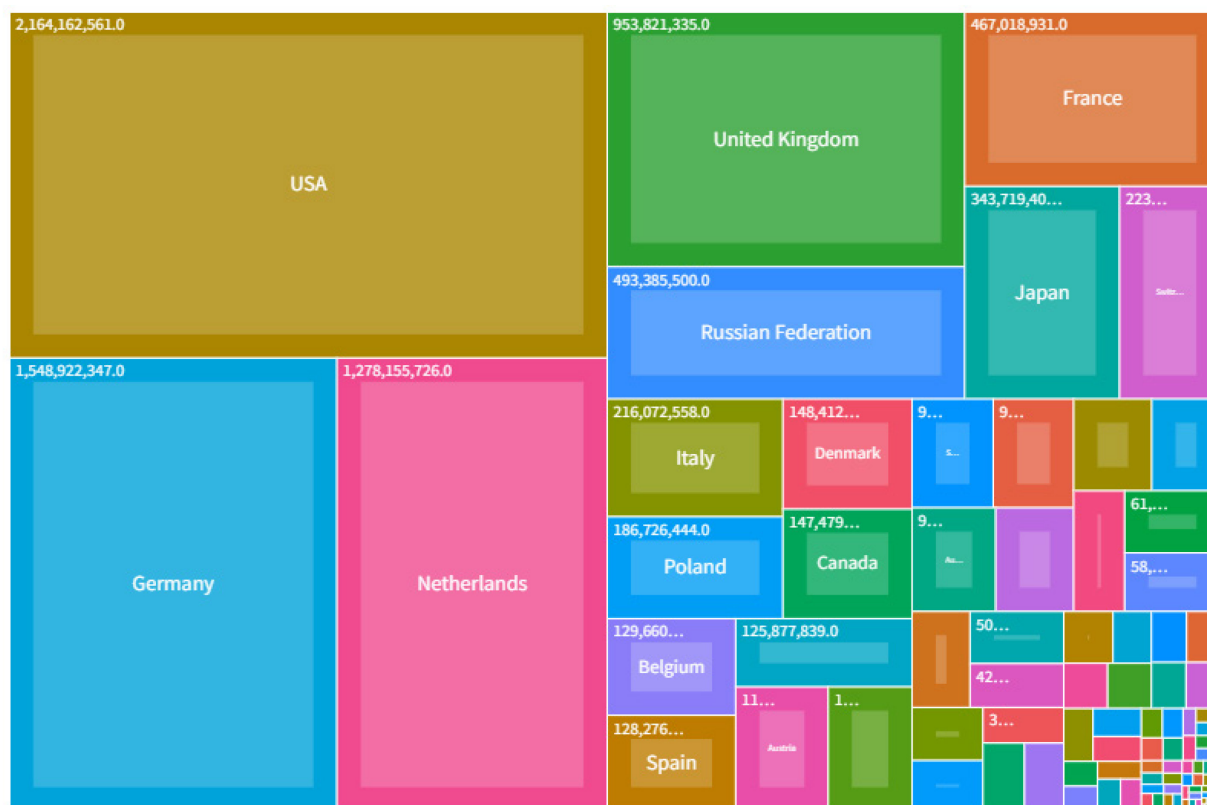


Source: UN COMTRADE 2022

According to UN COMTRADE⁸ data, global exports of cut flowers were worth \$10.8bn in 2021, a 26.8% increase from 2020 (HS 0603 - Cut flowers and flower buds of a kind suitable for bouquets or for ornamental purposes, fresh, dried, dyed, bleached, impregnated or otherwise prepared.) The Netherlands was the top exporter (roses, orchids, lilies and chrysanthemums), followed by developing countries like Colombia (15.9% share), Ecuador (8.6%), Kenya (6.7%) and Ethiopia (2.3%). Ecuador and Colombia exported the most roses and carnations respectively in 2021, Thailand topped the orchid trade while Colombia dominated with lilies and Costa Rica with chrysanthemums. Kenya and Ethiopia are the main suppliers of flowers to Europe, while Colombia and Ecuador are the biggest exporters to North America.

Top importers of fresh cut flowers were almost exclusively developed countries: the U.S., Germany, the Netherlands, the UK and Russia in 2021, the U.S. being the top importer of fresh cut flowers with 21.4% share. Germany is the second biggest importer of cut flowers in the world with 15% share (USD 1.6 bln).

Figure 10. Global import of cut flowers per country, 2021 (USD)



Source: UN COMTRADE 2022

⁸ The United Nations' international trade database

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According to Proficient Market Insights⁹ the top manufacturers / key players in fresh flower market are:

- ▶ Dümme Orange (the Netherlands), <https://na.dummenorange.com/>
- ▶ Syngenta Flowers (the Netherlands), <https://www.syngentaflowers.com/>
- ▶ Finlays (India), <https://www.finlays.net/>
- ▶ Beekenkamp (the Netherlands), <https://www.beekenkamp.nl/>
- ▶ Karuturi (India), https://www.ide.go.jp/English/Data/Africa_file/Company/ethiopia03.html
- ▶ Oserian (Kenya)
- ▶ Selecta One (Germany), <https://selecta-one.com/>
- ▶ Washington Bulb (U.S.), <https://www.tulips.com/>
- ▶ Arcangeli Giovanni & Figlio (Italy), <https://www.arcangeli.it/>
- ▶ Carzan Flowers (Kenya)
- ▶ Rosebud (Uganda), <https://www.rosebudlimited.com/>
- ▶ Kariki (Kenya)
- ▶ Multiflora (South Africa), <https://www.multiflora.co.za/>
- ▶ Karen Roses (Kenya), <https://www.karenroses.com/>
- ▶ Harvest Flowers (UK), <http://harvestflowers.com/>
- ▶ Queen's Flowers (U.S.), <https://www.queensflowers.com/>
- ▶ Ball Horticultural Company (U.S.), <https://www.ballhort.com/>
- ▶ Afriflora (the Netherlands), <https://afriflora.nl/>

Some other major players in the market are Afriflora, Tulips.com, Soc. Agr. Arcangeli Giovanni e Figlio S.A.S. di Giovanni Arcangeli e C., Floralife, ERNST BENARY SAMENZUCHT GMBH, DANZIGER, Sakata Seed America, Flamingo, Kurt Weiss Greenhouses, Inc. and The Marginpar BV. Annex 2 provides the list of the main wholesaler associations of Europe, the leading trade fairs in the European flower industry, and a list of several (online) registries through which buyers can be found.

As a member of the Eurasian Economic Union (hereinafter EAEU), it is logical that Armenian producers will first of all consider the market of member countries as the main export destination. Considering the existing historical links as well as profound knowledge of cultural differences of this market, Armenian producers and exporters successfully operate in this market. One of the important players in the EAEU market is the Russian Federation, which is one of the top five importers of fresh cut flowers in the world.

Though there is no data available on import of flowers from Kazakhstan in 2021, the data from other countries of this union (except Armenia), show growth of the demand. The exception is Belarus, where the import of cut flowers reduced by more than five times in 2021, which is the result of sanctions imposed in 2020 and 2021. Russia is the biggest importer of cut flowers in the EAEU market.

Table 10. Import of flowers by the member countries of the EAEU in 2020-2021, thousand USD

Flower	2020				2021			
	Russia	Belarus	Kazakhstan	Kyrgyzstan	Russia	Belarus	Kazakhstan	Kyrgyzstan
Roses	133,568.4	199,400.2	20,736.3	1,455.8	253,081.5	35,150.9	-	2,305.1
Carnations	14,817.3	23,290.3	647.7	49.5	37,108.0	4,392.2	-	23.2
Orchids	2,690.4	2,144.8	137.1	-	4,740.8	424.3	-	2.4

⁹ <https://proficientmarketinsights.com/>

Flower	2020				2021			
	Russia	Belarus	Kazakhstan	Kyrgyzstan	Russia	Belarus	Kazakhstan	Kyrgyzstan
Chrysanthemums	46,582.6	64,269.6	3,439.8	42.9	94,360.0	11,653.0	-	72.2
Lilies	4,027.7	4,573.4	512.9	288.4	6,759.1	749.3	-	5.3
Cut flowers other than roses, carnations, orchids, chrysanthemums or lilies	69,249.4	52,077.1	3,717.3	341.2	96,471.8	9,464.0	-	85.2

Source: UN COMTRADE 2022

Roses are the main type of flowers that have the highest demand in the EAEU countries. More than USD 290 mln roses were imported by the member countries of the union (except for Armenia and Kazakhstan¹⁰) in 2021. Russia is the biggest importer of roses in the EAEU market, with an import value of more than USD 250 million. As it can be seen from Table 10, the share of Belarus drastically decreased because of the sanction imposed on this country in 2021. However, Belarus continues to be the second highest importer of roses and cut flowers in the EAEU region.

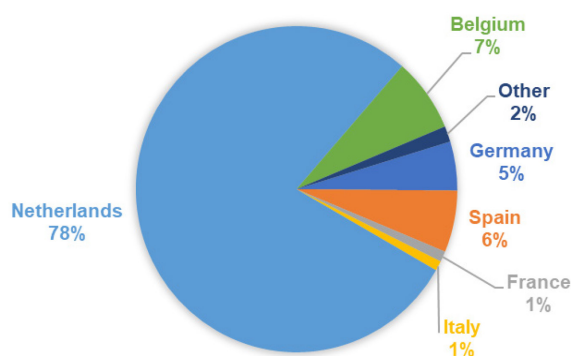
The second type of flower which has the highest demand in the market is chrysanthemums. More than USD 106 mln were spent by three countries of the EAEU for the import of chrysanthemums, Russia being the leader in this import. Import of cut flowers other than roses, carnations, orchids, chrysanthemums or lilies, that include alstroemeria, anthuriums etc. amounted to USD 106 mln in 2021.

Main exporters of roses to the Russian Federation were Ecuador (USD 173mln), Kenya (USD 45 mln) and the Netherlands (USD 12mln) in 2021. Armenia was the 6th biggest exporter of roses to the Russian Federation (USD 3.7mln). According to research based on the data of UN COMTRADE, the average price for a rose exported from Ecuador, Kenya, the Netherlands of Columbia was equal to USD 7.5-7.6 in 2021, while the average price for a rose exported from Armenia was USD 3.6. This can be explained by the customs duty preference that has Armenia as a member of the Eurasian Economic Union. Ecuador, Kenya, Colombia and the Netherlands were the biggest exporters of roses to Belarus and Kazakhstan as well.

Unlike roses, chrysanthemums were mainly imported from the Netherlands. Other European countries such as Spain and Italy were considered biggest exporters of chrysanthemums to Russia as well. As regards the carnations, main exporters are Colombia, Ecuador, Turkey and the Netherlands. As regards the export of cut flowers from the member countries of the EAEU, these capacities are very limited. Moreover, the trade

is mainly between each other with Russia being the main trading partner of these countries.

Figure 11. The European market for cut flowers



Variety of flowers consumption is mostly based on colour, stem lengths and long vase life. However, there are varieties of flowers that don't have a demand in this market. In this market, the high season is considered from March to October, when main national and international holidays happen (international women day, holidays in May, etc.)

The European market for cut flowers was estimated at around USD 16 billion in 2021 (calculations based on

¹⁰ At the time of the preparation the report data for Kazakhstan were not available

data of Astute Analytica). The European market for cut flowers market is segmented into type, application, and country. Based on flower type, the market is segmented into rose, carnation, lily, chrysanthemum and gerbera, and others. Import of cut flowers to the European Union (EU) increased between 2017 and 2021. The Netherlands (78%), Spain, Belgium and Germany are the main destinations of flower imports in the EU (see Figure 11).

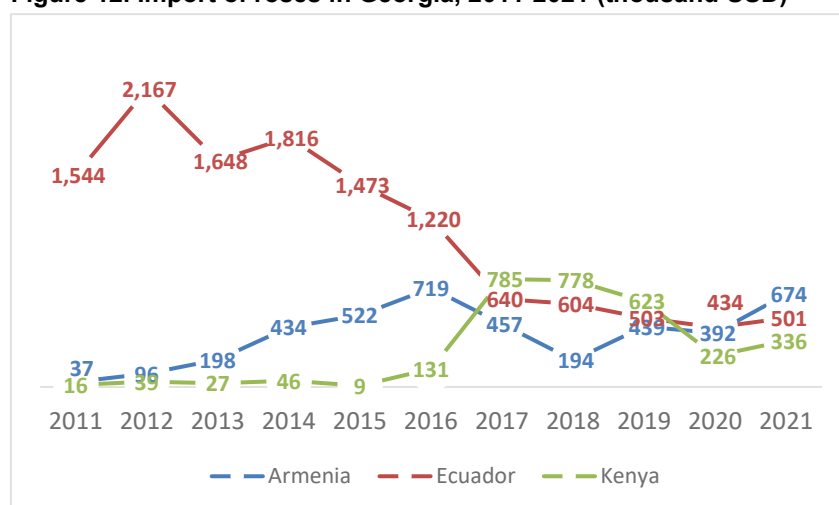
The Netherlands is an important trade hub for cut flowers in the European market. Here is located the Royal FloraHolland - one of the largest auction companies in the world. According to the annual report of the auction, “product turnover in the marketplace amounted to € 5.6 billion, an increase of 21% in comparison to 2020. In 2021, 11.7 billion flowers and plants were traded, 3% more than in 2020. Royal FloraHolland’s operating income was 15% higher than in 2020, mainly due to an increase in product turnover as a result of higher prices. This contributed to a positive result after tax of € 6.5 million, whereas there was a loss of € 5.8 million in 2020.”¹¹

The most imported type of flowers in the EU is rose. The rose segment held the largest share in the European cut flowers market. Their import share as a percentage of the total cut flower imports is estimated to be 63% in 2021. The leading suppliers of flowers to the EU market in 2021 were Kenya (USD 455 million), Ecuador (USD 296 million) and Ethiopia (USD 186 million).

Roses are sold as mono bunches, in bouquets or as single stems. The most important colours are red, pink and white. Roses are often bought as a present. Consumers in Germany, Belgium, the Netherlands and Denmark buy flowers more often for their own use. In countries such as Poland, the Czech Republic, Austria and France, the majority of flowers in volume are bought as presents.

Flowers exported to the EU must comply with EU legislation on plant health. The EU has laid down phytosanitary requirements to prevent the introduction and spread of organisms harmful to plants and plant products in the EU. Flowers imported to the EU must be accompanied by an official phytosanitary certificate guaranteeing the phytosanitary conditions of the plants and plants products, as well as that the shipment has been officially inspected, complies with statutory requirements for entry into the EU, and is free of quarantine pests and other harmful pathogens. Phytosanitary certificates are issued by the relevant national authority of Armenia - Food Safety Inspection Body of the Republic of Armenia.

Figure 12. Import of roses in Georgia, 2011-2021 (thousand USD)



Source: UN COMTRADE 2022

Georgia traditionally is considered as one of strategic and important trade partners of Armenia. Import of cut flowers to Georgia equalled USD 2.2mln, with roses having the highest share in this import: more than USD 1.6mln in 2021. Armenia was the biggest exporter of roses to Georgia in 2021, followed by Ecuador and Kenya.

Moreover, import of roses from Armenia has a tendency to grow in the recent five years, while import from Ecuador and Kenya is decreasing. Our analysis has also

¹¹ See <https://np-royalfloraholland-production.s3-eu-west-1.amazonaws.com/8-Over-ons/Documenten/Royal-FloraHolland-Annual-Report-2021.pdf>

identified an interest from Georgian importers toward Armenian flowers, in case it will be possible to identify trusted partners producing high quality of products.

Though Armenia does not have diplomatic relations with **Turkey**, this market is important for analysis as well, as Turkey is considered not only as a potential competitor for Armenian cut flower producers, but also, as a buyer of flowers from Armenia. Turkey is not a big importer of cut flowers. In 2021 Turkey imported around USD 3.3 million cut flowers, which is a bit more than in 2020 (USD 2.9mln). The country imports mainly roses (USD 1.8mln or 225,524 items) and chrysanthemums (USD 467 thousand), both from the Netherlands. Meanwhile, Turkey is a big exporter of carnations (almost USD 53.5 mln), the third biggest exporter after Colombia and the Netherlands. Main export markets are the Netherlands, UK and Bulgaria. Carnations make almost 90% of the flower exports of Turkey. The remaining 10 percent are roses (USD 62.3 thousand), chrysanthemums (USD 19.2 thousand) and other types of flowers. This means that Turkey is not a big competitor for Armenian cut flower producers (particularly for producers of roses and chrysanthemums). Moreover, they can become importers, if the border between Armenia and Turkey opens.

As of the beginning of 2021 over 7,800 hectares of lands (including greenhouses and farms) in **Iran** were under cultivation of flowers and ornamental plants¹². In 2021 the export of Iranian cut flowers amounted USD 6.9mln, a bit higher than in 2020 and almost three times less than in 2019 (USD 21.5mln.) According to the data of the International Trade Center, Iranian flowers and ornamental plants were exported to 28 different countries in the mentioned period, Iraq being the main destination of the export (76% or USD 5.3mln.) China, Turkmenistan and Germany were also among the top destinations for Iranian flowers with USD 583 thousand, USD 406 thousand and USD 124 thousand of exports respectively. Export of dried, dyed, bleached, impregnated or otherwise prepared cut flowers and buds, of a kind suitable for bouquets or for ornamental purposes (HS code 060390) constitute the biggest part of the cut flower export (85%), followed by roses with the total export volume of USD 883 thousand. In 2022, the approximate price range for Iranian fresh cut flowers is between USD 7.38 and USD 6.8 per kilogram¹³. Iran produces and exports almost 70% of the world's demand for Damask Rose, big portion of which goes for internal consumption and production of essence, rose water, cooking purposes as well as for decor.

According to the data available in the open sources, "Iran's domestic flower demand stands at 2.25 billion stems per annum¹⁴". However, according to the data of the International Trade Center no import of cut flowers (HS 0603) were registered since 2017. This is mostly explained by the sanctions applied to Iran, which makes it difficult to transfer money and even purchase quality fertilisers.

The Iranian Agriculture Ministry's Greenhouse Development Program is one of the priority programmes, which aims to increase productivity, efficiency, and water consumption management in the agriculture sector. In the framework of this programme, new greenhouse estates will be set up in Siahkal, Masal, Shaft, Rezvanshahr, and Anzali provinces, where different types of vegetables, ornamental flowers, apartment flowers and cut branches of flowers, medicinal plants, and uniquely shaped fruits would be cultivated. Roses are grown predominantly in the Tehran province, Yazd province, Fars province, Isfahan province, Kerman province, Kermanshah province, and Mahallat city of Markazi province. According to different estimations, there are around 150 hectares of greenhouses for cut rose production.

Nevertheless, Iran can be considered as one of export destinations for Armenian flower producers, taking into consideration the existing historical relations between two countries, the Interim Agreement leading to formation of a free trade area between the Eurasian Economic Union and its Member States and the Islamic Republic of Iran signed in 2018 as well as the national holidays celebrated in Iran, where the high number of flowers are traded (e.g. the Iranian New Year - Nowruz festival, Mather's day (January), Father's day

¹² <https://www.tehrantimes.com/news/450635/Exports-of-cut-flowers-ornamental-plants-exceed-5m-in-Q1>

¹³ <https://www.selinawamucii.com/insights/prices/iran/fresh-cut-flowers/>

¹⁴ <https://financialtribune.com/articles/economy-business-and-markets/77330/iran-s-flower-industry-blooming>

(February) etc.) The Iranian customer, according to our research from open sources, has high expectations. They like tall stems, large-sized flower heads, with red, white, and pink being favourite colours. Bicolours and soft tones such as jasmine and light purple are new trends in the Iranian market.

Each year the Iranian Society for Ornamental Plants, the Ornamental Plants Research Centre and Iran's Ministry of Agriculture organise the National and International Congress of Flower and Ornamental Plants¹⁵. The Congress aims to promote knowledge and expand communication between national and international experts and researchers in the field of flower and ornamental plants. Establishing interaction and communication between experts, professors, manufacturers, students and activists of the flower industry and ornamental plants is one of the goals of the congress. The Congress encourages cooperation among manufacturers, promotes commercialization of products. It is a place, where Armenian producers can present their experience of flower cultivation, share knowledge on greenhouse production and establish business contacts with potential buyers and investors interested in the flower industry. The Government of Armenia could play an important role by taking the leading role in negotiations with Iranian partners for ensuring market access for Armenian producers.

The Middle East (ME) market is one of interesting markets, covering the Western Asia and Egypt. It includes 19 countries among which 13 countries are part of the Arab World with 315 mln consumers. The Middle East countries are characterised with easier access and low taxation than the EU market for the importers besides its diversified population, which makes it an attractive market for most producers. It is expected that this region will grow economically and will have a high growth of population in the coming years. This market is attractive, as it pays more attention to the quality and origin of products and will continue to do so, which can be considered as an alternative high value market for Armenian producers.

The United Arab Emirates (UAE) is the major commercial, logistic and tourism hub in the region. Kuwait and Qatar could be interested as well, as they are members of the Gulf Cooperation Council and have almost the same import/export policies as UAE. Iran is the closest Middle East country to Armenia. Nevertheless, taking into consideration closed foreign trade policy, several restrictions on agricultural products and limited information on the country's preferences, the market is currently considered as less interesting for Armenian flower producers.

UAE has a stable macroeconomic environment, good infrastructure and ease of access to finance. Moreover, "the UAE is increasing its presence on the world stage as a major hub for the flowers trade. In particular, Dubai has turned into a busy botanical trading hub for flowers, live trees, seedlings, roots and bulbs. The Dubai Flower Centre¹⁶ at the Dubai International Airport is currently considered as the most modern logistics centre for the ME's flowers and plants market."¹⁷ This is why the market of Middle East countries, and particularly the market of UAE has been researched in the framework of this analysis.

The market of the UAEs is very specific. There is a high demand for tropical flowers in this market, due to the long vase life of these flowers. In this market new products that surprise consumers are valued accompanied with novelties and less-known varieties. However, traditional flowers, such as roses, chrysanthemums etc. are in high demand as well. As in the case of other markets, the variety of flower consumption is mostly based on colour and stem lengths.

The import of flowers has been increasing during the past five years, except for a small decline in 2020 due to COVID-19. In 2021, the total amount of import of flowers constituted USD 64.2 mln, 27.5% more than in

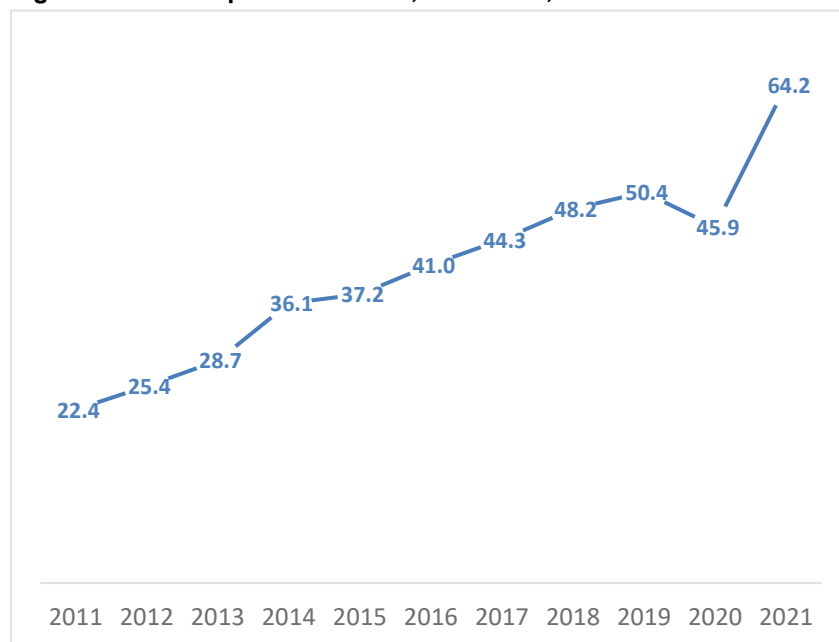
¹⁵ The last event took place on 13-15 September 2022 in Shiraz, Iran

¹⁶ Dubai flower center handles flower imports and exports. It has a capacity of preserving 150,000 tons of flowers and other perishables.

¹⁷ MIDDLE EAST AS AN ALTERNATIVE MARKET FOR ARMENIA: Greenhouse Crops, Berries, Flowers, Nuts and Processed fruits (dried/frozen), International Center for Agribusiness research and Education, 2021

2019. The annual average growth rate of import of flowers for the period from 2017-2021 was 11% (see Figure 13).

Figure 13. UAE import of Flowers, 2017-2021, million USD



Source: UN COMTRADE 2022

The major import partners of the UAE for flowers are the Netherlands, Kenya, Ethiopia, India, Colombia, China, Ecuador (see Table 11). UAE imports mainly form the Netherlands (35.9%) and Kenya (33.3%). The share of Ethiopia, which is the third largest exporter to the UAE is 5.9%.

There are no specific requirements for the packaging of the flowers for import to the UAE market. No specific labelling requirements exist as well. There are no specific phytosanitary requirements for import of flowers to this market and the phytosanitary certificate issued by

the relevant body of Armenia is enough to export flowers to the UAE market.

Table 11. Flowers (HS 0603) import structure of UAE by countries

Country	Trade Value (USD)	Share in Flower Imports (%)
Netherlands	23,043,910.0	35.9%
Kenya	21,381,386.0	33.3%
Ethiopia	3,779,533.0	5.9%
India	3,532,170.0	5.5%
Colombia	1,919,926.0	3.0%
South Africa	1,763,156.0	2.7%
Ecuador	1,641,992.0	2.6%
China	1,625,456.0	2.5%
Israel	1,225,007.0	1.9%

Source: UN COMTRADE, 2022

There are no specific provisions on **quality grade standards** for cut flowers as well and the well-known standards available in the international market (for example quality control used in Dutch auctions) are applied in the country.

Considering the position of UAE as a major hub for regional food trade, as well as the huge demand for exotic and long-lasting flowers, we think that Armenian cut flowers have a potential to enter this market. Such kinds of flowers have high prices and the cost of shipment by air cargo can be justified

for Armenian producers. Using the air cargo will give an opportunity to avoid unpredictable closes of relevant border crossing points at the border of Russia and damage of cut flowers.

Key trends: The proliferating demand for flowers for decoration for various occasions is a key factor in the floriculture¹⁸ market. Worldwide, flowers are used at the personal and professional front for decoration, aesthetics, and to exchange greetings. The adoption of newer technologies and more precise management in commercial floriculture has led to higher crop yield. The use of modern farm practices has also led to increased profitability for farmers engaged in floriculture: the profit of floriculture products per unit area is higher over other agriculture products. This is luring farmers to switch to floriculture.

¹⁸ Floriculture, also known as flower farming, is a discipline of horticulture that is concerned with the cultivation of flowers. In other words, floriculture is concerned with growing and marketing ornamental flowers.

Furthermore, the rising popularity of Ayurveda and other native therapies is stoking the demand for floriculture products. Flowers such as rose, jasmine, and tuberose are used in the manufacture of essential oils and other Ayurvedic formulations¹⁹.

In traditional markets such as the United Kingdom, Germany and Scandinavia, the demand for roses that are certified as **socially responsible and environmentally friendly** is increasing. Many EU retailers require suppliers to comply with production standards that involve **Good Agricultural Practices** or environmental and social standards, including MPS-ABC, GlobalG.A.P., Fairtrade and ETI²⁰. Large retailers often ask for a variety of certificates. Compliance with these schemes can increase demand for Armenian cut flowers in foreign, particularly European markets.

Quality is a prerequisite for supplying to the EU market. Good quality is important in every market channel, also for low-priced flowers. A vase life of approximately seven days is often regarded as the minimum.



Data Bridge Market Research²¹ forecasts that the floriculture market will project a compound annual growth rate of 8.6% during the forecast period of 2021-2028 reaching USD 80.5 billion in 2029. Growth and expansion of e-commerce industry especially in the developing economies, rising inclination of population towards gardening, rising advancements in the biotechnology industry are the major factors attributable to the growth of the floriculture market. This means that the floriculture market value, which was USD 3.65 billion in 2020 will climb up to USD 7.062 billion by the year 2028²².

Growing awareness about high profits associated with cultivating ornamental plants will emerge as the major factor fostering the growth of the market. Also, growing demand for cut flowers owing to their sweet fragrance and beauty is another important factor fostering the growth of the market. Growth in the expenditure for research and development proficiencies by the biotechnology industry and increasing personal disposable income will further create lucrative and remunerative growth opportunities for the market.

¹⁹ <https://www.transparencymarketresearch.com/floriculture-market.html>

²⁰ <https://www.cbi.eu/market-information/cut-flowers-foilage/buyer-requirements>

²¹ See <https://www.databridgemarketresearch.com/reports/global-floriculture-market>

²² This prediction was done before the war in Ukraine. It is clear that the war has impacted on the global flower market and its trend, because of imposed sanctions on Russia and Belarus. However, we think that this impact is not so huge and calculations of the Bridge Market Research still are achievable.

However, high investments and maintenance costs are the major factors that will pose a major challenge to the growth of the market. Also, allergies to plants and flowers to some individuals will further slowdown the market growth rate. Also, the Russian invasion of Ukraine, sanctions against Russia and Belarus and logistic issues arising from these actions will further derail the market growth rate.

2.3 IMPACT OF THE WAR IN UKRAINE ON THE FLOWER MARKET

With the industry just recuperating from the ravages of covid-19 pandemic, another setback has just hit the global flower industry. The war in Ukraine, sanctions against Russia, disruption of the logistics channels of Ukraine and Russia have impacted the supply chain of flowers in the world. The suspension of air traffic in both Ukraine and Russia simply means no exportation of flowers to markets in both countries from Europe or African countries.

Moreover, fertilisers are mainly produced in both Ukraine and Russia. More disruptions are likely to set in and further strain an already struggling sector, where the cost of production has been greatly high due to the existing cost of fertilisers in Kenya.

According to Royal FloraHolland after a great start in 2022, the demand for flowers and plants fell sharply at the end of February due to the situation in Ukraine. Energy prices were already high at the end of 2021. They rose to extreme heights from late February onwards. According to the CEO of the auction, Steven van Schilfgaarde: “There is a drop in demand, considerable uncertainty in the market and falling consumer confidence. The necessary energy transition cannot be achieved overnight, while high costs leave growers with little room to invest. The international position of the Dutch floriculture industry is at stake. Without government measures, I foresee lasting damage being caused to our sector.”²³

In the beginning of November 2022, DutchNews.nl reported that “the world’s biggest orchid grower, SO Natural (the Netherlands), was being forced to stop growing blooms because of mounting gas prices”. The company produces more than 14 million orchids a year for supermarkets and shops across Europe. But despite substantial investments, new owner Watertoren Hazerswoude is pulling the plug on the heat-intensive orchid trade, citing that growing orchid is no longer possible with current and future gas prices²⁴.

In October 2022, one of the Dutch biggest plant breeding companies said it will close its doors at the end of March next year because of the impact of high energy prices on greenhouse-based cultivation. Plantise, which specialises in growing vegetables and decorative plants, will shut down its Dutch operations on April 1, 2023. According to DutchNews.nl, experts predict the high gas prices will lead to a major shakeout in the Dutch greenhouse and horticultural sector²⁵.

In fact, the forecasts of experts become reality in the Netherlands. Figures published by the Dutch Association of Wholesalers and market analyst Floridata and published in FloraCulture International²⁶, show that the total exporter revenues have dropped in the first three quarters of 2022, with Dutch global flower and plant exports declining by 2 per cent to EUR 5.6 billion. As it was mentioned by the chief executive of VGB “Shipments to our major export destinations Germany, the UK and France are down. Poland and Italy only show insufficient growth. The skyrocketing gas and electricity prices have a significant impact on our industry, forcing growers to make difficult decisions about whether to plant less or leave the greenhouse empty altogether. This situation causes pressure on the availability and variety of ornamentals. At the trader’s level the situation is also dire with companies having to pay significantly more for gas and electricity.”²⁷

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²³ <https://www.hortibiz.com/newsitem/news/royal-floraholland-reports-on-exceptionally-good-year/>

²⁴ <https://www.dutchnews.nl/news/2022/11/worlds-biggest-orchid-grower-call-it-quits-over-high-gas-prices/>

²⁵ <https://www.dutchnews.nl/news/2022/11/worlds-biggest-orchid-grower-call-it-quits-over-high-gas-prices/>

²⁶ <https://aiph.org/floraculture/news/dutch-flower-and-plant-exports-decline-by-2-per-cent-in-the-first-three-quarters-of-2022/>

²⁷ <https://aiph.org/floraculture/news/dutch-flower-and-plant-exports-decline-by-2-per-cent-in-the-first-three-quarters-of-2022/>

According to Wageningen University and Research “Dutch greenhouses can’t do without gas yet”. Greenhouses consume nine per cent of the natural gas in the Netherlands and increase of prices of natural gas heavily impacts the operation of greenhouses. Greenhouses use a lot of gas and electricity, especially in winter, for heating and lighting the plants. Prices have recently risen rapidly, especially since the outbreak of the war in Ukraine and the reduction in gas supplies from Russia. Prices for gasoline, diesel, and LPG in the Netherlands now equal EUR 1.940 for diesel, EUR 1.053 for LPG and around EUR 2 for gasoline. Today, 38 percent of greenhouse horticulturalists expect to have difficulty paying their bills by the end of 2022. Some growers decided last winter to heat less, switch off the lights or not to use their greenhouses²⁸.

The Ministry of Economic Affairs and Climate Policy of the Netherlands is working on a shutdown plan for Dutch businesses, should real shortages occur. The plan includes compensation for greenhouse horticulture companies that voluntarily reduce their energy consumption. This will enable growers to assess what would be the most economically sound course of action: to continue growing plants through the winter or to take a break²⁹.

The problems mentioned above are recorded not only in the EU countries but in other parts of the world as well. For example, Kenya has lost 25 per cent of its horticulture market in the European Union following Russia's invasion of Ukraine early in 2022. The rise in the cost of living caused by the war has affected consumers' purchasing power, leading to a drop in demand for cut flowers and vegetables in the EU market.

In the first half of 2022 the flower market of the Russian Federation had serious issues. The sanctions against Russia, fluctuations of the exchange rates, increase of the costs for purchasing and delivering flowers by 40-60 percent influenced the local price of flowers in Russia. In the period from 14 February to mid May 2022, the delivery of a rose with a stem height of 50 centimetres has risen in price from 82 to RUB 112, and for a 60-centimetre one - from RUB 94 to 125. Chrysanthemum with the small head previously cost RUB 84, in May - RUB 109; with the large head - RUB 106 and 139, respectively. Gerbera in early February was sold for RUB 102, in May - for RUB 144. Lily has risen in price from RUB 275 to 342; alstroemeria - from RUB 74 to 93; carnation - from RUB 35 to 44.

This inevitably brought an increase in retail prices. So, for example, for a rose with 50cm stem, the retail price has changed from RUB 175 to 225, for 60cm ones - from RUB 94 to 250. Chrysanthemum with a small head was sold for RUB 155, in May 2022 it was RUB 205; for large heads, these are RUB 195 and 230, respectively. Gerbera rose in price from RUB 185 to 210, lily - from RUB 425 to 635, alstroemeria - from RUB 160 to 180, carnation - from RUB 75 to 90.

In this situation Armenia increased export of flowers to the Russian market. Though there is no final statistical data for 2022 yet, according to the Federal Service for Veterinary and Phytosanitary Surveillance of the Russian Federation, around 5.5 mln flowers are imported to the territory of the Stavropol Krai in the first 10 months of 2022, of which 5,387,166 were roses, 12,060 - gerbera. Other types of flowers were also imported, but in small numbers. According to this body, import of Armenian flowers to the Russian market increased by around 3 times.

According to the analytical center Akcent, Armenia will quickly occupy the Russian flower market. It is noted that the former channels of European supplies are closed - there are almost no flowers imported from Italy, Spain, Denmark, Germany and Belgium. Flowers from Ecuador, Kenya, Vietnam become expensive due to difficulties in logistics.

²⁸ <https://www.hortibiz.com/newsitem/news/energy/wur-greenhouses-cant-do-without-gas-yet/>

²⁹ <https://www.hortibiz.com/newsitem/news/energy/wur-greenhouses-cant-do-without-gas-yet/>

3 CUT-FLOWER PRODUCTION OF ARMENIA

3.1 ADVANTAGES OF CUT-FLOWER PRODUCTION IN ARMENIA

In Armenia, the cut flowers (flowers that are grown for selling on the local and/or foreign markets) are grown mostly in greenhouses, using both soil and hydroponic growing systems. The most demanded cut flowers for local and export markets are roses, gerbera, alstroemeria (Peruvian lily), lisianthus (Eustoma) and carnation. Production peculiarities of several types of flowers grown in Armenia are provided as an Annex 2 to this report.

Compared to many other countries due to favourable climate conditions in some regions of Armenia which ensure long daily light and proper temperature through the whole production year some types of flowers bloom huge petals, have very good quality and long vase life. According to assessments the average daylight in Armenia is comparably higher in Armenia than in other countries, which creates favourable conditions for construction of greenhouses and production of flowers. Nevertheless, different regions of Armenia are specialised in production of cut flowers, depending on the type of a flower and required environment.

A relative humidity of 60-70% and altitude of the growing area are also important factors for flower production. More than 76% of territory of Armenia is at the altitude of 1,000-2,500m above sea level with the humidity norm between 67% to 72%. These climate conditions make the country one of the preferred places in the world for flower production.

The types of flowers having the huge demand in the market (rose, gerbera, lisianthus, alstroemeria) are grown in greenhouses. Despite of the geographical and climate conditions, easy access to gas, water and electricity and their prices considered as important prerequisites for greenhouse operation. Moreover, according to producers, tariffs of electricity and gas make the essential part of the cut flowers production costs because of the need for heating and ventilation of the greenhouses during the flowers production cycle.

Armenia is rich with water resources which generate from precipitation, surface waters and groundwater inflows. It is important also to emphasize the quality of water: the mountain waters of Armenia are reach with different minerals, that are important for plant, including flower growing. In addition to the easy access to the electricity and gas in all regions of Armenia (ensured by the Government support programmes as well), the tariffs for these resources are comparatively low in Armenia, considering the current prices in many countries (including European).

As agriculture is one of the top priority sectors of the economy, there are many government support programmes promoting horticulture (including greenhouse construction, cut flower production, etc.) development in Armenia. These and above-mentioned prerequisites created favourable preconditions for cut flower sector growth potential in Armenia.

The Netherlands, Kenya, Ecuador and Ethiopia are the leaders of cut flower production in the world because of the high quality of produce. According to many experts' opinion quality of Armenian flowers are compatible with the Dutch and Ecuadorian flowers and higher than Kenyan and Ethiopian ones. Moreover, costs for production in Armenia is lower than in the Netherlands and Kenya. Alongside with this, there is a consistently growing demand for cut flower in the EAEU (particularly Russian and Belorussian) and Middle East markets, where Armenia has easy market access. Moreover, Armenia has a preferential and duty-free access to the EAEU market.

3.2 MAIN TECHNOLOGIES APPLIED IN THE SUB-SECTOR

3.2.1 Greenhouse structures and sizes

Greenhouses come in different shapes and sizes. A commonly used typology is distinction between low-tech, mid-tech and high-tech greenhouses. Low-tech greenhouses are usually covered with polyethylene film and have passive climate control. Mid-tech greenhouses usually have polyethylene film structures with limited environmental control. High-tech greenhouses mainly have glass structures with a high degree of active climate control and automation.

In Armenia, there is a wide range of operating greenhouses, starting with the small-scale tunnel plastic models to modern glass greenhouses, where yields are usually higher with a better quality and climate control systems.

However, very few greenhouses in Armenia are covered by glass. Reasons for not using glasshouses in Armenia are different and mainly relate to costs of construction and operation of such greenhouses. Particularly:

- ▶ glasses are expensive compared to polyethylene film
- ▶ in winter glasshouses require additional costs for heating
- ▶ in summer or hot season glasshouses require additional costs for cooling and/or shading
- ▶ the glasses can be damaged by hail and will require additional costs for renovation.

Another reason for avoiding use of the glass greenhouses is that the average daylight is comparably higher in Armenia than in other countries and there is no need of having glasses.

Greenhouses with polyethylene film are mainly built in one-layer or two-layer. In the latter case, air is inflated between two layers, which provides additional isolation and improves the structure's ability to retain temperatures through cold nights, withstand hail and heavy snow.

According to the seasonality feature, there are two types of greenhouses operating in Armenia: heated (winter) - hothouses and unheated (early spring and late autumn) - greenhouses. Majority of small low-tech greenhouses are unheated greenhouses. Depending on the heating method, there are greenhouses heated by water pipes or air heating. Different types of air heaters and thermogenerators are used (which use steam, boiled water, gas or electricity).

In general, two types of greenhouses are constructed in Armenia: tunnel (single-flight) and modular (multi-flight) greenhouses. These greenhouses are either soil based or hydroponic greenhouses. The main difference between growing flowers in conventional - soil greenhouse and hydroponic one is the speed of flower growing, effectiveness and quantity and quality of the yield received in hydroponic conditions.

Hi-tech or mid-tech (some of them) greenhouses in Armenia are hydroponic greenhouses, though initially it requires bigger investments, it also ensures high profitability. Small greenhouses are mainly soil based greenhouses, but many flower growers gradually switch to hydroponics and drip irrigation system.

According to the sizes the cut flower greenhouses can be divided in three categories: small – less than 1000 sq.m., middle - from 1,000 sq.m. up to 5,000 sq.m., and big - 5,000 sq.m. and bigger.

The big cut flower greenhouses in Armenia are built using Dutch or French construction, while mid-sized and small greenhouses either newly constructed or renovated the old soviet type greenhouse using Chinese, Turkish or Iranian structures.

As to the cover of the greenhouses, three types are used: polyethylene, polycarbonate and glass. Polyethylene films existing in the Armenian market are produced in different countries, such as Russia, Israel, Greece, China and Iran. Prices of polyethylene films vary from USD 0.4 to USD 1 per sq.m. As to polycarbonates, it is possible to find Chinese, Russian, Italian and Swiss polycarbonates in the Armenian market. The latter are superior to other polycarbonates in their physical and other properties. The price of 1 sq.m. of high-quality polycarbonate is higher than the price of ordinary glass.

3.2.2 Heating, irrigation and ventilation systems

For the purpose of growing high-quality cut flowers, the greenhouses need to have modern and advanced systems that will provide the possibility of total technological control over all cycles of flower production. These are high technological systems aiming to control the essential conditions for efficient and high-quality flowers' production including control over proper water-substrate receipt and pH control as well as to keep proper ventilation regime in the greenhouse.

The big high-tech and some mid-tech cut flower greenhouses in Armenia ensure maintenance of the required temperature, lighting, humidity and CO₂ in accordance with the specific needs for a specific variety using automatic systems (mainly Priva brand). Many mid-tech greenhouses use the automatic system which is made in Kazakhstan and is three times cheaper than Priva.

Usually, greenhouse heating in Armenia is performed through a gas fired boiler with pipes or air heating equipment (so called air gun). However, this type of heating becomes expensive because of changes in gas prices. Because of this, the Armenian greenhouse operators are looking for cost-effective approaches and techniques.

Due to fluctuations in weather conditions as well as because of hot climate in summer, many greenhouses use cooling/ventilation systems. Some of the techniques for cooling during high temperature is fogging or shade cloth, which is used to cover the top of the greenhouse. In summer, greenhouses in Armenia also use special shading agents that reflect high levels of solar energy.

In the mid-tech greenhouses, the cooling, ventilation and humidity regulation of the greenhouse are done with ventilators installed on the front and rear parts of the greenhouse. The ventilators are working automatically based on the temperature and humidity level measured by the system. Very often Chinese ventilators/cooling systems are used, as the prices and maintenance costs of these systems are comparatively cheaper.

In low-tech greenhouses cooling and ventilation (including humidity regulation) are done through the windows either on the roof of the greenhouse or on the front and rear upper parts. During the day greenhouse operators open those windows for a certain time period. This is done manually or in some cases on an automatic basis.

Though the number of sunny days, and as a result, solar capacity potential in Armenia is higher, solar panels are not widely used by greenhouse operators. The reason for this is the size of the area which is needed for construction of relevant solar photovoltaic systems.

The profile of the average producer of cut flower in Armenia is as follows:

- ▶ mid-size greenhouse (from 1,000 sq.m. up to 5,000 sq.m)
- ▶ medium quality of the greenhouse structure, either constructed or renovated the old soviet type greenhouse using Israeli, German, Iranian, Chinese or Turkish material
- ▶ medium quality of heating system using gas boiler with pipes or air heating equipment (so called air gun)
- ▶ medium quality ventilation systems using Chinese ventilators/cooling systems

- ▶ medium quality drip irrigation system with Iranian or Chinese pipes and Kazakh automation system
- ▶ locally produced seedlings
- ▶ medium quality Russian fertilizers.

3.3 PREFERABLE REGIONS/PROVINCES (AND CONDITIONS) PER TYPE OF FLOWER



The optimum temperature conditions for rose cultivation/production in a greenhouse is 18°C to 27°C with a relative humidity of 60-70%. It also requires from 12 to 14 hours of daily light which is perfectly ensured at pre-mountain and mountain territories of Armenia with the altitude 1,200 m and higher above sea level. All these conditions for rose cultivation naturally exist in **Kotayk, Aragatsotn, Gegharkunik and Tavush** (foothill and hillside territories/zones) regions of Armenia. Therefore, the biggest greenhouses for rose production were established in these regions of Armenia (e.g., Goght village /Kotayk region, Achajur village/ Tavush region) to reduce production costs of artificial maintenance of temperature and humidity in hydroponic greenhouses.

Kotayk province is one of the most preferable provinces, as it has the highest number of sun light during growing season. **Gegharkunik and Syunik** provinces started attracting greenhouse investments just recently, considering their favourable climate condition and availability of proper sun/daily light. In these both regions winter is a bit stronger than in Kotayk province, however the global warming has its influence on the local climate of these regions. Besides, due to low labour cost it is possible to construct flower greenhouses with low operational costs. The temperature in these two regions is lower by 5-7 degrees compared to Ararat or Armavir provinces which enable to cultivate flowers such as rose and carnation using less energy to cool and ventilate the greenhouses during the hot season. Having cultivation of flowers at such mountain altitudes provides also benefits to spend less costs for heating of the greenhouses due to the larger number of sun days and stronger sun rays during the winter season of the flowers production.

Another benefit of having flower production in Syunik province is close proximity to Iranian border which can reduce possible logistic costs in case of exporting of flowers from Armenia to/through Iran.

Ararat and Armavir provinces of Armenia are considered as the main crop production regions predominantly with intensive agriculture. There are also a huge number of greenhouses in these provinces, which are mainly specialized in production of **gerbera, chrysanthemum, lisianthus or carnations**. Temperature in these provinces is higher in summer, nevertheless, the local producers of cut flowers are used to use cooling and ventilation systems to ensure proper temperature regimes during the hot production seasons.

3.4 MAIN OPERATORS (PRODUCERS, INPUT SUPPLIERS, EXPORTERS, MIDDLEMAN, RETAIL/WHOLESALE)

3.4.1 Producers

There are more than 1,000ha of greenhouses operating in Armenia, out of which around 170ha are growing flowers. Distribution of the flower growing greenhouses per province is different. According to the data obtained from different sources, most of the greenhouses with big scale of flower production are located in Kotayk, Tavush and Aragatsotn provinces of Armenia, while in Ararat and Armavir provinces many small- and medium-scale producers are located. Unfortunately, we can say that this is not comprehensive data, because there are many small greenhouses that are not registered in any state or regional body, as well as because of the high growth tendency of the sector. There are also greenhouses that are in the construction stage. According to different sources, more than 20ha of greenhouses are planned to construct in 2022-2023 for flower production.

Annex 1 of the report provides the list of more than 280 greenhouses operating in different provinces of Armenia. This data was received from relevant regional administrations and partner organisations. Again, this is not the comprehensive list of greenhouses, although it lists all high-tech greenhouses currently operating in Armenia.



Rose Art LLC

Rose Art LLC is the leader in production and export of flowers (roses) in Armenia. According to our research, Rose Art operates around 35ha greenhouses. It grows only roses. The main part (more than 90%) of the roses are exported to Russia. They are cooperating with relevant Dutch companies (purchase of seedlings, consultations, etc.) though no export to the Netherlands is registered.



Vard Agro LLC

Vard Agro LLC is a company that started its business with construction of greenhouses for other businesses. Since 2018 they have started their own business of flower production. Currently they produce only roses (2ha). Simultaneously, they provide consultancy, some inputs, etc. to other smaller producers of flowers, as well as support others in sales. Currently they cooperate with small producers of in total more than 10ha greenhouses. Meantime, they continue constructing/reconstructing greenhouses and providing wide range of services to greenhouses.

Ecofruit LLC and Greenhouse LLC

Both greenhouses are located in Tavush province and are specialised in production of flowers (roses). The greenhouses were constructed in 2017 and started operation in 2019. In total, both greenhouses cover 9ha territory, of which 5.5ha are Ecofruit's greenhouses and 3.5ha – Greenhouse LLC. Moreover, 4ha of these greenhouses are glasshouses of Dutch origin (glasshouse of 1st generation). Main export market is Russia.

Avalanzh LLC

The greenhouse operates in Aragatsotn province of Armenia and occupies 4.2ha area. It is specialized in the production of roses. According to the available information, 3ha of the greenhouse is operating according to the Ultra-clima concept.

3.4.2 Input suppliers

Producers of high-quality flowers which are the biggest cut flower greenhouses (mainly roses) are using seedlings imported from the Netherlands. Most of those companies import the seedlings themselves, e.g., Rose Art LLC, Avalanzh LLC, etc. For instance, the Rose Art company, the biggest greenhouse of roses, purchases its seedlings from the Dutch company DeRuiter.

However, the remaining producers, small and medium scale producers, buy seedlings bred (grown) by the local breeders or imported from the Netherlands or other European countries. The same we can say about fertilisers. There are several representatives of seed/seedlings or fertiliser importers, majority of which, that are working with small flower growers, import cheap and low-quality products. However, producers, that are interested in the quality of their product and intend to export, try to order seeds/seedling either from foreign countries or buy from local companies.



Agrotech LLC (<https://agrotech.am/>)

One of these companies is Agrotech LLC, founded in 2014. The company provides high quality products for plant cultivation, as well as agronomic consultation to greenhouse producers, farmers and other people involved in horticulture. Agrotech LLC presents the products of the leading manufacturers from

Europe (including the Netherlands) and from the world to Armenia. The company is the leading supplier of the crop market and covers 95% of the market of the water-soluble fertilizers.



Hrashk Aygi LLC (<https://hrashkaygi.am/eng>)

One of the agricultural companies of Armenia, which suggests to its customers wide variety of chemicals, fertilizers, seeds, farm machineries and garden tools. “Hrashk Aygi” cooperates with different well-known American, Chinese, Russian, German and Italian agricultural companies.

Except companies there are also several individuals that are importing high-quality seedlings and fertilizers from the Netherlands, Spain and other countries. Some of those individuals are officially representing Dutch suppliers.

3.4.3 Exporters and middlemen

Fifty-three companies were involved in the export of Armenian cut flowers in 2021 compared to 24 exporters in 2020. Main export markets are Russia and Georgia. In several cases these are producers themselves, which have contacts in foreign markets and export their products. As regards the small and medium growers, they are involved only in flower growing activities, and export is done by specialised companies.

There are many middlemen in the cut flower market who are operating as individuals, without registration of the business. The middlemen are involved in all the stages of the cut flower sales - retail, wholesale and export. Sometimes, those middlemen are the flower growers who sell in the local market or export also the flowers of other producers (usually from the same region) together with their own flowers.

In the wholesale markets of Yerevan around 70% of the sold flowers are represented by the producers and some 30% by the middlemen.

3.4.4 Retailers/wholesalers

Eighty-four companies were involved in the wholesale trade and additional 15 companies operated as agents involved in the wholesale trade in 2021.

Wholesale trade of cut flowers is done mainly in two cut flower markets located in Yerevan. Working hours of these markets are different. One market, which is located near to Hrazdan stadium, operates 21.00-22.00, while the second market, located on 43 Shirak Street, is open 9:00-11:00 from November to March and 7:00-9:00 from March to November. Prices in the wholesale markets are similar: AMD 1,500 for each truck. Capacities of markets are different as well. The biggest one is the market located on Shirak Street, where, however, according to producers and middlemen, quality of sold flowers is inferior to the quality of flowers sold in Hrazdan stadium.

Retail trade is done mainly through three different channels: directly from the greenhouse, in the flower shops (including on-line shops) and in the wholesale markets. It shall be noted that there are several premium flower shops, mainly in Yerevan, who are selling high-value bouquets from the flowers imported from Kenya or Ecuador. In total there were 976 retailers registered at the State Revenue Committee of Armenia in 2021.

3.4.5 Cooperation with Dutch companies

Dutch suppliers of seeds, seedlings and fertilisers are well known in Armenia, because of the high quality of products and innovative approach (new varieties of flowers, new colours etc.) The Netherlands is famous in Armenia because of its high-tech greenhouses, Dutch technologies and equipment used in agriculture. However, when we speak with medium and small greenhouses, which are not equipped with high-tech and innovative tools, they either have a lack of such information or don't want to buy because of the price. Very often the producers complain that it is not possible to find information necessary to grow flowers and even when they contact to Dutch growers, this information is not open for them.

Dutch companies don't have offices in Armenia and either worked through Russia based branches or directly with Armenian buyers. Even today, after all sanctions against Russia, no new Dutch offices and suppliers were opened in Armenia. It is very surprising, as Armenia has a huge potential of becoming a hub in the Eurasian Economic Union. Instead of this, Dutch flower producers open offices and production in the U.S. or other countries, which don't have preferential economic relations with the 5th biggest flower market in the world.

During discussions and interviews with local operators, the following list of Dutch companies was identified:

Fertilisers / substrates

- ▶ Yara Nederland (<https://www.yara.nl/>)
- ▶ BVB Substrates (<https://www.bvb-substrates.nl/>)
- ▶ Grodan B.V. (<https://www.grodan.com/>)

Seeds/bulbs/seedlings

- ▶ Dümme Orange (<https://na.dummenorange.com/site/en>)
- ▶ Youngplants (<https://youngplants holland.com/en/>)
- ▶ Florensis (<https://www.florensis.com/en-gb>)
- ▶ GreenGarden (<https://www.greengardenflowerbulbs.nl/en/>)
- ▶ DeRuiter (<https://www.deruiter.com/en/>)
- ▶ Petkus Selecta (<https://www.petkus-selecta.com/>)
- ▶ Schreurs (<https://www.schreursgerbera.com/>)
- ▶ Schneider BV (<https://www.schneiderbv.nl/>)

- ▶ HilverdaFlorist (<https://www.hilverdaflorist.com/>)
- ▶ Van Egmond Lisianthus (<https://www.vanegmondlisianthus.com/en/>)
- ▶ Jan de Wit en Zonen B.V. (<https://www.jandewitenzonen.com/en/home/>)
- ▶ Amsonia (<https://www.amsonia.nl/>)
- ▶ Schreurs (<https://www.schreursroses.com/>)
- ▶ IQ Plants (<https://iqplants.eu/>)

Laboratory tests/analysis

- ▶ Groen Agro Control (https://agrocontrol.nl/en/home-en/?avia_forced_reroute=1)

3.4.6 Interest of operators in cooperation with Dutch suppliers, buyers and/or potential investors

Interviews with flower producers, suppliers and exporters showed precise interest toward the Dutch investments. Local businesses are ready to enlarge their capacities, purchase new land, if there are Dutch investors ready to cooperate with them. Moreover, they are ready to produce a high-quality flower, based on quality requirements of the client, if there are Dutch buyers or investors and if they provide quality requirements. Some respondents expressed readiness to construct high-tech greenhouses and apply Dutch technologies, provided there are buyers of their products in the Netherlands or other countries or they will be able to register as a supplier in Royal FloraHolland.

3.5 MAIN OPPORTUNITIES AND PROBLEMS EXISTING IN THE SUB-SECTOR AND SUB-SECTOR DEVELOPMENT POTENTIAL

3.5.1 Problems

Lack of affordable advisory and laboratory services

Many local producers of cut flowers in Armenia are self-educated and most of them learn from their peers, experienced friends or relatives who have been engaged in flower production for a long time. Almost all the interviewees mentioned the lack of professional agronomists and proper advisory and consultation services which drastically impacts on quality and efficiency of cut flower production in Armenia. All of them mentioned the need for the advisory and consultation service from Dutch companies as one of the top priorities. For many producers the advisory/consultancy services are expensive and in some cases the producers do not have access to the needed services.

Another big gap in the sector is absence of easily accessible proper laboratory service for analysis of hydroponic substrate as well as professional advisory service to provide producers with appropriate receipt of the substrate (e.g. proper composition of fertilizers). Basically, the local producers send the three samples (from three different sources: water without substrates, water with substrates and drainage) of water-hydroponic substrate to the Netherlands via FedEx (or similar posting services) for precise laboratory analysis and provision of proper recipes. The laboratory analysis costs AMD 90,000 (about EUR 220) per sample, if it is done in Armenia and plus EUR 250-300 the producers must pay for receiving the recipe of the hydroponic substrate. During one year the middle-sized producers of flowers may apply twice for such a service, while big producers apply for the laboratory analysis every two weeks³⁰.

Production of stable quality and quantity cut flowers

Due to the reasons described in the previous paragraph, the local producers are not able to maintain stable quality and quantity of the produced cut flowers. Very often, the lack of experienced agronomists and availability of affordable advisory and laboratory services result in improper cultivation of the flowers or

³⁰ In general, big producers send their samples directly to the Netherlands

failure in pest and disease control. Because of this, local producers from time to time have low quality harvest or loss of the produce at all.

Another reason for low quality and quantities of the produce is also lack of first-class seedlings and planting materials. The flower breeding local capacity is low and with locally produced seedlings the local producers may have maximum 3 years of flower vegetation/production period and substantial decline of the yield. Therefore, after the 3rd year they have to plant new seedlings.

All the factors described above result not only in higher costs and financial losses during the particular period, but also in long-term and much worse impact - loss of the buyers and business relations, especially in the export markets.

Difficulty in close cooperation with Dutch companies

All the cut flowers producers in Armenia recognize the leadership of the Dutch companies in the sector and the highest quality of expertise, services, inputs and technologies. Armenian producers are keen on learning from the Dutch experts to improve the quality and efficiency of production. They are ready to invest in learning/training programs to develop their capacities and improve the quality of the production. Local producers, especially small and mid-size ones are also very interested in obtaining the Dutch quality seedlings, including new varieties of different flowers, but they do not have access and possibility for importing.

As it was mentioned by several interviewees, they have a problem of cooperation with big Dutch companies which usually impose strict contractual obligations. Moreover, big Dutch companies do not cooperate directly with the Armenian producers, instead they do it through the regional representatives who are based mostly in Russia.

Logistics

The recent lockdowns related to COVID-19 pandemic situation in Armenia and abroad as well as the recent war between Armenia and Azerbaijan have created an uncondusive environment for the exporting of flowers. The exporting opportunity for local producers during 2020 and 2021 was drastically decreased. All the producers, including the big ones (e.g. Goght and Achajur greenhouses, the biggest producers of rose) had to sell their produce only in the local market which resulted in market saturation. During those 2 years all the producers had to sell their produce at very cheap prices. This resulted in miserable income or, in some cases (particularly during the summertime), even in big losses for all. In this situation the small and some mid-size producers suffered the most.

Another serious problem is delays at Upper Lars, a border crossing checkpoint on the Georgian-Russian border located in South Ossetia. These problems negatively impact the import of inputs and export of cut flowers. Due to huge lines of trucks at the Upper Lars checkpoint passing the Georgian-Russian border may last many days and even weeks which shorten the shelf life and quality of cut flowers, which ultimately causes diminishing of the price in the Russian market.

Ensuring transportation of cut flowers in a short period of time is essential for the life cycle of the flower as well as credibility of the producer (or exporter). Many flowers are fragile, and easily bruised, broken or otherwise damaged during transportation. It is important to pack them in such a way that they arrive at their destination in the same condition they were in when they were harvested. In Armenia the distance between the production area and the market places where flowers are sold for local buyers usually is around 30-50 km and small trucks are enough for this transfer. Export (transportation) of flowers to foreign markets, when distances are longer enough, require special approach to flowers and special requirements for transportation conditions.

There are several conditions that need to be kept for ensuring the quality of cut flowers: temperature, light, water supply, safety from damage, etc. Maintenance of these conditions prolongs the life of cut flowers. However, even if all these conditions are kept, duration of transportation is essential for the life of flowers. According to cut flower producers, road transportation mode is usually used for exporting cut flowers to Russia. It is cheaper, but takes several days to reach the buyer. Delays caused by the closure or slow passing (due to long queues) of the Upper Lars border crossing point extends this transportation time sometimes to 20-25 days, which of course impacts on the quality of flowers. Transportation by air is used as well. However, this mode of transportation is more expensive than road transportation and sometimes not suitable (very often producers need to wait several days to find free space in aircraft).

These cases are for exportation to Russia. In the case of European or Middle East markets, exportation by road is very difficult and is costly in terms of time and money.

For instance, according to three cut flower producers there are many difficulties in transportation of the cut flowers to the Middle East countries (e.g. UAE) by transit via Iran. Each of them separately tried to export, but faced many difficulties and uncertainties and gave up. However, if the Government of Armenia in cooperation with the Iranian authorities solves the issue, it might become a route with a great potential. According to Mr. Yeghishe Hovhannisyan, the President of the Freight Forwarding Union it will take maximum 10 days for truck to reach UAE by transit via Iran and may cost around USD 3,500-4,000.

As regards to the exports to European countries, the most favourable route via Poti (Georgia) — Ilyichevsk (Ukraine) – Varna (Bulgaria) is disrupted due to the current war in Ukraine. Just before the war it would take the truck from Armenia around 10 days to reach the Netherlands and would cost around USD 5,500. The Government of Armenia is working on establishing freight forwarding route to European countries with use of ferry services in the Black Sea which could save time and money for businesses. Currently the negotiations are conducted with the APM Terminals, Dutch company which is the operator of the Poti port. However, according to Mr. Yeghishe Hovhannisyan, even if the ferry system is established, still, it will not be useful for exporters of goods that require specific temperature regime, because Armenian railway wagons (carriages) do not have relevant Gensets³¹. This is not suitable for cut flower transportation because the time for freight forwarding from Armenia to Rotterdam port with use of ferry services takes approximately 30-35 days.

Air transportation to the Netherlands is not available as well, as there are no direct flights to Amsterdam or other cities, while to Dubai it is possible, but again, it is expensive. However, some importers of flower bulbs, seedlings and other inputs, as well as exporters of flowers use the air transportation to European countries. Mostly they use civil airlines which costs ca. EUR 3.5-4.8 per 1 kg. Some of them also use services of Coyne Airways, British cargo airline which operates cargo flights also to Armenia and the cost for transportation of 1kg is ca. EUR 6.5-7.0. Current options for air carriage to and from European countries are rather expensive, especially with cargo airlines. Another issue related to currently existing air carriage options, which is more important, is that both are not stable. The best option would be to launch special aircraft that will be involved in air carriage of Armenian cut flowers to countries in EAEU, Europe, Middle East, etc. Please see the respective recommendation in the section 5.2 below.

Communication with Dutch companies showed that Dutch producers will not be interested to invest in Armenia, if the logistics issue will not be solved. There is a huge demand from the Russian market, which, however, is not met today by Armenian producers, again, because of logistics issues.

Road transportation difficulties caused by the problems occurring from time to time in the Upper Lars checkpoint resulted also in increase of the prices of fertilizers and other inputs related to flower production,

³¹ A Genset (generator set) is a generator unit that attaches to a reefer (refrigerated) container and is used for perishable goods being transporting overseas or on a truck.

hence the production cost of the Armenian cut flowers. This, in turn, has led to an increase of Armenian cut flower final prices in foreign markets.

3.5.2 Opportunities

Conducive business environment

As it was mentioned above, the agriculture sector (including cut flower production) is one of the top priorities of the Government of Armenia. Especially during the last 4-5 years the Government has initiated many reforms and adopted legislation and regulations, including Government support programmes, which create very conducive and enabling environment for businesses in general, and some of them - for the cut flower sector particularly. During 2022 the Government has included cut flowers in the list of perishable products, hence allowing simplified export procedures.

There are a number of state support programmes (section 4.2 below) according to which the cut flower producers and exporters have opportunity to receive different types of support, including 0% interest rate loans for financing production or purchase of equipment and machinery, subsidies or cash-back for construction of high-tech greenhouses and other infrastructure, etc.

There are also some tax preferences or exemptions for agribusinesses in general and some additional ones specifically for agri-SMEs (section 4.1.2 below).

Climate conditions and accessibility of infrastructure

As it was mentioned in the section 1.1.1, above Armenia has almost ideal natural conditions necessary for high-quality cut flower production. Moreover, in Armenia there are many agricultural lands that are not cultivated and it is possible to establish cut flower greenhouses on huge territories. There are several regions in Armenia where the climate is very favourable, there is easy access to necessary infrastructure, very good quality water is available, etc.

3.5.3 Development potential

Investment potential

All the interviewed producers confirm that the cut flower business is profitable and all intend to enlarge their production if they find investors or partners from Dutch big flower producer companies. As they mention, they already have enough knowledge and skills, and if additional knowledge and experience is shared with them, they can become high professionals in this area. Except for some state-of-the-art knowledge and investments, they do not see any other obstacle to scale up the production significantly.

Export potential

As it was mentioned above, Armenian cut flower producers are successfully exporting their produce to the Russian and Georgian markets and there is a huge potential for growth. According to the exporters current volumes of exported cut flowers comprise only 1% of the Russian market and there is huge demand for much more volumes, taking into account also recent obstacles for importing cut flowers from EU countries and Kenya. The businessmen have already established very good market linkages and, according to all the interviewees without any exception, there is an excess demand for Armenian cut flowers in those markets.

If the issues with high logistics costs and time are solved the export of Armenian cut flowers can be increased significantly.

Regional hub

In the Middle East market Armenian flowers are not competitive because of the transportation costs. For instance, according to two producers of roses, they have tried to export to Dubai, UAE. According to them the production cost is lower and the quality is much better in the case of roses produced by some Armenian

producers compared with the roses imported to Dubai from Kenya. However, after calculation of the transportation (in this case air transportation) costs they understood that the prices, even with the very low (almost no) profit margin, are not competitive.

However, the manager of one of the wholesale markets assured that the production and sales, including export of Armenian cut flowers is growing very fast and if sufficient and right targeted investments are made it will be possible to increase the volumes of high-quality flowers and reduce the costs of both production and transportation.

Based on all the above-mentioned factors, it can be stated that by making investments in establishment of high-quality flowers production and other necessary infrastructure, i.e. establishment of more high-tech greenhouses, storing facilities and proper organization of logistics it will be possible to make Armenia as a regional hub for production and export of high-quality cut flowers in the Eurasian, European and Middle East regions.

Considering the above mentioned and the capacity of cut flower sub-sector of Armenia, the following competitive advantages have been identified:

- ▶ The cut flower production sub-sector of the country has a great potential of growth and currently the tendency is notable,
- ▶ Due to favourable geographical location and climate conditions, increased involvement of high and advanced technologies, easy access to infrastructures and relatively low cost for the latter Armenia currently is producing some types of cut flowers that are one of the highest qualities in the region, and some of them are of the highest quality (considering the countries of the EAEU, Georgia, Turkey and Iran),
- ▶ Armenia is a member of EAEU and has free trade with the member countries (Belarus, Kazakhstan, Kyrgyzstan and Russia) with a market of more than 200 mln people. As a member of the EAEU, Armenia has a preferential trade agreement with Iran, free trade agreements with Vietnam, Singapore and Serbia. Neighbourhood with Iran and Georgia opens access to the Middle East and European markets respectively. Armenia also benefits from a preferential trade regime (GSP) with the U.S., Switzerland, Canada, Norway and Japan. Ultimately, Armenia maintains free trade agreements with Georgia and CIS countries
- ▶ There are medium and big flower producers specialised in production and exporting of not only roses, but alstroemeria, lisianthus (Eustoma), chrysanthemum, gerbera and other flowers,
- ▶ Armenia has no limitation of importing flower seedlings, bulbs and other input materials necessary for flower growing. There are already established cooperation with Dutch companies, producing seedlings, fertilisers and other input materials,
- ▶ The conducive investment climate makes Armenia the best place for investments,
- ▶ There are a number of state support programmes that target the agricultural sector (including cut flower production and export) (section 4.2 below)
- ▶ There are some tax preferences or exemptions for agribusinesses in general and some additional ones specifically for agri-SMEs (section 4.1.2 below)
- ▶ And last but not least, according to the Ministry of Economy, Armenia will become a member of the UPOV convention at the beginning of 2023.

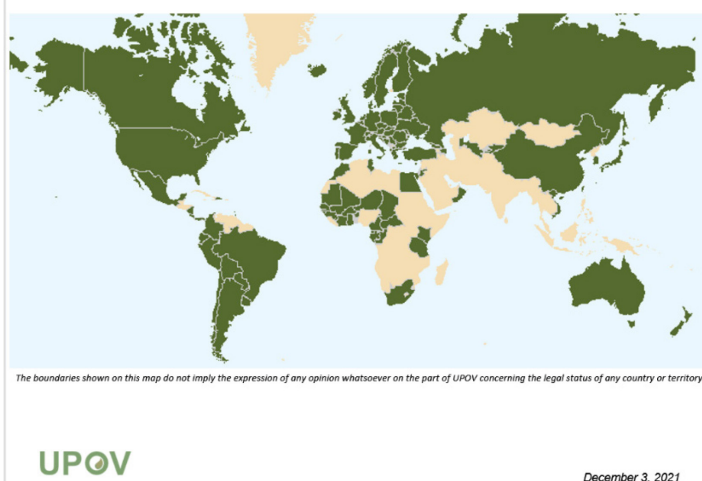
4 LEGISLATION AND REGULATORY FRAMEWORK

4.1 LEGISLATION

4.1.1 UPOV Convention

The International Union for the Protection of New Varieties of Plants (UPOV) is an intergovernmental organisation based in Geneva (Switzerland). UPOV was established in 1961 by the International Convention for the Protection of New Varieties of Plants (the “UPOV Convention”).

Table 12. The map of UPOV member countries



The UPOV Convention provides the basis for members to encourage plant breeding by granting breeders of new plant varieties an intellectual property right: the breeder's right. In the case of a variety protected by a breeder's right, the authorization of the breeder is required to propagate the variety for commercial purposes. As of mid-November 2022, there are 78 members of the UPOV Convention and 58 observer countries, including Armenia.

According to the Convention “Each Contracting Party shall adopt all measures necessary for the implementation of this Convention; in

particular, it shall:

1. provide for appropriate legal remedies for the effective enforcement of breeders' rights;
2. maintain an authority entrusted with the task of granting breeders' rights or entrust the said task to an authority maintained by another Contracting Party;
3. ensure that the public is informed through the regular publication of information concerning
 - ▶ applications for and grants of breeders' rights, and
 - ▶ proposed and approved denominations.”³²

Armenia started the procedure of becoming a member of the Union in 2003 by means of a Note of the Permanent Mission of the Republic of Armenia to the United Nations Office and other International Organizations in Geneva requesting the advice of the Council on the conformity with the 1991 Act of the “Law of the Republic of Armenia on the Protection of Selection Achievements” (Law). The Council examined the Law and decided to:

- ▶ “(a) advise the Government of Armenia that the Law of the Republic of Armenia on the Protection of Selection Achievements (the Law), in its main provisions, incorporates the substance of the 1991 Act, and that it may deposit an instrument of accession to the 1991 Act;
- ▶ “(b) further advise the Government of Armenia that it may wish to amend and supplement the texts of its legislation, as recommended in document C(Extr.)/21/2, so as to avoid recourse to the general principle in Article 2 of the Law.”

On August 29, 2003, the Constitutional Court of the Republic of Armenia confirmed that the obligations stipulated in the UPOV convention correspond to the Constitution of the Republic of Armenia. On October 22, 2003, the National Assembly of the Republic of Armenia adopted the resolution “Ratifying the International Convention for the Protection of New Varieties of Plants”.

³² UPOV member countries are obliged to pay a membership fee. It was agreed that the membership fee for Armenia will be 1/5 of the one unit - 10,728 Swiss francs and one-time fee of 1,667 Swiss francs

From July 2010 to September 2022, the Union provided comments on different versions of the Draft Law.

In September 2022 Armenia requested the examination of the Draft Law on the Protection of Varieties of Plants of Armenia, for conformity with the 1991 Act of the UPOV Convention. In the opinion provided by the Office of the Union on 27 September 2022, was mentioned that the Draft Law incorporates the substantive provisions of the 1991 Act and suggested to the Council to ***“take a positive decision on the conformity of the Draft Law of Armenia on the Protection of Varieties of Plants with the provisions of the 1991 Act of the International Convention for the Protection of New Varieties of Plants, which allows Armenia once the Draft Law is adopted with no changes and the Law is in force, to deposit its instrument of accession to the 1991 Act.”***

In October the UPOV Council approved relevant decision, confirming the compliance of the draft Law of Armenia on the Protection of Varieties of Plants with the provisions of the 1991 Act of the International Convention for the Protection of New Varieties of Plants. Armenia will become a UPOV member, once the law is adopted by the National Assembly of the Republic of Armenia.

4.1.2 Tax legislation

According to Armenian legislation legal entities or sole proprietors involved in primary agricultural production are exempted from the value added tax (VAT) if their annual turnover is less than 115mln Armenian dram. These business operators are also exempted from the profit tax until the end of 2024. The table below shows the tax payment rates for greenhouses per type of business operator.

Action	Legal entity	Sole proprietor
Sale of primary agricultural product in the territory of Armenia (VAT)	N/A	N/A
Export of primary agricultural product (VAT)	N/A	N/A
Profit tax	Is exempted until 31 December 2024	Is exempted until 31 December 2024
Income tax to employees	20% for the year 2023	20% for the year 2023
Social security payments for employees ³³	5%, if the monthly salary is less than AMD 500,000 or At the difference of 10% and AMD 25,000 if the monthly salary is more than AMD 500,000	5%, if the monthly salary is less than AMD 500,000 or At the difference of 10% and AMD 25,000 if the monthly salary is more than AMD 500,000
Social security payment for entrepreneurial activities		5%, if the annual income is less than AMD 6,000,000 or At the difference of 10% and AMD 300,000 if the annual income is more than AMD 6,000,000

According to the “Tax Code” of Armenia, sale of equipment and their parts classified under HS codes 8432, 8433, 8434, 8436, 8701, of fertilizers of HS codes 31, of pesticides of HS codes 3808 91, 3808 92, 3808 93, 3808 94, 3808 99, products of HS codes 0106 41 000, 106 49 000, 5305 00 000 0, 9406 00 310 0, as well as seeds and seedlings of agricultural crops and perennial plantations are exempted from VAT.

³³ Social security payments are paid for employees born after 1 January 1974

4.2 SUPPORT PROGRAMMES

Program on State assistance of leasing for financial lending of agri-food equipment in the Republic of Armenia

The main goal of the program is to provide business entities operating in the agri-food industry with the necessary machinery by using mechanisms of financial lending (leasing) of equipment. In the framework of the programme, the business entities operating in agri-food industry are allowed to get equipment for their production, including greenhouses. The total cost of equipment purchased within the framework of this program should not exceed AMD 1,000.0 million.

The terms of leasing are as follows:

- ▶ the leasing contract is signed up to five years
- ▶ the leasing is provided in Armenian dram at an annual interest rate of up to 12 percent per annum, of which up to 10 percentage points are subsidized or in foreign currency with an annual interest rate of up to 9% per annum, of which up to 6 percentage points are subsidized
- ▶ the lessee pays an advance payment of 20% of the value of the leased item
- ▶ the cost of the subject of leasing includes the purchase price of the subject of leasing, the costs associated with the importation of the subject of leasing into the Republic of Armenia.

Program on Subsidizing the Interest Rates on Loans Provided to the Agricultural Sector

The businesses interested in construction of greenhouses or modernizing their technologies can benefit from this support programme. In the framework of this programme business entities are provided with subsidized loans in the amount of 3-15 million drams with an annual interest rate of 5% (for cooperatives – 3% and for border areas – 0%). The loan is provided up to 3 years.

Support Programme for Consolidation of Agricultural Lands

The programme aims to achieve increase of productivity and competitiveness and promote investments in the agricultural sector of Armenia by consolidating the small and fragmented agricultural lands. In order to receive relevant state support, the total area of the consolidated land should be at least 30 ha, and the support is provided for the works performed on the consolidated land of no more than 200 ha (inclusive).

The support programme lists some types of activities the beneficiary should do (or partially implement) in the consolidated land, in order to receive the state support. Beneficiaries will be provided with the state support in the form of compensation for the costs actually incurred for the works carried out by the beneficiary, provided for in the program, but not more than 50% of the cost provided for each work in the below table:

N	Work	Unit of measure	Number of works	Unit cost (AMD)	Total (AMD)
1	Collection of surface and deep stones by rock pickers and stacking	Ha	1	300,000	300,000
2	Transportation of collected stones	Ha	1	100,000	100,000
3	Flattening the area	Ha	1	75,000	75,000
4	Analysis of the soil, determination of mechanical composition and capacity	Ha	1	20,000	20,000
5	Application of manure, poultry litter, peat and various composts	T/Ha	30-40	5,000	150,000
6	Deep down with tractor plows: 30-35 cm	Ha	1	50,000	50,000
7	Soil preparation works	Ha	1	65,000	65,000
8	Construction of a reservoir for irrigation purposes	M ³	1000	2,000,000	2,000,000
TOTAL					2,760,000

Programme on State Compensations of Monthly Salary for Organizations Attracting Highly Skilled Specialists

According to the program, commercial and non-commercial organizations (including higher education institutions) can benefit from state compensation of 20% - 70% of monthly salaries of highly qualified specialists they hire. The support programme defines certain criteria, which include indicators regarding the academic and professional experience of the highly qualified specialist. The state support scheme will be in force until December 31, 2025.

In order to be able to apply for the state support program, the employer needs to hire a highly qualified specialist who has lived outside of the Republic of Armenia for 12 (cumulative) during the 30 months prior to the time of the organization applying to the state support program, as well as corresponds to at least one of the following criteria:

- ▶ has graduated from one of the 400 leading universities according to the **QS World University Rankings**³⁴, published in the year of application for participation in the program, and received a bachelor's, master's and/or doctorate degree (or other equivalent higher education qualification accepted in the given country), and/or
- ▶ has at least 10 years of experience in any of the world's leading companies included in the Forbes³⁵, Fortune³⁶, HeadHunter³⁷, NIFTY³⁸, Dow Jones³⁹, FTSE⁴⁰, S&P⁴¹, SSE Composite⁴², SZSE⁴³, KOSPI⁴⁴, KOSDAQ⁴⁵, BSE SENSEX⁴⁶, NSE of India⁴⁷, BOVESPA⁴⁸, IBRX⁴⁹, ITEL, Nikkei⁵⁰, TOPIX⁵¹, DAX⁵², MDAX⁵³, MOEX Russia⁵⁴.

The following is the defined scale for state reimbursements:

Employer	Criteria	Reimbursement
LLC, CJSC, OJSC, University, Scientific or Research Institution, NGO, Foundation	Bachelor or Master's degree from Top 400 (no PhD from any University)	20% of the salary on the monthly basis, not more than AMD 1 mln.
	10+ years of work experience (no PhD from any University)	
LLC, CJSC, OJSC, University, Scientific or	Bachelor or Master's degree from Top 400, as well as PhD from any university	50% of the salary on the monthly basis, not more than AMD 1.5 mln.
	PhD from Top400 universities	

³⁴ <https://www.topuniversities.com/university-rankings/world-university-rankings/2022>

³⁵ <https://www.forbes.com/lists/global2000/?sh=64259d485ac0>

³⁶ <https://fortune.com/global500/>

³⁷ <https://www.huntedhead.com/2012/04/20/headhunter-top-15-worldwide/index.html>

³⁸ https://en.wikipedia.org/wiki/NIFTY_50#Index_changes

³⁹ <https://www.cnbc.com/dow-30/>

⁴⁰ <https://www.londonstockexchange.com/indices/ftse-100/constituents/table>

⁴¹ <https://www.slickcharts.com/sp500>

⁴²

⁴³ http://english.sse.com.cn/markets/indices/data/list/constituents/index.shtml?COMPANY_CODE=000001&INDEX_Code=000001

⁴⁴ <https://www.szse.cn/English/>

⁴⁵ <https://topforeignstocks.com/indices/the-components-of-the-korea-stock-exchange-kospi-index/>

⁴⁶ <https://www.investing.com/indices/kosdaq-100-components>

⁴⁷ <https://www.bseindia.com/markets/equity/EQReports/TopMarketCapitalization.aspx>

⁴⁸ <https://www.nseindia.com/regulations/listing-compliance/nse-market-capitalisation-all-companies>

⁴⁹ <https://tradingeconomics.com/brazil/stock-market>

⁵⁰ https://www.b3.com.br/en_us/market-data-and-indices/indices/broad-indices/indice-brasil-100-ibrx-100-composition-index-portfolio.htm

⁵¹ <https://indexes.nikkei.co.jp/en/nkave/index/component>

⁵² <https://markets.businessinsider.com/index/components/topix-500>

⁵³ <https://markets.businessinsider.com/index/components/dax>

⁵⁴ <https://markets.businessinsider.com/index/components/mdax>

⁵⁵ <https://www.moex.com/en/>

Employer	Criteria	Reimbursement
Research Institution, NGO, Foundation	10+ years of work experience, as well as PhD from any university	
LLC, CJSC, OJSC Scientific or Research Institution, NGO, Foundation & University	Bachelor or Master's degree from Top 400, as well as PhD from any university who teaches at Armenian university and at the same time works for a different works in an Armenian organization/company	50% of the salary on the monthly basis, but not more than AMD 1.5 mln. for other organization / company, 70% of the salary on the monthly basis, but not more than AMD 2 mln. to university
	PhD from Top 400 University who both work at an Armenian Organization/Company and teaches at university	
	10+ years of work experience, as well as PhD from any university who teaches at Armenian university and at the same time works for a different works in an Armenian Organization/company	

Infrastructure for Investments

The new support programme adopted by the Government of Armenia in August 2022, foresees construction of relevant infrastructures by the Government (including roads, water supply (including for irrigation), drainage, gas supply, electricity supply and telecommunication systems) in the agricultural sector.

According to the programme, the costs of construction of the infrastructures by Government shall not exceed

- ▶ 10% of the total amount investments not exceeding 500mln Armenian drams or
- ▶ 20% of the total amount of investments exceeding 500mln Armenian drams⁵⁵.

Besides of these support programmes, the “Law on Value Added Tax” of the Republic of Armenia gives an opportunity to **delay VAT payments** up to 3 years in the framework of investments projects, exceeding AMD 300 billion and more. Moreover, if there is an investment project in the agricultural sector, the import of technological equipment, their components and accessories, raw materials and materials intended for use in the territory of the Republic of Armenia are **exempted from the customs duties**.

⁵⁵ For details see: <https://www.arlis.am/DocumentView.aspx?DocID=167831> (in Armenian)

5 CONCLUSIONS AND RECOMMENDATIONS

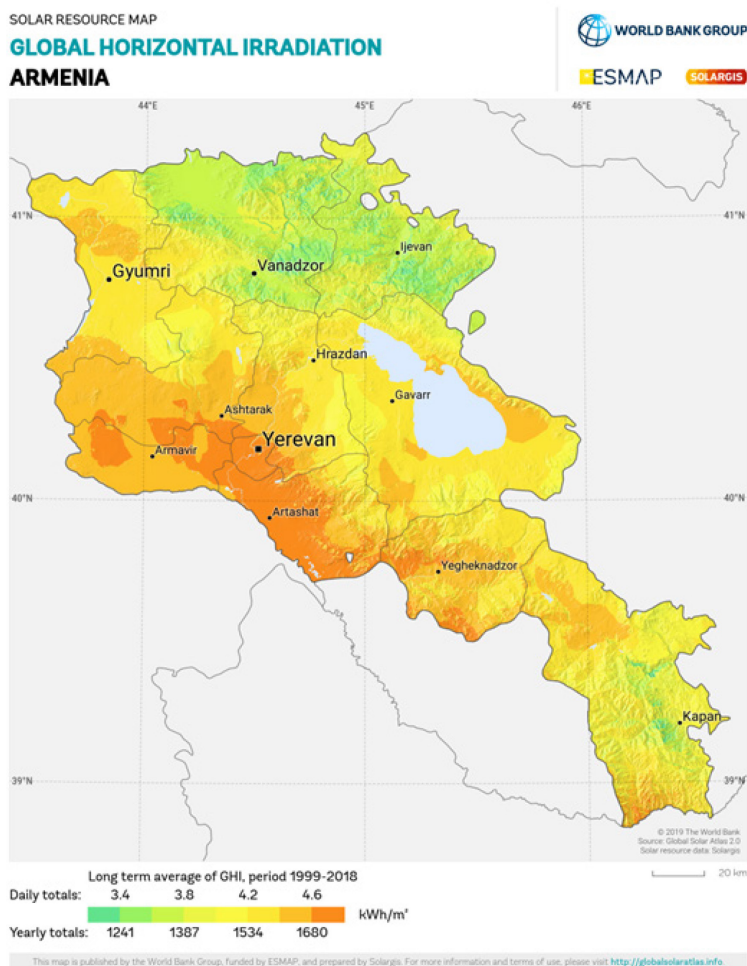
5.1 CONCLUSIONS

According to the official statistics of Armenia the flower production has had a positive growth in the last several years, with simultaneous increase of export. Our research has shown that de facto numbers of production and export are much bigger. The flower production still has a potential to grow based on the current demand from foreign markets, interest from potential markets and preferential climate and geographical location of Armenia. Based on the conducted analysis, the following conclusions have been made.

Conclusion 1. Preferential geographical location and desirable climate

As it was presented in the first chapter, Armenia has a favourable climate condition for production of flowers in greenhouses: the extremes in climate are rare, solar radiation and number of sunny days are comparably higher than in the Netherlands or other countries of the region. There is an availability of high-quality water resources in the form of precipitation and existing water resources (rivers, lakes and groundwater). The day to day increases of greenhouses in the respective provinces of Armenia validates this conclusion.

Figure 14. Global Horizontal Irradiation Map of Armenia, 2020



The Global horizontal irradiation map of Armenia (see Figure 11) as well as communication with relevant cut flower producers show that depending on the type of flowers, there are several preferential provinces. Particularly, preferable provinces for growing roses in greenhouses are Aragatsotn, Kotayk, Gegharkunik and Syunik (Sisian region). Kotayk province is one of the most preferable, as it has the highest number of sun lights per year. Temperature here is lower by 3-5 degrees compared to Ararat or Armavir provinces and in summer less energy is required for the cooling of greenhouses. Because of the high number of sunlight and sunny days, heating costs in winter are also lower than in Ararat or Armavir provinces.

Aragatsotn, Gegharkunik and Shirak provinces also have high numbers of sunlight and sunny days, though the temperature in these provinces is lower. Humidity and temperature are higher in Tavush region and southern part of Syunik regions. Ararat and Armavir provinces are considered as agricultural

provinces of Armenia. There are a huge number of greenhouses in these provinces, which are mainly specialised in production of gerbera, chrysanthemum, lisianthus (*Eustoma*) or carnations.

Aragatsotn, Ararat, Armavir and Kotayk provinces are closer to Yerevan, the main infrastructural hub of Armenia: here is located the biggest international airport of the country, roads of these provinces are in good condition and there is a relevant labour force experienced in flower production. Shirak, Tavush and Lori provinces are closer to the border of Georgia and transportation from here will be less expensive (considering also availability of railway stations). As to the Gegharkunik province, though it is not far from Yerevan (1-2 hours drive) and from Tavush province (2-2.5 hours drive to the border of Georgia), there is an issue relating to availability of labour force.

Syunik province is a bit far from Yerevan (sometimes more than 6 hours are required to reach the capital), but it is the only province bordering Iran and having close trade relations with this country.

The availability of land for greenhouse production depends to a large extent on the land characteristics: not much covered with forests and grassland, does not have high altitude, has no high slope, and population density is not too high. Protected areas are excluded as a suitable area for greenhouse production. In this regard the preferable provinces are Aragatsotn, Kotayk, Syunik, Shirak and Gegharkunik for rose production, Ararat, Armavir, Lori provinces for other flower types, though Lori and Tavush are covered with forests and have number of protected areas.

An important factor for identification of suitable areas for high-tech greenhouses is the availability of energy (resources). In this regard, the energy aspect includes power plants, small hydro-electric power plants, solar photovoltaic panels and gas pipelines. Energy resources are available in all provinces of Armenia.

Considering the above mentioned, we think that all provinces of Armenia are suitable for flower production, though in several areas more investments will be needed for greenhouse cooling or heating. Nevertheless, the operators should consider pros and cons of each province (Ararat and Armavir have suitable human and labour resources, Syunik is close to Iran, temperature in Vayots Dzor is high, etc.)

Conclusion 2. Market opportunities

Geographical advantages of Armenia are not limited to excellent climate conditions, weather and availability of agricultural resources. The geographical location is beneficial also from the perspective of trade. Armenia is located on the crossroad of Europe and Asia and benefits from preferential trade regimes. Armenia is a member of EAEU and has free trade with the member countries (Belarus, Kazakhstan, Kyrgyzstan and Russia) with a market of more than 200 mln people. As a member of the EAEU, Armenia has a preferential trade agreement with Iran, free trade agreements with Vietnam, Singapore and Serbia. Neighbourhood with Iran and Georgia opens access to the Middle East and European markets respectively. Armenia also benefits from a preferential trade regime (GSP) with the U.S., Switzerland, Canada, Norway and Japan. Ultimately, Armenia maintains free trade agreements with Georgia and CIS countries.

Russia is the main market of Armenian cut-flowers. Around 90% of flowers produced in Armenia were exported to the Russian market in 2021. All the statistical data for the last 10 months and current tendency of export show that in 2022 this volume will be higher. Among others, some of the reasons include the war in Ukraine and logistical issues that other flower exporters (such as Kenya and Ethiopia) currently face. Considering the comparatively low energy prices in Armenia as well as the established industry, with already available cooperation in the Russian and EAEU markets, Armenia has a capacity to expand its export to these markets.

The Middle East market is also one of the promising markets for Armenian cut flower producers. Establishment of new contacts and improvement of logistic routes will allow to reach this market as well.

Given the high-tech greenhouse development in Armenia, it seems logical to focus on cut flower production for high-end markets (Middle East, Europe, Russia) to earn back the investments. On the other hand, the

product itself will require different types or differently equipped greenhouses because of specificities of different flowers.

Conclusion 3. Knowledge and Experience

Besides the technology, knowledge and skills are very important for producing high quality flowers and for expanding the export capacities. Moreover, it is important to educate and prepare young people for a career in flower production. Together with education there is a need to have a proper laboratory infrastructure, qualified quality managers, state services, etc., as flower production and export requires regular testing of quality and composition of substrates, control over the quality of the products, daily communication with partners, etc.

As of today, the only institution that has a programme on rose growth in greenhouses is the International Center for Agribusiness Research and Education Foundation established by Texas A&M University in cooperation with the Armenian National Agrarian University. However, these are short-term training programmes and the topic on rose growth is included in the overall course on greenhouse construction and operation. The duration of the course is only six months. However, discussions with flower producers identified the lack of relevant specialists in this sub-sector. As it was mentioned by most small and medium-sized cut flower producers, there is no access to affordable consultancy/advisory services from Dutch companies. Only a few big greenhouses have invited specialists from the Netherlands or other countries. The others are self-educated producers, which gained knowledge based on their experience.

Conclusion 4. Logistics

Export related logistics is another issue raised by local flower producers, exporters and foreign buyers or possible partners. Flower is considered as a perishable product and short-term transportation and ease of access to markets are important for ensuring fresh and high quality of produce. Communication with producers, exporters and potential buyers highlighted the logistics issues that exist in Armenia. Cut flowers are mainly exported to the Russian market by land transportation, using the road transport (refrigerated trucks). There is only one route which passes through Georgia and customs control happens at the Upper Lars border checkpoint. During the winter time this checkpoint is mostly closed. Due to the war in Ukraine and increase of traffic flows through this border point, very often trucks stop on the border for more than 10 days.

Discussions with potential Dutch buyers have further exacerbated this issue, as there are no direct flights to the Netherlands and land transportation may take more than 20 days, influencing the quality and shelf life of flowers. In order to attract investments from the Netherlands, Armenia, first of all needs to solve the issue related to logistics. Even if Dutch investors are interested in the Armenian cut flower sub-sector and are ready to make investments, the logistics issue should be solved in advance.

This situation not only negatively impacts the quality of products but has a huge negative impact on the reputation of Armenian producers and exporters. There is a possibility to use air transport, which however is expensive and has limited capacity (number of flights, aircraft cargo capacity, etc.)

The prices for air transportation to Russia will cost RUB 160 (USD 2.6) per 1 kg. There is also an opportunity to export to the Middle East Market, as prices for air transportation (USD 1,6-2 per kg). According to some experts, potentially, the air transportation of cut flowers to European countries will costs on average EUR 3.5-4.8 per 1 kg with civil airlines and EUR 6.5-7.0 per 1 kg with foreign air carriers. However, currently seedlings from the Netherlands are imported by passenger airplanes and the cost for 1 kg “weight per unit volume” is EUR 3.5.

Conclusion 5. Business and investment environment with relevant state support programmes

As it is presented in the Section 4 of this report there are a number of state support programmes that target the agricultural sector. There are also support programmes aiming to involve highly educated and experienced specialists in almost all sectors of the economy, including cut-flower production.

The business and investment climate are favourable for starting and developing business opportunities in Armenia. The Government of Armenia has declared and is implementing an “open door” policy, applying almost no restriction to investment activities. The legal framework of Armenia provides 100% ownership of resident legal entities, equal treatment, as foreign companies are entitled by law to the same treatment as Armenian companies. There are no limitations on the exchange of foreign currencies and the repatriation of profits, no restrictions on remittances or staff recruitment.

The legislation grants high standards of protection and guarantees to investors. The Law on Foreign Investments grants national treatment of foreign investors by stipulating that the legal regime related to foreign investments cannot be less favourable than the regime applied to citizens and/or legal entities of Armenia.

Armenia is a member of the World Trade Organisation and guarantees application of Most Favoured Nation and National Treatment approaches. In addition, Armenia will become a UPOV member in the beginning of 2023.

All of these and other legal provisions create a favourable environment for the Dutch flower producers, aiming to invest and operate in Armenia.

With regards to Investor-State dispute settlement (ISDS), national and international arbitration is available to investors. Armenia is a party to the International Centre for Settlement of Investment Disputes Convention and has ratified the United Nations Commission on International Trade Law Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958 New York Convention). Armenia is also a party to the Energy Charter Treaty, which provides detailed investor protection and access to ISDS.

There are number of other conclusions that are provided below:

- ▶ Many local producers of cut flowers in Armenia are self-educated and most of them learn from their peers, experienced friends or relatives who have been engaged in flower production for a long time. Almost all the interviewees mentioned the lack of professional agronomists and proper advisory and consultation services which drastically impacts on quality and efficiency of cut flower production in Armenia.
- ▶ Another big gap in the sector is absence of easily accessible proper laboratory service for analysis of hydroponic substrate as well as professional advisory service to provide producers with appropriate advice on flower cultivation, including recipe of the substrate (e.g. proper composition of fertilizers).
- ▶ The local producers are not able to maintain stable quality and quantity of the produced cut flowers.
- ▶ The flower breeding local capacity is low and with locally produced seedlings the local producers may have maximum 3 years of flower vegetation/production period and substantial decline of the yield. Therefore, after the 3rd year they have to plant new seedlings.

5.2 RECOMMENDATIONS

Armenian cut flowers producers and consumers realize the Dutch leadership in the cut flower global floristic market taking into consideration the innovative technology, quality, the invention of new flower varieties/types and historically recognized position in this value chain. Local producers are also aware about the important role the Netherlands plays in developing agricultural technologies, providing high education and knowledge in the cut flower sub-sector. Majority of Armenian producers and organisations providing consultancy and other services in this sub-sector are interested in establishing business relationship and

long-term cooperation with the Dutch companies involved in flower plantlets and input supply, production of cut flowers, or advisory and consultation services as well as in education. The same attitude and readiness for cooperation was received from the Dutch side: Dutch greenhouse construction companies and companies operating in the cut flower markets (the Royal FloraHolland, flower variety inventors, etc.) clearly understand the advantages of Armenia in flower production business and are interested to enter the Armenian market, having in mind the recent changes in the world trade and supply chains as well.

Below are some recommendations and suggestions formulated based on the interviews conducted and discussions held with Armenian operators and Dutch companies, that can improve the cut flower production and export capacities of Armenia and deepen mutual beneficial cooperation with the Netherlands in this sub-sector.

- ▶ **Construction of greenhouses by the Dutch companies:** greenhouse production has a huge development potential in Armenia. Each year hundreds of new greenhouses are constructed, some of them having several hectares of territory and particularly in rose production. However, Dutch companies are not actively involved in these construction activities. So far, a few Dutch companies constructed high-tech greenhouses in Armenia. Meanwhile, the Richel Group (France) or smaller local greenhouse construction companies actively work in the market and construct greenhouses according to models used by Richel Group. In order to enter the Armenian market, Dutch greenhouse construction companies (particularly those that are specialised in construction of greenhouses intended specifically for cut flowers production) need to compete with already existing providers. To do so there is a need to:
 - Widely present advantages of Armenia as a country with greenhouse sub-sector development potential, and particularly as a country, which is the only country in the region that is specialised in production of cut flowers in greenhouses and is ready to expand its capacity;
 - Enter the Armenian market with aggressive marketing strategy by offering special packages, which will include “single source” approach: where the company suggests everything (only Dutch origin) that is needed for construction and operation of a greenhouse in one package;
 - Organization of awareness raising events and other similar initiatives during which it will be explained why the Dutch greenhouses and technologies are expensive and what are the advantages and benefits of using them;
 - Together with the mentioned packages, Dutch organisations could suggest bonuses (e.g. free shipping, provision of services of specialists free of charge or with a low rate, access to the Dutch market, business linkages with potential buyers in the Netherlands or favourable payment mechanism (some financing products can be developed together with the Armenian or Dutch financial institutions), etc.).

- ▶ **Information dissemination:** Though the Armenian cut flower producers know about the advanced level of Dutch flower production, they are interested to work with investors, flower breeders and Dutch suppliers and expressed readiness to produce flowers for the Dutch buyers, most of them don't have precise information on the quality requirements and standards applied to flowers (particularly to roses) in the Dutch market. They don't know about the interests and expectations of Dutch buyers. For these purposes it is suggested:
 - *To organise representative events for local organisations, inviting relevant potential partner companies and specialists from the Netherlands;*
 - *To share contacts of Dutch flower producers or buyers that are interested and ready to establish cooperation with Armenian counterparts and buy locally produced flowers or invest in the cut flower sub sector of Armenia;*
 - *Organise exchange study visits for state officials and cut flower producers to the Netherlands, particularly to the Royal FloraHolland auction, in order to present how the auction is operating, what are the main requirements for flowers, etc. It could also provide*

an opportunity to discuss with the management of the company on possibilities of establishing branch office/regional auction of Royal FloraHolland in Armenia for this region (including member states of the EAEU, Georgia, Turkey, etc.).

- ▶ **Improvement of laboratory capacities:** To produce high quality flowers, greenhouses (particularly hydroponic greenhouses) should provide the plant with all the microelements necessary for its growth and development. The cut flower producers (mainly the medium sized and big producers) regularly send plant irrigation and drainage water samples to agrochemical laboratories in the Netherlands or other European country to perform nutritional analysis of the microelements content in them and to prepare nutrition recipes based on the results obtained. Although there is a laboratory in Armenia which conducts such tests, it is expensive because of the monopolistic position. In addition to that, many experts are not satisfied with the quality of those analyses. Delivering water samples to European laboratories and obtaining test results sometimes takes a long time and is very costly which makes it impossible to respond to problems with plant nutrition in a timely manner. At the same time, the greenhouses are forced to make additional payments for the delivery of substrates.

The establishment of a high-quality agrochemical laboratory in Armenia or provision of support to existing laboratories for improving their capacities and delivering tests that meet the current requirements will allow cut flower producers to perform the necessary analyses more often and efficiently and produce high quality flowers. As a result, the nutritional problems arising in the process of plant cultivation and the fight against diseases will be solved quickly. It will increase the quality of produced flowers and, as a result, will contribute to the sub-sector development.

- ▶ **Transfer of knowledge and know-how:** Along with development potential, certain problems rise due to the lack of specialists and the lack of appropriate professionals. Flower production in greenhouses requires specific knowledge and experience, which is not sufficient or even is missing in Armenia. This is why there is a high demand for specialists in the flower sub-sector, especially for the following fields: Agronomy; Plant protection; Agribusiness and Management. Thus, it is suggested to support in implementation of following activities:
 - *Organization of training and capacity building activities for flower producers per type of flower. Training and education in suitable Dutch companies and universities, especially at Wageningen University, can be an excellent opportunity for local specialists. Study visits to relevant flower producer companies can be organised as well. It is important also to provide scholarships for education of specialists in the universities or training centers of the Netherlands;*
 - *Invest in establishment of a joint greenhouse educational center in Armenia or development of relevant certification programmes or curricula in the National Agrarian University of Armenia.*
- ▶ **Promote investments in Armenia:** fertilizers are important for the proper growth of flowers in and out of greenhouses. These supplies are mainly imported to Armenia. Previously it was done mainly from Russia through cooperation with branch offices of Dutch suppliers. After the start of the war in Ukraine these channels are mostly disrupted⁵⁶ and supply of relevant fertilizers is ensured by the limited number of local companies. This situation creates difficulties for small and medium flower producers, as the prices are high.
 - It is suggested to make investments for establishing fertilizer producing company(ies) in Armenia (could be joint ventures). This will allow to meet not only local needs of fertilizers, but also export to the countries where Russia was the main exporter. For higher economic

⁵⁶ <https://aiph.org/floraculture/news/are-western-sanctions-causing-a-fall-in-russias-flower-imports/>

feasibility this company or companies may produce not only fertilizers necessary for cut flower production but also fertilizers that are necessary for other sub-sectors of agriculture.

- Another option could be opening stores or branch offices of Dutch suppliers in Armenia. This will not only make the information about Dutch producers and their products available for Armenian flower producers, but will create also an opportunity to enter the EAEU market.

- ▶ **Cut flower hub:** Armenia is one of the biggest producers of roses in the region. These roses are exported mainly to the Russian market, and in smaller quantities to Georgia and Belarus. It shall be mentioned that according to many experts the quality of grown roses meets the requirements of the Royal FloraHolland. According to Royal FloraHolland, there are big and high-quality producers of cut flowers in Armenia that can become a supplier for the auction and sell their products through them. Because of the situation in Ukraine, it is very difficult for Dutch flower growers to reach the post-soviet region and sell their flowers here (logistics is expensive and supply chains are disrupted, there are some production difficulties in the Netherlands, etc.). Having a central geographical position in this region, favourable climatic conditions for cut flower growing (particularly roses, gerbera and lisianthus), Armenia can **become a hub of cut flowers** for this region (member countries of the EAEU, Georgia, Turkey, Ukraine, CIS countries etc.). It would be desirable, if with the support of the Embassy of the Netherlands, Armenia attracts investments from Dutch companies, creates a cluster and negotiates with Royal FloraHolland on establishing a kind of branch that will supply cut flowers to the whole region from Armenia. There is a such example in Kenya and that model can be replicated in Armenia.

- ▶ **Suggestions to the Government of Armenia:** There are several recommendations to the Government of Armenia as well, the implementation of which will create a conducive environment for development of Armenian cut flower sub-sector. Below are some of these suggestions:

- **Logistics issue:** As it was described in the section 3.5. above road transportation difficulties caused by the problems occurring from time to time at the Upper Lars checkpoint and high costs for air transportation result in increase of the prices of fertilizers and other inputs related to flower production, as well as the production costs of the Armenian cut flowers from one side and increase of Armenian cut flower final prices in foreign markets on another side.
- To solve this issue, it is suggested to the Government of Armenia to launch **a special aircraft that will be involved in transportation of products of Armenian origin to foreign markets (particularly to the countries in EAEU, Europe, Middle East)**. For higher economic feasibility this aircraft can also transport other high-value and perishable agricultural products to the same directions. In this case, for instance transportation to and from the Netherlands, according to opinions of some importers and exporters and relevant experts, as well as our rough estimations will cost ca. EUR 2.0 per 1 kg compared to the current average EUR 4.8-6.5 per 1kg. For this purpose, we recommend to conduct more detailed economic feasibility analysis for this option. Meanwhile, the Government should make or attract investments for constructing cooling centers at the airport and negotiate with local and foreign airports to reduce the prices for cargo services.
- **Changes in the greenhouse state support programme to provide support for construction of high-tech greenhouses:** the greenhouse programme currently in force is for small and medium greenhouses. According to this programme the support is provided if the applicant is going to construct a greenhouse design of which is provided for by the respective decision of the Government, i.e. mid-tech greenhouses with polyethylene cover. This programme will be finished next year. It is suggested that the Government adopts a new programme according to which **the support (loan percentage subsidies and/or cash backs) will be provided for construction of big (more than 1 ha) and high-tech greenhouses. The volume of the Government support could depend on the size and quality of to be constructed greenhouse, i.e. bigger the size and higher the quality bigger the volumes of the support.**



6 ANNEXES

6.1 PRODUCTION PECULIARITIES OF ROSE, ALSTROEMERIA, GERBERA AND LISIANTHUS IN ARMENIA



Rose production: Rose belongs to the “Rosacea” family, and its scientific name is “Rosa”. Rose farming is widespread and a popular business worldwide. The rose is indeed one of the leading cut flowers also in Armenia. It is used in almost every ceremony and recognized as a “luxury” flower.

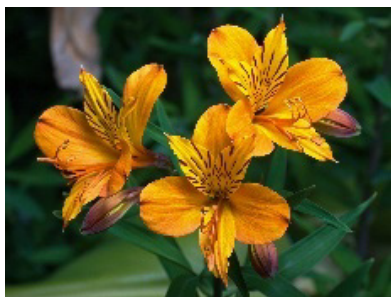
Roses cannot grow well in humid climates but can tolerate high temperatures. Rose plants need complete exposure to sun rays, hence Armenian climate is perfectly fit for Rose flower preference for best growing.

The high value rose (Dutch species/varieties) in Armenia is grown mostly in hydroponic greenhouses. Nevertheless, due to the lack of first-class rose plantlets/seedlings from the Netherlands as well as low capacity of local flower propagating technology, the local producers may have maximum 3 years of rose vegetation/production in their greenhouses and must start a new generation and vegetation of rose farming after the 3rd year due to declining yield. The flower yield reaches its maximum during the 3rd year providing on average 5 flowers per plant, with the mid yield during the 2nd year (on average 4 flowers per plant) and the minimum yield (3 flowers per plant) during the first production year.

Main expenses for the rose production are gas and electricity. On average, the mid-size rose producers with the average capacity of a 4,000 sq.m. greenhouse pay AMD 3 - 4 mln per month for heating of their greenhouse. On average, the heating season lasts from 4 to 5 months depending on a year/winter condition.

The average quantity of the roses sold by the average rose producer in Armenia during the whole production year is about 1,600 roses per day (106 common packs consisting of 15 roses) depending on a year of vegetation and scale/capacity of rose producers. Most producers of rose in Armenia do not need the cold storage facilities for long storing, since the marketing of the produced flowers is based on a daily (or maximum another few days) sale.

The average price for A class cut rose was 4,000 AMD per one common pack consisting of 15 roses in 2021. An average price per one A class rose was about 260 drams.



Alstroemeria production: Alstroemeria is mainly grown and produced in the Armavir region, Armenia. It needs 12-hour intensive daily light which is a necessary precondition for Alstroemeria proper growth. Armavir region has favourable climate conditions for Alstroemeria production ensuring the required light regime for the plant.

Alstroemeria is also very sensitive to the temperature regime in the greenhouse and it perfectly grows when the temperature is about 20°C but not higher than 23°C. During the summer season the producers of this type of flower try to keep the best/optimal temperature regime in greenhouses, which is from 18 to 20°C. While in winter season the temperature is kept from 15 to 18°C. To keep such proper temperature condition for growing Alstroemeria in the Armavir region, the producers use special ventilation devices/systems.

According to producers, after the third year the quality of flowers starts to decrease, therefore there is need for replanting for a new vegetation/production cycle. Nevertheless, there are many local small producers who keep production cycle for more than three years, even up to ten years, to avoid new investment costs. Those are mainly small producers who are focused on selling the low-quality produce at local markets. But those who are used to exporting Alstroemeria to the Russian market have to keep this three-year production cycle to ensure high quality of flowers which fit the Russian cut flower market requirements. The productivity of Alstroemeria from one sq.m. in the big greenhouses is from 200 to 300 flowers.

Generally, local producers of Alstroemeria propagate/breed the flower themselves, applying vegetative propagation methods by splitting one flower/plant into many others. From one plant they may receive from 7 to 8 flowers.

The local producers are always keen on bringing new varieties (colours) of Alstroemeria (e.g., Dubai, Jaffa, Champaign). Generally, local producers learn about new varieties from their friends and/or other producers. So far, new types of Alstroemeria have been directly purchased from Russian producers, with whom Armenian big producers have established good business relationships.

Official/contractual purchase of a new batch of flower varieties is very costly. Some big producers of Alstroemeria have to pay significant amount (USD 20,000) to Dutch companies to obtain rights for each new variety/colour of Alstroemeria. While small producers may share new varieties/colours of Alstroemeria for no cost. As a result, the new variety/colour widely spreads among many producers of Alstroemeria at the Armenian market.

The harvesting of Alstroemeria is mainly done every week. The average weekly yield/harvest for big producers is around 15,000 flowers during the autumn season with a growing volume potential up to around 30,000 per week during the spring season.

The average export price for high quality Alstroemeria is fluctuating from AMD 150 (about USD 0.4) to AMD 200 (about USD 0.5) during winter and spring time, while in summer it is decreasing to AMD 50-100 (about USD 0.12). The shipment of the flowers to Russia is carried out mainly through air transport. The air transportation cost per 1 kg of Alstroemeria (about 17-18 flowers) is RUB 165 RUB (about USD 2,7). Bulk shipment of Alstroemeria is carried out in boxes, each of which consists of 350 film packs of Alstroemeria. Each pack contains 10 flowers.

After the start of the Ukrainian war the demand and sales volumes for Alstroemeria in the Russian market have increased. The highest sales season for the export of flowers to Russia is in March, which is due to the holiday on March 8, International Women's Day. Alstroemeria is a long storing flower and can be stored and transported during 15-20 days without any cooling conditions and without losing the quality. One of interviewees, who is a big Alstroemeria producer and exporter to Russia, has become famous in the Russian market due to his high-quality flowers. His flowers are recognized by big buyers and flower actors in the Russian market due to the prime quality of supplied Alstroemeria.

Alstroemeria is produced in greenhouses mainly covered with multi-layer polyethylene. It is grown only in ground soil (not hydroponic) due to the extended and dense root system of the plant. Soil in the greenhouses is changed once every three years. The producers use organic fertilizers in the form of bird droppings/chicken manure and mineral combined soluble fertilizers. Ventilation in the greenhouses ensures proper temperature regime. Irrigation is provided by a simple water pump supply system and not through drip irrigation as the plant is very sensitive to excessive moisture conditions but at the same time the flower is very demanding as to the water. The cost of combined soluble fertilizers is about USD 900-1000 for six months of production.

One of the challenges for big producers of Alstroemeria is that the Armenian flower market is full of low quality Alstroemeria since a lot of producers in Armenia are not ready to improve their production, bringing new investments and technologies. Thus, they stay within the same space of greenhouse production by offering cheap and low-quality flowers (less than 30 AMD which is equal to about 0,07 USD).

According to producers, the investment needed for the construction of a 1,000 sq.m greenhouse for Alstroemeria production including all costs such as agri-inputs, ventilation, heating, irrigation and fertilization system as well as planting material is about AMD 28 mln. (ca. USD 63,000). The net profit from 1,000 sq.m for one production year is around AMD 8 mln. (ca. USD 20,000).



Gerbera production: Gerbera is grown mostly in glass greenhouses in Ararat province of Armenia and concentrated mostly in Mkhchyan and some surrounding communities. There are more than 30 greenhouses focused on Gerbera production in Armenia.

Despite the fact that Gerbera production is mostly concentrated in Ararat region due to the previous long history of vegetable production in greenhouses in this region during the Soviet times, there are many problems with Gerbera cultivation in this region. The main problems are related particularly to very hot summer season with high temperature and less humidity in the region. All these problems increase production costs to keep an optimal growing condition for Gerbera during a hot season, particularly costs of electricity for the ventilation and hydration in the greenhouses. In addition, Gerbera producers mention high electricity bills for the heating during the winter season and artificial lighting during the foggy days which frequently happen in this region.

Gerbera seedlings are mainly imported from the Netherlands. The main supplying companies are “Selecta and Schreurs”. Gerbera producers mainly apply 2 years of vegetation/production while the Dutch varieties can be cultivated 3 and more years. This is due to the lack of professionalism of local experts/agronomists in Gerbera production specifics. The productivity of Gerbera in Armenia depends on variety but on average is limited to 30,5 flowers per plant per year while the productivity of Dutch varieties in the Netherlands according to Dutch companies’ promotional catalogues varies from 200 to 240 flowers per plant per year.

All producers of Gerbera in Armenia struggle with unstable market prices of the flower in the local market through the production year. According to Gerbera producers, the market prices are fluctuating from AMD 300 (USD 0.75) per box (consisting of 30 flowers/Gerbera) during the summertime and may reach AMD 9,000 (USD 22.5) per box during the wintertime. Anyway, the average the wholesale price per box of flowers is AMD 500-600 (USD 1.25-1.5), i.e. AMD 16-20 (USD 0.04-0.05 USD) per flower, which does not meet the producers’ business expectations. Therefore, in general the producers of Gerbera in Armenia are not keen on enlarging their current greenhouse capacity/ planting areas.

The local producers use their own network and linkages with buyers when selling Gerbera to Russia which is the main export market for local producers. The transportation of Gerbera to Russia is arranged mostly via air transportation. However, the cost of such transportation is very high due to the big volume/size of the bulk quantity of the flowers though the weight of one flower is little.

Considering the above-mentioned problems related to marketing of the Gerbera both in local and export markets, producers of the flower prefer selling their produce in bulk even at cheaper prices rather than challenge all the above-mentioned transportation obstacles, or problems with local market absorption and unstable market prices for Gerbera.



Lisianthus (Eustoma) Production: The cultivation/production of Lisianthus in Armenia is mainly organized in polyethylene greenhouse on the ground soil. The best conditions for growing Lisianthus is well drained soil high in organic matter with maintained temperature around 21-24°C and with moderate moisture level to prevent algae growth. It also needs good air circulation to escape high humidity in greenhouse area which may cause intensive fungi growth. The flower is very

dependent on soil nutrient components, therefore, the Lisianthus cultivation needs changing of soil after two or even 1 year of the flower cultivation. Anyway, the soil needs proper fertilization during the whole vegetation period with high macro and micro nutrient composition including organic matter. Lisianthus likes warm temperatures very much - from 25 to 30°C, and feels comfortable even when the temperature in the greenhouse reaches 35 or even 40°C. Besides, the flower needs 14 hours of daily light which is perfectly ensured in Ararat valley. Lisianthus is one the flowers that fits best for growing in Armenia.

Most of the Lisianthus growers produce more than 10 varieties/colors. The production/vegetation cycle of the flower is around 6 months starting from April until October-November. Though it depends on weather conditions and possibility of heating of the greenhouse to start marketing the cut flower in early spring (beginning of April) and end the vegetation season in December or even in January. The cultivation period of Lisianthus is 1 year with 2 vegetation seasons, from April to October and the following year in April. In case of availability of relevant demand and investments, producers are ready to ensure year-round production.

Watering of the flower is carried out through the drip irrigation system. Water supply is provided through water wells. The pH of water should be around 6,5. The main pests that are affecting the flower are thrips and mites. While the main diseases appearing in the greenhouses are fungi (mildew).

Producers of Lisianthus rarely use the ventilation system in their greenhouses to avoid additional electricity costs. Instead of using the ventilation technologies/system the local producers just open the front and side back windows of their greenhouses to ensure natural ventilation process. The producers prefer to use polyethylene for their greenhouses made in Greece or Germany which are worthy to buy due to relatively cheap prices and good quality.

The average productivity of 1 plant during the season is 6 flowers. The harvesting period of Lisianthus starts when the main flower plant has matured/grown for 1-2 flower buds. In the Netherlands usually only the first flower is sold because it has the highest quality (first quality). There is also another practice, including in Armenia, that the first flower bud is cut at early growth stage to receive more (second quality) flowers (on average 3-4). According to Lisianthus exporters, second quality Lisianthus are considered of better quality than those of first quality grown in the Netherlands.

Among the main costs during the production season for Lisianthus are gas and electricity. Gas is used to heat the greenhouse during winter or early spring time. The producers mainly use new or used air heaters. One such heater ensures proper temperature in the greenhouse during the winter time on the space of 500 sq.m., so for a 1,000 sq.m. greenhouse they need 2 air heaters. During the whole season the cost for heating might be around AMD 1 mln AMD (around USD 2,500). The electricity is mainly used to run/start up the heaters. The electricity cost fluctuates from AMD 50,000 to 60,000 AMD (USD 125-150) per month.

Another essential cost is fertilization which is periodically applied during the whole vegetation season of Lisianthus. During the production season local producers spend on average AMD 500,000 (USD 1,250) for fertilization. Apart from mineral fertilizers which are mainly Dutch origin, local producers also fertilize the soil by organic fertilizer in a form of manure. And the most significant expenditure for the local producers of Lisianthus is cost for planting materials/seedlings. The growers plant 25,000-35,000 Lisianthus seedlings in a 1,000 sq.m. greenhouse. The average cost for 30,000 seedlings is AMD 3,000,000 (USD 7,500).

The planting materials/seedlings of Lisianthus are mainly imported from the Netherlands. The cost of one seedling of Lisianthus imported from the Netherlands to Armenia is ca. AMD 100-110 (USD 0.25-0.275), including all transportation costs and customs payments. The delivered planting materials from the Netherlands are provided with all necessary documents and certificates (phytosanitary, origin etc.) The shipment of the seedlings is arranged mainly via air transport in special boxes each of which consists of approximately 2,500 seedlings. There are also cheaper seedlings imported from Turkey and Russia, though their quality is very poor and after 1 year of full vegetation most of the growers change to Dutch seedlings.

All the knowledge and practical skills on cultivation of the Lisianthus the producers have acquired through their own imperative approaches and personal experience. Also, they use their personal linkages and business relationship with the Dutch and Spanish experts from the flower production sector to receive direct advice and consultation on the specifics of growing Lisianthus in the greenhouse.

The demand for Lisianthus in the local and foreign markets is consistently growing during the last years. The price of Lisianthus depends on the sales season. The early sales season for Lisianthus in local markets starts from April (in case the plantation was organized in winter time - February) with prime high price of AMD 300-400 (USD 0.75-1) per flower. The average price per flower during the production season is AMD 200 (USD 0.5). In summer time the price goes down. The most saturated market with Lisianthus is July when the wholesale price is becoming the cheapest - AMD 100 (USD 0.25) per flower. From September the price again starts growing, reaching the highest price in October and November. The wholesale of Lisianthus in Yerevan is organized in 2 big wholesale flower markets.

The Lisianthus storage potential is high, it can be kept for more than 10 days without any cooling storage facility, while in a cold storage facility it can be kept for one month. The transportation of Lisianthus to the main export market, Russia is organized via air transport. The Russian market requires only fixed 60cm lengths of the harvested flowers, and big flower head/bud, while the local market consumers mostly like the small buds of flowers. The packing of Lisianthus during the export to Russia is made with film cellophane, 30-35 flowers in one pack.

6.2 LIST OF BUYERS, WHOLESALERS AND TRADE FAIRS OF THE EUROPEAN FLOWER INDUSTRY



The Dutch Association of Wholesalers in Floriculture Products, VGB (The Netherlands) - With 175 members, VGB represents almost 80% of the Dutch trade volume in flowers and plants. The list of members is available here: <https://www.vgb.nl/leden/>



Association of the German Flower Wholesale and Import Trade e.V.

The Association of the German Flower Wholesale and Import Trade, BGI (Germany) - is the national interest group of the German cut flower and pot plant wholesalers and import dealers. BGI was founded in 1965 and represents at least three-quarters of all German wholesalers. The website contains a list of members (<https://bgi-ev.de/en/members/>).



The Flower Import Trade Association, FITA (United Kingdom) - Founded in the late 1970s FITA is the Association for importers of cut flowers in the UK. With the majority of members working closely with growers in Colombia, FITA is currently responsible for bringing nearly 80% of all Colombian flowers into the UK. The list of members is available here: <https://www.fita-uk.com/members.html>

Trade Fairs

Trade fairs offer opportunities to meet with current and potential buyers. The leading trade fairs in the European flower industry are:

- ▶ International Floriculture Trade Fair (the Netherlands) - https://happexhibitions.com/iftf/?page_id=357
- ▶ FloraHolland Trade Fair (the Netherlands) - <https://tradefairaalsmeer.royalfloraholland.com/>
- ▶ IPM Essen (Germany) - <https://www.ipm-essen.de/world-trade-fair/>
- ▶ Flormart (Italy) - <https://flormart.it/en/>
- ▶ Four Oaks Trade Show (the UK) - <https://www.fouroaks-tradeshow.com/>
- ▶ Iberflora (Spain) - <https://iberflora.feriavalencia.com/>
- ▶ Florissimo (France) - <http://www.florissimo.fr/index.php>
- ▶ Salon du Végétal (France) - <https://www.salonduvegetal.com/>

Buyers' List

The flower industry has several online registries through which it is possible to find buyers. Here are few of them:

- ▶ Flowerweb - <https://www.flowerweb.com/en/search/company>
- ▶ Europages - <https://www.europages.com/>
- ▶ Kompass - <https://am.kompass.com/en>
- ▶ Wer Liefert Was - <https://www.wlw.de/en/home>